

The economic effects of EU-reforms in corporate income tax systems

Study for the European Commission
Directorate General for Taxation and Customs Union
Contract No.TAXUD/2007/DE/324

by

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October 2009

Abstract

This report adopts an applied general equilibrium model for the EU27 to study the economic implications of a common corporate tax base in the European Union, either or not combined with consolidation and formula apportionment. The analysis of the common corporate tax base (CCTB) centres around the issue of base broadening versus rate reduction. It emphasises the trade-off between, on the one hand, a low effective marginal tax rate, which minimises distortions in investment and, on the other hand, a low statutory corporate tax rate, which minimises multinational profit shifting to outside locations.

The simulation outcomes suggest that the CCTB with a broad base and a reduction in the tax rate will not raise welfare in Europe. In fact, in a world without tax havens and location choice such reform would harm welfare in the EU. However, if tax havens and location choices between the US, Japan and the EU are taken into account, base broadening cum rate reduction will reduce profit-shifting vis-à-vis tax havens and the EU will be able to attract new firms by a lower average effective tax rate, so that welfare in the EU will remain constant on average. For individual member states, who benefit from profit shifting and discrete location, this tax reform may be beneficial. European wide coordination mitigates fiscal spillovers via profit shifting and discrete location within the European Union, which renders high statutory corporate tax rates less distortionary.

The common consolidated corporate tax base with formula apportionment (CCCTB) has further implications via compliance costs, the allocation of capital and multinational profits and via the consolidation of losses. Although the debate has not settled yet, we assume in the simulations that consolidation involves a reduction of compliance costs, which benefits all participating countries. Consolidation and formula apportionment affect welfare via an elimination of profit shifting and by replacing existing distortions in capital export neutrality by a distortion induced by the formula factors. The latter render corporate taxes effectively excises on these factors. For individual countries, however, consolidation and formula apportionment does have welfare effects. The consolidation of losses reduces the tax burden on firms, which may yield economic benefit for the EU. Yet, if the reduction of tax revenues is compensated by higher corporate tax rates, this positive effect disappears. Overall, consolidation and formula apportionment tend to yield small welfare gains for the EU on average, but this gain is unevenly distributed across countries.

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1 Introduction

This report analyses the economic effects of reforms at the EU level in corporate income taxation systems. The first set of reforms include a common corporate tax base in the EU (CCTB) along the lines of proposals by the CCCTB Working Group. The second set of reforms adds to the common base a shift from separate accounting towards consolidation with formula apportionment. It is labelled: the common consolidated corporate tax base (CCCTB). The third set of reforms combines the CCCTB with harmonisation of the tax rate across Member States, the European corporate income tax (EUCIT).

In quantifying the economic implications of the harmonisation proposals, we combine information from microdata on European companies, the ORBIS database, with a computable general equilibrium model, CORTAX. Calculations with the ORBIS database provide detailed information on the implication of the tax reforms for the cost of capital (adopting the methodology of Devereux and Loretz, 2008ab). The economic effects of these changes in the cost of capital are investigated with CORTAX, a computable general equilibrium model that has been designed to analyse corporate taxes in the European Union (Bettendorf et al. 2006, Van der Horst et al. 2007). An earlier version of this model has been updated for this study by using more recent data. Moreover we have extended the model to cover all 27 Member States of the EU and by modelling additional economic mechanisms such as effects via tax havens outside the EU and discrete location choices. Also loss probabilities have been modelled to analyse the welfare implications of loss consolidation relative to loss carry forward.

The report starts in section 2 with a description of the CORTAX model and its calibration, which is partly based on the ORBIS database. Section 3 shows simulation outcomes for a common corporate tax base (CCTB) in Europe under a number of alternative assumptions, e.g. regarding the deductions in the common base, the coverage of firms and the inclusion of some mechanisms in CORTAX. Section 4 discusses the impact of consolidation and formula apportionment and analyses proposals for a common consolidated corporate tax base (CCCTB). Section 5 discusses proposals for a European corporate income tax (EUCIT). Section 6 concludes.

2 The CORTAX model

This study adopts two different tools in analysing corporate tax reforms. The CORTAX model is a computable general equilibrium model for the EU, describing the macro-economic implications of the reforms. The ORBIS database contains micro information from European firms, which is used for the calibration of CORTAX and for the design of tax reforms. This section discusses the features of CORTAX and demonstrates how ORBIS is used in its calibration. Appendix A offers some technical details.

2.1 Structure of CORTAX

CORTAX is an applied general equilibrium model that describes the 27 countries of the European Union, plus the US and Japan. It is designed to simulate the economic implications of unilateral and multilateral corporate tax policies as well as the harmonisation of these policies. The model is heavily inspired by the OECDTAX-model of Sørensen (2001; 2004ab; 2007). An earlier version of CORTAX was used for European tax policy analysis in Bettendorf et al. (2006, 2007) and Van der Horst et al. (2007). A detailed description of the structure and parameterisation of the model can be found in Bettendorf and van der Horst (2008).

The structure of each country is the same. Countries are linked to each other via trade in goods markets, international capital markets and multinational firms. Below, we discuss the model structure of each country in more detail as well as the international linkages.

2.1.1 Households

Following the overlapping generations model of Diamond, households are assumed to live for two periods. One may interpret one period to cover 40 years. We express all variables in annual terms to facilitate the interpretation of the outcomes in terms of national accounts data. Behaviour within each 40-year period is assumed to be constant.

Households make their decisions regarding work, consumption and saving by maximizing a life-time utility function subject to an intertemporal budget constraint. When young (i.e. the first period), households choose to allocate their time between leisure and work. When old (i.e. the second period) household do not work but only consume. Young households receive after-tax wage income and lump-sum transfers. This income at a young age is allocated over consumption and savings. Savings are invested in a mix of bonds and stocks, which are assumed to be imperfect substitutes and which yield different rates of return. In the second period, households are retired. Consumption at old age is financed by the assets saved from the first period plus an after-tax rate of return and by lump-sum transfers. Moreover, the older generation is assumed to own the fixed factor used by firms. Therefore, the old receive the economic rents.

Household optimization yields expressions for labour supply, savings and the optimal asset portfolio. Asset returns are determined on world markets and we do not explore residence-based taxes on capital in this study. Therefore, saving distortions are not affected by the policies explored here. The most important distortions in household behaviour are related to the consumption/leisure choice. Labour supply behaviour in CORTAX is governed by the usual income and substitution effects. In particular, a higher income tends to raise the demand for leisure and thus reduces labour supply. A higher wage rate for a given level of income raises the price of leisure and thus tends to cause substitution from leisure into consumption. This increases labour supply. Most empirical studies suggest that substitution effects dominate income effects so that the uncompensated elasticity of labour supply is positive.

2.1.2 Firms

We briefly discuss the behaviour of the firm. A more detailed analysis is given in appendix A. CORTAX distinguishes between two types of firms: domestic firms and multinationals. One representative domestic firm and one representative multinational headquarter is located in each country. The multinational owns a subsidiary in each foreign country. With 29 countries in CORTAX, we thus have 30 different firms operating in each country, namely the representative domestic firm, the representative headquarter and 28 subsidiaries that are owned by the headquarters in the other countries.

Each firm is assumed to maximise its value subject to the accumulation constraints and a production function. Thereby, the multinational considers the sum of the values of its headquarter and all subsidiaries. The production function features three primary factors: labour, capital and a location-specific fixed factor (e.g. land). Labour is immobile across borders and wages are determined on national labour markets. Capital is assumed to be perfectly mobile internationally so that the return to capital (after source taxes) is given for each country on the world capital market. The location-specific fixed factor is supplied inelastically. Its income reflects an economic rent. Rents earned by subsidiaries accrue to the headquarter in the parent country, which is assumed to wholly own the subsidiary. The multinational enterprises are assumed to be wholly owned by households in the origin country. It implies that countries can partly export the tax burden to households abroad by taxing subsidiaries.

In calibrating the model of the firm, capital and labour parameters are determined by national accounts data on labour and capital income shares. The fixed factor is – somewhat arbitrarily – set at 2.5% of value-added in each country. This value ensures that CORTAX yields a reasonable value for the corporate tax-to-GDP ratio. A sensitivity analysis with respect to the size of the fixed factor is performed in Appendix B.

The initial size of subsidiaries in CORTAX is determined by data on bilateral foreign direct investment (FDI) stocks. In particular, these stocks determine the size of the fixed factor in each subsidiary. Given the fixed factor, multinationals decide on how much capital and labour to

employ in each of their foreign subsidiaries. For domestic firms and multinational parents, the size of the fixed factor is calibrated at a fixed proportion of output so that we obtain reasonable figures for aggregate corporate tax revenues.

Firms finance their investment by issuing bonds and by retaining earnings (issuing new shares is excluded in CORTAX). The optimal financial structure depends on the difference between the after-tax cost of debt and equity. A corner solution is ruled out by including a financial distress cost associated with high debt positions. The marginal cost of debt finance increases in the debt share.

One important difference between production in a domestic firm and production in a multinational firm is that foreign subsidiaries need intermediate inputs in producing output. These intermediate inputs are supplied by the parent company. As there is only one homogeneous good in the model, the arms-length price for this intermediate input is equal to the market price of the numeraire good, i.e. equal to one. However, the parent company can charge a transfer price for intra-company deliveries that deviates from this arms-length price. In particular, a headquarter company has an incentive to set an artificially low (high) transfer price for supplies to subsidiaries in countries that feature a lower (higher) statutory corporate tax rate. In this way, the multinational is able to shift profits from high to low-tax countries, thereby reducing its overall tax liability. To ensure an interior solution, we specify a convex cost function to capture the costs associated with manipulated transfer pricing. Hence, profit shifting to countries with very low corporate tax rates becomes increasingly costly at the margin.

CORTAX captures the costs that firms incur to comply with the corporate tax system. These costs are modelled as a share of the labour force in companies that are required for tax administration efforts. This overhead labour is specified as a fixed fraction of the number of workers in the production process. Therefore, compliance costs increase proportionally in the payroll of the firm.

2.1.3 Losses and loss carry forward

In CORTAX, representative firms are equal ex-ante. Ex-post, however, firms differ due to random shocks. We assume that random shocks occur in output or, equivalently, in the value of sales. In the good outcome, the revenue from sales is larger than in the bad outcome. In the latter case, profits become negative. Hence, ex-post there are both profit making firms and loss making firms. Still, as firms are equal ex-ante, the possibility of different ex-post outcomes introduces ex-ante uncertainty. We assume that firms are risk neutral and decide on their optimal levels of investment, employment, debt shares, and transfer prices before knowing whether they are subject to a negative shock. Hence, they base their input decisions on expected output values and expected marginal productivities. The probabilities of profit and loss are assumed to be independent so that shocks for a firm are not correlated between years.

In today's corporate tax regimes in Europe, losses can be carried forward and offset against future profits within the same country. It implies that losses are treated asymmetric from profits for two reasons. First, the year at which losses can be offset is usually bounded so that some losses cannot be offset against future profits. Second, firms can only carry forward nominal losses, i.e. without indexation. Due to discounting, the value of these losses declines over time. In CORTAX, we assume that losses can be carried forward one year. If the company makes a loss in two consecutive years, the first-year loss dries up and cannot be offset against profits in the future. Although this may underestimate the current opportunities for loss compensation (losses can usually be carried forward more than one year), the assumption of uncorrelated shocks tends to overestimate the amount of losses that can be offset. Appendix A discusses how the introduction of losses, together with loss carry forward, affects the model of the firm in CORTAX.

2.1.4 Government

Government behaviour in CORTAX is exogenous, Hence, the government does not optimize its policies and we simply modify exogenous tax and expenditure parameters. In performing simulations with CORTAX, we keep the government budget balanced, i.e. the government does not run a surplus or deficit after a reform. On the revenue-side of the government budget constraint, tax revenues consist of indirect taxes on consumption and direct taxes on various sources of income: corporate income, labour income, dividends, capital gains and interest. On the expenditure side of the constraint, we find government consumption, interest payments on public debt and lump-sum transfers. We keep government consumption and public debt constant as a fraction of GDP. The initial labour and consumption tax rates are calibrated by using effective taxes computed from Eurostat (2007). The initial rates determine the distortions induced by changes in labour and consumption taxes. The calibration of corporate tax systems is described in section 2.2.

2.1.5 Equilibrium

Equilibrium must hold on each market. On the goods market, we assume a homogenous good that is traded on a perfectly competitive world market. Thereby, countries cannot exert market power so that the terms of trade is fixed. The goods price acts as a numeraire in the model. On asset markets, bonds of different origins are perfect substitutes and can be freely traded on world markets. Accordingly, the return to these assets is fixed for an individual country. The same holds for equity. Debt and equity are, however, imperfect substitutes. The current account equals the change in the net foreign asset position for each country (including rest of the world), due to Walras law.

As labour is immobile internationally, wages are determined nationally. In the version of CORTAX we use in this paper, the national labour markets are competitive so that wage

adjustments ensure equality between labour supply and demand. In Bettendorf et al. (2007), we explore the importance of labour-market imperfections and involuntary unemployment for the implications of tax reforms. Empirical ambiguity on the wage equation for different countries, however, made us decide to adopt the competitive model.

2.1.6 Welfare

We compute the compensating variation to measure the welfare effects of policy changes. The compensating variation is equal to the transfer that should be provided to households to maintain their utility at the pre-reform level. A positive compensating variation implies a welfare loss, i.e. an excess burden from taxation. In presenting the welfare effects of reforms, we put a minus for the compensating variation so that a positive value denotes an increase in welfare. We denote this by the welfare effect and express it in terms of GDP.

The welfare effects of a tax reform differ from the impact on economic aggregates such as private consumption or gross domestic product. This is because utility depends also on leisure. More employment may raise income, consumption and gross domestic product, but the decline in leisure reduces these benefits in terms of welfare. Moreover, an increase in gross domestic product may be accompanied by an inflow of foreign capital, the return of which flows to foreign owners, rather than domestic residents. It is also why GDP differs from gross national income, which is generally perceived to be a better proxy for national welfare. Welfare may also be affected by multinational profit shifting which raises income but leaves the gross domestic product unchanged.

2.1.7 Extensions: tax havens and discrete location

A important element in corporate tax analysis is the distortionary impact of high statutory corporate tax rates. The basic CORTAX model captures the impact of high corporate tax rates on transfer price manipulation of multinationals among the 29 countries. Yet, this may underestimate the extent to which high corporate tax rates erode corporate tax bases. The reason is twofold. First, high tax rates may affect the discrete location of profitable investment by multinationals. Recent literature stresses that this decision margin is relevant (see e.g. Devereux and Griffith, 2003; Devereux and Lockwood, 2006; De Mooij and Ederveen, 2008). Second, CORTAX ignores profit shifting *vis a vis* countries outside the group of 29, most notably outside tax havens. To capture these two mechanisms, we extend CORTAX by modelling outside tax havens and discrete location choices. This section discusses the main features of these two extensions. Appendix A shows the underlying theoretical assumptions in more detail.

Outside tax havens

Profit shifting in the basic version of CORTAX occurs via transfer pricing within multinational groups in the 29 countries in the model. This profit shifting is proportional to initial FDI stocks.

Yet, not all forms of profit shifting are linked to FDI. Indeed, multinationals have a variety of other ways to shift profits to low-tax locations, such as via royalty payments, cost and income allocations or debt shifting. Moreover, profit shifting will not be restricted to the 29 countries modelled in CORTAX. Especially shifting to outside tax havens might be relevant in practice.

To remedy these shortcomings of CORTAX, we introduce a simple but straightforward extension by modelling an outside tax haven. The idea is that multinationals face an extra decision margin, namely how much effort to put in shifting profits to the tax haven. On the one hand, these efforts create a cost for the multinational, e.g. to set up a tax haven subsidiary, deal with tax haven authorities and settle possible disputes with the home fiscal authority. These costs are assumed to increase in a convex way with the amount of effort. On the other hand, profit shifting yields a benefit to the firm that is proportional to the difference between the statutory corporate tax rate in the country where it operates and the corporate tax rate in the outside tax haven. This benefit is a proportional reduction in the tax base in the home country of the company. In the optimum, multinationals set the marginal benefit from profit shifting equal to its marginal cost. The inclusion of a tax haven implies that a higher corporate tax rate in a country induces a larger erosion of its corporate tax base via more substantial profit shifting.

Discrete location

In the basic version of CORTAX, rents are due to a location-specific fixed factor in production. Yet, many rents are not location-specific but firms-specific, e.g. due to brand names, patents or market power in the entire internal market. Firm-specific rents may well move across international borders. A tax on rents may therefore change the location of production (Devereux and Griffith, 2003). To capture mobile rents in CORTAX, we provide a straightforward extension by making the size of the fixed factor owned by multinationals dependent on the statutory tax rate. In this way, CORTAX captures the impact of the corporate tax system on the discrete location choice of profitable investment.¹

In modelling the impact of tax rates on the location choice of multinationals, we consider two cases. First, we assume that non-European multinationals will invest in Europe, irrespective of the tax on rents, but the precise location within Europe is responsive to tax. In terms of the model, we assume that the firm-specific fixed factor of multinationals is fixed within the European Union, but it is not fixed for an individual country. The firm-specific rents are thus mobile within the EU, but not between Europe and other parts of the world. One motivation for this assumption is that Europe is a relatively closed market where multinationals need to be present, irrespective of tax.² Second, we consider the case where the firm-specific fixed factor is

¹ The average effective tax rate (EATR) can be computed as a weighted average of the effective marginal tax and the statutory tax (Devereux and Griffith, 2003). By including an endogenous impact of statutory tax rates on mobile economic rents, CORTAX captures both components of the EATR separately. Together, the model thus contains the impact of the EATR on investment.

² Another motivation is that Japan and the US adopt tax credit systems which render the tax rate in Europe less important as investors are ultimately taxed at the rate in their home country. It implies that multinational firms who decide about location

mobile also between Europe and the rest of the world. In that case, also investment from Japan and the US can respond to the average corporate tax rate adopted in European countries.

2.2 Calibration of CORTAX

CORTAX is calibrated for the 27 Member States of the European Union plus the US and Japan. We use data for 2005 to replicate national aggregates from national accounts data, such as consumption shares, labour-income shares, the average number of hours worked and foreign direct investment. Moreover, we make extensive use of information from the ORBIS database. A full description of the calibration process is given in Van der Horst et al. (2008). Here, we concentrate on parts of the calibration that are crucial for the outcomes of corporate tax reforms.

2.2.1 The ORBIS database

The main source of microeconomic data used in the calibration of CORTAX is the ORBIS database, a comprehensive set of data of companies around the world. In the update currently used, it contains information on over 9 million companies. This large number is possible because the database contains unconsolidated reports of companies within corporate groups, a fact which we exploit in our analysis.

ORBIS is provided by the Bureau van Dijk, which standardizes the balance sheet information collected from over 40 different information providers. In addition to balance sheet and profit and loss account items, the database also includes ownership information. The information on the ownership structure includes the name and number of shareholders, their country of residence and the percentage of ownership. The same information is available for the subsidiaries.

The balance sheet data includes information about the assets structure, broken down into fixed, tangible and intangible assets, the current assets, stocks, debtors and cash and about the liabilities divided into current and non-current liabilities. The profit and loss accounts inter alia provide information about operating revenues, the cost of goods sold, gross profits, earnings before interest and taxes, financial revenues and expenses, taxation, profit and loss before and after tax. Additionally, memo lines like the number and cost of employees, interest payments and depreciation are available. Further data available for the companies includes their date of incorporation, the legal form, their NACE (4 digits) classification and their activity status.

The ORBIS update of October 2006 contains data for the world top 9 million firms from 1993 to 2005. The criteria for selecting the top 9 million companies are based on turnover, number of employees and assets. For computational reasons we further restrict the sample to

choice consider the statutory tax in a country relative to the European average. Only if a country reduces its tax rate below the European average will it become more attractive as a location for profitable investment projects.

companies which report total assets larger than two million US dollars. The exclusion of smaller companies is appropriate for our kind of research, as it is reasonable to assume that most of these companies are not incorporated and hence are not affected by the introduction of a CCCTB. In total we are left with 658,793 companies in the 27 EU member states for which we have ownership information and 429,922 observations for which all the necessary information is available.

In a first step, we work out chains of ownership by merging the subsidiaries with majority shareholders within our sample. In combination with the information about the global owner provided by ORBIS directly, this allows us to attribute 256,294 companies to 86,940 different corporate groups. Out of these, 4,765 operate in more than one European country which implies that they will be affected by a potential consolidation of profits. In addition to the identification of the ultimate owner, the fact that we can identify the chain of ownership allows us to do robustness checks with different assumptions about the water's edge. For example, as in Devereux and Loretz (2008a) it is possible to analyse how the results would be affected if non-European multinationals are only allowed to consolidate with direct ownership.

The firm level data are used to calibrate CORTAX. This section presents some descriptive background statistics of ORBIS. The first column of Table 2.1 presents the number of firms/corporate groups in each country. The total number of firms is now only 340,558 (about 4/5 of the initial 430 thousand observations), which is due to the fact that we summed up 151,126 unconsolidated accounts into 61,896 groups. The next three columns present the country averages of the share of assets in buildings, machinery and intangibles. While ORBIS reports the size of the stocks and intangibles assets, it does not split the tangible assets into different kinds. We therefore make use of a study by McKenzie et. al. (1998), which reports size and industry specific assets structures to split the tangible assets into buildings, machinery and land. This approach is in line with Egger et al. (2008) and Devereux and Loretz (2008b). We define the shares relative to the sum of tangible assets, intangible assets and stocks, so they add up to one. It is noteworthy that land and stocks are not tax depreciable, however, the latter can influence the cost of capital depending on the rule for inventory valuation.

Table 2.1 Summary statistics of ORBIS

Country	No. of firms	buildings	machinery	intangibles	stocks	Land
Austria	1570	21.7%	27.9%	5.4%	37.6%	7.4%
Belgium	11,555	24.0%	25.3%	4.9%	36.1%	9.7%
Bulgaria	1,290	23.8%	29.9%	2.8%	34.5%	9.1%
Cyprus	92	36.3%	19.8%	11.3%	19.9%	12.8%
Czech Republic	6,905	24.2%	31.5%	2.2%	30.4%	11.7%
Germany	14,928	24.5%	23.9%	4.4%	37.3%	9.8%
Denmark	5,242	33.7%	24.1%	5.7%	21.4%	15.0%
Spain	64,896	23.0%	21.2%	9.3%	36.4%	10.1%
Estonia	1,048	31.5%	27.4%	1.4%	26.2%	13.5%
Finland	5,307	24.0%	25.4%	7.7%	33.5%	9.4%
France	50,698	19.7%	17.9%	14.5%	39.7%	8.2%
United Kingdom	25,505	28.7%	24.1%	4.9%	30.4%	11.8%
Greece	8,104	21.2%	26.6%	5.1%	39.2%	7.9%
Hungary	4,219	22.2%	31.3%	3.3%	33.3%	9.9%
Ireland	1,294	29.1%	22.3%	3.6%	33.5%	11.5%
Italy	99,061	17.6%	22.6%	8.5%	44.1%	7.1%
Lithuania	874	20.6%	34.1%	1.0%	36.7%	7.7%
Luxembourg	541	23.6%	23.0%	8.0%	36.6%	8.8%
Latvia	755	23.3%	32.9%	1.2%	33.5%	9.1%
Malta	112	32.5%	17.8%	0.7%	35.9%	13.1%
Netherlands	4,489	27.6%	21.8%	6.4%	33.1%	11.1%
Poland	8,187	26.5%	32.7%	2.9%	27.7%	10.1%
Portugal	6,481	19.6%	29.3%	3.1%	40.5%	7.5%
Romania	2,976	22.3%	37.3%	1.9%	30.0%	8.4%
Slovak Republic	1,698	27.1%	30.6%	1.7%	25.7%	14.9%
Slovenia	1,821	23.3%	38.3%	2.9%	27.4%	8.1%
Sweden	10,910	27.2%	23.6%	4.7%	33.1%	11.4%
Europe	340,558	21.9%	23.1%	8.0%	37.9%	9.1%

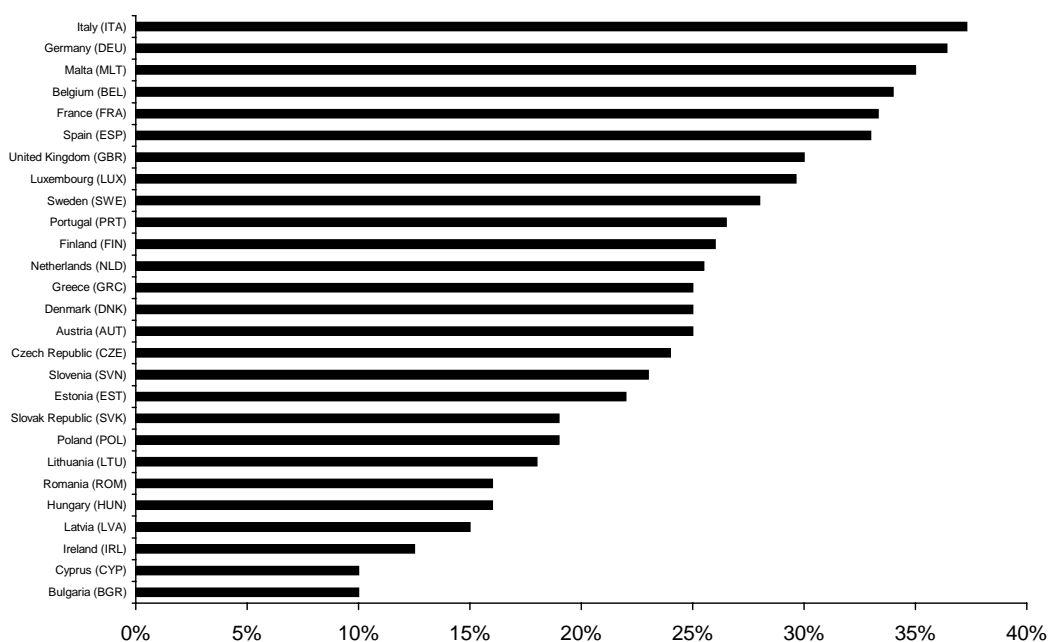
2.2.2 European tax systems

The initial structure of corporate tax systems plays an important role for the outcomes of tax reforms. The model is calibrated on tax data for 2005. In the baseline of the model, we simulate corporate tax changes in 2006 and 2007. The reforms explored in this study are therefore imposed relative to the corporate tax systems in Europe in 2007. The baseline also describes the economic changes induced by these reforms, as simulated by the model.

2.2.2.1 Corporate tax rates

Figure 2.1 shows the statutory corporate tax rates in Europe in 2007. These rates include local taxes and surtaxes that some countries have adopted. The unweighted average in the EU is 24%. We see from Figure 2.1 that the variation across countries is large, with rates ranging from a low 10% in Cyprus and Bulgaria to over 35% in Germany and Italy. Overall, corporate tax rates are relatively high in the older member states of the EU and in Malta and relatively low in the new member states and Ireland.

Figure 2.1 Corporate tax rates in EU countries, 2007



Source: Structures of European Tax Systems, European Commission

2.2.2.2 Fiscal depreciation

There is substantial variation in tax bases across European countries, partly due to differences in fiscal depreciation schemes and inventory valuations. Table 2.2 summarizes this information, based on the tax laws in 2007. It shows the variation in both the rates and systems of depreciation. The variation is relatively modest for industrial buildings, where a large number of countries allow for straight line depreciation with rates between 3 and 5 percent. Plant and machinery is more often allowed to be depreciated according to a declining balance schedule, with rates between 25 and 40 percent. The depreciation rules for intangibles – which we measure through the depreciation rules for a patent – vary most with a spread from 5 percent straight line in Spain to immediate expensing in Denmark. A noteworthy exception is Estonia with its distribution tax only applicable on paid out dividends. For this reason, there is no depreciation scheme applicable as a tax base definition is not needed.

Table 2.2 Depreciation schemes and inventory valuation in corporate tax systems in the EU^a

Country	Buildings	Machinery	Intangibles	Inventory valuation
Austria	SL 3%	SL 14.3%	SL 12.5%	LIFO
Belgium	DB 10%, SL 5%	DB 40% SL 20%	SL 20%	LIFO
Bulgaria	SL 4%	SL 15%	SL 25%	LIFO
Cyprus	SL 4%	SL 10%	SL 8%	FIFO
Czech Republic	DB 30 years	DB 10 years	SL 16.7%	average
Germany	SL 3%	DB 30%, SL 10%	SL 20%	LIFO
Denmark	SL 5%	DB 25%	SL 100%	FIFO
Spain	SL 3%	DB 24%	SL 5%	LIFO
Estonia	n.a.	n.a.	n.a.	n.a.
Finland	DB 7%	DB 25%	SL 10%	FIFO
France	SL 5%	DB 32.2%	SL 20%	average
United Kingdom	SL 4%	DB 25%	DB 25%	FIFO
Greece	SL 8%	SL 14.3%	SL 10%	LIFO
Hungary	SL 2%	SL 14.3%	SL 8%	average
Ireland	SL 4%	SL 12.5%	SL 10%	average
Italy	SL 5%	SL 10%	SL 33.3%	LIFO
Lithuania	DB 25%	DB 40%	DB 66.7%	FIFO
Luxembourg	SL 4%	DB 30%	SL 20%	LIFO
Latvia	DB 10%	DB 40%	SL 20%	average
Malta	SL 10%, SL 2%	SL 20%	SL 8%	LIFO
Netherlands	SL 3%	DB 30%	SL 10%	LIFO
Poland	SL 2.5%	SL 10%	SL 20%	LIFO
Portugal	SL 5%	DB 31.3%	SL 10%	LIFO
Romania	SL 2.5%	SL 50%, SL 8.3%	SL 50%, SL 5.5%	average
Slovak Republic	DB 20 years	DB 6 years	SL 20%	average
Slovenia	SL 3%	SL 20%	SL 10%	LIFO
Sweden	SL 4%	DB 30% SL 20%	DB 30%, SL 16.3%	FIFO

^a SL denotes a straight line depreciation and DB a declining balance system. Where a switch between declining balance and straight line is possible, or where there are more than one rate of depreciation we provide both rates.

With the information contained in Table 2.2, we compute for each asset the net present value of the depreciation allowances as a percentage of the purchase price of investment. This value indicates how generous fiscal depreciation rules are for that particular asset. Using asset shares from ORBIS, we can then compute a weighted average of these values for a each firm in the database. For CORTAX, we use the country averages of these firm-specific values of fiscal depreciation. They are reported in Table 2.3, along with the value of first-year tax depreciation. The net present values of allowances vary from 28.79 percent in Malta to almost fifty percent in Lithuania. Most countries lie in a range between 33 and 46 percent.

Table 2.3 Summary information about the NPV of fiscal depreciation schemes in % of the purchase price

Country	First year tax depreciation	Net present value of allowances
Austria	5.31%	36.83%
Belgium	13.50%	44.37%
Bulgaria	6.14%	39.93%
Cyprus	4.33%	41.78%
Czech Republic	4.32%	39.26%
Germany	8.80%	35.67%
Denmark	13.45%	45.72%
Spain	6.24%	32.95%
Estonia	0.00%	0.00%
Finland	8.80%	40.46%
France	9.64%	40.07%
United Kingdom	8.41%	39.28%
Greece	6.01%	41.09%
Hungary	5.19%	35.32%
Ireland	4.32%	35.79%
Italy	5.98%	38.04%
Lithuania	19.43%	49.53%
Luxembourg	9.45%	39.35%
Latvia	15.73%	46.17%
Malta	6.87%	28.79%
Netherlands	8.01%	35.70%
Poland	4.52%	37.41%
Portugal	10.48%	39.63%
Romania	20.18%	43.65%
Slovak Republic	6.81%	44.30%
Slovenia	8.65%	46.01%
Sweden	9.57%	39.68%
Europe - average	7.61%	37.87%
Standard deviation	4.62%	8.90%

The values in Table 2.3 form the basis for the calibration of the tax base in CORTAX. Thereby, we modify the tax base indicator for two countries: Estonia and Belgium. Belgium introduced in 2006 the Allowance for Corporate Equity (ACE) system. As we include reforms up to 2007, our baseline captures this Belgium ACE.³ In Estonia, the value of fiscal depreciation is zero as no depreciation allowances are available. However, Estonia does not tax retained profits. Indeed, it only levies a 22% tax rate on profit distributions. Hence, corporate profits in Estonia go untaxed as long as they are not repatriated to the parent or distributed to shareholders. To correct for this special feature of the Estonian tax system, we modify its corporate tax base by

³ See Devereux and De Mooij (2009) for an analysis with CORTAX of the ACE system.

assuming a positive allowance. It is set so as to replicate the corporate-tax-to-gdp ratio for Estonia. We maintain the Estonian corporate tax rate at 22%.

2.2.2.3 Effective marginal tax rates

In CORTAX, the effect of corporate taxation on investment is determined by the cost of capital. How corporate taxes affect the cost of capital is measured by the effective marginal tax rate (EMTR). It is defined as the difference in the cost of capital in the presence and in the absence of tax, in percentage of the tax-inclusive cost of capital. The EMTR depends on various parameters in the corporate tax system, such as depreciation allowances, inventory valuations, depreciation of financial costs and the statutory tax rate. Its value is positive if corporate taxes raise the cost of capital and vice versa (see Box “The user cost of capital and the EMTR”).

The user cost of capital and the EMTR

The impact of corporate taxes on the user cost of capital depends on the initial corporate tax system. This effect is best reflected by considering a simple tax system. Assuming equity-financed investment, the cost of capital (c) depends on the corporate tax (τ) in the following way

$$c = \frac{1 - \tau A}{1 - \tau} (r + \delta)$$

where A denotes the net present value of depreciation allowances in percent of the cost of an investment and $r + \delta$ is the pre-tax cost of capital. This expression shows that the corporate tax rate exerts no effect on the cost of capital if $A = 1$, which is the case under a cash-flow tax. Intuitively, the cash-flow tax turns the corporate tax into a tax on economic rent which is non-distortionary for investment. The smaller the tax allowances become (i.e. the smaller A), the more corporate taxes raise the cost of capital.

From the definition of the EMTR, we derive a direct relationship between the EMTR and the statutory corporate tax rate

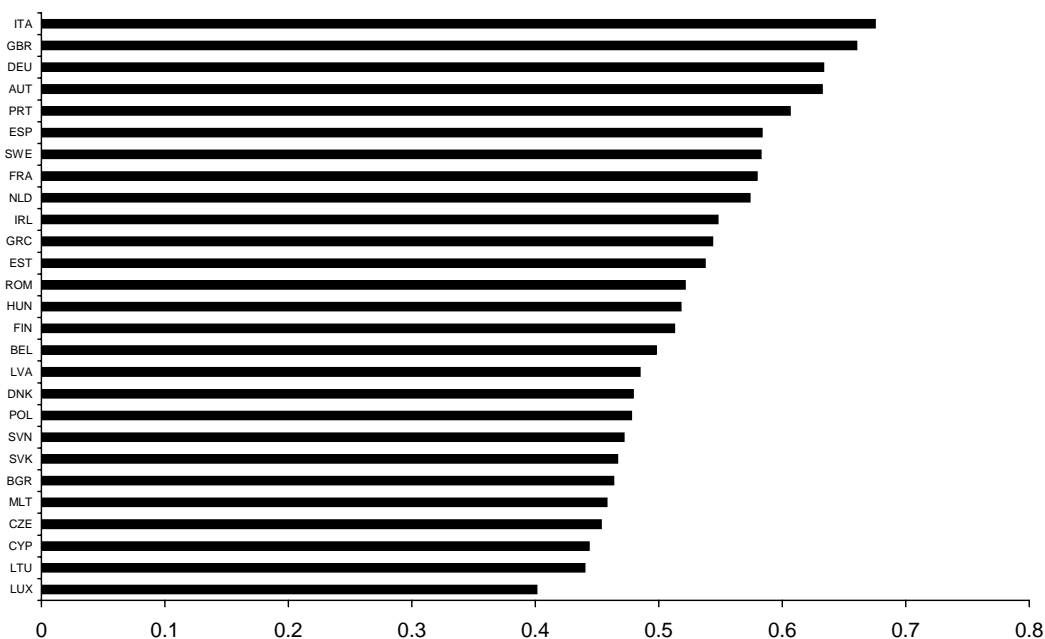
$$EMTR = \frac{c - (r + \delta)}{c} = \frac{1 - A}{1 - \tau A} \tau$$

This expression shows the positive relationship between the statutory corporate tax rate and the EMTR. This effect also depends on A . If $A = 1$, the EMTR is zero, irrespective of the rate of corporate tax. It reflects the non-distortionary character of the corporate tax in this case. The lower A , the more τ raises the EMTR, i.e. the more distortionary the corporate tax rate becomes for investment. If $A = 0$, the EMTR equals the statutory corporate tax rate.

CORTAX computes the EMTR for each country and for both debt-financed and equity-financed investment. As nominal interest is deductible for the corporate tax base and fiscal depreciation is typically more generous than economic depreciation, the EMTR for debt-financed investment is usually negative. The EMTR for equity financed investment is generally positive since the cost of equity finance is not deductible from the corporate tax base. The distortionary impact of corporate taxation thus depends on how investment is financed. Figure

2.2 shows the average debt share per country as used in CORTAX. These values are based on the average per country as observed in the ORBIS database.

Figure 2.2 Average debt-asset ratio of firms in EU countries, 2007



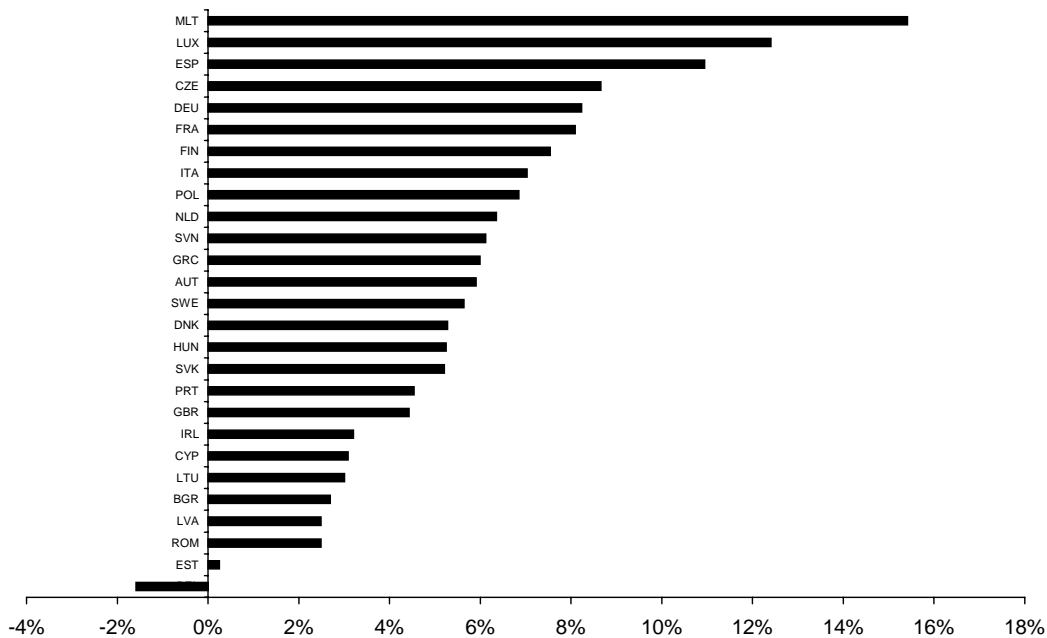
Source: Country averages obtained from the ORBIS database

The average debt/asset ratio in Figure 2.2 lies between a low 0.4 in Luxembourg and a high 0.67 in Italy. The ratio is positively correlated with statutory corporate tax rates (correlation coefficient of 0.5). It may reflect that multinationals finance their investments in high-tax countries by relatively high shares of debt. In particular, headquarters investing in subsidiaries abroad can choose between debt and equity finance. The tax burden on the income earned depends on the choice of finance. When financed by debt, the interest is deductible for the subsidiary in the host country and taxed in the home country of the parent. When financed by equity, the dividend of the subsidiary is taxed at the rate of the host country and repatriated dividends are untaxed in the country of the parent if that country uses an exemption system (which is the case in continental Europe). To minimize the tax liability, a parent company will therefore prefer debt finance for subsidiaries located in high-tax countries and equity finance for subsidiaries in low-tax countries.

We use the average debt/asset ratio for each country to compute a weighted average of the EMTRs for debt and equity finance. We interpret this as a summary indicator of how distortionary the corporate tax system is for marginal investment decisions. It implicitly assumes that marginal debt shares are equal to average debt shares. Figure 2.3 shows these EMTRs. The Belgium EMTR is negative, which is due to the Belgian ACE. In other countries,

the EMTR is positive and ranges between a low 0.25% in Estonia to a high 15% in Malta. In general, the EMTR is relatively high in the old EU countries and low in the new member states.

Figure 2.3 Average EMTR in EU countries, 2007



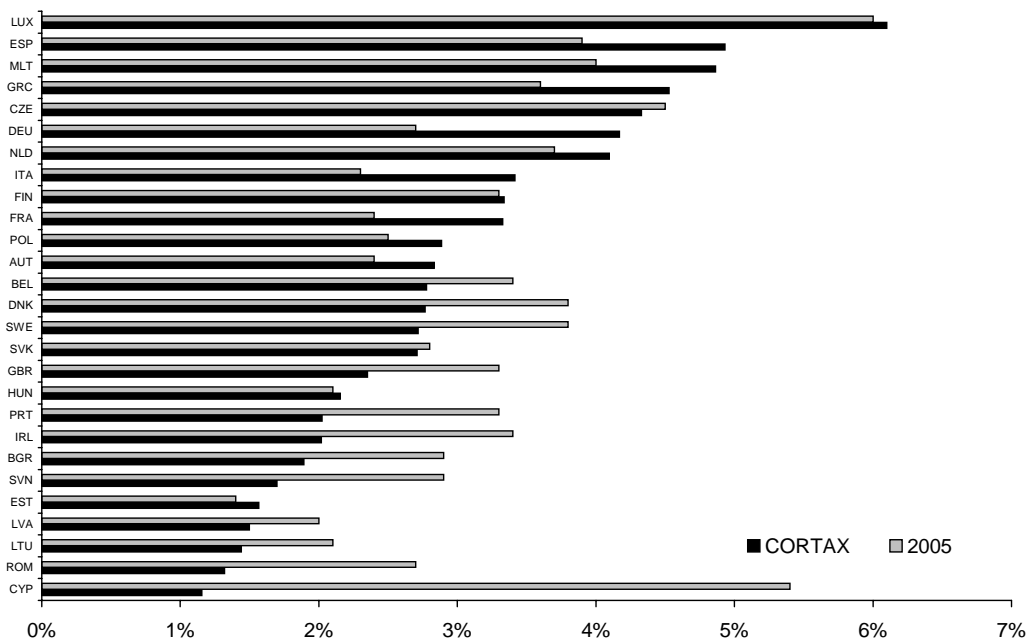
Source: CORTAX

2.2.2.4 Corporate tax revenue

CORTAX predicts corporate tax revenues in each EU country. In determining the corporate tax base, we use national accounts data on gross value added minus total labour income, thereby correcting for the income from the self employed. The share of economic rents is set at 2.5% of value added. Regarding deductible costs, we use capital shares from national accounts, fiscal depreciation rates from Table 2.3, a nominal interest rate of 4.5% (real rate of 2% and 2.5% inflation) and debt shares from Figure 2.2. Figure 2.4 shows the corporate tax-to-gdp ratios as predicted by CORTAX for 2005. They are compared to actual revenue data for 2005.

On average, CORTAX predicts a corporate tax-to-gdp ratio of 3.5 in 2005. The data for 2005 suggest a ratio of 2.5. Hence, CORTAX overestimates corporate tax revenue by 40%. One reason for this may be that CORTAX assigns a too large share of capital income to the corporate tax base while in practice part of this is taxed under the personal income tax as firms are not incorporated. Another reason may be that CORTAX underestimates profit shifting from the European Union to outside tax havens.

Figure 2.4 Corporate tax revenue in % of GDP according to CORTAX and data 2005



Source: Taxation trends in Europe, European Commission and CORTAX. Correction in the data for Germany where we use OECD data on revenue statistics to include revenue from local taxes.

The difference between predicted and actual corporate tax-to-GDP ratios in Figure 2.4 are positively correlated with statutory corporate tax rates (correlation coefficient 0.58). Hence, for countries with low statutory corporate tax rates (Cyprus, Bulgaria, Ireland) the model predicts too low corporate tax-to-gdp ratios. For countries with high corporate tax rates (Germany, Italy, Spain and Malta), the model predicts too high corporate tax-to-gdp ratios. It feeds the suspicion that CORTAX insufficiently captures profit shifting from high to low tax countries.

2.2.2.5 Compliance costs

The European Commission (2004) reports extensive evidence on perceived compliance costs by firms. These costs include those required for company taxation and VAT as well as the costs voluntarily incurred to minimize tax payments. Compliance costs are estimated at 1.9% and 30.9% of taxes paid by large firms and SMEs, respectively. Costs are larger for firms with subsidiaries. The European Commission (2001) estimates the costs related to transfer pricing in multinational companies. Estimates range from 1 to 2 million euro for medium-sized enterprises and 4 to 5.5 million euro for large multinational groups. Compliance costs of 7.5 million euro would amount to 3% of CIT revenues. Devereux (2004) concludes from this EC-report that compliance costs likely amount to between 2.7% to 4% of tax revenues. We set the compliance costs in CORTAX at 4% of corporate tax revenue for all firms.

2.2.2.6 Losses

We use ORBIS to obtain information about the average loss probability and the aggregate ratio of loss/profit in the EU. The average loss probability is around 0.2; the aggregate ratio of loss/profit equals $\frac{1}{4}$. As the ratio of loss/profit probabilities 0.2/0.8 matches the aggregate loss/profit ratio, the average loss in a loss-making firm is assumed to be equal to the average profit in a profit making firm. These assumptions are adopted in the calibration of CORTAX. In the baseline of CORTAX, we assume that loss carry forward applies in all countries of the EU.

2.2.3 Key elasticities

An important part of the calibration of CORTAX involves parameters that determine the key elasticities in the model. This section discusses how we choose these parameters and how elasticities compare to empirical evidence.

2.2.3.1 Labour-supply distortions

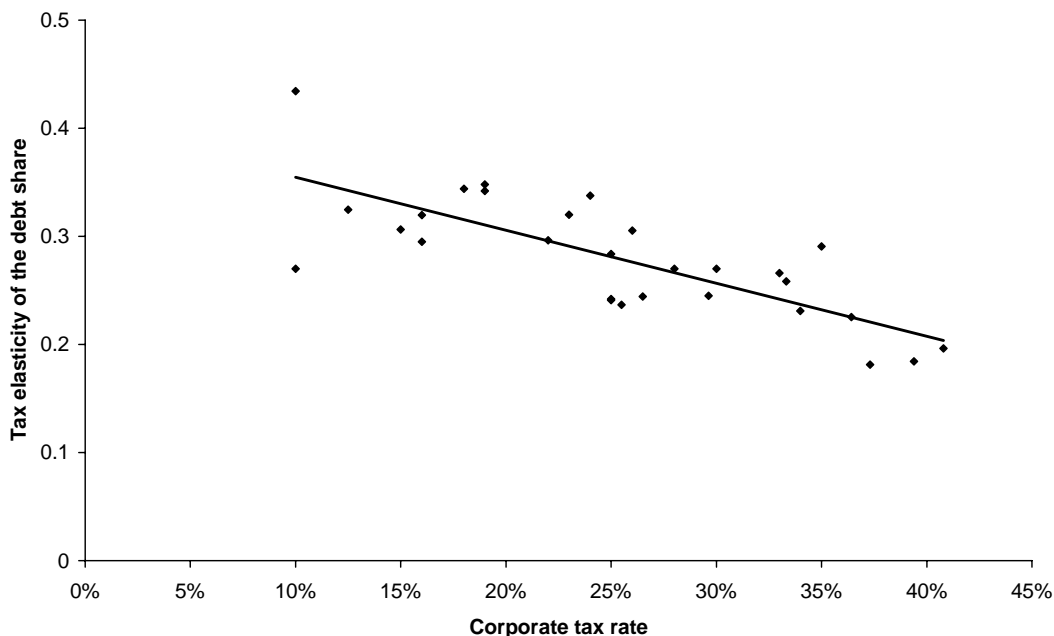
Taxes on income and consumption distort labour supply incentives. These effects are determined by the substitution elasticities in the utility function of households, together with preference parameters. For all countries, the intratemporal elasticity of substitution between consumption and leisure is set at 1.0; the intertemporal elasticity of substitution is set at 0.5. The preference parameters for leisure are chosen so as to replicate data on the average hours per worker in EU countries. Based on these parameters, we find that on average across the EU, the uncompensated elasticity of labour supply is 0.19. This corresponds to the consensus in the empirical literature (see e.g. Evers et al., 2008).

2.2.3.2 Financial distortions

In CORTAX, the convexity of the financial distress cost determines the impact of corporate taxation on a firms' financial policy. A number of studies aim to identify this impact. Graham (2004) reviews earlier studies using time series data and concludes that most report small tax effects. More recent studies using cross-section variation between companies typically report larger effects. For instance, Gordon and Lee (2001) find that a 1%-point reduction in the corporate tax rate reduces the debt/asset ratio at the margin by 0.36%-point. Another strand of this literature has explored the impact of taxation on the financial policies of multinationals, thereby using cross-country variation in tax rates. Altshuler and Grubert (2003) report a semi-elasticity of -0.4 . Desai et al. (2003) arrive at a semi-elasticity of -0.25 . In CORTAX, we set the parameters in the financial distress cost function so as to obtain a semi-elasticity of the debt share with respect to the corporate tax rate between 0.2 and 0.4. The mean value is 0.27. As the financial distress cost is a convex function of the debt share, the semi-elasticity falls in the corporate tax rate. Figure 2.5 shows this by presenting the elasticity of the debt share for all EU

countries (each point representing a country) and relating it to the corporate tax rate in these countries.

Figure 2.5 Reduced-form elasticities of the debt share with respect to the corporate tax rate in CORTAX

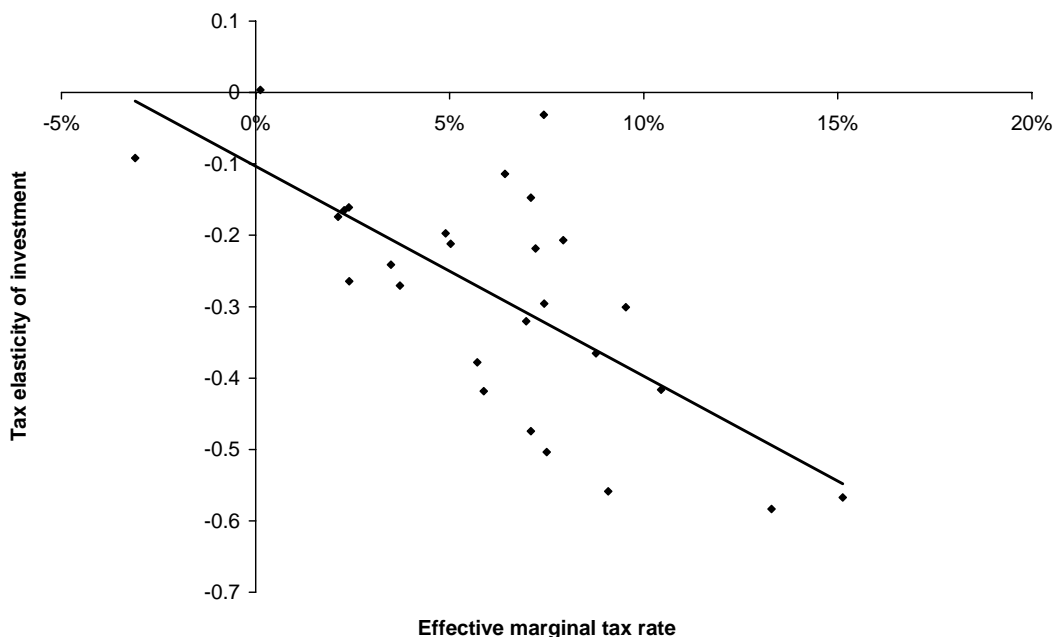


2.2.3.3 Investment distortions

To determine the size of corporate tax distortions on investment, we need to quantify two effects: (i) the impact of the corporate tax on the cost of capital and (ii) the impact of the cost of capital on investment. The effect of corporate taxes on the user cost of capital depends on the initial corporate tax system, as explained in the box on “The cost of capital and the EMTR”. The second effect depends on the substitution elasticity between labour and capital. The US Joint Committee on Taxation (1997) reports a range of estimated elasticities in the literature between 0.2 and 1.0. Chirinko (2002) reviews recent empirical literature and points at the wide range of estimates from less than 0.3 using aggregate investment data, 0.25-0.5 using firm-level panel data, to 0.4-0.9 with cointegration estimates on capital and its user cost. Most general equilibrium models adopt values between 0.5 and 1.0. We use a value of 0.7 in the baseline simulations. This corresponds with an elasticity of investment to the user cost of -0.9 . Direct estimates on the elasticity of investment with respect to the cost of capital are consistent with this (Hassett and Hubbard, 2002).

To summarise the investment distortions induced by corporate taxes, we compute tax-rate elasticities of investment in CORTAX. They are depicted in Figure 2.6. On average, the tax-elasticity is -0.3 , i.e. a 1%-point higher corporate tax rate reduces investment by 0.3%. It ranges from zero in Estonia to -0.6 in Spain (with a high EMTR). Investment thus becomes more responsive to tax if the EMTR in a country is larger.

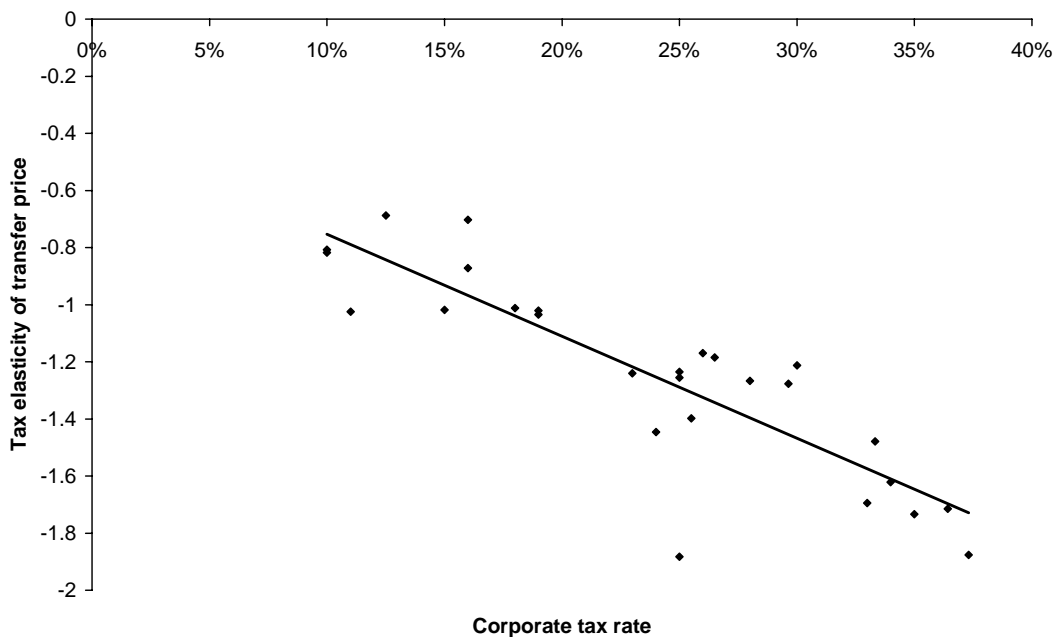
Figure 2.6 Reduced-form elasticities of investment with respect to the corporate tax rate in CORTAX



2.2.3.4 Transfer pricing distortions

The elasticity of transfer pricing with respect to the corporate tax rate is determined by the parameters in the convex cost function of transfer price manipulation. There exists some evidence on its size. Clausing (2003) exploits intra-firm trade data of US multinationals and finds that tax rates have a significant impact on transfer prices. In particular, a 10% point lower tax rate in a country results in a reduction in the intrafirm price that an affiliate in that country pays by 3 to 5%. In CORTAX, we adopt a somewhat larger tax elasticity of 1.2. The reason is that transfer pricing is only one channel that multinationals can use in the model to shift their profits across borders. Other channels include income or cost reallocations, loss shifting or modification of corporate financial policy. Studies on the aggregate revenue implications of profit shifting therefore report more sizeable effects due to profit shifting (see e.g. Devereux, 2006). The larger tax elasticity of transfer pricing captures this to some extent. Figure 2.7 shows how the tax elasticity of transfer pricing varies with the corporate tax rate. Due to the convex function, it becomes increasingly costly at the margin to shift profits to countries that feature a low corporate tax rate. Figure 2.7 shows that the tax elasticity ranges between -0.8 in low-tax countries and -2 in high-tax countries.

Figure 2.7 Reduced-form elasticities of transfer prices with respect to corporate tax rate in CORTAX

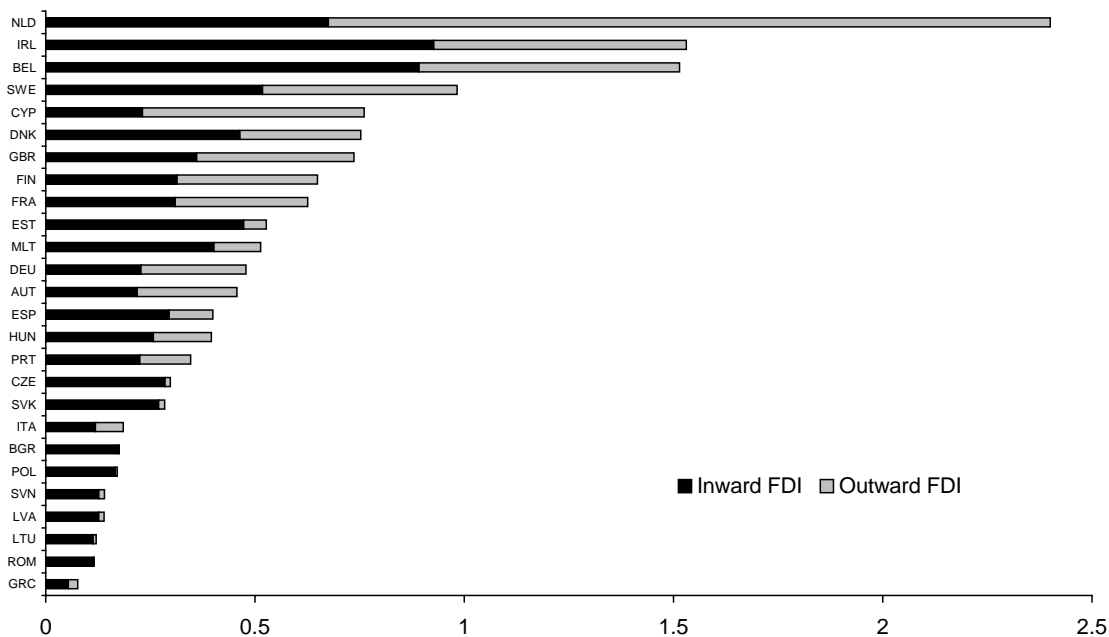


The extent to which transfer price manipulation affects the corporate tax base of a country depends on the size of the intrafirm exports of a countries’ parent and the intrafirm imports of its subsidiaries. In CORTAX, intrafirm trade is proportional to the initial bilateral FDI stocks. Figure 2.8 shows these stocks in EU countries as a percentage of GDP. In the figure, we leave Luxembourg out because of its exceptional position.⁴

We see that the variation across countries is large. The Netherlands stands out with a sum of the inward and outward FDI stock of 2.4 times its GDP. Stocks are generally small in Central and Eastern Europe, especially the outward stocks. This has important implications for profit shifting. For instance, a small change in the transfer price for a Dutch multinational has serious implications for corporate tax payments. In contrast, a large change in the transfer price for a Romanian multinational will have a negligible impact for corporate tax revenue in Romania.

⁴ Luxembourg especially features large FDI positions vis a vis other countries. For an average EU country, the total sum of the inward and outward stock of FDI is 60% of GDP. The second-largest stock is found in the Netherlands which is 2.4 times its GDP. Luxembourg stands out with a stock of 9.4 times its GDP.

Figure 2.8 Inward and outward FDI in % of GDP in EU countries, 2005

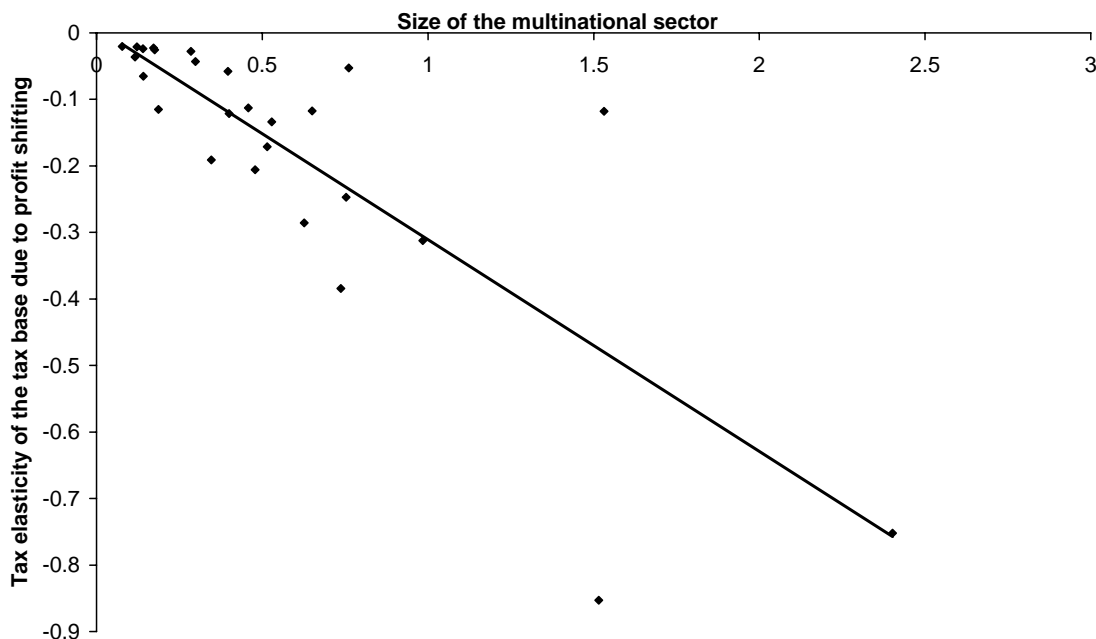


Source: OECD datastream

Together, the elasticity of the transfer price (Figure 2.7) and the size of multinationals (Figure 2.8) determine the sensitivity of the total corporate tax base for changes in the corporate tax rate via transfer price manipulation. We summarize this effect in Figure 2.9, showing the tax elasticity of the corporate tax base. The average value of the tax base elasticity equals -0.23 . It means that the corporate tax base shrinks by 0.23% due to profit shifting if the corporate tax rate is increased by 1%-point. Figure 2.9 shows that the majority of countries feature a smaller elasticity as the multinational sector is small.⁵ The low elasticities in Cyprus and Ireland are due to the small elasticity of the transfer price with respect to the corporate tax rate. For countries where multinationals are more important, elasticities are larger. The largest elasticities are reported in Belgium and the Netherlands which feature the largest multinational sectors. In the Netherlands, a 1%-point higher corporate tax rate reduces the tax base via profit shifting by 0.8%.

⁵ Note that not only the total size of FDI, but also the country where it is located matters for the aggregate elasticity.

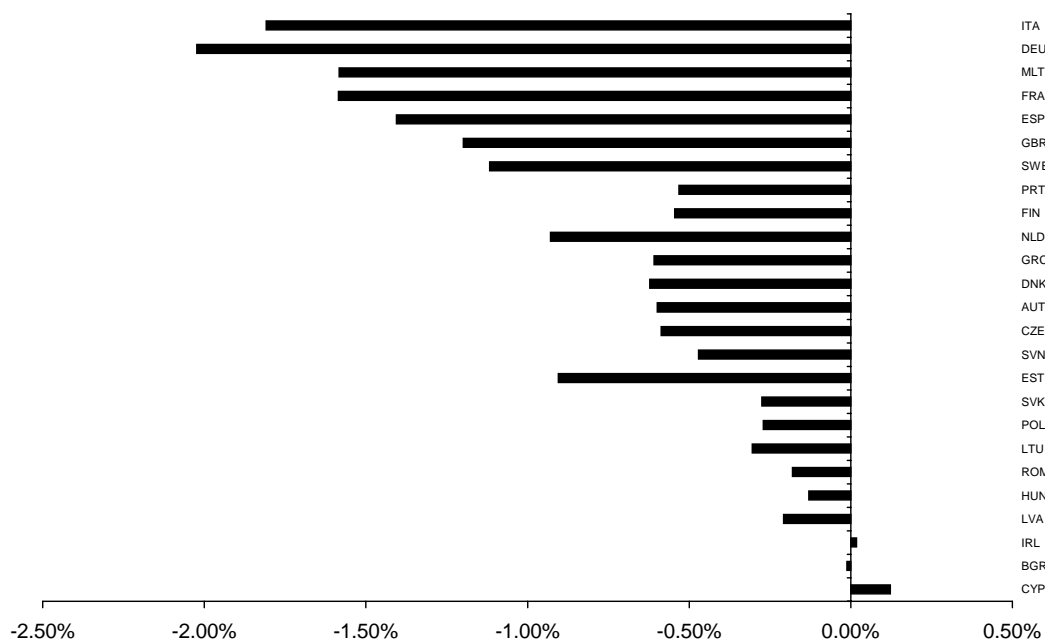
Figure 2.9 Reduced-form elasticity of the tax base in % of GDP (due to profit shifting) with respect to the corporate tax rate according to CORTAX



2.2.3.5 Profit shifting to tax havens

The size of profit shifting to the tax haven is determined by the convexity of the effort cost function. We set the parameters such that we obtain a semi-elasticity of the corporate tax base of $-\frac{1}{2}$. It implies that a 10%-point tax differential *vis a vis* the average tax haven reduces the corporate tax base by 5%. The calibration is based on two pieces of evidence. First, empirical studies on profit shifting typically yield large elasticities of the tax base. For instance, De Mooij (2005) reports a tax-rate elasticity of the corporate tax base of -1.0 on the basis of a selection of empirical studies on profit shifting. The elasticity captured by transfer pricing in CORTAX implies an average elasticity of approximately $-\frac{1}{4}$ on average (see Figure 2.9). Adding $-\frac{1}{2}$ brings the total magnitude of profit shifting closer to these empirical estimates. A second piece of evidence is obtained from our revenue estimates. The predicted corporate tax revenues by CORTAX are approximately 1% of GDP higher than the observed revenues in European member states. One reason for this might be the underestimation of profit shifting. With the calibration of $-\frac{1}{2}$, the corporate tax-to-GDP ratio falls by slightly more than 1% so that CORTAX now properly reflects actual tax revenue in the EU. The size of this revenue effect differs across countries and depends on the initial corporate tax rate. In particular, the higher the rate, the more profits are shifted and the larger is the reduction in tax revenue. Figure 2.10 shows that revenues fall up to 2% in high-tax countries like Germany and Italy and by a negligible amount in low-tax countries like Cyprus, Bulgaria and Ireland.

Figure 2.10 Revenue effect of the inclusion of an outside tax haven



Source: CORTAX simulations

2.2.3.6 Discrete location

Empirical studies point at different responsiveness of location choice (the extensive margin) and incremental investments (the intensive margin) to (effective) corporate tax rates. De Mooij and Ederveen (2008) perform a meta analysis of studies and conclude that the extensive investment margin is typically more responsive than the intensive margin. Incremental investments are found to respond to the effective marginal tax rate (EMTR) with an average value of the semi-elasticity of -4 . In the basic version of CORTAX, the elasticity is driven by the substitution elasticity in the production function and the initial EMTR. On average, it is a bit smaller than the -4 reported in the meta analysis. The meta analysis reveals that investments at the extensive margin respond to the effective average tax rate (EATR) with a semi-elasticity of around -6 . In setting the parameters of discrete location choices in CORTAX, we set the response of firm-specific fixed capital such that the total effect of a 1%-point change in the average effective tax rate yields a 6% reduction in total FDI in an average European country. In the version of CORTAX where location choices are only endogenous within the EU and not between the EU, Japan and the US, the within-Europe elasticities are slightly larger than in the version where also cross-continental location choices are endogenous. This is required to maintain the semi-elasticity of total FDI equal to the value obtained from the meta study.

2.3 Interpretation of results

CORTAX is an attractive tool to analyse corporate tax reforms. Yet, it also suffers from limitations that need to be taken into account when interpreting the outcomes. We briefly discuss the values and limitations of our methodology. One way to shed light on the limitations is sensitivity analysis, which we will also discuss in this section.

2.3.1 Values of CORTAX

CORTAX is valuable for economic policy analysis as it combines three vital properties: theoretical rigour, empirical validity and institutional detail. First, CORTAX encompasses several behavioural margins of firms and households, including labour supply choices, saving behaviour, investment decisions, financial behaviour, and multinational profit shifting. By deriving these behavioural margins from microeconomic optimisation, CORTAX allows for easy interpretation of the results and relates macroeconomic outcomes to the underlying microeconomic responses of agents. The general equilibrium setting also allows for feedback effects of policies through market responses, such as the labour market. Exploring policies in such a comprehensive and consistent framework offers potentially important insights for policy makers. Indeed, the model forces one to discuss the main assumption that ultimately drive the outcomes the model. In this way, it supports communication and helps thinking about the most likely implications of policy changes.

A second valuable property of CORTAX for policy analysis is its empirical validation. Various share parameters are set so as to replicate true economic data in the EU. This adds to the realism of the model outcomes. Moreover, we use available evidence on the responses at various decision margins in the model. This determines the strength of various behavioural effects to tax reforms and, therefore, ultimately their economic and welfare effects. It makes CORTAX particularly relevant for policy makers as governments typically face trade-offs in designing institutions. By quantifying different sides of these trade-offs, it offers input to the debate on optimal government policy.

A third property of CORTAX is its attention to institutional detail. CORTAX pays due attention to the corporate tax systems in Europe by distinguishing corporate tax rates, alternative fiscal depreciation schemes, immediate expensing, different modes of finance, and opportunities for profit shifting. Especially the combination of CORTAX with information from micro data on firm structures in different countries using the ORBIS database provides a unique methodology to both the calibration and the design of reforms analysed.

2.3.2 Limitations of CORTAX

Despite its values, the methodology adopted in this study also suffers from limitations. In particular, while assumptions driving the outcomes of the model are based on the best-possible

empirical information and widely accepted economic theories, it is still an outcome of a simplified description of the real world. Like any CGE model, CORTAX ignores certain economic mechanisms, includes specifications that are not undisputed, and it cannot take away the uncertainty about the strength of certain behavioural effects to tax policies. For these reasons, numerical outcomes should be taken with proper care. It is also why we will perform a sensitivity analysis.

To facilitate a proper assessment of the CORTAX outcomes, we discuss some of its features that should be kept in mind when interpreting numbers. The first issue is CORTAX' treatment of risk. The model distinguishes between debt and equity and assumes different rates of return for these two assets, which is consistent with ex-post returns in real world observations. The equity returns contain a risk premium, however, which forms a compensation for the higher uncertainty of equity stakes as compared to risk-free government bonds. CORTAX does not explicitly model risk and thus ignores the uncertainty cost of holding equity. In fact, the CES function for the asset portfolio of households is an imperfect shortcut to obtain an interior solution for household asset portfolios, but does not account for the cost of risk taking.

A second qualification is that CORTAX does not consider distributional concerns. While various taxes in the model thus cause distortions in investment and labour supply, there is no explicit underlying distributional reason why the government does this. Indeed, the optimal tax structure in the model would be to simply raise lump-sum taxes and eliminate all other taxes. One therefore needs to be careful in interpreting simulations where the tax burden is shifted from distortionary taxes to lump-sum taxes, or between different distortionary taxes, as this may have distributional implications which are overlooked.

A third issue is that CORTAX assumes one homogenous good. The price of this good is determined on a competitive world market on which no country can exert market power. Therefore, the terms of trade is fixed for all countries. Reforms may well affect world markets, especially when the EU implements these reforms jointly.

A fourth point is that CORTAX assumes that the labour market is competitive. This is an unrealistic description of European labour-markets, which are characterised by equilibrium unemployment. Bettendorf et al. (2007) explore how labour-market imperfections modify the impact of corporate tax changes on the economy via its effect on structural unemployment. They find that the cost of capital is an important determinant of the equilibrium unemployment rate. Therefore, policies that reduce the cost of capital can help to fight European unemployment. It magnifies the positive welfare impact of these policies. However, there is considerable uncertainty about the parameters determining the impact on equilibrium unemployment. In light of this uncertainty, we decided to assume a competitive labour market in our analysis.

These caveats make us aware of the limitations of the CORTAX simulations. Yet, it also shows its value since the consistency of the framework provides common ground for a

structured discussion about both the assumptions and the economic implications of corporate tax reforms. Sensitivity analysis further facilitates this by offering insight in how changes in certain assumptions affect the conclusions.

2.3.3 Sensitivity analysis

We perform two types of sensitivity analysis with CORTAX. First, we consider policy reforms in the model with and without tax havens and discrete location choices. Second, we vary the parameters in CORTAX that determine, respectively, the strength of investment responses to the cost of capital, and the size of the fixed factor. More specifically, we modify the substitution elasticity between labour and capital in production from 0.7 to 0.5 and limit the fixed factor from 2.5% of value added to 1.5%.

2.3.4 Reading CORTAX outcomes

The outcomes of CORTAX reflect a new steady state equilibrium after a policy shock, which should be interpreted as the long-run effect of the policy change. Reforms always keep the government budget constraint balanced by adjusting other taxes or transfers. Government expenditures on public consumption or government debt remain unaffected. We concentrate on the following selection of variables in presenting CORTAX results:

- CIT-rate: the statutory corporate tax;
- Rev_cit: the absolute change in corporate tax revenue as a share of GDP;
- Coc: Absolute change in the cost of capital. It is computed as a weighted average over debt and equity financed investment;
- Wage: relative change in the wage rate paid to domestic employees;
- Capital: relative change in total capital stock;
- Employ: relative change in total employment by firms;
- GDP: relative change in gross domestic product, which comprises the value added from capital, labour and the fixed factor, but not that of intermediate inputs in foreign subsidiaries.
- Welfare: absolute change in compensating variation expressed in % of GDP. It is the transfer provided to households to keep utility at the initial level. We put a minus sign for the compensating variation so that a positive value reflects a welfare gain.

The tables in appendix B report outcomes for all European countries. In the main text, we concentrate on the impact on European averages, which are GDP-weighted. In a number of figures, we also show country variations.

3 Common Corporate Tax Base in Europe

This section considers the economic implications of common corporate tax base (CCTB) proposals in the EU. We explore three alternative versions of the common base. In each simulation, we consider the effects under a balanced budget rule where the government adjusts corporate tax rates to keep revenue constant ex-ante, i.e. before taking account of behavioural responses. For instance, if the base is broadened, a government can reduce its corporate tax rate. If there are ex-post revenue implications due to behavioural responses, the government is assumed to adjust transfers to balance the budget ex-post.⁶ We start with a common base that is applied to all firms and then consider one that is selectively applied to multinationals. These simulations are based on the basic version of CORTAX (without the tax haven and discrete location). Subsequently, we consider simulations based on an extended version. In all simulations, the strengths and limitations of CORTAX, as set out in section 2.3, should be taken into account.

3.1 Three forms of the CCTB

We consider three alternative versions of a common corporate tax base in Europe. The first is based on the depreciation schemes suggested by the CCCTB Working Group (2007), which we label as CCTB-WG20, named after the 20% depreciation of plant and machinery. The details for this scheme are as follows:

- Industrial buildings are depreciated straight line over 40 years at 2.5 percent per year.
- Plant and machinery is depreciated at 20 percent declining balance
- Intangibles are depreciated straight line over 15 years at 6.66 percent per year.⁷

The second version of a common tax base is the same, except that plant and machinery is depreciated at 25 instead of 20 percent. We label this alternative proposal as CCTB-WG25.

The final version of the common base is not proposed by the CCCTB Working Group, but is a useful benchmark for our analysis. This common base implies, on average for the EU, an unchanged net present value of depreciation allowances. Hence, we label it as CCTB-EUav.

⁶ This balanced budget rule prevents that corporate tax rates need to be modified substantially more in light of endogenous changes in the tax base due to behavioural responses. The assumption made also makes sense from a policy perspective. Indeed, the ex-ante revenue effects best reflect the short-term. If revenues gradually change in the long-term due to behavioural effects, governments are likely to adjust other taxes or expenditures to satisfy the budget constraint.

⁷ Further the CCCTB Working group discusses to harmonise the inventory valuation to a weighted average system. This would imply that the inflation partly falls under corporate taxation. Compared to the current system, this would signify a small broadening in tax base for countries that apply a LIFO system, and a comparable narrowing of the tax base for countries with a FIFO system. The extent of the change in the tax base depends on the inflation and on the duration stocks are held. Under our assumptions (e.g. inflation of 2.5 percent), the effect does not exceed 2 percent.

There is a variety of combinations in depreciation rules that matches the CCTB-EUav. For instance, the following structure meets this requirement:

- Industrial buildings are depreciated straight line over 25 years at 4 percent per year.
- Plant and machinery are depreciated at 30 percent declining balance, with a switch to straight line at 15 percent after three years.
- Intangibles are depreciated straight line over 9 years at 11.11 percent per year.

Table 3.1 Effect of three CCTB proposals on the net present value of tax depreciation allowances^a

	Base 2007		CCTB-WG20		CCTB-WG25		CCTB-EUav	
	First year	NPV-other	First year	NPV-other	First-year	NPV-other	First-year	NPV-other
Austria	5.3%	36.8%	6.5%	34.0%	7.9%	35.2%	8.2%	38.8%
Belgium	13.5%	44.4%	6.0%	32.5%	7.3%	33.5%	7.6%	37.9%
Bulgaria	6.1%	39.9%	6.8%	34.7%	8.3%	35.9%	8.6%	39.4%
Cyprus	4.3%	41.8%	5.6%	36.8%	6.6%	37.7%	7.3%	41.4%
Czech Republic	4.3%	39.3%	7.1%	35.7%	8.6%	37.1%	8.9%	39.7%
Germany	8.8%	35.7%	5.7%	31.3%	6.9%	32.3%	7.2%	37.1%
Denmark	13.5%	45.7%	6.1%	35.7%	7.3%	36.7%	7.7%	39.7%
Spain	6.2%	33.0%	5.4%	31.7%	6.5%	32.6%	7.0%	39.0%
Estonia	0.0%	0.0%	6.4%	34.6%	7.7%	35.8%	8.0%	39.7%
Finland	8.8%	40.5%	6.2%	34.4%	7.5%	35.5%	7.9%	39.7%
France	9.6%	40.1%	5.0%	31.3%	5.9%	32.0%	6.6%	35.8%
United Kingdom	8.4%	39.3%	5.9%	33.3%	7.1%	34.3%	7.5%	39.2%
Greece	6.0%	41.1%	6.2%	32.6%	7.5%	33.7%	7.9%	39.0%
Hungary	5.2%	35.3%	7.0%	35.6%	8.6%	36.9%	8.9%	39.2%
Ireland	4.3%	35.8%	5.4%	31.1%	6.6%	32.1%	6.9%	37.9%
Italy	6.0%	38.0%	5.5%	30.3%	6.7%	31.3%	7.1%	35.1%
Lithuania	19.4%	49.5%	7.4%	35.7%	9.1%	37.1%	9.3%	38.7%
Luxembourg	9.5%	39.4%	5.7%	32.6%	6.9%	33.5%	7.3%	38.4%
Latvia	15.7%	46.2%	7.2%	35.9%	8.9%	37.2%	9.1%	39.4%
Malta	6.9%	28.8%	4.4%	26.9%	5.3%	27.6%	5.6%	35.1%
Netherlands	8.0%	35.7%	5.5%	32.0%	6.6%	32.9%	7.0%	39.4%
Poland	4.5%	37.4%	7.4%	38.0%	9.0%	39.4%	9.4%	39.8%
Portugal	10.5%	39.6%	6.6%	32.9%	8.0%	34.1%	8.3%	37.9%
Romania	20.2%	43.7%	8.2%	39.5%	10.0%	41.1%	10.3%	43.1%
Slovak Republic	6.8%	44.3%	6.9%	35.8%	8.4%	37.0%	8.7%	39.5%
Slovenia	8.7%	46.0%	8.4%	41.3%	10.4%	42.9%	10.6%	46.5%
Sweden	9.6%	39.7%	5.7%	32.1%	6.9%	33.1%	7.3%	39.3%
Average	7.6%	37.9%	5.7%	32.0%	6.9%	33.0%	7.3%	38.0%
Standard dev.	4.6%	8.9%	0.9%	3.0%	1.2%	3.2%	1.1%	2.2%

^a First year means the value of first-year tax allowances in percent of the purchase price of the investment. NPV-other means the net present value of other allowances in percent of the purchase price of the investment.

Source: Own computations using ORBIS

For each of the three CCTB-reforms, we calculate the value of the first year allowance and the net present value of other depreciation allowances for each asset. Subsequently, we use ORBIS to compute firm-specific averages of fiscal depreciation, using firm asset structures as weights. We then compute averages per country from these firm-specific rates. They serve as summary indicators for the tax base. Table 3.1 summarizes these country averages. We see that the CCTB does not imply identical tax bases for all countries. This is due to differences in asset structures between countries, which underlie the computation of these averages. Still, the variation across countries is substantially reduced by the CCTB: the standard deviation drops from an average of 4.6 percent and 8.9 percent for first-year and other depreciation to, respectively, around 1 percent and 3 percent.

Table 3.1 shows that the CCTB-WG20 reduces the first-year allowance by on average 1.9%-points compared to the current EU systems. The NPV of other depreciation allowances falls by 5.9%-points. Hence, the CCTB-WG20 implies a broadening of the corporate tax base in Europe. Indeed, except for Hungary and Poland where the tax base is narrowed, all European countries see their base being broadened by the CCTB-WG20. Compared to the CCTB-WG20, the CCTB-WG25 implies a slight narrowing of the corporate tax base. The value for the first-year allowance increases by 1.16%-points; for other depreciation allowances it increases by 0.97%-points. By construction, the CCTB-EUav has a negligible effect on the tax base on average in the EU relative to the current situation. For about half of the EU countries, it implies a broadening of the corporate tax base; for the other half it implies a narrowing of the base.

3.2 CCTB for all firms

This section shows outcomes of three CCTB reforms based on the basic version of CORTAX (excluding tax havens and discrete location). We start with the common base applied to all firms, i.e. both national and multinational companies. The effects are reported in Appendix B. Here, we focus on the main findings.

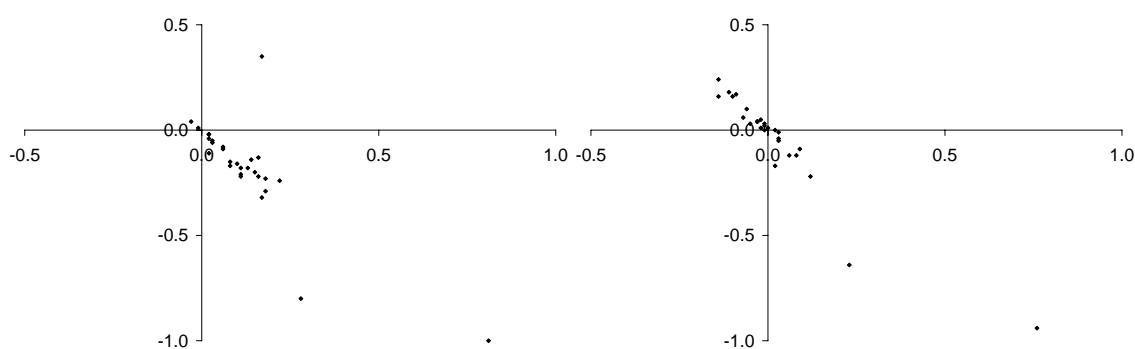
Table 3.2 Economic effects for the EU of three CCTB reforms

	CCTB-WG20	CCTB-WG25	CCTB-EUav
Corporate tax rate	- 2.9	- 2.4	- 0.5
Corporate tax revenue in % GDP (ex-post)	0.2	0.2	0.0
Cost of capital	0.1	0.1	0.0
Investment	- 1.6	- 1.2	0.1
Wage	- 0.5	- 0.3	0.1
Employment	- 0.1	- 0.1	0.0
GDP	- 0.5	- 0.4	0.1
Welfare	- 0.2	- 0.1	0.0

Table 3.2 shows the economic effects for EU-averages of each of the three CCTB reforms. We see that CCTB-WG20 and CCTB-WG25 allow for a reduction in the corporate tax rate by, respectively 2.9%-points and 2.4%-points. Despite these lower tax rates, however, these reforms reduce investment, employment, GDP and welfare. The CCTB-EUav leaves the average corporate tax rate in the EU almost unchanged and is accompanied by virtually no economic impact. CORTAX thus reveals that a policy of base broadening and rate reduction at the EU level causes negative economic and welfare effects. Why is this the case?

The reason for the negative economic effects of base broadening and rate reduction under CCTB-WG20 and CCTB-WG25 is that the cost of capital increases. Indeed, less generous depreciation allowances require that firms need to obtain a higher rate of return on their marginal investment to break even. Although a lower corporate tax rate partly offsets this, it will be insufficient to prevent an increase in the cost of capital. Intuitively, corporate tax *allowances* apply to the cost of investments at the margin. Corporate tax *rates* apply to both the margin of new investment and to economic rents. The latter causes no distortions. As a result, a revenue-neutral reform of base broadening and rate reduction shifts the tax burden from economic rents to capital, thereby increasing the cost of capital (see the box “Numerical example of base-broadening-rate-reduction and the cost of capital”). Thus, fewer investment projects are profitable so that the level of investment falls. The smaller capital stock exerts a negative impact on the marginal product of labour and, therefore, on the wage rate. This discourages labour supply in light of the positive labour supply elasticity so that employment contracts. Ultimately, base broadening and rate reduction at the European level reduces welfare in the EU by 0.2% of GDP under CCTB-WG20 and by 0.1% of GDP under CCTB-WG25. GDP falls by 0.5% and 0.4%, respectively.

Figure 3.1 Effect of CCTB-WG20 (left) and CCTB-EUav (right) on welfare (y-axis) and cost of capital- (x-axis)



The effects of the CCTB reforms differ across countries. Figure 3.1 shows this for the effect of CCTB-WG20 and CCTB-EUav on the cost of capital and welfare. The left panel shows that the CCTB-WG20 increases the cost of capital in nearly all countries. The effect is largest in Belgium where the abolishment of the ACE system induces a considerable rise in the cost of

capital. In Hungary and Poland, however, the cost of capital falls because these countries start with a tax base that is broader than under the CCTB-WG20. Clearly, Figure 3.1 shows that the rise in the cost of capital is accompanied with lower welfare because of the investment distortions it brings along. The right panel of Figure 3.1 shows that CCTB-EUav raises the cost of capital for about half of the countries, but reduces it for the other half. Again, the welfare effects follow closely the impact on the cost of capital.⁸

Numerical example of base-broadening-rate-reduction and the cost of capital

A simple example may illustrate further how an equal-yield reform of base broadening and rate reduction raises the cost of capital. Consider a firm with 100 units operating profits (π) and an investment cost (C) of 50 units. To calculate taxable profits (T), one needs to account for allowed tax deductions (A) defined in percent of the investment cost. The statutory corporate tax rate (τ) is then applied on the taxable profits to arrive at the tax revenues (TAX).

$$TAX = (\pi - C*A) * \tau$$

Assume first a tax system with a corporate tax rate of 25% and allowed tax deduction of 80%. This yields tax revenues

$$(100 - 50*0.8) * 0.25 = 15$$

Now consider a revenue neutral tax reform that reduces the statutory tax rate to 20%. This implies that the allowed tax deductions need to be reduced to 50%. Hence, the tax revenues are the same:

$$(100 - 50*0.5) * 0.2 = 15$$

Comparing the effective marginal tax rate (EMTR) under these two scenarios highlights that the rate-cut-cum-base-broadening reform increases the cost of capital. Define r as the real interest rate of 5%, we can write down a simple definition of the cost of capital

$$CoC = (1 - \tau*A) / (1 - \tau) * r$$

Substituting all parameter values in this expression, we easily verify that before the reform, the cost of capital is 5.3% while after the reform it is 5.6%. Applying the usual definition of the EMTR

$$EMTR = (CoC - r) / CoC$$

we see that the reform increases the EMTR from 6.2% to 11.1%.

Sensitivity analysis

The Tables in Appendix B show the effects of CCTB-WG20 under two alternative parameter settings in CORTAX. First, we reduced the substitution elasticity between labour and capital from 0.7 to 0.5. Second, we reduced the share of the fixed factor in value added from 2.5% to 1.5%. The outcomes in appendix B suggest that a lower elasticity of substitution between labour and capital reduces the investment response to the higher cost of capital. This mitigates the adverse economic implications of the CCTB-WG20. The results remain qualitatively the same though. A smaller share of the fixed factor does a similar thing: it reduces the adverse economic implications because corporate tax rates to a smaller degree apply to economic rents if the share

⁸ An exception is Luxembourg where the reduction in the statutory tax rate yields relatively large welfare gains. This is due to its extreme FDI position which, in CORTAX, implies a relatively strong impact of corporate tax rates on profit shifting. Statutory tax reduction in Luxembourg is therefore welfare improving in Luxembourg, despite the higher cost of capital.

of the fixed factor is smaller. Accordingly, corporate taxes become more distortionary. Base broadening and rate reduction then becomes a more attractive policy.

3.3 CCTB for multinationals

Next, we consider the three CCTB reforms when applied selectively to multinational firms. Domestic firms in EU countries would then still be subject to the current national tax regimes. We call this the selective CCTB. To balance the government budget, we adjust corporate tax rates only for multinationals, i.e. not for domestic firms. The regime for national companies thus remains the same, including the rate. Table 3.3 shows the economic implications of the three selective CCTB reforms for EU-averages. The country effects are reported in Appendix B.

Table 3.3 Economic effects for the EU of three CCTB reforms, selectively applied to multinationals

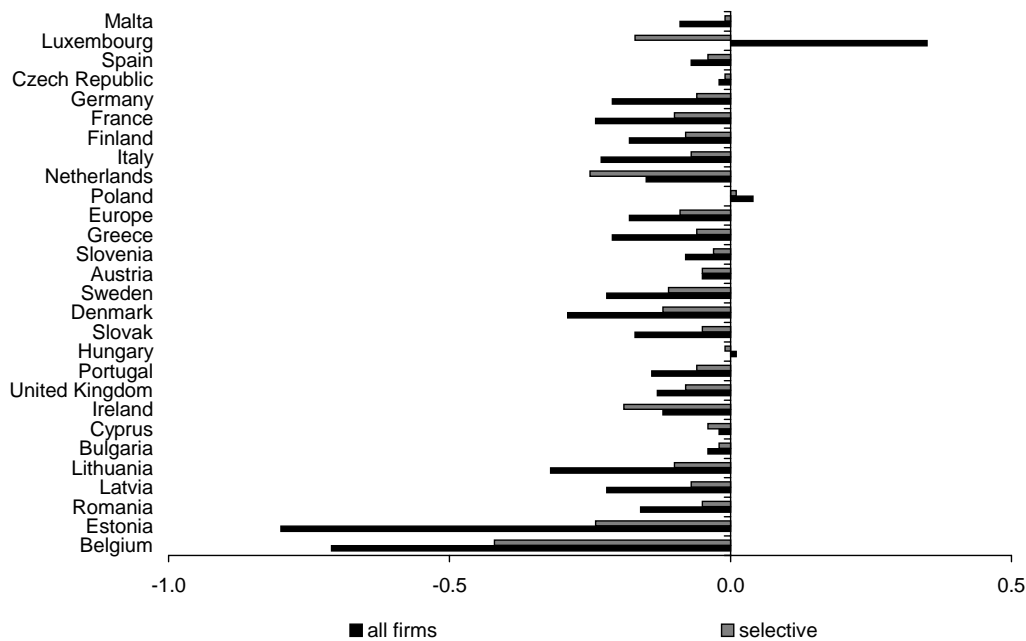
	CCTB-WG20	CCTB-WG25	CCTB-EUav
Corporate tax rate	- 2.6	- 2.1	- 0.3
Corporate tax revenue in % GDP (ex-post)	0.1	0.1	0.0
Cost of capital	0.1	0.1	0.0
Investment	- 0.7	- 0.5	0.1
Wage	- 0.2	- 0.2	0.0
Employment	- 0.1	- 0.1	0.0
GDP	- 0.2	- 0.1	0.0
Welfare	- 0.1	- 0.1	- 0.0

Table 3.3 shows that, in qualitative terms, the economic effects of the selective CCTBs are very similar to the general application of the CCTB (see Table 3.2). There is one important difference though. Selective application of the CCTB implies that marginal effective tax rates for multinationals will differ from those of domestic firms. Indeed, the two types of firms face different rules for fiscal depreciation. Especially in countries where the national rules differ much from the rules under the CCTB, there can be sizable differences between the cost of capital for domestic firms and for multinationals. The difference in cost of capital distorts resource allocation within countries, i.e. it creates a distortion in production efficiency. Indeed, the tax system favours investment in the sector where the effective marginal tax rate is lower at the expense of the other sector. This production distortion reduces welfare. These negative welfare effects are, however, more than offset by smaller coverage of the CCTB, which mitigates the rise in the cost of capital under CCTB-WG20 and CCTB-WG25. Accordingly, the effects in Table 3.3 are smaller than in Table 3.2.

Figure 3.2 visualises that the selective application of the CCTB mitigates the welfare reduction in nearly all member states. Among the exceptions are open economies like Ireland, Luxembourg and the Netherlands, where the tax reform for all firms reduces welfare less than the selective tax reform. On the one hand, the selective CCTB implies a smaller distortion in

production efficiency. On the other hand, the selective reform introduces uneven treatment of domestic and multinational firms. The balance between both effects is negative for countries with a large share of multinational enterprises.

Figure 3.2 Welfare effect of CCTB, for all firms and selectively applied



3.4 CCTB in the presence of tax havens and discrete location

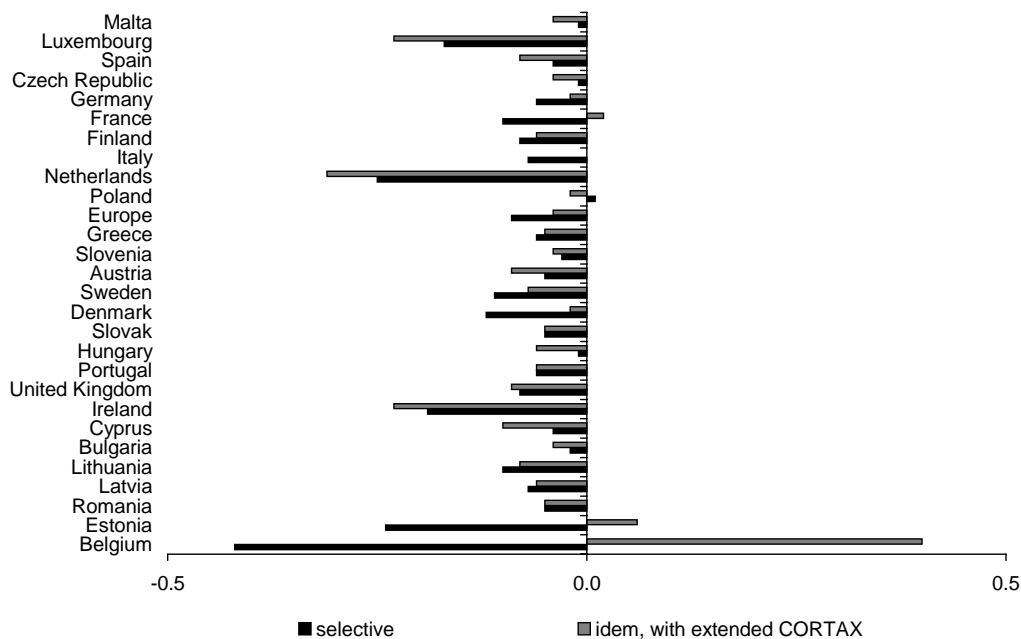
This section considers the CCTB reforms in an extended version of CORTAX that captures the impact via profit shifting to outside tax havens and discrete location choices. Appendix B shows the outcomes for a variety of simulations, i.e. both general and selective application of the CCTB and for subsequent extensions with the tax havens and the discrete location choice. Here we concentrate on the selective CCTB-reforms, with an adjustment of corporate tax rates that apply only to the multinationals. Moreover, we consider the model with both tax havens and discrete location within the EU (i.e. not between the EU, Japan and the US). The economic implications for the EU on average are presented in Table 3.4. Figure 3.3 shows the welfare effects for the member states.

Table 3.4 Economic effects for the EU of three CCTB reforms, selectively applied to multinationals, in the presence of tax havens and discrete location in the EU

	CCTB-WG20	CCTB-WG25	CCTB-EUav
Corporate tax rate	- 3.1	- 2.5	- 0.3
Corporate tax revenue in % GDP (ex-post)	0.1	0.1	0.0
Cost of capital	0.1	0.1	0.0
Investment	- 0.6	- 0.5	0.0
Wage	- 0.1	- 0.1	0.0
Employment	- 0.1	- 0.1	0.0
GDP	- 0.1	- 0.1	0.0
Welfare	- 0.0	- 0.0	0.0

In qualitative terms, the outcomes of Table 3.4 are the same as in Table 3.3, i.e. investment, employment and welfare fall under CCTB-WG20 and CCTB-WG25, but they remain unchanged under CCTB-EUav. Yet, the size of the effects is much smaller in the extended version of CORTAX. Compared to Table 3.3, we see that the base broadening in CCTB-WG20 and CCTB-WG25 allows for a stronger reduction in tax rates. Intuitively, the inclusion of tax havens hardly affects the revenue gains from base broadening in the proposed tax reforms. Tax rate reduction, however, has a smaller impact on tax revenues, as part of the taxable profits are shifted towards the tax haven. For given revenue from base broadening, rates can thus be reduced more. Rate reduction is also more favourable than in the basic version of CORTAX because it mitigates profit shifting from Europe towards outside tax havens. This partly offsets the adverse economic implications induced by a higher cost of capital. Still, Table 3.4 reveals that GDP declines by 0.1% under both CCTB-WG20 and CCTB-WG25, while investment declines by around ½%. The reduction in welfare is close to zero.

Figure 3.3 Welfare effects of selective CCTB, with tax haven and location choice



Closer inspection of the Tables in Appendix B learns that the difference between Tables 3.3 and 3.4 is caused by the inclusion of tax havens, not discrete location choices. The reason is that the location of discrete investments is determined by differences in tax rates between European countries, not by changes in the average tax rate in the EU. Hence, while the inclusion of discrete location choices does affect the consequences of the CCTB reforms for individual countries, it hardly affects the effects for the EU as a whole. The inclusion of outside tax havens, in contrast, implies that corporate tax rate reduction in Europe is more beneficial as fewer profits are shifted outside the EU. It raises the question how important profit shifting to outside tax havens really is. The basic version of CORTAX takes an extreme position where profit shifting between Europe and outside countries is very small (only the manipulation of transfer prices vis a vis Japan and the US is included). In the extended version of CORTAX, the elasticity of profit shifting to tax havens is set at a high value. Empirical evidence does not give us sufficient guidance as to what is the most plausible case. In our view, it seems plausible that the effects of the selective CCTB are somewhere between the simulations of Tables 3.3 and 3.4.

In section 2.1 we discuss the alternative assumption on discrete location where not only intra-EU investments, but also investment from Japan and the US can respond to changes in corporate tax rates. Table 3.5 summarises the EU-wide economic effects of the CCTB given this alternative allocation choice.

Table 3.5 Economic effects for the EU of CCTB-reforms, selectively applied to multinationals, in the presence of tax havens and global discrete location

	CCTB-WG20	CCTB-WG25	CCTB-Euav
Corporate tax rate	-3.1	-2.5	-0.3
Corporate tax revenue in % GDP (ex-post)	0.1	0.1	0.0
Cost of capital	0.1	0.1	0.0
Investment	-0.5	-0.4	0.0
Wage	-0.1	-0.1	0.0
Employment	-0.1	0.0	0.0
GDP	0.0	0.0	0.0
Welfare	0.0	0.0	0.0

3.5 Is there a rationale for base broadening and rate reduction?

CORTAX simulations suggest that a European-wide policy of base broadening and rate reduction in corporate taxation is unlikely to be welfare improving. Nevertheless, we have seen that a number of European countries have pursued such a policy during the last decades. And these policies have also found support among economists. For instance, Sørensen (2006) argues that “by broadening the corporate tax base and lowering the statutory rate, a country may be able to raise a given amount of corporate tax revenue in a more efficient manner.” Haufler and Schjelderup (2000) conclude that “in the presence of multinational firms capable of shifting profits abroad, it becomes optimal for the government to reduce statutory rates and to lower the depreciation allowances to meet the revenue requirement”. Devereux, Griffith and Klemm (2002) state that “rate-cutting, base broadening tax reforms are thus the optimal strategy from the governments perspective”. How do these observations compare with the results from CORTAX?

The CORTAX results are not inconsistent with the above conclusions from economists. The reason is that the authors above refer to corporate tax reforms by individual countries. When in CORTAX an individual country broadens its base and reduces its rate, it will benefit from attracting multinational profits from within the EU and from improving the location advantage for discrete investment choices. For a number of individual countries, CORTAX therefore finds that base broadening and rate reduction is an attractive policy from a welfare point of view (see e.g. Devereux and De Mooij, 2009). These are precisely the mechanisms emphasised in the literature. But do these results carry over to a multilateral European reform?

On a European scale, the beneficial effects of lower corporate tax rates are smaller. This is because tax rate reduction attracts fewer profits if all other European countries pursue the same policy such that only profit-shifting vis-à-vis tax havens outside the EU will be reduced. Similarly, the comparative location advantage of a country for profitable investments does not improve if all other member states reduce their tax rate too. Again, only location choices vis-à-vis third countries like the United States and Japan will be improved. On balance, a multilateral

policy of base broadening and rate reduction is therefore less likely to be welfare improving than a unilateral policy. Indeed, it seems plausible that the adverse economic implications of this policy via an increase in the cost of capital dominate the favourable impact via profit shifting. In fact, without tax havens and location choice such reform will harm welfare in the EU. However, if profit-shifting vis-à-vis tax havens is important and the EU is able to attract new firms by a lower average tax rate, will base broadening cum rate reduction be neutral for welfare in the EU.

This result illustrates the importance of fiscal externalities in the case of non-cooperative tax setting. Indeed, each individual country has an incentive to lower their tax rate in order to broaden their own base via an inflow of profits and discrete investments. However, this comes at the expense of the tax base in other countries. Ultimately, fiscal externalities creates tax competition where all countries set suboptimally low rates of corporate tax. Through cooperation, European countries can internalise these externalities and design more efficient tax systems, featuring higher corporate tax rates and smaller distortions at the margin of new investment.

3.6 Effects of the CCTB on compliance costs

A common base could result in lower compliance costs in the long run as multinationals no longer have to deal with 27 different tax regimes, but only one common set of rules. Thus, they can reap economies of scale in tax compliance. It is difficult to estimate by how much compliance costs will fall. In the short run, companies need to learn the new rules so that these costs may actually increase. Moreover, in case of a selective application, national tax authorities would have to use two different regimes, namely a national regime for national companies and the European regime for multinationals. This could increase administrative costs. In the long run, however, one may expect a reduction in compliance costs for firms. As discussed in section 2.2.2.5, we assume that compliance costs are currently around 4% of total corporate tax payments. These costs might fall for multinationals under a CCTB. We therefore relate the reduction in compliance costs to the size of the multinational sector in each country. Based on correspondence with the Commission Services, who are currently undertaking a survey among businesses on compliance costs, we reduce compliance costs for subsidiaries due to the CCTB by 30%. We keep compliance costs for domestic firms and headquarters at their current level. On average, this would imply a reduction in compliance costs of 0.4% of the total corporate tax revenue in Europe, or 0.01% of GDP. The associated welfare gain is similar. Hence, one could add approximately 0.01% of GDP to the welfare effects in the previous tables to obtain an estimate for the welfare effect that includes the impact on compliance costs. Note that countries hosting more multinationals gain more than countries hosting few multinationals. Appendix B

shows the impact of the CCTB-WG20 reform for individual countries if lower compliance costs are taken into account.

3.7 Summary of EU-wide effects of the CCTB

Table 3.6 summarises the effects of the CCTB for the EU in alternative scenarios. The design of the common base is the most important determinant of the economic and welfare effects. The effects are mitigated if the tax reform is applied selectively to multinational firms.

	CIT-rate			GDP			Welfare		
	WG20	WG25	EUav	WG20	WG25	EUav	WG20	WG25	EUav
only multinationals									
basic model	-2.6	-2.1	-0.3	-0.2	-0.1	0.0	-0.1	-0.1	0.0
tax haven & location choice (in EU)	-3.1	-2.5	-0.3	0.0	0.0	0.0	0.0	0.0	0.0
all firms									
basic model	-2.9	-2.4	-0.5	-0.5	-0.4	0.1	-0.2	-0.1	0.0
include reduction in compliance costs	-2.9			-0.4			-0.2		
weaker investment response	-2.9			-0.4			-0.2		
smaller fixed factor	-3.5			-0.4			-0.1		
tax haven	-3.4			-0.4			-0.1		
location choice	-2.9			-0.5			-0.1		
tax haven & location choice (global)	-3.4	-2.8	-0.5	-0.3	-0.2	0.1	0.0	0.0	0.0

4 Common consolidated corporate tax base

This section uses CORTAX to assess the economic implications of reforms towards a common consolidated corporate tax base (CCCTB). As a starting point, we take the three CCTB reforms analysed in the previous section. We then add consolidation and formula apportionment. This yields a number of extra effects which we discuss in section 4.1. Section 4.2 demonstrates the effects for the CCCTB applied to multinationals. We briefly discuss the effects for alternative simulations in section 4.3. In all simulations, we assume that the government adjusts corporate tax rates to keep revenue constant ex-ante.

4.1 Consolidation and formula apportionment

To understand the impact of the CCCTB, we first discuss the different effects induced by consolidation and formula apportionment. We divide them into three different categories: (i) an effect on compliance costs; (ii) a shift from separate accounting to formula allocation; and (iii) the shift from loss carry forward to loss consolidation.

4.1.1 Compliance costs

The reduction in compliance costs induced by consolidation is difficult to predict. On the one hand, compliance costs may fall for a number of reasons. For instance, multinationals no longer have to put effort in determining transfer prices for complicated transactions. Moreover, firms can calculate a single European tax liability based on common rules instead of 27 different ones based on very diverse national systems. This would be particularly beneficial if a central administration became responsible for the tax treatment of the multinational. On the other hand, administrative and compliance costs may also rise. For instance, if tax authorities have to deal with two different systems, one for domestic firms and one for multinationals, this may increase the cost of administration. For multinationals, compliance costs may not fall much if each subsidiary has to administer its tax accounts to the national government in the country where it operates.

In the absence of clear-cut empirical information about how much compliance costs will fall under the CCCTB, we impose the following assumption. In the initial situation, CORTAX assumes that compliance costs are 4% of total corporate tax payment for all firms. In the simulation, we reduce the compliance costs of subsidiaries to zero. Compliance costs for the multinational headquarter and for domestic firms remain unchanged. It implies a reduction in compliance costs equivalent to 1.3% of the total corporate tax revenue in Europe, or 0.04% of GDP. The associated welfare gain is similar. Countries hosting more foreign subsidiaries gain more than countries hosting relatively few subsidiaries.

4.1.2 A scenario without profit shifting

Under consolidation, firms and the government no longer need to set arms-length prices for intermediate deliveries within multinationals. Accordingly, the opportunities for multinationals to manipulate these transfer prices and, therefore, to shift profits are eliminated. To isolate the impact of an elimination of profit shifting, we present a hypothetical scenario in which profit shifting is eliminated. For instance, if transfer prices could be perfectly monitored by tax authorities and no disputes across governments would arise, a system of separate accounting could in theory be enforced without profit shifting through manipulated transfer prices.

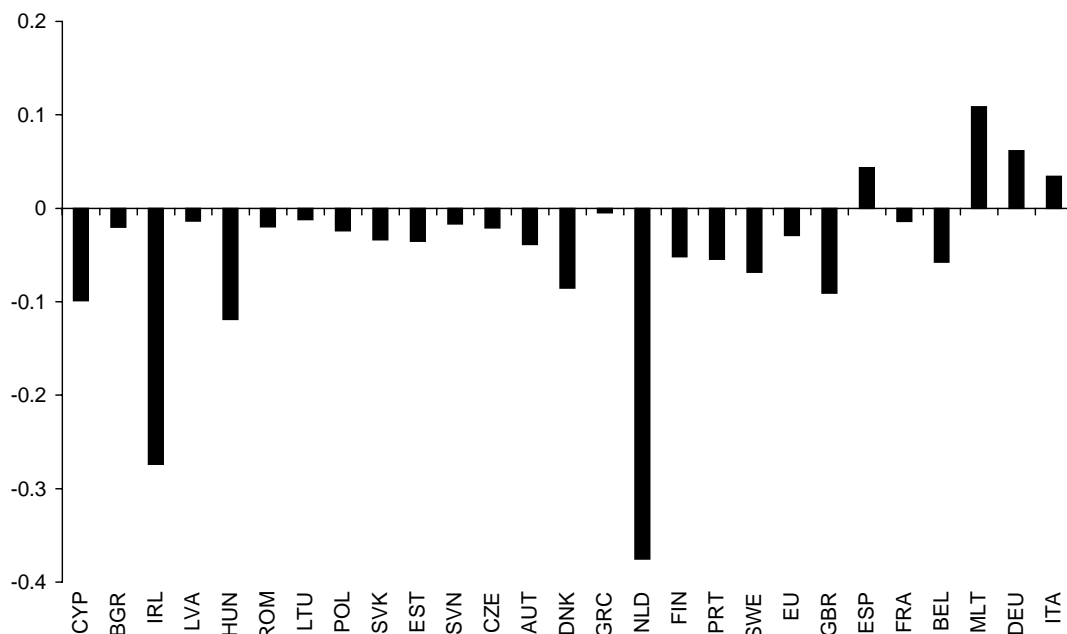
Figure 4.1 shows the consequences of this for welfare in all EU countries.⁹ (see Table C.21 in appendix C). Countries are ranked according to their initial corporate tax rate. We see that a large number of low-tax countries in Europe will lose from abolishing profit shifting opportunities. A few larger EU countries that feature high corporate tax rates – Spain, Germany and Italy – will gain. It reflects precisely the distributional implications from profit shifting today: profits are shifted from high-tax countries to low-tax countries. The extent to which a country currently benefits from transfer pricing depends, apart from its tax rate, on the size of its multinational sector and on the allocation of its inward and outward FDI stocks. Countries with a small (large) multinational sector experience small (large) welfare gains from profit shifting. Given the high shares of FDI in Ireland and the Netherlands (which holds primarily large stocks in high-tax countries), these are the countries that lose most from the abolishment of profit shifting.

The abolishment of profit shifting opportunities is not a zero-sum game in CORTAX. In particular, aggregate welfare in the EU declines by 0.03% of GDP. The reason is that profit shifting allows multinational firms to reduce the overall tax burden on corporate capital. In this way, profit shifting encourages investment, raises GDP and improves welfare (assuming that revenue-neutrality is obtained through an adjustment in lump-sum transfers). Abolishing profit shifting therefore not only affects the distribution of tax revenues among states, but also raises the tax burden on multinationals and increases aggregate corporate tax revenue.

CORTAX ignores issues of fairness and legitimacy. Moreover, profit shifting may have other implications for efficiency that are not captured by the model. For instance, governments can save on their administrative costs if they no longer have to engage in costly enforcement of transfer pricing rules. Moreover, the possibility of profit shifting creates an advantage for multinationals that does not apply to purely domestic firms. By discriminating between firms, it creates a distortion in production efficiency.

⁹ The figure is constructed from Tables C.21 (the common base without profit shifting) in deviation of Table B.1 (the common base, WG20).

Figure 4.1 Welfare effects (in % GDP) of a scenario where profit shifting is eliminated



4.1.3 From separate accounting to formula apportionment

We now turn to the allocative implications of the CCCTB reforms. Under the CCCTB, profits of a multinational operating in different countries are consolidated. These consolidated profits are then apportioned across countries according to a formula of the form:

$$\omega_{ij} = w^L \frac{L_{ij}}{L_i} + w^K \frac{K_{ij}}{K_i} + w^Y \frac{Y_{ij}}{Y_i} \quad (4.1)$$

where w^L , w^K , and w^Y denote the formula factors adding up to one: $w^L + w^K + w^Y = 1$ and X_{ij} denote the share of the multinational i 's factor X_i that is operational in country j , where $X = L, K, Y$. The profits apportioned to each country can be taxed at the national corporate tax rates. In the simulations, we assume that these rates are not affected by consolidation and formula apportionment, i.e. we only adjust rates to ensure ex-ante budget neutrality.¹⁰ In the simulations, we start with a formula with factors of 1/3 for employment, assets and output.¹¹

In CORTAX, the shift from separate accounting to consolidation with formula apportionment has a number of effects. We divide them into three categories: (i) an ex-ante impact on the distribution of corporate tax bases across countries; (ii) a removal of profit

¹⁰ For an analysis of tax competition under consolidation with formula apportionment in CORTAX, see Van der Horst et al. (2007).

¹¹ We do not consider sales by destination since data on this are not available. Instead, we use output.

shifting within the EU (see section 4.1.2); (iii) a shift from current distortions in international capital allocation towards a new type of distortion associated with the formula factors.

The ex-ante impact on corporate tax revenue occurs because formula (4.1) will in general yield a different distribution of the tax base across countries than the current system of separate accounting. Therefore, formula allocation will cause an ex-ante reallocation of corporate tax bases and, therefore, of corporate tax revenues. Devereux and Loretz (2008) and Fuest et al. (2008) explore the ex-ante revenue implications of formula allocation using micro data. In CORTAX, the reallocation of revenue is governed by national accounts data (which determine the shares in the formula for each country).

The second effect of consolidation and formula apportionment is that multinationals and governments no longer need to determine arms-length prices for intermediate deliveries within the EU. Accordingly, the opportunities for multinationals to shift profits are reduced. This first of all affects the distribution of corporate tax bases between EU countries. Indeed, low-tax countries in Europe will lose revenue as multinationals no longer shift their profits into low-tax locations. High-tax EU countries will gain for the same reason. As discussed in section 4.1.2, the abolition of profit shifting is not a zero-sum game in CORTAX. On the one hand, if firms no longer engage in transfer price manipulation, they save resources that can be used more productively. This improves welfare. On the other hand, the opportunity of profit shifting under separate accounting allows multinationals to reduce their overall tax burden. Taking away this opportunity thus raises tax burden, which discourages investment and hurts welfare.

The last effect of formula apportionment has to do with distortions in capital allocation. In the current system, firms have an incentive to locate capital (next to profits) in low-tax countries since the income that is generated is taxed at source. Accordingly, capital flows from high-tax to low-tax countries, which hurts welfare by harming production efficiency (violation of capital export neutrality). Under formula apportionment, this distortion disappears since all income earned by the multinational is consolidated. Yet, the formula may introduce a new type of distortion. In particular, a multinational firm will have an incentive to reallocate factors X_j to low-tax jurisdictions as this changes the weights appearing in (6.2). With a larger weight of low-tax countries, more income is taxed at low rates so that the tax burden for the multinational falls. Effectively, statutory corporate tax rates become taxes on the factors that appear in the formula. In case of input factors in (6.1) and when tax rates differ across countries, firms will have an incentive to relocate inputs. Thus, one distortion in capital allocation is replaced by another distortion. The net effect on welfare is not a priori clear.

4.1.4 From loss carry forward to loss consolidation

Under current corporate tax regimes in Europe, firms can offset losses against future profits within the same company. Under this loss carry forward, some losses can not be offset, either due to limitations in the period of loss offset or because firms do not make future profits.

Moreover, losses are not indexed. Hence, they need to be discounted under loss carry forward to compute them in net present value terms. Under consolidation, losses are more valuable. A loss in one part of the company can be offset immediately against profits elsewhere as long as these are positive. In that case, losses can always be offset against these profits and without discounting. Therefore, the tax burden under loss consolidation is generally lower than under loss carry forward.

To illustrate how much the corporate tax burden will fall under loss consolidation, consider the following example (this closely resembles what we assume in CORTAX). Suppose there are 100 firms. Among them, 80 make a profit of 1000 and 20 make a loss of 1000 (this corresponds to the loss probabilities and the loss size used in CORTAX). The total taxable base of profit making firms is therefore 80 000 if the losses cannot be offset and 60 000 if losses are offset immediately. Under loss consolidation, the tax base is thus 25% smaller. As the tax reduction applies only to multinational firms, we multiply this by the share of multinationals in the economy, which is approximately 60% in Europe. Consolidation would then reduce the corporate tax burden by 15%.¹² In the steady state equilibrium of CORTAX, the reduction in the tax base is smaller because losses can be carried forward from the past. In CORTAX, 80% of the previous-year losses (i.e. the probability of profit) can be offset against profits in the next year (the other 20% dry up because no profits are made). In our example, this equals a loss compensation of 16 000. Yet, these profits need to be discounted at, say 5% interest, which reduces its current value to 15200. Compared to immediate loss offset under consolidation of 20 000, the value of losses drops by 4 800. It implies a reduction of the corporate tax base by $4\,800 / 64\,800 = 7.5\%$ when moving from loss carry forward to loss consolidation. Assuming a share of multinationals of 60% of all companies, the aggregate decline in the tax base in the steady state would be 4.5%.

In the CORTAX simulations, loss consolidation indeed reduces corporate tax revenue in Europe by slightly less than 5%, which is about 0.2% of GDP. The reduction is higher for countries featuring high corporate tax rates and a large multinational sector. The incentive effects of loss consolidation on investment and employment are subtle. The box “Incentive effects of loss consolidation versus loss carry forward” explains this in more detail.¹³ Despite the lower corporate tax burden due to consolidation, it shows that the cost of capital does not necessarily fall. Intuitively, marginal returns on investment can still be positive but taxed later or only partially under loss carry forward. Under loss consolidation such positive marginal

¹² Fuest, Hemmelgarn and Ramb (2006) find a decline in the tax base of 20% using data on German multinationals. ORBIS suggests that the share of multinationals in Germany is 70%. It would imply a direct reduction of 17.5% in Germany.

¹³ Note that CORTAX does not capture three other potentially important effects of loss consolidation. First, higher after-tax profits may stimulate investment if firms are liquidity constrained. Empirical evidence supports the positive investment effect of net internal funds (see e.g. Hubbard, 1997). This argument seems most relevant, however, for small domestic firms and not for multinationals. Second, a more symmetric treatment of profits and losses under consolidation may reduce the risk of investment as the government better insures losses. This Domar-Musgrave effect may stimulate risk taking and raise returns to capital in the economy. Finally, loss consolidation can remove a barrier for multinational firms to locate in certain countries or to organise their affairs in the most efficient way.

returns are taxed immediately and always and therefore taxed at a higher effective rate. We also see that that labour demand will be affected since wage costs may effectively decline. The economic effects of loss consolidation are therefore not a priori clear.

Incentive effects of loss consolidation versus loss carry forward

Assume a firm that produces output by combining labour and capital. Ex-ante, firms are equal. Ex-post, they may suffer from a random shock in the value of sales. In the good outcome, the revenue from sales equals Y_t^g . In the bad outcome, there is a lower value Y_t^b , such that profits are negative. Ex-post, a share of q firms obtain a good outcome and a share $1-q$ obtains a bad outcome. Assuming risk neutrality, firms consider the expected value of output when determining their demand for inputs.

Under loss consolidation, we assume that all losses can be immediately offset against profits elsewhere in the multinational group. The expected aggregate corporate tax base is

$$(1) \quad E(\Pi^C_t) = qY_t^g + (1-q)Y_t^b - wL_t - \phi I_t$$

where wL_t denote labour costs, I_t is investment and ϕ stands for an investment tax credit. Immediate loss offset does not distort the demand for capital and labour:

$$(2) \quad qY_K^g + (1-q)Y_K^b = \frac{1-\phi\tau}{1-\tau} r \quad (3) \quad qY_L^g + (1-q)Y_L^b = w$$

where subscripts denote marginal productivities, r is the return to equity and τ is the corporate tax rate. Expressions (2) and (3) suggest that firms set the expected marginal productivity of capital and labour equal to their respective prices. According to (2), the corporate tax raises the cost of capital as long as investment is not fully deductible, i.e. $\phi < 1$.

Under loss carry forward, firms cannot immediately offset losses. Instead, we assume they carry forward their loss one year and then offset it against a possible profit. The expected tax base is now determined by profitable firms minus the taxable loss they carry from the previous year

$$(4) \quad E(\Pi^L_t) = q[Y_t^g - wL_t - \phi I_t + \frac{1-q}{1+r}(Y_t^b - wL_t - \phi I_t)]$$

Compared to loss carry forward, the tax base is unambiguously smaller under consolidation:

$$(5) \quad E(\Pi^C_t) - E(\Pi^L_t) = (1-\theta)[Y_t^b - wL_t - \phi I_t] < 0$$

where $\theta = q(1 + \frac{1-q}{1+r}) \leq 1$. The first-order conditions are:

$$(6) \quad qY_K^g + (1-q)Y_K^b = \frac{1-\phi\tau}{1-\tau} r + \frac{\tau}{1-\tau} \xi(\phi r - Y_K^b) \quad (7) \quad qY_L^g + (1-q)Y_L^b = w + \frac{\tau}{1-\tau} \xi(w - Y_L^b)$$

where $\xi = (1-q)\left(1 - \frac{q}{1+r}\right) \leq 1$. The first-order conditions in (2) and (3) are modified by two tax terms in (6) and (7). Intuitively, the

price of limited loss offset is that part of labour and capital costs that would 'normally' be deducted from gross income cannot be deducted in two consecutive bad years. This price is, partly or fully, compensated with the fact that gross income in consecutive bad outcomes will be untaxed either.

Interesting result from equation (7) is that loss carry forward would unambiguously raise labour costs, because the price in terms of wages exceeds the compensation in terms of the marginal productivity of labour *in bad outcomes* ($w > Y_L^b$). Whether or not loss carry forward raises capital costs depend on the corporate tax system: if only a small share of investments are deductible (i.e. if ϕ is small), the reduced taxation of production in bad outcomes Y_K^b implies a reduction in the cost of capital.

4.2 CCCTB for multinationals

We illustrate the effect of consolidation and formula apportionment for CCCTB reforms where the common base applies to multinationals. The common bases are the same as under the CCTB and are now referred to as CCCTB-WG20, CCCTB-WG25 and CCCTB-EUav. We explore the reform using the basic version of CORTAX, excluding tax havens and discrete location. Alternative simulations (broader coverage and extended model) are discussed in section 4.3. The average effects for the EU are summarised in Table 4.1. The outcomes for individual countries are presented in appendix C.

Table 4.1 Economic effects for the EU of three CCTB reforms, selectively applied to multinationals

	CCCTB-WG20	CCCTB-WG25	CCCTB-EUav
Corporate tax rate	- 0.8	- 0.2	0.9
Corporate tax revenue in % GDP (ex-post)	0.0	- 0.0	- 0.2
Cost of capital	0.2	0.1	- 0.0
Investment	- 0.9	- 0.7	0.3
Wage	0.0	0.0	0.4
Employment	0.0	0.0	0.2
GDP	- 0.2	- 0.2	0.2
Welfare	- 0.0	0.0	0.1

Table 4.1 suggests that the CCCTB-WG20 and CCCTB-WG25 reforms do not involve much base broadening. Indeed, while the CCTB-WG20 allows for a 2.6%-point reduction in the corporate tax rate, the CCCTB-WG20 only allows for a reduction by 0.8%-point. The reason is that loss consolidation implies a narrowing of the corporate tax base for multinationals which offsets the revenue implications from base broadening due to the new set of depreciation rules. Under the CCCTB-WG25, revenues remain virtually unchanged so that rates cannot be reduced on average.

Despite the small impact on the corporate tax base and the tax rate, we do find that the first two CCCTB reforms exert an upward effect on the cost of capital and, therefore, reduce investment. The reason is that base broadening via changes in depreciation rules and via changes in loss offset have a different impact on the cost of capital. In particular, depreciation rules apply to new investment and therefore fully affect its costs. In contrast, loss consolidation does not necessarily reduce the cost of capital but rather narrows the base of the entire corporate group. On balance, we find that the cost of capital increases under the first two CCCTB reforms, despite an unchanged tax base.

Table 4.1 suggests that the labour market is unaffected by the first two CCCTB reforms. Yet, GDP falls in light of the decline in investment. The overall effect on welfare is negligible.

Under the CCCTB-EUav, the corporate tax base is narrowed. On the one hand, the new depreciation rules exert only a small impact on corporate tax revenue under this base. On the

other hand, loss consolidation causes a narrowing of tax bases. Despite the higher rates necessary to cover the revenue loss of consolidation, we find that the cost of capital does not change significantly. The reduction in labour costs induced by loss consolidation increases employment, however, by 0.2%. This also stimulates investment as more employment raises the return to capital. Investment expands by 0.3%. GDP rises by 0.2% and welfare by 0.1% of GDP.

Compared to the CCTB Table 3.2, the economic effects of the CCCTB are more favourable. Therefore, we may conclude that consolidation and formula apportionment by itself exerts a positive welfare effect. To better understand the origin of this positive effect, Table 4.2 disentangles the difference between the CCCTB and the CCTB. In particular, the first two columns show for the two Working Group versions (CCTB-WG20 and CCTB-WG25) the economic effects of the common base. The next three columns in Table 4.2 show the effects of consolidation and formula apportionment, distinguished by three effects discussed in section 4.1: (i) lower compliance costs; (ii) the shift to formula allocation; and (iii) the shift to loss consolidation.¹⁴ The last two columns show the effects of the CCCTB under the two alternative common bases.

Table 4.2 Decomposition of the EU-effects induced by consolidation and formula apportionment

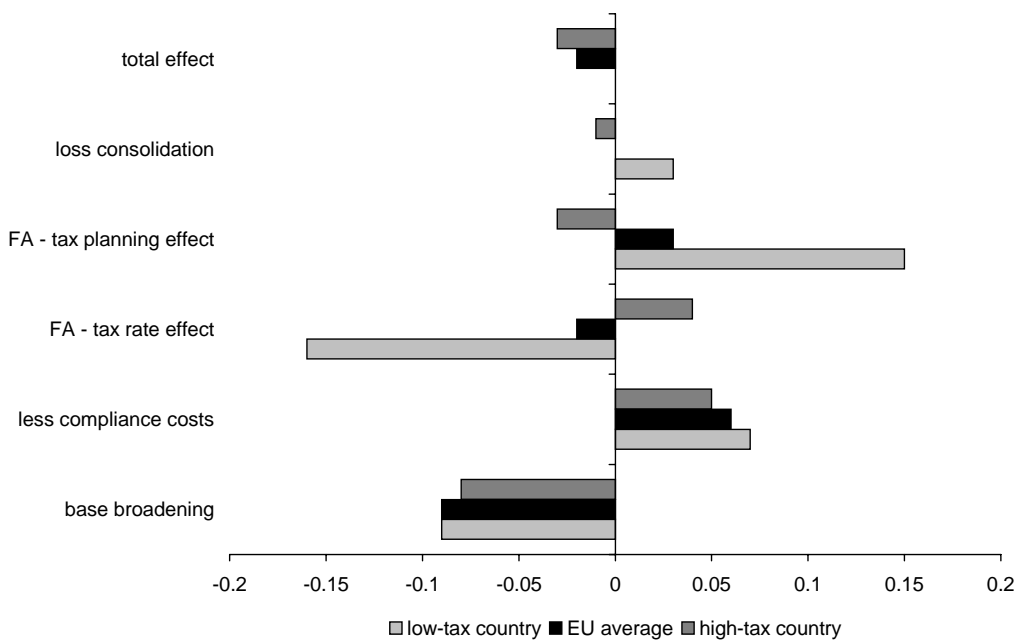
	CCTB		Consolidation & Formula Apportionment			CCCTB	
	WG20	WG25	Compliance	FA	Losses	WG20	WG25
Corporate tax rate	- 2.6	- 2.1	- 0.1	0.1	1.9	- 0.8	- 0.2
Corporate tax to GDP	0.1	0.1	0.0	- 0.0	0.1	0.0	- 0.0
Cost of capital	0.1	0.1	0.0	- 0.1	0.1	0.2	0.1
Investment	- 0.7	- 0.5	0.1	0.1	- 0.4	- 0.9	- 0.7
Wage	- 0.2	- 0.2	0.1	0.1	0.1	0.0	0.0
Employment	- 0.1	- 0.1	0.0	0.0	0.1	0.0	0.0
GDP	- 0.2	- 0.1	0.1	0.0	- 0.1	- 0.2	- 0.2
Welfare	- 0.1	- 0.1	0.1	0.0	0.0	- 0.0	0.0

According to Table 4.2, the lion share of the positive economic impact of consolidation and formula apportionment is due to lower compliance costs. This effect is responsible for an aggregate welfare gain in Europe of approximately 0.1% of GDP. We see that the move from separate accounting to formula apportionment exerts a negligible effect on GDP and welfare. It is the result of different offsetting effects: fewer incentives to shift profits and capital from high to low-tax countries but renewed distortions in the allocation of formula factors to low-tax countries. On balance, CORTAX suggests that the aggregate effect on welfare in the EU is very small. This is confirmed by Figure 4.1, representing the welfare effects for the group of low-tax (with tax rates below EU-average) and high-tax countries. Clearly, low tax countries loose from

¹⁴ For WG20 we present the detailed tables underlying this decomposition. The column 'compliance' is the difference between Tables B.22 and B.4 and measures the reduction in compliance costs due to consolidation. The column 'Losses' is the difference between Tables C.4 and C.22. The column FA is the difference between Tables C.22 and C.23.

the abandoning of transfer-pricing possibilities and the introduction of the formula (combined in the tax rate effect). The same low-tax countries benefit, however, from new tax planning possibilities in the allocation of the formula factors. Finally, Table 4.2 shows that loss consolidation requires a 1.9%-point increase in corporate tax rates to balance the government budget. The combination of a lower tax burden via loss consolidation and a higher tax burden due to higher rates raises the cost of capital. Accordingly, investment slightly falls. At the same time, loss consolidation reduces labour costs so that employment expands. On balance, GDP slightly falls but the net effect on welfare is negligible.

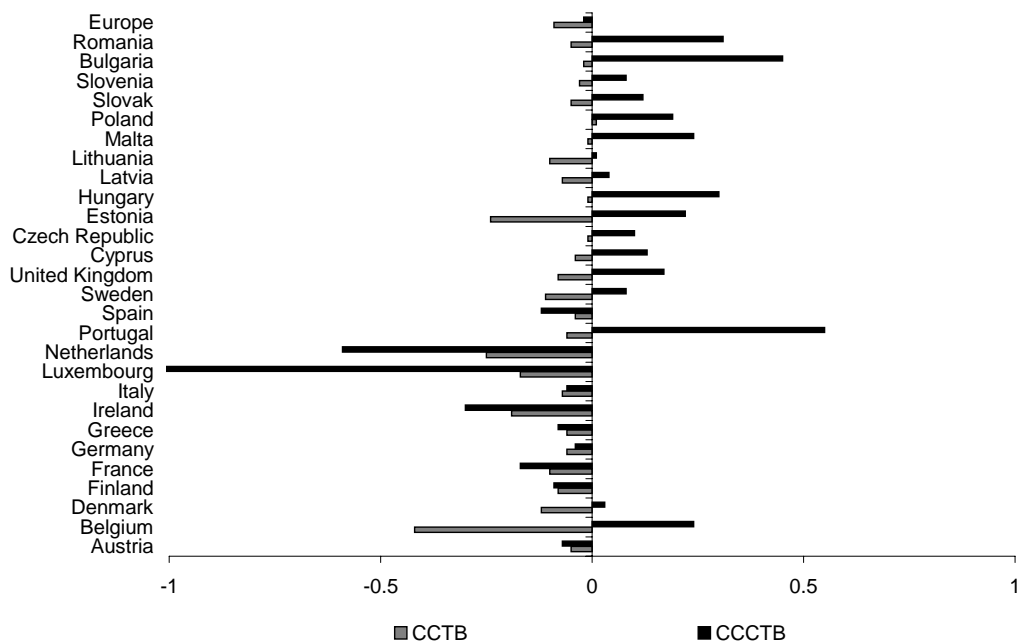
Figure 4.1 From CCTB to CCCTB in five steps, budget closed with change in CT-revenues



Only MNEs, budget closed with change in CT-rate (ex ante), base according to WG20

Overall, the CCCTB reforms yield more favourable economic effects than the CCTB reforms, despite that tax rates are higher under the CCCTB (to compensate for the revenue effects from loss consolidation). Figure 4.1 shows that the new member states in particular benefit from consolidation.

Figure 4.2 Welfare effects of selective CCCTB reforms



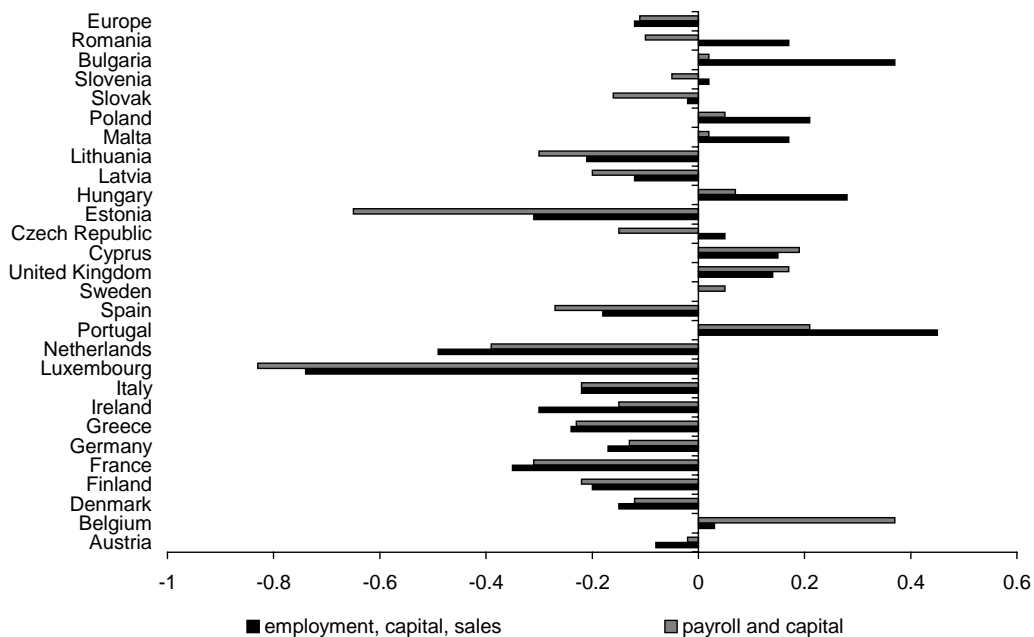
4.3 Formula apportionment

Alternative apportionment formula's affect the distribution of economic and welfare effects, but hardly matters for the EU on average. For simulations on the CCCTB-WG20, we investigate the sensitivity to alternative formula's, with relative weights in brackets:

- employment (1/3), capital (1/3) and sales (1/3), which has been used throughout
- employment (1/6), payroll (1/6), capital (1/3) and sales (1/3)
- employment (1/4), payroll (1/4) and capital (1/2)
- payroll (1/3), capital (1/3) and sales (1/3)
- payroll (1/2) and capital (1/2)

Detailed results are presented in Tables C.1 (for the first scenario) and C.24-27 (for the alternatives). Figure 4.3 illustrates the welfare effects of the final alternative (on payroll and capital) with our basic formula. The switch to payroll instead of employment mainly benefits high-wage countries (in the former EU15) at the expense of low-wage countries (like Romania and Bulgaria). The larger weight on capital benefits capital-intensive countries like Belgium, Ireland and the Netherlands. The impact for the EU on average is negligible.

Figure 4.3 Welfare effects of alternative apportionment formula



Appendix C contains several other simulations for CCCTB reforms. Since these simulations do not differ much with respect to the impact of consolidation and formula apportionment, we discuss them only briefly. The main differences are similar to those for the CCTB reforms and discussed more extensively in section 3.

Noticeable are the set of simulations in Appendix C considering CCCTB reforms where the common base applies to all firms, rather than only multinationals. The extension of the broader common base under CCCTB-WG20 and CCCTB-WG25 to domestic firms implies a rise in the cost of capital in most countries and a larger reduction in investment.

4.4 Tax haven and discrete location

Section 2 discusses the extended CORTAX model that includes tax havens and discrete location choice. As discussed in section 3, the inclusion of an outside tax haven modifies the quantitative impact of policies characterised by base broadening and rate reduction, i.e. CCTB-WG20 and CCTB-WG25. With consolidation and formula apportionment, corporate tax rates can be reduced less because loss consolidation involves a reduction in corporate tax revenue. The implications are illustrated in Table 4.3. We find that CCCTB-WG20 reduces corporate tax rate by only 0.6%-points, on average in the EU while CCCTB-WG25 no longer allows for a lower corporate tax rate. As a result, extending CORTAX with outside tax havens only marginally changes the outcomes of the CCCTB simulations. In fact, higher tax rates in the CCCTB-WG25 and CCCTB-EUav reforms render the implications of these reforms less favourable than in the

basic version of CORTAX. Note, however, that including discrete location and tax havens does matter for individual country effects. Indeed, countries that reduce their statutory corporate tax rates relative to others benefit more from the CCCTB due to an improved location advantage for profitable investments and due to less profit shifting to tax havens.

Table 4.3 Economic effects for the EU of three CCCTB reforms, selectively applied to multinationals, in the presence of tax havens and discrete location

	CCCTB-WG20	CCCTB-WG25	CCCTB-EUav
Corporate tax rate	- 0.6	0.1	1.4
Corporate tax revenue in % GDP (ex-post)	0.0	0.0	- 0.2
Cost of capital	0.2	0.2	0.0
Investment	- 0.9	- 0.8	0.1
Wage	- 0.0	0.0	0.3
Employment	- 0.0	- 0.0	0.1
GDP	- 0.2	- 0.2	0.1
Welfare	0.0	0.0	0.1

Table 4.4 shows the economic effects of the selective CCTB reforms under an alternative assumption regarding discrete location. Instead of location choices being responsive only to effective tax rates within the EU, firms are now also responsive in locating between Europe, Japan and the US. It implies that base broadening and rate reduction in Europe as a whole makes Europe a better location for profit making activities. Table 4.4 shows the impact of the CCTB-WG20 in case global location responses are included. Indeed, we find that the economic implications of the CCTB-WG20 reform is more favourable. Investment, employment and GDP fall less and the impact on welfare is negligible. Yet, signs do not change under our parameterisation of the elasticity of discrete location.

Table 4.4 Economic effects for the EU of CCCTB-WG20 reform for all firms in the presence of global discrete location

	within EU	global
Corporate tax rate	-2.2	-2.2
Corporate tax revenue in % GDP (ex-post)	0.1	0.1
Cost of capital	0.1	0.1
Investment	-1.6	-1.6
Wage	-0.2	-0.2
Employment	-0.1	-0.1
GDP	-0.4	-0.3
Welfare	-0.1	0.0

Finally, Appendix C shows simulation outcomes for alternative values for the substitution elasticity between labour and capital and the size of the fixed factor. The first sensitivity analysis reveals that simulations with base broadening and rate reduction exert smaller negative

effects on investment and, consequently, on welfare. In the second sensitivity analysis, the effects are similar for the same reasons as explained in section 3.

4.5 Summary of EU-wide effects of the CCCTB

Table 4.5 presents the summary of the economic effects of the alternative scenario's of the CCCTB for the EU on average. In comparison with the common base (CCTB) in Table 3.5, the welfare effects of both Working Group proposals are more favourable. Yet, the design of the common base is important for the economic and welfare effects of the total reform. Table 4.5 highlights the important role for outsider countries in assessing the economic effects of changes in the tax rate: the EU benefits from a tax cut if tax havens are important and if firms from non-EU countries will move in. However, for the economic effects of base broadening, consolidation and formula apportionment, outsider countries are less important. The variation in effects for individual countries are large - and highly depending on the apportionment formula - generating welfare losses for some and gains for others.

Table 4.5 Summary of EU-wide effects of the CCCTB

	CIT-rate			GDP			Welfare		
	WG20	WG25	EUav	WG20	WG25	EUav	WG20	WG25	EUav
only multinationals									
basic model	-0.8	-0.2	0.9	-0.2	-0.2	0.2	0.0	0.0	0.1
tax haven & location choice (in EU)	-0.6	0.1	2.4	-0.2	-0.2	0.0	0.0	0.0	0.0
all firms									
basic model	-1.8	-1.3	0.6	-0.5	-0.4	0.1	-0.1	-0.1	0.1
tax haven	-2.2			-0.4			-0.1		
location choice	-2.0			-0.5			-0.1		
tax haven & location choice (global)	-2.2	-1.6	0.9	-0.3	-0.3	0.0	0.0	0.0	0.1

5 European corporate income tax

This section explores the economic implications of a European corporate income tax (EUCIT). The starting point is the three CCCTB reforms of the previous section. We add to this the harmonisation of the corporate tax rate in the EU. We refer to them as the EUCIT-WG20, EUCIT-WG25 and EUCIT-EUav reform, respectively. In Table 5.1, the European corporate tax rates is harmonised at a rate of 24.2%, which is equal to the unweighted EU-average in 2007. It implies a 5.3%-point reduction in the weighted EU-average tax. This comes along with a decline in corporate tax revenue. We raise consumption taxes to ensure a balanced budget for all governments. In Table 5.2, we modify the common corporate tax rate so that, on average in the EU, the government budget is balanced ex-ante. In that case, EUCIT-WG20, EUCIT-WG25 and EUCIT-EUav require a common corporate tax rate of, respectively, 27.9%, 28.4% and 30.9%. If corporate tax revenue changes in a country, we assume that the government adjusts consumption taxes to balance its budget.

Table 5.1 Economic effects of three EUCIT reforms

	EUCIT-WG20	EUCIT-WG25	EUCIT-EUav
Corporate tax rate	- 5.3	- 5.3	- 5.3
Corporate tax revenue (ex-post)	- 0.5	- 0.6	- 1.0
Consumption tax revenue (ex-post)	0.4	0.5	0.8
Cost of capital	0.1	0.0	- 0.2
Investment	- 0.4	0.2	2.1
Wage	0.4	0.6	1.3
Employment	- 0.0	0.0	0.1
GDP	- 0.0	0.2	0.8
Welfare	0.0	0.1	0.2

We see from Table 5.1 that the common European corporate tax raises investment, GDP and welfare under EUCIT-WG25 and EUCIT-EUav. This is not the case with the EUCIT-WG20 reform where welfare is unchanged while GDP and employment fall. These outcomes are induced by a number of opposing effects. First, EUCIT-WG20 and EUCIT-WG25 imply a broader corporate tax base via less generous depreciation allowances. This raises the cost of capital. Second, all EUCIT reforms shift the tax burden from corporate income to consumption. This reduces the cost of capital and offsets the first effect. For a given corporate tax reduction of 5.3%-point, the reduction in the corporate tax burden is larger if the corporate tax base is reduced less. As a result, the EUCIT-WG25 reform no longer increases the cost of capital since the shift from corporate to consumption taxation offsets the upward effect from base broadening on the cost of capital. This experiment even raises welfare by 0.1% which is due to the reduction in compliance costs. EUCIT-EUav involves the largest shift in the tax burden from corporate income to consumption. We find that investment expands by 2.1% while employment

increases by 0.1%, despite the higher tax on consumption (which reduces the after-tax real wage). GDP expands by 0.8% while welfare improves by 0.2% of GDP.

Table 5.2 shows that the economic implications are less favourable if the common corporate tax rate is set at a higher level so as to ensure revenue neutrality, because corporate taxes are more distortionary than consumption taxes in CORTAX. The combination of higher corporate tax rates and lower consumption tax rates is therefore bad for welfare. The EUCIT-WG20 requires a common rate of 27.9%. It comes along with a reduction in GDP of 0.5% and a welfare reduction of 0.1% of GDP. The EUCIT-EUav reform requires a common rate of 30.9% and comes along with a welfare gain of 0.1% of GDP. Compared to the CCCTB reforms, the main difference is that the common rate in EUCIT removes distortions in production efficiency as firms no longer have an incentive to relocate production across Europe.

Table 5.2 Economic effects of three EUCIT reforms

	EUCIT-WG20	EUCIT-WG25	EUCIT-EUav
Corporate tax rate	- 1.6	- 1.1	1.4
Corporate tax revenue in % GDP (ex-post)	0.0	- 0.0	- 0.2
Consumption tax revenue (ex-post)	- 0.2	- 0.2	- 0.1
Cost of capital	0.2	0.1	0.0
Investment	- 2.0	- 1.5	0.1
Wage	- 0.4	- 0.2	0.3
Employment	- 0.1	- 0.0	0.1
GDP	- 0.5	- 0.4	0.1
Welfare	- 0.1	- 0.0	0.1

6 Conclusions

We have analysed the economic implications of a common corporate tax base in the European Union, either or not combined with consolidation and formula apportionment. To that end, we adopt an applied general equilibrium model for the EU27 which encompasses several distortions associated with corporate tax systems, including marginal and inframarginal investment decisions, multinational profit shifting, limited loss compensation and the debt-equity choice of firms.

The common corporate tax base (CCTB) raises the issue of base broadening versus rate reduction. Corporate tax rates apply to both the margin of new investment and to economic rents, where the latter causes no distortions. A reduction in corporate tax allowances only apply to the cost of investments at the margin. The tax reform with a broader base and lower rate will likely reduce welfare with about 0.1-0.2% of GDP, as it shifts the burden of the corporate tax from rents to marginal investments. Individual countries may, however, benefit from a similar tax reform, because an unilateral reduction of the tax rate mitigates multinational profit shifting to outside locations.

The common consolidated corporate tax base with formula apportionment (CCCTB) has further implications via compliance costs, the allocation of capital and multinational profits and via the consolidation of losses. Lower compliance costs raise welfare in the EU, by about 0.1% of GDP in our simulations, and partly offset the possible adverse welfare effects induced by base broadening. The shift from loss carry forward to loss consolidation also has the potential to raise welfare by mitigating production distortions, but these benefits are offset if higher corporate tax rates will be used to cover the budgetary cost of loss consolidation. The shift from separate accounting to formula apportionment has minor efficiency implications for Europe as a whole, but does involve a redistribution of welfare across Member States. Overall, the CCCTB according to the working group (version WG20 or WG25 in our simulations) is neutral for welfare if tax havens and location choices between the US, Japan and the EU are taken into account. In deviation from this neutral average,, the CCCTB involves winners and losers induced by the introduction of the common base, the elimination on profit shifting and the introduction of formula apportionment.

The results in this study illustrate a number of effects induced by European harmonisation on which we have some empirical information. Still, many of these effects are highly uncertain as the empirical literature shows quite some variation in study results. Moreover, the model might ignore other effects of consolidation and formula apportionment, which are inherently difficult to quantify, such as the impact of loss consolidation on the internal organisation of European businesses. It suggests that the outcomes of this study should be taken with proper caution.

References

- Altshuler R., and H. Grubert, 2003, Taxes, repatriation strategies and multinational financial policy, *Journal of Public Economics* 87, 73-107.
- Bettendorf, L and A. van der Horst, 2008, Documentation of CORTAX, mimeo, The Hague.
- Bettendorf, L., J. Gorter and A. van der Horst, 2006, Who benefits from tax competition in the European Union?, CPB Document no. 125, The Hague.
- Bettendorf, L., A. van der Horst and R.A. de Mooij, 2007, Corporate tax policy and unemployment in Europe: an applied general equilibrium analysis, Tinbergen Institute Discussion Paper 07-056.
- Chirinko, R.S., 2002, Corporate taxation, Capital Formation, and the Substitution Elasticity Between Labor and Capital, CESifo Working Paper No. 707.
- Clausing, K.A., 2003, Tax-motivated transfer pricing and US intrafirm trade prices, *Journal of Public Economics* 87, 2207-2223.
- Desai, M.A., C. Fritz Foley, and J.R. Hines, 2003, A multinational perspective on capital structure choice and internal capital markets, Harvard NOM Research Paper no. 03-27.
- Devereux, M.P. and R. Griffith, 1998, Taxes and the Location of Production: Evidence from a Panel of U.S. Multinationals, *Journal of Public Economics* 63, 335–67.
- Devereux, M.P. and R. Griffith, 2003, Evaluating Tax Policy for Location Decisions, *International Tax and Public Finance* 10, 107–26.
- Devereux, M. (2004). Debating proposed reforms of the taxation of corporate income in the European Union. *International Tax and Public Finance*, 11:71–89.
- Devereux, M. P., 2006, The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence, Oxford University Centre for Business Taxation Working Paper Series, WP 07/02, Said Business School, Oxford.
- Devereux, M.P. and B. Lockwood, 2006, How are plant location decisions and capital flows in Europe affected by corporate income taxes?, European Tax Policy Forum.

Devereux, M.P. and S. Loretz, 2008a, The Effects of EU Formula Apportionment on Corporate Tax Revenues, *Fiscal Studies* 29.1, 1-33.

Devereux, M.P. and S. Loretz, 2008b, Increased efficiency through consolidation and formula apportionment in the European Union?, Oxford University Centre for Business Taxation Working Paper no. 08/12.

Devereux, M.P. and R.A. de Mooij, 2009, Alternative systems of business tax in Europe: an applied analysis of ACE and CBIT reforms, Study for the European Commission, DG Taxation and Customs Union.

Egger, P., S. Loretz, M. Pfaffermayr and H. Winner, Firm-specific forward-looking tax rates, Oxford University Centre for Business Taxation Working Paper no. 08/11.

European Commission (2001). Towards an internal market without tax obstacles: A strategy for providing companies with a consolidated corporate tax base for their EU-wide activities. Communication COM(2001)582.

European Commission, 2004, European Tax Survey. Taxation Papers 3.

Eurostat, 2007, Taxation trends in the European Union, Data for the EU Member States and Norway.

Evers, M., R.A. de Mooij, and D.J. van Vuuren, 2008, The wage elasticity of labour supply: a synthesis of empirical estimates, *De Economist* 156, pp. 25-43.

Fuest, C., T. Hemmelgarn and F. Ramb, 2008, How would the introduction of an EU-wide formula apportionment affect the size and the distribution of the corporate tax base? An analysis based on German multinationals, forthcoming in: *International Tax and Public Finance*.

Gordon, R.H. and Y. Lee, 2001, Do Taxes Affect Corporate Debt Policy? Evidence from US Corporate Tax Return Data, *Journal of Public Economics* 81, 195–224.

Graham, J., 2003, Taxes and corporate finance: a review, *The Review of Financial Studies*, vol. 16, no. 4, pp. 1075–1129.

Hassett, K. and R.G. Hubbard, 2002, Tax policy and business investment, in M. Feldstein and A. Auerbach (eds.), *Handbook of Public Economics* Vol. 3, Elsevier North Holland, pp. 1293-1343.

Haufler, A. and G. Schjelderup, 2000, Corporate tax systems and cross country profit shifting, *Oxford Economic Papers*, vol. 52, no. 2, pp. 306-325.

Horst, A. van der, Bettendorf, L., and Rojas-Romagosa, H. (2007). Will corporate tax consolidation improve efficiency in the EU? Document 141, CPB.

Hubbard, R.G., 1997, Capital-market imperfections and investment, NBER Working Paper no. 5996.

Joint Committee on Taxation, 1997, Tax modelling project and tax symposium papers, Washington: U.S. Government Printing Office.

McKenzie, K.J., M. Mansour, and A. Brule, 1998. The calculation of marginal effective tax rates, Technical Committee of Business Taxation Working Paper 97-15.

Mooij, R. de, 2005, Will corporate income taxation survive? *De Economist*, 153, 277-301.

Mooij, R. de, and S. Ederveen, 2008, What do we know about intensive and extensive tax margins of business behaviour, mimeo Erasmus University Rotterdam.

Sørensen, P. B., 2001, OECDTAX: a model of tax policy in the OECD economy. EPRU, University of Copenhagen.

Sørensen, P. B., 2004a, Company tax reform in the European Union, *International Tax and Public Finance*, 11, 91-115.

Sørensen, P. B., 2004b, International tax coordination: regionalism versus globalism, *Journal of Public Economics* 88, 1187-1214.

Sørensen, P. B., 2007, Can capital incomes taxes survive? And should they?, *CESifo Economic Studies* 53, 172-228.

Appendix A Modelling firm behaviour in CORTAX

This appendix discusses in more detail how firm behaviour is modelled. CORTAX starts from a standard dynamic optimization problem of the firm, which maximizes its value subject to accumulation constraints and a production function. In optimizing its value, firms choose their optimal levels of employment and investment, as well as the optimal financial structure between debt and equity. We also discuss the two extensions of the basic framework: the introduction of a tax haven and the modelling of location choices.

Model of the firm

Denote the value of the firm in year t by V_t and its dividend payments by Div_t . We ignore new equity issues and abstract from residence taxes on capital levied at the household level. An investor is indifferent between investing in the firm and investing elsewhere at a rate of return r as long as:

$$rV_t = Div_t + V_{t+1} - V_t \quad (\text{A.1})$$

The right-hand side of (A.1) reflects the sum of dividends and capital gains on the investment in the firm. The left-hand side shows the return on the asset V_t if it were invested elsewhere. The rate r denotes the discount rate used by the firm. Solving (A.1) for V_t yields an expression for the value of the firm as the discounted stream of future dividends:

$$V_t = \sum_{s=t}^{\infty} Div_s \left[\frac{1}{1+r} \right]^{s-t+1} \quad (\text{A.2})$$

Dividends follow from the cash-flow restriction of the firm:

$$Div_t = Y_t - wL_t - [r_b + c_b]d_{bt}K_t - \tau\Pi_t - I_t + d_{b,t+1}K_{t+1} - d_{bt}K_t \quad (\text{A.3})$$

where Y_t denotes output (price is normalised to 1) and wL_t stands for labour costs. The third term on the right-hand side of (A.3) captures the cost of debt. It equals the debt ratio (d_b) times the capital stock (K_t) times the real interest on firm debt r_b . In addition to this, the variable c_b denotes a financial distress or agency cost associated with high debt finance. It depends on the leverage of the firm, i.e. $c_b = c_b(d_{bt})$. The fourth and fifth terms on the right-hand side of (A.3) reflect corporate tax payments ($\tau\Pi_t$) and investment (I_t). Finally, cash-flow is affected by a change in debt of the firm, captured by the last two terms on the right-hand side of (A.3).

The corporate tax base, Π_t , is defined as:

$$\Pi_t = Y_t - wL_t - d_{bt}R_bK_t - \delta_f D_t - \phi I_t \quad (\text{A.4})$$

It consist of total revenue from sales minus labour costs, deductible financial costs and deductible depreciation allowances. The third term on the right-hand side of (A.4) reflects the deductible financial costs from investment. As shown by (A.4), it is the nominal interest payments on actual debt ($d_{bt}R_bK_t$) which are deductible from the corporate tax base, where $R_b = (1+r_b)(1+\pi)^{-1} \approx r + \pi$ is the nominal interest rate and π is the rate of inflation. Most corporate tax systems do not allow a deduction of the cost of equity, except for Belgium that introduced such a system in 2006. The last two terms on the right-hand side of (A.4) reflect fiscal depreciation. The fourth term is the annual rate of fiscal depreciation, equal to δ_f , times the stock of fiscal depreciable assets, denoted by D_t . The last term denotes the share of the investment that can be depreciated immediately after its purchase, measured by ϕ . Note that $\phi = 1$ would imply immediate expensing of investment. If $\phi = \delta_f$, annual fiscal depreciation at rate δ_f would start in the period of purchase, rather than one year after the purchase.

Regarding economic and fiscal depreciation, we assume a declining balance at a rates of, respectively, δ and δ_f . The accumulation of capital in, respectively, the firms financial accounts and its tax accounts is thus reflected by:

$$K_{t+1} = I_t + (1 - \delta)K_t \quad (\text{A.5})$$

$$(1 + \pi)D_{t+1} = (1 - \phi)I_t + (1 - \delta_f)D_t \quad (\text{A.6})$$

where (A.6) takes into account that fiscal depreciation only applies to the share that is not immediately expensed, i.e. $(1 - \phi)$ and that the price of fiscal assets is not indexed for inflation.

Firm behaviour is now derived from maximizing its value (A.2), subject to the accumulation equations (A.5) and (A.6):

$$L = \sum_{s=t}^{\infty} \left[Div_s - \lambda_{s+1} [(1 + \pi)D_{s+1} - (1 - \phi)I_s - (1 - \delta_f)D_s] - \mu_{s+1} [K_{s+1} - I_s - (1 - \delta)K_s] \right] \left[\frac{1}{1 + r} \right]^{s-t+1} \quad (\text{A.7})$$

where λ_t is the Langrange multiplier for D_t and μ_t the Langrange multiplier for K_t (Tobins q) and discounting occurs at the real rate r . We will now subsequently discuss the optimal choice regarding the financial structure and investment by the firm.

Financial behaviour

We first optimize (A.7) with respect to the debt share. This yields the following first-order condition:

$$c_b + \frac{\partial c_b}{\partial d_{bt}} d_{bt} = r - r_b + \tau R_b \quad (\text{A.8})$$

The left-hand side of (A.8) denotes the marginal cost of a higher debt share. High debt may be costly due to financial distress associated with a larger risk of bankruptcy or higher agency costs. In the optimum, the marginal cost of higher debt equal the marginal benefit reflected by the right-hand side of (A.8). This marginal benefit of debt finance is equal to the difference in the real required market cost of debt versus equity plus a tax term that reflects the favourable treatment of debt over equity. Hence, due to this discrimination of the corporate tax system in favour of debt, the corporate tax rate raises the relative benefits of debt finance.

The benefits from debt finance on the right-hand side of (A.8) are independent of the debt share. To avoid a corner solution in which firms find it optimal to finance the entire capital stock with either debt or equity, we specify a convex cost function of holding debt. In particular, we use the following function for the cost of holding debt:

$$c_b = \frac{\chi}{d_b^{(1+\varepsilon_b)} (1-d_b)^{(1-\varepsilon_b)}} - \frac{c_{b0}}{d_b} \quad (\text{A.9})$$

so that

$$c_b + \frac{\partial c_b}{\partial d_b} d_b = \left[\frac{d_b - \varepsilon_b}{1-d_b} \right] \left(c_b + \frac{c_{b0}}{d_b} \right) \quad (\text{A.10})$$

As long as the debt share exceeds ε_b , expression (A.10) suggests that the marginal cost of holding debt is positive. The marginal costs tend to rise in the debt share and fall in the parameters χ and ε_b . Hence, the higher the initial leverage of the firm, the more costly it is to further raise the share of debt finance. The parameters χ and ε_b are set at levels so as to replicate the elasticity of the debt share found in empirical studies.

Investment behaviour

To find optimal investment, we specify the production function $Y_t = CES(K_t, L_t)$ as a constant elasticity of substitution function with capital and labour as inputs. Production features decreasing returns to scale with respect to these to inputs. Thus, a fixed factor is at the background, which earns an economic rent in production. In optimizing its value, the firm determines the optimal demand for labour and investment. Labour demand is determined by setting the value of the marginal product of labour equal to the before-tax wage rate. Below, we concentrate on the demand for investment. Denote the marginal product of capital as Y_K . The first-order conditions for investment I_t , and the stock variables D_t and K_t read as follows:

$$(1 - \phi\tau) = (1 - \phi)\lambda + \mu \quad (\text{A.11})$$

$$\lambda = \tau \frac{\delta_f}{R + \delta_f} \quad (\text{A.12})$$

$$Y_K(1 - \tau) = \mu(r + \delta) - d_b(r - r_b - c_b) - d_b\tau R_b \quad (\text{A.13})$$

where we used the property that λ and μ are constant on a steady state balanced growth path. The first-order conditions in (A.11) – (A.13) together determine the optimal investment by firms. In particular, by substituting (A.11) and (A.12) into (A.13), we get the following expression for the optimal capital stock:¹⁵

$$Y_K = \frac{1}{1 - \tau} \left[r^* + \delta - \tau \left[\frac{\phi R + \delta_f}{R + \delta_f} \right] (r + \delta) \right] \quad (\text{A.14})$$

$$r^* = d_b[r_b + c_b - \tau d_b R_b] + (1 - d_b)r \quad (\text{A.15})$$

Expression (A.14) denotes the cost of capital, i.e. the marginal productivity of capital that is required to make up for the cost of finance and depreciation. In the absence of a corporate income tax, the cost of capital is equal to the financial cost of investment (i.e. the weighted average of debt and equity) and economic depreciation. To understand the impact of corporate taxation, we first consider the case of equity-financed investment (i.e. if the marginal debt share is zero, $d_b = 0$). In that case, (A.14) and (A.15) modify to:

$$Y_K = r + \delta + \frac{\tau}{1 - \tau} \left[1 - \frac{\phi R + \delta_f}{R + \delta_f} \right] (r + \delta) \quad (\text{A.16})$$

We see that the cost of capital is equal to that in the absence of tax ($r + \delta$), plus a tax term between square brackets. The tax term is zero if $\phi = 1$. In that case, there is immediate expensing of investment, which transforms the corporate income tax into an R-based cash-flow tax. This system is neutral to the cost of capital and, therefore, for investment. Also if the normal return on equity-financed investment would be deductible from the corporate tax, the corporate tax would be neutral to the cost of capital and investment. This neutrality property of the ACE requires that the imputed return on equity equals the nominal discount rate used by the firm.

If $\phi < 1$, the term between square brackets on the right-hand side of (A.16) is always positive. Hence, corporate taxes raise the cost of capital financed by equity. A higher cost of

¹⁵ We assume no adjustment costs in capital formation so the capital stock will immediately move to its new optimum

capital requires that the marginal product of capital increases. In light of decreasing returns to scale with respect to capital in production, a smaller capital stock is required to achieve this. Consequently, a higher cost of capital induced by a higher corporate tax rate will reduce investment.

If part of investment is financed by debt ($d_b > 0$), (A.15) is modified as the financial cost of investment is now a weighted average of the cost of debt and the cost of equity. We see that the cost of debt is reduced by the deductibility of nominal interest costs. The interest deductibility thus reduces the cost of capital, perhaps even below the level obtained in the absence of tax.

Profit shifting behaviour

In producing output, subsidiaries use intermediate inputs that are supplied by their parent company. The arms-length price for this intermediate input is equal to the market price of the numeraire good, but the parent company can manipulate this transfer price for intra-company deliveries. In particular, the benefit from marginally changing the transfer price is measured by the difference in the statutory corporate tax rate that applies to the subsidiary (τ^f) and the rate that applies to the parent (τ^m). This benefit needs to be weighed against the cost of transfer pricing. We adopt the following cost function for manipulating transfer pricing (i.e. the price that the headquarter charges for goods supplied to its subsidiary):

$$c_q = \frac{|p_q - 1|^{1+\varepsilon_q}}{1+\varepsilon_q} \quad (\text{A.17})$$

Hence, deviating the transfer price (p_q) from its arms-length price (equal to one) creates a cost for the multinational, which is convex if $\varepsilon_q > 0$. In the optimum, the marginal cost from transfer price manipulation is set equal to marginal benefit, which is determined by the corporate tax differential between the foreign subsidiary and the multinational headquarter, i.e.:

$$\frac{\partial c_q}{\partial p_q} = \text{sign}(p_q - 1) |p_q - 1|^{\varepsilon_q} = \tau^f - \tau^m \quad (\text{A.18})$$

Expression (A.18) shows that the headquarter company has an incentive to set an artificially low (high) transfer price for supplies to subsidiaries in countries that feature a lower (higher) statutory corporate tax rate. In this way, it shifts profits from high to low-tax countries, thereby reducing its overall tax payment. The marginal cost of this manipulation depends on the initial deviation of the transfer price from its arms-length price. The speed at which transfer prices increase is determined by the parameter ε_q . In the model, we set its value so as to replicate empirical evidence on profit shifting.

Incentive effects of loss consolidation versus loss carry forward

Assume a firm that produces output by combining labour and capital. Ex-ante, firms are equal. Ex-post, they may suffer from a random shock in the value of sales. In the good outcome, the revenue from sales equals Y_t^g . In the bad outcome, there is a lower value Y_t^b , such that profits are negative. Ex-post, a share of q firms obtain a good outcome and a share $1-q$ obtains a bad outcome. Assuming risk neutrality, firms consider the expected value of output when determining their demand for inputs.

Under loss consolidation, we assume that all losses can be immediately offset against profits elsewhere in the multinational group. The expected aggregate corporate tax base is:

$$E(\Pi^C_t) = qY_t^g + (1-q)Y_t^b - wL_t - d_{bt}R_bK_t - \delta_f D_t - \phi I_t \quad (\text{A.19})$$

The expected after-tax stream of dividends is:

$$Div_t = qY_t^g + (1-q)Y_t^b - wL_t - [r_b + c_b]d_{bt}K_t - \tau \Pi_t - I_t + d_{bt+1}K_{t+1} - d_{bt}K_t \quad (\text{A.20})$$

As before, firms maximize the value of the firm, which is the net present value of the stream of dividends, subject to the accumulation of capital. It yields the following first-order conditions for capital, cf. equation (A.14) and (A.15):

$$qY_K^g + (1-q)Y_K^b = \frac{1}{1-\tau} \left[r^* + \delta - \tau \left[\frac{\phi R + \delta_f}{R + \delta_f} \right] (r + \delta) \right] \quad (\text{A.21})$$

and labour:

$$qY_L^g + (1-q)Y_L^b = w \quad (\text{A.22})$$

which are the familiar conditions based on the expected marginal productivity of respectively capital and labour. Both expressions suggest that firms set the expected marginal productivity of capital and labour equal to their respective prices. According to (A.21), the corporate tax raises the cost of capital as long as investment is not fully deductible, i.e. $\theta < 1$.

Under loss carry forward, firms cannot immediately offset losses. Instead, we assume they carry forward their loss one year and then offset it against a possible profit. The loss IT in the previous year is given by:

$$\Pi^-_{t-1} = Y_{t-1}^b - wL_{t-1} - d_{bt-1}R_bK_{t-1} - \delta_f D_{t-1} - \phi I_{t-1} < 0 \quad (\text{A.23})$$

The nominal value of this lagged loss can (with probability $1-q$) be offset against current profits if current profits are positive (with probability q), such that the expected tax base $E(\Pi^L)$ is:

$$E(\Pi^L)_t = q \left[Y_t^q - wL_t - d_{bt}R_bK_t - \delta_f D_t - \phi I_t + \frac{1-q}{1+r^n} \Pi^-_{t-1} \right] \quad (\text{A.24})$$

where r^n is the nominal rate of return. Compared to loss carry forward, the tax base is unambiguously smaller under consolidation:

$$E(\Pi^C) - E(\Pi^L) = (1-\theta)\Pi^-_{t-1} < 0, \quad \theta = q \left(1 + \frac{1-q}{1+r^n} \right) \quad (\text{A.25})$$

where $\theta \leq 1$ is the fraction of expenditures which can be deducted from total revenues. Given the expected tax base in (A.24), dividends can be written as:

$$Div_t = qY_t^g + (1-q)Y_t^b - wL_t - [r_b + c_b]d_{bt}K_t - \tau E(\Pi^L)_t - I_t + d_{bt+1}K_{t+1} - d_{bt}K_t \quad (\text{A.26})$$

Note that the limited deductibility of losses implies that the first-order condition for labour is adjusted to:

$$(1-\tau)qY_L^g + \left(1 - \frac{q\tau}{1+r^n} \right) (1-q)Y_L^b = (1-\theta\tau)w \quad (\text{A.27})$$

which can be written as:

$$qY_L^g + (1-q)Y_L^b = w + \frac{\tau}{1-\tau} (1-q) \left(1 - \frac{q}{1+r^n} \right) (w - Y_L^b) \quad (\text{A.28})$$

which shows that limited loss offset induces an increase in labour costs, given that $w \geq Y_L^b$.

The first-order conditions for investment I_t , and the stock variables D_t and K_t now read as:

$$(1-\theta\phi\tau) = (1-\phi)\lambda + \mu \quad (\text{A.29})$$

$$\lambda = \tau \frac{\delta_f}{R + \delta_f} \quad (\text{A.30})$$

$$(1-\tau)qY_K^g + \left(1 - \frac{q\tau}{1+r^n} \right) (1-q)Y_K^b = \mu(r + \delta) - d_b r (1-\theta\tau) \quad (\text{A.31})$$

where we abstract in (A.31) from financial distress costs and inflation. Equations (A.29)-(A.31) can be combined to:

$$qY_K^g + (1-q)Y_K^b = r + \delta + \frac{\tau}{1-\tau} \left[1 - \frac{\phi r + \delta_f}{r + \delta_f} \right] (r + \delta) + \frac{\tau}{1-\tau} (1-q) \left(1 - \frac{q}{1+r^n} \right) (d_b r_b + \phi(r + \delta) - Y_K^b) \quad (\text{A.32})$$

which shows that limited loss offset raises the cost of capital if marginal productivity of capital in the bad outcome is less than the deductibility of debt and immediate expenses.

Modelling an outside tax haven

In an extended version of CORTAX, we introduce an outside tax haven that features an exceptionally low corporate tax rate, denoted by τ^h . Firms are able to shift part of their profits to this tax haven, independent of the amount of FDI they have invested. Hence, the inclusion of a tax haven reflects other modes of profit shifting than transfer price manipulation. In modelling profit shifting to tax havens, we assume that firms decide about the effort they put into profit shifting activities. This effort is denoted by θ . The idea may be that the multinational has to invest manpower in the relations with the subsidiaries and governments in the tax havens. The higher the effort, the more profits will be shifted to the tax haven but also the higher will be the costs involved. In particular, for each euro paid in corporate tax, the tax saving from profit shifting is assumed to rise linearly in the effort, i.e.

$$\Theta = \theta(\tau - \tau^h) \quad (\text{A.33})$$

The costs of profit shifting per euro of profit is assumed to rise in a convex way in the effort, i.e.

$$c^{ps} = A^{-1/\gamma} \frac{\theta^{1+1/\gamma}}{1+1/\gamma} \quad (\text{A.34})$$

where $\gamma \geq 0$. The costs and benefits enter the expression for dividends

$$Div = Div^{org} + \tau\Theta\Pi - c^{ps}\Pi \quad (\text{A.35})$$

where Div^{org} denotes the original dividend equation in CORTAX. By optimising the value of the firm with respect to the effort θ , we find the following first-order condition

$$\theta = A[\tau(\tau - \tau^h)]^\gamma \quad (\text{A.36})$$

Substituting into the dividend equation yields that the average net benefit from profit shifting is positive as long as $\tau > \tau^h$

$$(\tau^\Theta - c^{ps})\Pi = A \frac{[\tau(\tau - \tau^h)]^{1+\gamma}}{1+\gamma} \Pi > 0 \quad (\text{A.37})$$

which is due to the convex character of the cost function. For the government, profit shifting to the tax haven implies a revenue loss equal to

$$\tau^\Theta \Pi = A[\tau(\tau - \tau^h)]^{1+\gamma} \Pi \quad (\text{A.38})$$

In the calibration of CORTAX, we set γ equal to 1 so that the costs of profit shifting rise quadratically in effort. The parameter A is set in such a way that we obtain a reasonable amount of profit shifting.

Discrete location choice

Another extension of CORTAX refers to location choice. The literature on foreign direct investment emphasises that investment is not only responsive to the cost of capital, but that also inframarginal investment and location choices are important. One reason may be that firms earn firm-specific economic rents that are mobile across borders. Such rents can be due to patents, brand names, specific managerial talents or market power. Firms then locate their affiliates in countries where the average effective tax rates are relatively low.

In CORTAX, we do not explicitly model the origins of firm-specific economic rents. Instead, we endogenise the value of economic rents earned by a multinational in CORTAX in each location by making it dependent of the corporate tax rate. In particular, suppose that the multinational owns a firm-specific fixed factor H , which it can allocate between two countries, H_i and H_j . If the firm maximizes the sum of profits in the two locations ($\Pi_i + \Pi_j$), the first order condition with respect to the allocation of the fixed factor in country i reads as

$$\frac{\partial \Pi}{\partial H_i} = (1 - \tau_i)F_{H_i} - (1 - \tau_j)F_{H_j} = 0 \quad (\text{A.39})$$

In the production function of CORTAX, firms combine labour and capital using a CES production function and then combine this with the fixed factor using a Cobb-Douglas structure. This yields a simple expression for the marginal value of allocating the fixed factor in each of the two locations. Using this production structure, we can write the optimal share of the fixed factor in the two locations as:

$$\frac{H_j}{H_i} = \frac{X_j}{X_i} \left[\frac{1-\tau_j}{1-\tau_i} \right]^{\frac{1}{1-\alpha}} \quad (\text{A.40})$$

where X denotes the composite input of labour and capital. Hence, the share of the fixed factor allocated in country j relative to country i falls in the tax rate in country j relative to country i . In CORTAX, we model the share of the fixed factor of a multinational in a specific country as a function of the statutory tax rate in that country, relative to the weighted EU average. The responsiveness of the fixed factor to this tax differential is set so as the replicate empirical estimates on the impact of corporate taxes on FDI.

Appendix A2 Country tables baseline scenario

The first table in this appendix shows the country-specific data for corporate taxation in the baseline scenario (tax rate, measures of the tax base and the revenues as share of GDP). Second, we present a scenario where, starting from the baseline with separate accounting, transfer pricing is eliminated. This is a partial simulation as it does not specify what economic conditions or government regulation might induce firms to fix transfer prices at unity.

Table A.1: Corporate taxation in the baseline scenario

		CIT rate	CIT base (%GDP)	CIT revenues (% GDP)
Austria	AUT	25.0	12.6	3.1
Belgium	BEL	34.0	3.6	1.2
Bulgaria	DNK	25.0	11.3	2.8
Cyprus	FIN	26.0	14.4	3.7
Czech Republic	FRA	33.3	11.1	3.7
Germany	DEU	36.4	12.0	4.4
Denmark	GRC	25.0	15.4	3.8
Spain	IRL	12.5	18.0	2.2
Estonia	ITA	37.3	10.4	3.9
Finland	LUX	29.6	29.3	8.7
France	NLD	25.5	16.2	4.1
United Kingdom	PRT	26.5	8.1	2.2
Greece	ESP	33.0	15.6	5.1
Hungary	SWE	28.0	10.8	3.0
Ireland	GBR	30.0	8.7	2.6
Italy	CYP	10.0	12.7	1.3
Lithuania	CZE	24.0	18.4	4.4
Luxembourg	EST	22.0	6.7	1.5
Latvia	HUN	16.0	14.9	2.4
Malta	LVA	15.0	11.0	1.6
Netherlands	LTU	18.0	10.6	1.9
Poland	MLT	35.0	15.7	5.5
Portugal	POL	19.0	16.7	3.2
Romania	SVK	19.0	15.8	3.0
Slovak Republic	SVN	23.0	11.9	2.7
Slovenia	BGR	10.0	14.2	1.4
Sweden	ROM	16.0	9.1	1.4
United States	USA	39.4	14.2	5.6
Japan	JPN	40.8	18.0	7.3
Europe	EU	29.5	11.9	3.5

Table A.2: Separate accounting without transfer pricing

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	0.00	0.00	0.03	-0.02	0.04	-0.13	-0.05	-0.05
BEL	0.00	0.00	-0.22	-0.03	-0.18	0.12	0.20	0.12
DNK	0.00	0.00	0.04	-0.02	0.07	-0.11	-0.08	-0.08
FIN	0.00	0.00	0.05	-0.01	0.06	-0.02	-0.06	-0.06
FRA	0.00	0.00	-0.02	-0.01	-0.02	0.06	0.02	0.01
DEU	0.00	0.00	-0.09	-0.01	-0.09	0.05	0.10	0.07
GRC	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00
IRL	0.00	0.00	0.23	-0.13	0.29	-0.65	-0.25	-0.37
ITA	0.00	0.00	-0.04	-0.01	-0.04	0.04	0.05	0.03
LUX	0.00	0.00	0.84	-0.06	0.90	0.64	-0.86	-0.90
NLD	0.00	0.00	0.40	-0.04	0.44	0.15	-0.41	-0.42
PRT	0.00	0.00	0.03	-0.01	0.03	-0.13	-0.06	-0.05
ESP	0.00	0.00	-0.03	0.00	-0.03	0.04	0.03	0.02
SWE	0.00	0.00	0.04	-0.01	0.05	-0.01	-0.05	-0.05
GBR	0.00	0.00	0.06	-0.01	0.06	0.04	-0.08	-0.08
CYP	0.00	0.00	-0.01	-0.06	0.06	-0.47	-0.08	-0.11
CZE	0.00	0.00	0.00	-0.01	0.02	-0.11	-0.03	-0.02
EST	0.00	0.00	0.00	-0.01	0.02	-0.15	-0.03	-0.03
HUN	0.00	0.00	0.04	-0.05	0.10	-0.32	-0.10	-0.12
LVA	0.00	0.00	-0.01	-0.01	0.01	-0.12	-0.02	-0.02
LTU	0.00	0.00	-0.01	-0.01	0.01	-0.09	-0.02	-0.01
MLT	0.00	0.00	-0.18	-0.02	-0.11	0.18	0.14	0.10
POL	0.00	0.00	-0.01	-0.02	0.02	-0.15	-0.03	-0.03
SVK	0.00	0.00	-0.04	-0.03	0.03	-0.21	-0.04	-0.04
SVN	0.00	0.00	0.00	-0.01	0.01	-0.08	-0.02	-0.02
BGR	0.00	0.00	-0.06	-0.03	0.00	-0.23	-0.02	-0.02
ROM	0.00	0.00	0.00	-0.02	0.01	-0.16	-0.02	-0.02
EU	0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.01	-0.02

Appendix B Country tables CCTB

The tables in this appendix show the country-specific outcomes of several simulations of CCTB. In presenting the results, we focus on the following variables

- CIT-rate = absolute change in the statutory corporate tax rate
- Rev_CIT = absolute change in the corporate tax revenue as a share of GDP
- CoC = absolute change in the cost of capital, average across all firms
- Wage = relative change in the wage rate
- Capital = relative change in total capital stock
- Employm. = relative change in total employment
- GDP = relative change in gross domestic product
- Welfare = absolute change in $-1 \times$ compensating variation expressed in % of GDP
(i.e. positive value reflects a welfare gain)

Tables B.1 – B.22 show the effects of CCTB reforms under the three different definitions of the common base, i.e. CCTB-WG20, CCTB-WG25 and CCTB-EUav. They are presented in the following order:

- Tables B.1 - B.3: CCTB reforms where the common base is applied to all firms
- Tables B.4 - B.6: CCTB reforms where the common base is applied to multinationals
- Tables B.7 - B.8: CCTB-WG20 reforms with tax havens
- Tables B.9- B.10: CCTB-WG20 reforms with discrete locations
- Tables B.11 - B.16: CCTB reforms with tax havens & discrete location
- Tables B.17 - B.18: CCTB-WG20 reforms with weaker investment response
- Tables B.19 - B.20: CCTB-WG20 reforms with smaller share of fixed factor
- Tables B.21 - B.22: CCTB-WG20 reforms with reduction in compliance costs
- Tables B.23 - B.28: CCTB-WG20, CCTB-WG25 and CCTB-EUav with tax haven and global discrete location choice

Table B.1: CCTB-WG20 for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.84	0.03	-0.34	-0.12	-0.02	-0.16	0.02	-0.05
BEL	-15.47	0.63	-8.45	-2.58	-1.05	-1.82	1.45	-0.71
DNK	-4.30	0.18	-2.34	-0.70	-0.14	-0.68	0.21	-0.29
FIN	-2.27	0.11	-1.36	-0.45	-0.09	-0.50	0.11	-0.18
FRA	-4.67	0.22	-2.50	-0.65	-0.19	-0.70	0.23	-0.24
DEU	-3.16	0.15	-1.86	-0.55	-0.17	-0.61	0.20	-0.21
GRC	-2.70	0.11	-1.45	-0.57	-0.13	-0.60	0.14	-0.21
IRL	-0.64	0.02	-0.31	-0.17	0.02	-0.32	-0.02	-0.12
ITA	-4.67	0.18	-2.25	-0.66	-0.20	-0.72	0.25	-0.23
LUX	-1.60	0.17	-3.20	-0.61	-0.83	-1.81	-0.17	0.35
NLD	-1.57	0.08	-1.09	-0.39	-0.08	-0.50	0.02	-0.15
PRT	-3.29	0.14	-1.57	-0.34	-0.07	-0.32	0.13	-0.14
ESP	-0.67	0.03	-0.41	-0.13	-0.01	-0.17	0.01	-0.07
SWE	-3.54	0.16	-1.93	-0.53	-0.11	-0.47	0.19	-0.22
GBR	-2.94	0.16	-1.67	-0.34	-0.08	-0.27	0.16	-0.13
CYP	-0.51	0.02	-0.25	-0.07	-0.02	-0.16	0.01	-0.02
CZE	-0.55	0.02	-0.23	-0.08	-0.02	-0.14	0.02	-0.02
EST	-10.55	0.28	-3.92	-1.82	-0.17	-1.32	0.31	-0.80
HUN	0.27	-0.01	0.15	0.04	0.01	-0.05	-0.03	0.01
LVA	-3.19	0.11	-1.36	-0.52	-0.10	-0.52	0.11	-0.22
LTU	-4.63	0.17	-2.07	-0.75	-0.14	-0.73	0.17	-0.32
MLT	-1.13	0.06	-1.05	-0.24	-0.07	-0.31	0.08	-0.09
POL	0.52	-0.03	0.33	0.11	0.03	0.06	-0.04	0.04
SVK	-2.02	0.08	-1.13	-0.45	-0.09	-0.48	0.10	-0.17
SVN	-1.53	0.06	-0.65	-0.21	-0.05	-0.25	0.06	-0.08
BGR	-0.64	0.02	-0.30	-0.10	-0.02	-0.14	0.02	-0.04
ROM	-2.65	0.10	-1.13	-0.36	-0.07	-0.36	0.08	-0.16
EU	-2.92	0.13	-1.58	-0.45	-0.13	-0.46	0.18	-0.18

Table B.2: CCTB-WG25 for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.08	0.00	0.06	0.02	0.01	-0.03	-0.02	0.00
BEL	-14.77	0.62	-8.33	-2.54	-1.06	-1.81	1.46	-0.69
DNK	-3.84	0.16	-2.11	-0.63	-0.13	-0.60	0.19	-0.26
FIN	-1.76	0.09	-1.05	-0.34	-0.07	-0.39	0.08	-0.13
FRA	-4.19	0.20	-2.26	-0.59	-0.17	-0.63	0.22	-0.22
DEU	-2.33	0.11	-1.38	-0.41	-0.13	-0.46	0.15	-0.15
GRC	-2.14	0.08	-1.12	-0.43	-0.11	-0.47	0.11	-0.16
IRL	-0.39	0.01	-0.16	-0.11	0.03	-0.24	-0.03	-0.09
ITA	-3.80	0.14	-1.82	-0.52	-0.17	-0.58	0.20	-0.18
LUX	-1.31	0.14	-2.59	-0.50	-0.64	-1.48	-0.13	0.24
NLD	-1.11	0.06	-0.76	-0.27	-0.05	-0.38	-0.01	-0.12
PRT	-2.58	0.11	-1.24	-0.27	-0.06	-0.25	0.10	-0.11
ESP	-0.08	0.00	-0.01	-0.01	0.02	-0.04	-0.03	-0.02
SWE	-2.98	0.14	-1.63	-0.45	-0.09	-0.40	0.17	-0.18
GBR	-2.30	0.12	-1.31	-0.26	-0.06	-0.21	0.13	-0.10
CYP	-0.35	0.01	-0.17	-0.05	-0.02	-0.12	0.00	-0.01
CZE	0.07	-0.01	0.16	0.07	0.01	0.01	-0.02	0.03
EST	-10.12	0.27	-3.79	-1.76	-0.17	-1.26	0.31	-0.76
HUN	0.73	-0.04	0.42	0.13	0.03	0.04	-0.05	0.05
LVA	-2.77	0.09	-1.19	-0.46	-0.09	-0.45	0.10	-0.19
LTU	-4.18	0.15	-1.89	-0.68	-0.13	-0.67	0.15	-0.29
MLT	-0.71	0.04	-0.68	-0.16	-0.05	-0.20	0.05	-0.06
POL	1.07	-0.06	0.67	0.23	0.06	0.19	-0.07	0.09
SVK	-1.55	0.06	-0.85	-0.33	-0.07	-0.36	0.08	-0.12
SVN	-0.71	0.02	-0.28	-0.09	-0.03	-0.12	0.03	-0.03
BGR	-0.38	0.01	-0.16	-0.05	-0.01	-0.08	0.01	-0.02
ROM	-2.07	0.08	-0.91	-0.29	-0.06	-0.29	0.07	-0.13
EU	-2.39	0.10	-1.23	-0.34	-0.10	-0.36	0.15	-0.14

Table B.3: CCTB-EUav for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.40	-0.11	1.41	0.47	0.12	0.44	-0.17	0.18
BEL	-12.14	0.59	-7.85	-2.41	-1.06	-1.74	1.50	-0.61
DNK	-1.62	0.08	-0.98	-0.30	-0.06	-0.25	0.10	-0.13
FIN	0.20	-0.01	0.15	0.05	0.01	0.03	-0.03	0.02
FRA	-1.70	0.09	-1.00	-0.26	-0.08	-0.27	0.10	-0.10
DEU	0.77	-0.03	0.47	0.13	0.06	0.15	-0.07	0.03
GRC	-0.34	0.00	-0.07	-0.01	-0.02	-0.03	0.01	0.01
IRL	0.69	-0.03	0.49	0.16	0.06	0.07	-0.08	0.03
ITA	-0.65	0.02	-0.21	-0.04	-0.03	-0.07	0.03	0.00
LUX	-0.19	0.02	-0.21	-0.09	0.11	-0.16	-0.02	-0.17
NLD	0.93	-0.05	0.73	0.22	0.12	0.16	-0.16	0.02
PRT	-0.62	0.03	-0.32	-0.06	-0.02	-0.03	0.04	-0.01
ESP	2.49	-0.14	1.76	0.52	0.17	0.54	-0.23	0.16
SWE	-0.68	0.03	-0.41	-0.11	-0.03	-0.09	0.05	-0.04
GBR	0.38	-0.02	0.25	0.05	0.02	0.03	-0.04	0.01
CYP	0.70	-0.03	0.38	0.10	0.02	0.11	-0.03	0.04
CZE	1.84	-0.09	1.28	0.50	0.09	0.47	-0.14	0.17
EST	-8.39	0.23	-3.27	-1.51	-0.16	-1.04	0.29	-0.64
HUN	2.03	-0.10	1.19	0.38	0.07	0.34	-0.12	0.16
LVA	-1.59	0.06	-0.72	-0.28	-0.05	-0.26	0.06	-0.12
LTU	-3.06	0.12	-1.44	-0.52	-0.10	-0.49	0.12	-0.22
MLT	1.40	-0.07	1.26	0.26	0.11	0.33	-0.13	0.06
POL	2.75	-0.14	1.71	0.59	0.14	0.59	-0.18	0.24
SVK	-0.06	-0.01	0.05	0.03	-0.01	0.03	0.00	0.03
SVN	1.42	-0.06	0.73	0.24	0.06	0.23	-0.08	0.10
BGR	0.41	-0.02	0.25	0.09	0.01	0.09	-0.02	0.05
ROM	-0.60	0.03	-0.34	-0.11	-0.02	-0.09	0.03	-0.05
EU	-0.49	-0.01	0.14	0.05	0.01	0.06	0.00	0.01

Table B.4: CCTB-WG20 for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.76	0.03	-0.11	-0.05	0.02	-0.07	0.00	-0.05
BEL	-10.30	0.82	-5.22	-1.74	-0.80	-1.41	1.00	-0.42
DNK	-4.12	0.19	-1.27	-0.33	-0.08	-0.29	0.12	-0.12
FIN	-2.30	0.11	-0.67	-0.19	-0.04	-0.23	0.05	-0.08
FRA	-4.36	0.24	-1.11	-0.27	-0.08	-0.24	0.14	-0.10
DEU	-2.95	0.16	-0.67	-0.19	-0.07	-0.19	0.10	-0.06
GRC	-2.68	0.11	-0.43	-0.17	-0.04	-0.18	0.04	-0.06
IRL	-0.54	0.02	-0.07	-0.12	0.12	-0.14	-0.03	-0.19
ITA	-4.46	0.19	-0.69	-0.21	-0.06	-0.20	0.09	-0.07
LUX	-1.45	0.18	-2.25	-0.48	-0.19	-0.91	-0.03	-0.17
NLD	-1.19	0.10	-0.41	-0.20	0.15	-0.08	-0.02	-0.25
PRT	-3.03	0.15	-0.66	-0.15	-0.03	-0.14	0.05	-0.06
ESP	-0.61	0.04	-0.17	-0.05	0.01	-0.07	0.00	-0.04
SWE	-3.01	0.18	-0.95	-0.25	-0.04	-0.16	0.11	-0.11
GBR	-2.01	0.18	-0.65	-0.14	-0.01	-0.06	0.07	-0.08
CYP	-0.46	0.02	-0.10	-0.04	0.01	-0.09	-0.01	-0.04
CZE	-0.56	0.02	-0.11	-0.03	-0.01	-0.08	0.00	-0.01
EST	-10.73	0.27	-1.68	-0.68	-0.12	-0.48	0.13	-0.24
HUN	0.25	-0.01	0.07	0.01	0.01	-0.06	-0.02	-0.01
LVA	-3.12	0.11	-0.45	-0.17	-0.03	-0.19	0.03	-0.07
LTU	-4.64	0.17	-0.69	-0.24	-0.05	-0.26	0.05	-0.10
MLT	-1.28	0.05	-0.74	-0.12	-0.07	-0.18	0.07	-0.01
POL	0.51	-0.03	0.13	0.04	0.02	0.00	-0.02	0.01
SVK	-2.10	0.07	-0.56	-0.18	-0.06	-0.23	0.04	-0.05
SVN	-1.55	0.06	-0.26	-0.08	-0.02	-0.11	0.02	-0.03
BGR	-0.63	0.02	-0.13	-0.04	-0.01	-0.07	0.01	-0.02
ROM	-2.57	0.10	-0.40	-0.13	-0.03	-0.15	0.03	-0.05
EU	-2.62	0.14	-0.65	-0.18	-0.05	-0.17	0.09	-0.09

Table B.5: CCTB-WG25 for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.07	0.00	0.04	0.00	0.03	-0.02	-0.02	-0.02
BEL	-9.42	0.81	-5.18	-1.73	-0.81	-1.45	1.01	-0.40
DNK	-3.67	0.17	-1.16	-0.30	-0.08	-0.26	0.11	-0.10
FIN	-1.78	0.08	-0.52	-0.15	-0.03	-0.18	0.04	-0.06
FRA	-3.91	0.21	-1.02	-0.25	-0.08	-0.21	0.13	-0.08
DEU	-2.17	0.11	-0.51	-0.14	-0.05	-0.14	0.08	-0.05
GRC	-2.12	0.08	-0.34	-0.13	-0.03	-0.14	0.04	-0.05
IRL	-0.32	0.01	0.01	-0.08	0.12	-0.09	-0.04	-0.16
ITA	-3.62	0.15	-0.58	-0.17	-0.06	-0.16	0.08	-0.05
LUX	-1.19	0.15	-1.87	-0.40	-0.15	-0.77	-0.01	-0.14
NLD	-0.84	0.07	-0.27	-0.14	0.13	-0.06	-0.03	-0.20
PRT	-2.36	0.12	-0.53	-0.12	-0.03	-0.11	0.05	-0.04
ESP	-0.07	0.00	0.01	0.00	0.03	-0.02	-0.02	-0.03
SWE	-2.52	0.15	-0.82	-0.21	-0.04	-0.14	0.09	-0.09
GBR	-1.56	0.14	-0.52	-0.11	-0.01	-0.05	0.05	-0.06
CYP	-0.32	0.01	-0.07	-0.03	0.01	-0.07	-0.01	-0.03
CZE	0.07	-0.01	0.08	0.03	0.01	-0.01	-0.01	0.00
EST	-10.30	0.27	-1.64	-0.66	-0.12	-0.46	0.13	-0.23
HUN	0.67	-0.04	0.20	0.05	0.02	-0.01	-0.03	0.01
LVA	-2.70	0.09	-0.40	-0.15	-0.03	-0.17	0.03	-0.06
LTU	-4.18	0.15	-0.63	-0.22	-0.05	-0.24	0.05	-0.09
MLT	-0.81	0.03	-0.48	-0.08	-0.05	-0.12	0.04	-0.01
POL	1.05	-0.06	0.28	0.08	0.03	0.05	-0.04	0.02
SVK	-1.61	0.05	-0.43	-0.13	-0.05	-0.18	0.04	-0.03
SVN	-0.72	0.02	-0.11	-0.03	-0.01	-0.06	0.01	-0.01
BGR	-0.37	0.01	-0.07	-0.02	-0.01	-0.05	0.00	-0.01
ROM	-2.01	0.08	-0.33	-0.10	-0.02	-0.12	0.02	-0.04
EU	-2.10	0.11	-0.52	-0.15	-0.04	-0.13	0.08	-0.07

Table B.6: CCTB-EUav for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.12	-0.12	0.60	0.19	0.06	0.17	-0.09	0.06
BEL	-6.05	0.77	-5.02	-1.69	-0.85	-1.59	1.02	-0.35
DNK	-1.54	0.08	-0.57	-0.14	-0.05	-0.11	0.07	-0.04
FIN	0.21	-0.01	0.09	0.02	0.02	0.02	-0.02	0.00
FRA	-1.57	0.09	-0.49	-0.11	-0.04	-0.09	0.07	-0.03
DEU	0.71	-0.04	0.20	0.05	0.04	0.06	-0.04	0.00
GRC	-0.34	0.00	-0.02	0.00	-0.01	-0.01	0.01	0.00
IRL	0.57	-0.03	0.34	0.09	0.11	0.12	-0.05	-0.06
ITA	-0.62	0.02	-0.08	-0.01	-0.01	-0.02	0.02	0.00
LUX	-0.18	0.02	-0.26	-0.07	0.03	-0.14	0.07	-0.09
NLD	0.69	-0.06	0.46	0.11	0.10	0.10	-0.10	-0.03
PRT	-0.57	0.03	-0.15	-0.03	-0.02	0.00	0.03	0.01
ESP	2.25	-0.15	0.92	0.23	0.13	0.23	-0.15	0.02
SWE	-0.57	0.04	-0.22	-0.05	-0.02	-0.03	0.03	-0.02
GBR	0.25	-0.02	0.11	0.02	0.01	0.01	-0.02	0.00
CYP	0.63	-0.04	0.18	0.05	0.01	0.06	-0.01	0.02
CZE	1.85	-0.09	0.65	0.21	0.07	0.23	-0.08	0.05
EST	-8.56	0.23	-1.46	-0.58	-0.12	-0.37	0.13	-0.19
HUN	1.87	-0.10	0.59	0.16	0.05	0.18	-0.06	0.05
LVA	-1.55	0.06	-0.25	-0.09	-0.02	-0.09	0.02	-0.04
LTU	-3.06	0.12	-0.50	-0.17	-0.04	-0.17	0.04	-0.07
MLT	1.60	-0.06	0.95	0.14	0.11	0.19	-0.11	-0.02
POL	2.68	-0.14	0.76	0.23	0.08	0.24	-0.08	0.07
SVK	-0.06	-0.01	0.02	0.01	0.00	0.02	0.00	0.01
SVN	1.44	-0.06	0.31	0.09	0.03	0.10	-0.03	0.03
BGR	0.41	-0.02	0.11	0.04	0.01	0.05	-0.01	0.02
ROM	-0.58	0.03	-0.12	-0.04	-0.01	-0.03	0.01	-0.02
EU	-0.30	-0.01	0.05	0.01	0.01	0.02	0.01	-0.01

Table B.7: CCTB-WG20 for all firms with tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-1.02	0.02	-0.29	-0.09	-0.02	-0.16	0.01	-0.04
BEL	-17.46	0.54	-7.31	-2.19	-0.90	-1.29	1.21	-0.60
DNK	-5.00	0.16	-2.06	-0.59	-0.14	-0.60	0.18	-0.22
FIN	-2.73	0.09	-1.18	-0.37	-0.09	-0.45	0.08	-0.13
FRA	-5.91	0.17	-2.01	-0.47	-0.18	-0.55	0.19	-0.14
DEU	-4.24	0.11	-1.45	-0.38	-0.15	-0.46	0.16	-0.11
GRC	-3.20	0.09	-1.24	-0.46	-0.12	-0.52	0.12	-0.16
IRL	-0.70	0.02	-0.29	-0.15	0.02	-0.34	-0.03	-0.11
ITA	-6.21	0.13	-1.71	-0.44	-0.18	-0.54	0.19	-0.11
LUX	-2.00	0.14	-2.94	-0.45	-0.90	-1.81	-0.23	0.53
NLD	-1.89	0.07	-0.96	-0.32	-0.08	-0.47	-0.01	-0.12
PRT	-3.92	0.12	-1.37	-0.29	-0.07	-0.28	0.11	-0.11
ESP	-0.89	0.03	-0.31	-0.09	-0.01	-0.15	0.00	-0.04
SWE	-4.27	0.14	-1.66	-0.43	-0.10	-0.39	0.16	-0.16
GBR	-3.65	0.13	-1.43	-0.27	-0.07	-0.20	0.13	-0.09
CYP	-0.54	0.02	-0.24	-0.07	-0.02	-0.17	0.00	-0.02
CZE	-0.66	0.01	-0.18	-0.05	-0.02	-0.14	0.01	-0.01
EST	-11.33	0.25	-3.59	-1.66	-0.17	-1.19	0.27	-0.71
HUN	0.30	-0.01	0.15	0.04	0.02	-0.07	-0.03	0.01
LVA	-3.45	0.10	-1.28	-0.48	-0.10	-0.50	0.10	-0.20
LTU	-5.06	0.15	-1.91	-0.68	-0.14	-0.68	0.15	-0.28
MLT	-1.52	0.05	-0.83	-0.17	-0.07	-0.25	0.06	-0.04
POL	0.60	-0.03	0.31	0.10	0.03	0.04	-0.04	0.04
SVK	-2.28	0.07	-1.02	-0.39	-0.09	-0.45	0.09	-0.14
SVN	-1.80	0.05	-0.56	-0.18	-0.05	-0.22	0.05	-0.06
BGR	-0.67	0.02	-0.28	-0.10	-0.02	-0.14	0.02	-0.04
ROM	-2.89	0.09	-1.06	-0.33	-0.07	-0.34	0.07	-0.14
EU	-3.42	0.10	-1.29	-0.34	-0.12	-0.37	0.15	-0.11

Table B.8: CCTB-WG20 for multinationals with tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.91	0.03	-0.09	-0.04	0.02	-0.07	-0.01	-0.04
BEL	-12.01	0.72	-4.79	-1.56	-0.72	-1.11	0.89	-0.37
DNK	-4.79	0.16	-1.13	-0.28	-0.08	-0.25	0.10	-0.09
FIN	-2.76	0.09	-0.58	-0.16	-0.04	-0.21	0.04	-0.06
FRA	-5.53	0.19	-0.91	-0.20	-0.08	-0.16	0.12	-0.05
DEU	-3.95	0.12	-0.53	-0.13	-0.06	-0.12	0.09	-0.03
GRC	-3.17	0.09	-0.38	-0.14	-0.04	-0.15	0.04	-0.05
IRL	-0.59	0.02	-0.07	-0.10	0.11	-0.17	-0.03	-0.17
ITA	-5.92	0.14	-0.56	-0.14	-0.06	-0.13	0.08	-0.03
LUX	-1.82	0.15	-2.07	-0.36	-0.30	-0.97	-0.10	0.03
NLD	-1.44	0.08	-0.37	-0.17	0.12	-0.10	-0.04	-0.20
PRT	-3.61	0.13	-0.58	-0.13	-0.03	-0.12	0.05	-0.05
ESP	-0.80	0.03	-0.13	-0.03	0.01	-0.06	-0.01	-0.03
SWE	-3.65	0.16	-0.83	-0.20	-0.04	-0.12	0.09	-0.09
GBR	-2.52	0.16	-0.57	-0.11	-0.01	-0.03	0.06	-0.06
CYP	-0.49	0.02	-0.10	-0.04	0.01	-0.10	-0.01	-0.03
CZE	-0.67	0.01	-0.08	-0.02	-0.01	-0.08	0.00	-0.01
EST	-11.49	0.25	-1.57	-0.63	-0.11	-0.43	0.12	-0.22
HUN	0.28	-0.01	0.07	0.01	0.02	-0.07	-0.02	-0.01
LVA	-3.37	0.10	-0.43	-0.16	-0.03	-0.18	0.03	-0.07
LTU	-5.07	0.15	-0.64	-0.22	-0.05	-0.24	0.05	-0.08
MLT	-1.72	0.04	-0.56	-0.08	-0.05	-0.14	0.05	0.00
POL	0.59	-0.03	0.13	0.03	0.02	-0.01	-0.02	0.00
SVK	-2.36	0.07	-0.50	-0.15	-0.05	-0.22	0.04	-0.04
SVN	-1.82	0.05	-0.22	-0.07	-0.02	-0.10	0.02	-0.02
BGR	-0.67	0.02	-0.12	-0.04	-0.01	-0.07	0.01	-0.01
ROM	-2.81	0.10	-0.38	-0.12	-0.03	-0.14	0.02	-0.05
EU	-3.08	0.12	-0.55	-0.14	-0.04	-0.13	0.08	-0.06

Table B.9: CCTB-WG20 for all firms with discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.85	0.03	-0.38	-0.21	-0.01	-0.28	0.01	-0.12
BEL	-15.64	0.63	-6.34	0.17	-1.18	0.84	1.47	0.98
DNK	-4.34	0.18	-2.17	-0.58	-0.13	-0.53	0.21	-0.22
FIN	-2.27	0.11	-1.50	-0.51	-0.12	-0.60	0.10	-0.19
FRA	-4.67	0.22	-2.40	-0.54	-0.20	-0.60	0.22	-0.17
DEU	-3.16	0.15	-1.86	-0.56	-0.17	-0.61	0.20	-0.21
GRC	-2.71	0.11	-1.47	-0.58	-0.13	-0.61	0.14	-0.22
IRL	-0.64	0.02	-0.52	-0.49	-0.09	-0.89	-0.04	-0.19
ITA	-4.68	0.18	-2.25	-0.62	-0.20	-0.68	0.25	-0.21
LUX	-1.60	0.17	-3.75	-1.03	-0.79	-2.20	-0.15	0.00
NLD	-1.58	0.08	-1.36	-0.62	-0.10	-0.82	0.00	-0.27
PRT	-3.28	0.14	-1.55	-0.34	-0.06	-0.30	0.12	-0.16
ESP	-0.67	0.03	-0.59	-0.28	-0.05	-0.38	0.00	-0.12
SWE	-3.54	0.16	-1.90	-0.50	-0.11	-0.44	0.19	-0.20
GBR	-2.95	0.16	-1.68	-0.36	-0.08	-0.29	0.16	-0.14
CYP	-0.51	0.02	-0.39	-0.21	-0.03	-0.41	0.00	-0.11
CZE	-0.56	0.02	-0.48	-0.23	-0.06	-0.38	0.03	-0.07
EST	-10.58	0.28	-2.63	-0.92	-0.02	-0.05	0.33	-0.47
HUN	0.27	-0.01	-0.08	-0.13	-0.02	-0.34	-0.04	-0.06
LVA	-3.20	0.11	-1.37	-0.52	-0.10	-0.52	0.11	-0.22
LTU	-4.63	0.17	-2.02	-0.72	-0.13	-0.69	0.17	-0.31
MLT	-1.12	0.06	-1.73	-0.44	-0.15	-0.54	0.15	-0.13
POL	0.52	-0.03	0.14	0.01	-0.01	-0.12	-0.04	0.01
SVK	-2.02	0.08	-1.28	-0.51	-0.11	-0.57	0.11	-0.18
SVN	-1.53	0.06	-0.75	-0.28	-0.07	-0.34	0.07	-0.10
BGR	-0.64	0.02	-0.56	-0.22	-0.06	-0.36	0.02	-0.08
ROM	-2.65	0.10	-1.14	-0.37	-0.08	-0.39	0.08	-0.16
EU	-2.93	0.13	-1.58	-0.42	-0.14	-0.46	0.18	-0.14

Table B.10: CCTB-WG20 for multinationals with discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.76	0.03	-0.14	-0.13	0.03	-0.17	-0.01	-0.10
BEL	-10.30	0.82	-5.37	-0.70	-1.03	-0.53	1.25	0.35
DNK	-4.21	0.19	-1.18	-0.20	-0.08	-0.13	0.13	-0.04
FIN	-2.29	0.11	-0.72	-0.22	-0.06	-0.28	0.05	-0.08
FRA	-4.35	0.24	-1.04	-0.16	-0.09	-0.12	0.14	-0.03
DEU	-2.95	0.16	-0.65	-0.18	-0.06	-0.17	0.10	-0.06
GRC	-2.69	0.11	-0.47	-0.18	-0.04	-0.19	0.05	-0.07
IRL	-0.53	0.02	-0.22	-0.39	0.05	-0.62	-0.05	-0.28
ITA	-4.47	0.19	-0.70	-0.16	-0.06	-0.15	0.10	-0.05
LUX	-1.46	0.18	-2.65	-0.79	-0.15	-1.21	0.00	-0.43
NLD	-1.29	0.09	-0.71	-0.43	0.13	-0.39	-0.02	-0.36
PRT	-3.02	0.15	-0.65	-0.14	-0.02	-0.11	0.06	-0.07
ESP	-0.61	0.04	-0.32	-0.18	-0.02	-0.25	0.00	-0.09
SWE	-2.99	0.18	-0.92	-0.22	-0.05	-0.14	0.10	-0.09
GBR	-2.00	0.18	-0.62	-0.18	-0.01	-0.11	0.06	-0.11
CYP	-0.46	0.02	-0.22	-0.16	0.01	-0.30	-0.01	-0.12
CZE	-0.56	0.02	-0.32	-0.17	-0.04	-0.29	0.01	-0.05
EST	-10.76	0.27	-0.87	0.10	-0.03	0.64	0.19	0.08
HUN	0.25	-0.01	-0.14	-0.14	-0.02	-0.33	-0.03	-0.07
LVA	-3.12	0.11	-0.44	-0.17	-0.03	-0.18	0.03	-0.07
LTU	-4.62	0.17	-0.60	-0.20	-0.04	-0.19	0.05	-0.09
MLT	-1.27	0.05	-1.20	-0.26	-0.12	-0.34	0.11	-0.04
POL	0.51	-0.03	-0.05	-0.06	-0.02	-0.17	-0.02	-0.02
SVK	-2.09	0.07	-0.62	-0.21	-0.07	-0.28	0.05	-0.06
SVN	-1.55	0.06	-0.33	-0.13	-0.04	-0.18	0.02	-0.04
BGR	-0.63	0.02	-0.36	-0.14	-0.05	-0.27	0.01	-0.05
ROM	-2.57	0.10	-0.40	-0.13	-0.03	-0.15	0.03	-0.05
EU	-2.62	0.14	-0.69	-0.18	-0.06	-0.19	0.10	-0.07

Table B.11: CCTB-WG20 for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-1.02	0.02	-0.33	-0.18	-0.01	-0.27	0.01	-0.10
BEL	-17.54	0.54	-5.32	0.45	-1.02	1.29	1.24	1.03
DNK	-5.02	0.16	-1.91	-0.49	-0.13	-0.47	0.17	-0.16
FIN	-2.72	0.09	-1.32	-0.43	-0.12	-0.55	0.08	-0.14
FRA	-5.91	0.17	-1.90	-0.35	-0.19	-0.43	0.18	-0.06
DEU	-4.24	0.11	-1.45	-0.38	-0.15	-0.46	0.16	-0.11
GRC	-3.21	0.09	-1.27	-0.47	-0.12	-0.53	0.12	-0.16
IRL	-0.71	0.02	-0.49	-0.44	-0.10	-0.86	-0.04	-0.16
ITA	-6.21	0.13	-1.71	-0.39	-0.17	-0.47	0.19	-0.09
LUX	-1.99	0.14	-3.56	-0.89	-0.89	-2.25	-0.23	0.21
NLD	-1.89	0.07	-1.23	-0.56	-0.11	-0.81	-0.02	-0.23
PRT	-3.92	0.12	-1.35	-0.29	-0.05	-0.26	0.10	-0.13
ESP	-0.89	0.03	-0.50	-0.25	-0.05	-0.37	-0.01	-0.10
SWE	-4.27	0.14	-1.63	-0.40	-0.10	-0.36	0.16	-0.15
GBR	-3.66	0.13	-1.43	-0.29	-0.08	-0.22	0.13	-0.10
CYP	-0.54	0.02	-0.35	-0.18	-0.02	-0.36	0.00	-0.10
CZE	-0.66	0.01	-0.42	-0.20	-0.06	-0.36	0.02	-0.05
EST	-11.32	0.25	-2.44	-0.87	-0.02	-0.09	0.29	-0.44
HUN	0.30	-0.01	-0.06	-0.11	-0.02	-0.31	-0.03	-0.05
LVA	-3.45	0.10	-1.28	-0.48	-0.10	-0.50	0.10	-0.19
LTU	-5.06	0.15	-1.87	-0.66	-0.13	-0.65	0.15	-0.27
MLT	-1.52	0.05	-1.50	-0.37	-0.14	-0.49	0.11	-0.09
POL	0.60	-0.03	0.13	0.01	0.00	-0.11	-0.04	0.01
SVK	-2.27	0.07	-1.15	-0.45	-0.10	-0.53	0.09	-0.16
SVN	-1.80	0.05	-0.65	-0.24	-0.07	-0.31	0.06	-0.08
BGR	-0.68	0.02	-0.51	-0.20	-0.06	-0.33	0.02	-0.07
ROM	-2.90	0.09	-1.07	-0.34	-0.08	-0.37	0.07	-0.14
EU	-3.42	0.10	-1.29	-0.30	-0.13	-0.36	0.14	-0.07

Table B.12: CCTB-WG25 for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.10	0.00	0.02	-0.07	0.02	-0.16	-0.03	-0.06
BEL	-16.85	0.53	-5.21	0.50	-1.04	1.32	1.26	1.06
DNK	-4.50	0.14	-1.66	-0.40	-0.12	-0.37	0.16	-0.13
FIN	-2.11	0.07	-1.03	-0.33	-0.10	-0.44	0.06	-0.10
FRA	-5.34	0.15	-1.69	-0.29	-0.17	-0.35	0.17	-0.03
DEU	-3.16	0.08	-1.08	-0.29	-0.12	-0.36	0.12	-0.08
GRC	-2.55	0.07	-0.98	-0.36	-0.10	-0.42	0.10	-0.12
IRL	-0.43	0.01	-0.33	-0.34	-0.09	-0.73	-0.05	-0.11
ITA	-5.11	0.11	-1.38	-0.31	-0.15	-0.38	0.16	-0.06
LUX	-1.63	0.11	-2.83	-0.72	-0.65	-1.79	-0.19	0.09
NLD	-1.35	0.05	-0.92	-0.44	-0.07	-0.67	-0.05	-0.19
PRT	-3.09	0.10	-1.07	-0.23	-0.04	-0.21	0.08	-0.10
ESP	-0.10	0.00	-0.19	-0.16	-0.02	-0.27	-0.04	-0.08
SWE	-3.61	0.12	-1.38	-0.33	-0.09	-0.29	0.14	-0.11
GBR	-2.88	0.11	-1.13	-0.23	-0.06	-0.18	0.10	-0.08
CYP	-0.37	0.01	-0.25	-0.14	-0.02	-0.29	0.00	-0.08
CZE	0.08	-0.01	-0.09	-0.08	-0.03	-0.23	-0.01	-0.01
EST	-10.89	0.25	-2.27	-0.78	-0.02	0.03	0.29	-0.39
HUN	0.82	-0.03	0.20	-0.02	0.00	-0.21	-0.06	-0.01
LVA	-3.00	0.09	-1.12	-0.42	-0.09	-0.43	0.09	-0.17
LTU	-4.57	0.14	-1.70	-0.59	-0.12	-0.58	0.14	-0.24
MLT	-0.96	0.03	-1.15	-0.29	-0.11	-0.38	0.09	-0.08
POL	1.24	-0.05	0.44	0.11	0.02	0.01	-0.07	0.05
SVK	-1.74	0.05	-0.88	-0.34	-0.08	-0.41	0.07	-0.11
SVN	-0.84	0.02	-0.34	-0.14	-0.04	-0.21	0.02	-0.04
BGR	-0.40	0.01	-0.35	-0.14	-0.05	-0.25	0.01	-0.04
ROM	-2.28	0.08	-0.87	-0.28	-0.06	-0.30	0.06	-0.12
EU	-2.80	0.08	-1.00	-0.22	-0.11	-0.27	0.12	-0.04

Table B.13: CCTB-EUav for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	3.01	-0.10	1.20	0.31	0.11	0.26	-0.16	0.08
BEL	-14.20	0.50	-4.76	0.71	-1.09	1.55	1.31	1.22
DNK	-1.94	0.07	-0.57	-0.07	-0.04	0.03	0.08	0.00
FIN	0.25	-0.01	0.08	0.03	-0.01	-0.01	-0.03	0.02
FRA	-2.23	0.07	-0.67	-0.05	-0.07	-0.04	0.07	0.03
DEU	1.09	-0.03	0.34	0.05	0.05	0.06	-0.07	-0.01
GRC	-0.41	0.00	-0.04	0.00	-0.02	-0.02	0.01	0.02
IRL	0.77	-0.03	0.35	0.07	-0.03	-0.15	-0.08	0.08
ITA	-0.91	0.01	-0.15	0.00	-0.03	-0.02	0.03	0.03
LUX	-0.24	0.02	0.11	-0.02	0.31	0.07	-0.04	-0.32
NLD	1.15	-0.04	0.50	0.05	0.11	-0.08	-0.18	-0.07
PRT	-0.76	0.02	-0.27	-0.01	-0.01	0.08	0.05	0.00
ESP	3.47	-0.11	1.20	0.19	0.12	0.16	-0.20	0.01
SWE	-0.85	0.03	-0.31	-0.02	-0.04	0.00	0.04	0.02
GBR	0.49	-0.02	0.22	0.02	0.01	-0.01	-0.04	-0.01
CYP	0.75	-0.03	0.32	0.06	0.01	0.03	-0.03	0.03
CZE	2.26	-0.08	0.93	0.30	0.06	0.24	-0.12	0.10
EST	-9.14	0.21	-1.57	-0.38	0.00	0.49	0.29	-0.21
HUN	2.31	-0.09	0.98	0.25	0.05	0.15	-0.11	0.10
LVA	-1.74	0.05	-0.64	-0.22	-0.04	-0.19	0.06	-0.09
LTU	-3.38	0.11	-1.25	-0.42	-0.08	-0.37	0.11	-0.18
MLT	1.95	-0.05	0.43	0.01	0.04	0.06	-0.05	-0.04
POL	3.23	-0.13	1.42	0.45	0.11	0.41	-0.16	0.18
SVK	-0.07	0.00	0.06	0.04	-0.01	0.04	0.00	0.02
SVN	1.72	-0.06	0.57	0.16	0.04	0.13	-0.07	0.06
BGR	0.44	-0.02	0.21	0.07	0.01	0.06	-0.02	0.04
ROM	-0.67	0.03	-0.31	-0.09	-0.01	-0.05	0.02	-0.04
EU	-0.51	-0.01	0.14	0.08	0.00	0.09	0.00	0.05

Table B.14: CCTB-WG20 for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.91	0.03	-0.12	-0.11	0.02	-0.17	-0.01	-0.09
BEL	-12.00	0.72	-4.85	-0.49	-0.92	-0.16	1.11	0.40
DNK	-4.85	0.16	-1.00	-0.16	-0.07	-0.10	0.11	-0.02
FIN	-2.74	0.09	-0.63	-0.19	-0.06	-0.26	0.04	-0.06
FRA	-5.52	0.19	-0.83	-0.08	-0.08	-0.03	0.12	0.02
DEU	-3.95	0.12	-0.53	-0.12	-0.06	-0.11	0.09	-0.02
GRC	-3.18	0.09	-0.40	-0.15	-0.04	-0.17	0.04	-0.05
IRL	-0.58	0.02	-0.20	-0.35	0.03	-0.61	-0.05	-0.23
ITA	-5.91	0.14	-0.57	-0.09	-0.06	-0.07	0.09	0.00
LUX	-1.80	0.15	-2.52	-0.70	-0.30	-1.31	-0.08	-0.23
NLD	-1.53	0.08	-0.66	-0.40	0.10	-0.42	-0.04	-0.31
PRT	-3.61	0.13	-0.56	-0.11	-0.02	-0.09	0.05	-0.06
ESP	-0.81	0.03	-0.29	-0.18	-0.02	-0.25	-0.01	-0.08
SWE	-3.60	0.16	-0.80	-0.18	-0.04	-0.10	0.09	-0.07
GBR	-2.49	0.16	-0.54	-0.16	-0.01	-0.08	0.05	-0.09
CYP	-0.49	0.02	-0.19	-0.14	0.01	-0.27	-0.01	-0.10
CZE	-0.67	0.01	-0.28	-0.15	-0.04	-0.28	0.01	-0.04
EST	-11.48	0.25	-0.74	0.08	-0.01	0.59	0.16	0.06
HUN	0.28	-0.01	-0.13	-0.12	-0.02	-0.30	-0.02	-0.06
LVA	-3.38	0.10	-0.41	-0.15	-0.03	-0.17	0.03	-0.06
LTU	-5.05	0.15	-0.55	-0.19	-0.04	-0.18	0.04	-0.08
MLT	-1.72	0.04	-1.03	-0.23	-0.11	-0.31	0.09	-0.04
POL	0.59	-0.03	-0.04	-0.05	-0.01	-0.16	-0.02	-0.02
SVK	-2.33	0.07	-0.54	-0.18	-0.06	-0.26	0.04	-0.05
SVN	-1.82	0.05	-0.29	-0.11	-0.03	-0.17	0.02	-0.04
BGR	-0.67	0.02	-0.32	-0.12	-0.04	-0.24	0.01	-0.04
ROM	-2.83	0.10	-0.37	-0.12	-0.03	-0.15	0.02	-0.05
EU	-3.08	0.12	-0.58	-0.14	-0.06	-0.14	0.08	-0.04

Table B.15: CCTB-WG25 for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.09	0.00	0.00	-0.08	0.03	-0.14	-0.03	-0.07
BEL	-11.04	0.71	-4.79	-0.52	-0.93	-0.24	1.10	0.39
DNK	-4.34	0.15	-0.87	-0.11	-0.07	-0.04	0.10	0.00
FIN	-2.13	0.07	-0.50	-0.15	-0.05	-0.21	0.03	-0.04
FRA	-4.98	0.17	-0.74	-0.05	-0.07	0.01	0.12	0.03
DEU	-2.94	0.09	-0.40	-0.10	-0.05	-0.10	0.07	-0.02
GRC	-2.54	0.07	-0.32	-0.11	-0.03	-0.13	0.03	-0.04
IRL	-0.35	0.01	-0.12	-0.28	0.03	-0.51	-0.05	-0.19
ITA	-4.86	0.11	-0.47	-0.07	-0.05	-0.06	0.08	0.00
LUX	-1.48	0.13	-2.03	-0.56	-0.20	-1.05	-0.05	-0.22
NLD	-1.08	0.06	-0.49	-0.32	0.09	-0.36	-0.05	-0.26
PRT	-2.84	0.10	-0.45	-0.09	-0.01	-0.07	0.04	-0.04
ESP	-0.09	0.00	-0.14	-0.14	-0.01	-0.22	-0.03	-0.08
SWE	-3.03	0.13	-0.68	-0.14	-0.04	-0.08	0.08	-0.05
GBR	-1.94	0.12	-0.43	-0.13	-0.01	-0.08	0.04	-0.07
CYP	-0.34	0.01	-0.14	-0.11	0.01	-0.22	-0.01	-0.08
CZE	0.08	-0.01	-0.14	-0.11	-0.02	-0.22	-0.01	-0.03
EST	-11.05	0.24	-0.66	0.13	-0.01	0.67	0.16	0.08
HUN	0.76	-0.04	-0.01	-0.08	-0.01	-0.25	-0.03	-0.04
LVA	-2.93	0.09	-0.36	-0.13	-0.03	-0.14	0.03	-0.05
LTU	-4.56	0.14	-0.50	-0.17	-0.03	-0.15	0.04	-0.07
MLT	-1.09	0.02	-0.82	-0.19	-0.08	-0.25	0.07	-0.04
POL	1.21	-0.05	0.08	-0.01	0.00	-0.11	-0.03	-0.01
SVK	-1.80	0.05	-0.42	-0.14	-0.05	-0.20	0.03	-0.04
SVN	-0.85	0.02	-0.18	-0.08	-0.02	-0.14	0.01	-0.03
BGR	-0.40	0.01	-0.24	-0.09	-0.03	-0.19	0.00	-0.03
ROM	-2.22	0.08	-0.30	-0.10	-0.02	-0.12	0.02	-0.04
EU	-2.48	0.09	-0.47	-0.11	-0.05	-0.11	0.07	-0.03

Table B.16: CCTB-EUav for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.64	-0.10	0.46	0.07	0.05	0.01	-0.08	-0.01
BEL	-7.32	0.68	-4.57	-0.60	-0.94	-0.46	1.09	0.35
DNK	-1.86	0.07	-0.24	0.06	-0.03	0.16	0.06	0.07
FIN	0.25	-0.01	0.04	0.01	0.00	-0.01	-0.02	0.01
FRA	-2.06	0.07	-0.27	0.05	-0.03	0.11	0.07	0.06
DEU	1.01	-0.03	0.14	0.00	0.03	0.00	-0.04	-0.02
GRC	-0.41	0.00	-0.01	0.01	0.00	0.00	0.01	0.01
IRL	0.62	-0.03	0.23	0.02	0.03	-0.05	-0.05	-0.02
ITA	-0.86	0.01	-0.06	0.02	-0.01	0.02	0.02	0.02
LUX	-0.22	0.02	0.09	0.01	0.24	0.13	0.07	-0.22
NLD	0.91	-0.05	0.35	0.00	0.10	-0.06	-0.11	-0.09
PRT	-0.70	0.03	-0.12	0.02	-0.01	0.10	0.03	0.02
ESP	3.13	-0.12	0.54	0.00	0.07	-0.07	-0.13	-0.06
SWE	-0.70	0.03	-0.15	0.02	-0.03	0.05	0.03	0.04
GBR	0.31	-0.02	0.09	0.01	0.01	-0.01	-0.02	0.00
CYP	0.68	-0.03	0.13	0.02	0.00	-0.01	-0.01	0.01
CZE	2.27	-0.08	0.37	0.06	0.03	0.02	-0.06	0.01
EST	-9.29	0.21	-0.30	0.34	0.00	0.96	0.17	0.18
HUN	2.13	-0.10	0.38	0.06	0.02	-0.01	-0.05	0.01
LVA	-1.70	0.05	-0.19	-0.05	-0.01	-0.02	0.02	-0.02
LTU	-3.37	0.11	-0.35	-0.10	-0.02	-0.05	0.04	-0.04
MLT	2.23	-0.04	0.09	-0.09	0.02	-0.08	-0.03	-0.08
POL	3.15	-0.13	0.50	0.12	0.04	0.07	-0.07	0.04
SVK	-0.07	-0.01	0.04	0.02	0.00	0.03	0.00	0.01
SVN	1.74	-0.06	0.19	0.03	0.01	0.01	-0.03	0.01
BGR	0.44	-0.02	0.08	0.02	0.00	0.03	-0.01	0.01
ROM	-0.65	0.03	-0.10	-0.02	0.00	0.01	0.01	-0.01
EU	-0.29	-0.01	0.01	0.01	-0.01	0.01	0.01	0.01

Table B.17: CCTB-WG20 for all firms with weaker investment response

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.84	0.03	-0.25	-0.12	-0.02	-0.14	0.02	-0.05
BEL	-15.31	0.64	-6.44	-2.60	-1.07	-1.25	1.48	-0.72
DNK	-4.30	0.18	-1.73	-0.71	-0.15	-0.51	0.22	-0.29
FIN	-2.27	0.11	-1.01	-0.45	-0.10	-0.40	0.12	-0.18
FRA	-4.67	0.22	-1.86	-0.66	-0.21	-0.55	0.25	-0.24
DEU	-3.15	0.15	-1.40	-0.56	-0.18	-0.48	0.22	-0.20
GRC	-2.70	0.11	-1.09	-0.57	-0.14	-0.47	0.15	-0.21
IRL	-0.64	0.02	-0.22	-0.17	0.02	-0.29	-0.02	-0.12
ITA	-4.67	0.18	-1.68	-0.66	-0.21	-0.57	0.26	-0.22
LUX	-1.59	0.17	-2.52	-0.63	-0.83	-1.59	-0.14	0.34
NLD	-1.57	0.08	-0.81	-0.39	-0.09	-0.41	0.03	-0.15
PRT	-3.29	0.14	-1.15	-0.35	-0.08	-0.24	0.13	-0.14
ESP	-0.67	0.03	-0.30	-0.13	-0.02	-0.14	0.01	-0.06
SWE	-3.54	0.16	-1.42	-0.53	-0.12	-0.35	0.20	-0.22
GBR	-2.94	0.16	-1.23	-0.34	-0.09	-0.19	0.17	-0.12
CYP	-0.51	0.02	-0.19	-0.07	-0.02	-0.15	0.01	-0.02
CZE	-0.55	0.02	-0.17	-0.08	-0.02	-0.12	0.02	-0.02
EST	-10.56	0.28	-2.88	-1.85	-0.18	-0.93	0.32	-0.80
HUN	0.27	-0.01	0.12	0.04	0.02	-0.06	-0.03	0.01
LVA	-3.19	0.11	-1.01	-0.53	-0.10	-0.41	0.12	-0.22
LTU	-4.64	0.17	-1.54	-0.76	-0.15	-0.57	0.18	-0.32
MLT	-1.13	0.06	-0.78	-0.25	-0.08	-0.24	0.09	-0.08
POL	0.52	-0.03	0.25	0.12	0.03	0.04	-0.04	0.04
SVK	-2.02	0.08	-0.84	-0.45	-0.09	-0.38	0.11	-0.17
SVN	-1.54	0.06	-0.48	-0.22	-0.06	-0.20	0.07	-0.08
BGR	-0.64	0.02	-0.22	-0.11	-0.02	-0.11	0.02	-0.04
ROM	-2.65	0.10	-0.83	-0.36	-0.07	-0.28	0.09	-0.16
EU	-2.92	0.13	-1.18	-0.45	-0.14	-0.36	0.19	-0.17

Table B.18: CCTB-WG20 for multinationals with weaker investment response

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.66	0.03	-0.08	-0.04	0.01	-0.05	0.00	-0.04
BEL	-7.50	0.94	-3.94	-1.32	-0.66	-0.86	0.89	-0.35
DNK	-3.54	0.22	-0.85	-0.24	-0.06	-0.14	0.09	-0.10
FIN	-2.03	0.12	-0.44	-0.14	-0.02	-0.13	0.04	-0.07
FRA	-3.80	0.26	-0.82	-0.21	-0.07	-0.12	0.12	-0.07
DEU	-2.57	0.17	-0.49	-0.14	-0.06	-0.10	0.09	-0.05
GRC	-2.47	0.12	-0.30	-0.13	-0.03	-0.11	0.04	-0.05
IRL	-0.44	0.03	-0.04	-0.09	0.09	-0.11	-0.03	-0.17
ITA	-3.93	0.21	-0.52	-0.16	-0.06	-0.11	0.08	-0.05
LUX	-0.90	0.23	-1.26	-0.31	0.03	-0.38	-0.27	-0.34
NLD	-0.94	0.11	-0.23	-0.14	0.14	0.00	-0.04	-0.24
PRT	-2.81	0.16	-0.49	-0.13	-0.03	-0.09	0.05	-0.05
ESP	-0.54	0.04	-0.11	-0.04	0.01	-0.04	0.00	-0.03
SWE	-2.56	0.20	-0.68	-0.19	-0.03	-0.07	0.09	-0.09
GBR	-1.70	0.19	-0.49	-0.11	-0.02	-0.02	0.06	-0.06
CYP	-0.41	0.02	-0.07	-0.03	0.01	-0.07	-0.01	-0.04
CZE	-0.52	0.02	-0.07	-0.03	-0.01	-0.06	0.00	-0.01
EST	-10.05	0.30	-1.15	-0.55	-0.11	-0.25	0.12	-0.22
HUN	0.23	-0.02	0.05	0.01	0.01	-0.06	-0.02	-0.01
LVA	-2.94	0.11	-0.33	-0.14	-0.03	-0.13	0.03	-0.06
LTU	-4.41	0.18	-0.49	-0.21	-0.05	-0.17	0.05	-0.09
MLT	-1.12	0.06	-0.45	-0.09	-0.05	-0.10	0.05	-0.01
POL	0.48	-0.03	0.09	0.03	0.02	-0.01	-0.02	0.01
SVK	-1.94	0.08	-0.35	-0.13	-0.04	-0.14	0.04	-0.04
SVN	-1.45	0.06	-0.18	-0.07	-0.02	-0.07	0.02	-0.02
BGR	-0.61	0.02	-0.09	-0.04	-0.01	-0.05	0.01	-0.01
ROM	-2.50	0.10	-0.29	-0.12	-0.03	-0.11	0.03	-0.05
EU	-2.28	0.16	-0.47	-0.14	-0.04	-0.09	0.08	-0.07

Table B.19: CCTB-WG20 for all firms with smaller share of fixed factor

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.98	0.02	-0.29	-0.10	-0.01	-0.15	0.02	-0.05
BEL	-21.45	0.44	-6.48	-1.64	-0.85	-0.19	1.15	-0.31
DNK	-4.95	0.16	-2.20	-0.62	-0.14	-0.62	0.22	-0.24
FIN	-2.57	0.10	-1.28	-0.41	-0.08	-0.47	0.11	-0.16
FRA	-5.46	0.18	-2.21	-0.55	-0.16	-0.60	0.24	-0.20
DEU	-3.68	0.13	-1.71	-0.48	-0.15	-0.53	0.22	-0.17
GRC	-3.01	0.10	-1.31	-0.52	-0.11	-0.54	0.15	-0.20
IRL	-0.73	0.02	-0.25	-0.17	0.06	-0.32	-0.03	-0.15
ITA	-5.54	0.15	-2.02	-0.55	-0.18	-0.59	0.27	-0.18
LUX	-1.96	0.15	-3.56	-0.63	-0.98	-2.09	-0.26	0.47
NLD	-1.73	0.08	-1.02	-0.35	-0.02	-0.42	0.01	-0.18
PRT	-4.13	0.12	-1.37	-0.29	-0.06	-0.25	0.14	-0.11
ESP	-0.75	0.03	-0.37	-0.11	0.00	-0.16	0.00	-0.07
SWE	-4.19	0.14	-1.81	-0.46	-0.10	-0.38	0.22	-0.18
GBR	-3.72	0.14	-1.67	-0.29	-0.09	-0.15	0.21	-0.08
CYP	-0.59	0.02	-0.24	-0.07	-0.01	-0.18	0.00	-0.03
CZE	-0.61	0.01	-0.21	-0.06	-0.02	-0.14	0.02	-0.02
EST	-10.02	0.21	-3.09	-1.44	-0.11	-1.01	0.29	-0.64
HUN	0.30	-0.01	0.13	0.03	0.02	-0.08	-0.03	0.01
LVA	-3.65	0.09	-1.20	-0.47	-0.07	-0.46	0.11	-0.21
LTU	-5.29	0.14	-1.82	-0.67	-0.10	-0.64	0.17	-0.30
MLT	-1.27	0.05	-1.19	-0.22	-0.09	-0.30	0.11	-0.05
POL	0.59	-0.03	0.30	0.11	0.03	0.04	-0.04	0.04
SVK	-2.25	0.07	-1.12	-0.41	-0.08	-0.47	0.11	-0.15
SVN	-1.78	0.05	-0.56	-0.19	-0.05	-0.22	0.07	-0.07
BGR	-0.72	0.02	-0.29	-0.10	-0.02	-0.14	0.02	-0.04
ROM	-3.16	0.09	-0.98	-0.32	-0.05	-0.32	0.08	-0.15
EU	-3.45	0.11	-1.42	-0.37	-0.11	-0.36	0.19	-0.14

Table B.20: CCTB-WG20, multinationals with smaller share of fixed factor

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.17	0.03	-0.10	-0.04	0.02	-0.06	0.00	-0.05
BEL	-7.52	0.70	-3.85	-1.23	-0.62	-0.57	0.79	-0.25
DNK	-7.40	0.17	-1.20	-0.28	-0.08	-0.22	0.12	-0.09
FIN	-2.61	0.10	-0.66	-0.18	-0.03	-0.22	0.05	-0.07
FRA	-4.60	0.21	-1.01	-0.22	-0.08	-0.17	0.14	-0.07
DEU	-3.11	0.14	-0.62	-0.16	-0.07	-0.15	0.11	-0.04
GRC	0.18	0.10	-0.39	-0.15	-0.03	-0.16	0.04	-0.06
IRL	1.12	0.02	-0.05	-0.11	0.13	-0.16	-0.04	-0.19
ITA	-0.45	0.17	-0.62	-0.17	-0.06	-0.15	0.10	-0.05
LUX	-3.72	0.17	-2.41	-0.44	-0.25	-0.95	0.03	-0.06
NLD	-2.53	0.09	-0.40	-0.17	0.17	-0.04	-0.03	-0.25
PRT	-3.91	0.14	-0.57	-0.13	-0.03	-0.12	0.05	-0.05
ESP	-0.81	0.04	-0.17	-0.05	0.01	-0.06	0.00	-0.04
SWE	-3.86	0.17	-0.89	-0.21	-0.04	-0.09	0.11	-0.09
GBR	-2.54	0.17	-0.64	-0.12	-0.02	0.00	0.08	-0.06
CYP	1.28	0.02	-0.10	-0.04	0.02	-0.10	-0.01	-0.04
CZE	2.74	0.01	-0.11	-0.03	-0.01	-0.09	0.01	-0.01
EST	-1.63	0.23	-1.40	-0.54	-0.10	-0.39	0.12	-0.19
HUN	1.85	-0.01	0.06	0.01	0.01	-0.08	-0.02	-0.01
LVA	-8.49	0.10	-0.40	-0.16	-0.03	-0.17	0.03	-0.07
LTU	-12.03	0.15	-0.61	-0.22	-0.04	-0.24	0.05	-0.09
MLT	-2.45	0.05	-0.84	-0.11	-0.09	-0.17	0.09	0.02
POL	2.89	-0.03	0.13	0.04	0.02	-0.01	-0.02	0.01
SVK	0.10	0.07	-0.58	-0.16	-0.06	-0.24	0.05	-0.04
SVN	-0.21	0.05	-0.24	-0.07	-0.02	-0.10	0.02	-0.02
BGR	0.63	0.02	-0.13	-0.04	-0.01	-0.08	0.01	-0.02
ROM	-12.03	0.09	-0.36	-0.12	-0.02	-0.14	0.02	-0.05
EU	-2.52	0.13	-0.58	-0.15	-0.04	-0.12	0.09	-0.07

Table B.21: CCTB-WG20 for all firms, with reduction in compliance costs

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.86	0.03	-0.33	-0.10	-0.02	-0.15	0.02	-0.04
BEL	-15.56	0.63	-8.37	-2.51	-1.07	-1.75	1.44	-0.67
DNK	-4.33	0.18	-2.28	-0.67	-0.14	-0.64	0.20	-0.27
FIN	-2.29	0.11	-1.31	-0.42	-0.10	-0.48	0.10	-0.16
FRA	-4.70	0.22	-2.45	-0.62	-0.19	-0.67	0.23	-0.22
DEU	-3.18	0.15	-1.84	-0.54	-0.17	-0.59	0.20	-0.19
GRC	-2.71	0.11	-1.44	-0.57	-0.13	-0.60	0.14	-0.21
IRL	-0.66	0.02	-0.29	-0.13	0.01	-0.26	-0.02	-0.09
ITA	-4.69	0.18	-2.24	-0.65	-0.20	-0.71	0.24	-0.22
LUX	-1.63	0.17	-3.21	-0.52	-0.98	-1.87	-0.19	0.56
NLD	-1.59	0.08	-1.09	-0.35	-0.12	-0.50	0.02	-0.09
PRT	-3.33	0.14	-1.55	-0.32	-0.07	-0.28	0.13	-0.12
ESP	-0.69	0.03	-0.37	-0.10	-0.01	-0.15	0.00	-0.05
SWE	-3.58	0.16	-1.88	-0.49	-0.11	-0.44	0.19	-0.19
GBR	-2.98	0.16	-1.66	-0.31	-0.08	-0.24	0.16	-0.11
CYP	-0.51	0.02	-0.23	-0.05	-0.03	-0.14	0.01	0.00
CZE	-0.56	0.01	-0.19	-0.06	-0.02	-0.12	0.02	-0.02
EST	-10.56	0.28	-3.87	-1.80	-0.17	-1.28	0.31	-0.79
HUN	0.25	-0.01	0.19	0.06	0.02	-0.02	-0.03	0.02
LVA	-3.20	0.10	-1.35	-0.51	-0.10	-0.51	0.11	-0.22
LTU	-4.64	0.17	-2.06	-0.74	-0.14	-0.72	0.17	-0.31
MLT	-1.17	0.06	-0.92	-0.20	-0.06	-0.26	0.06	-0.07
POL	0.52	-0.03	0.36	0.13	0.03	0.08	-0.04	0.05
SVK	-2.03	0.08	-1.09	-0.43	-0.08	-0.46	0.10	-0.16
SVN	-1.54	0.06	-0.63	-0.20	-0.05	-0.23	0.06	-0.08
BGR	-0.64	0.02	-0.27	-0.09	-0.02	-0.12	0.02	-0.04
ROM	-2.65	0.10	-1.11	-0.35	-0.07	-0.34	0.08	-0.16
EU	-2.94	0.13	-1.56	-0.43	-0.13	-0.44	0.18	-0.16

Table B.22: CCTB-WG20 for multinationals, with reduction in compliance costs

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.17	0.03	-0.10	-0.03	0.01	-0.05	0.00	-0.03
BEL	-7.52	0.82	-5.21	-1.69	-0.82	-1.37	1.00	-0.37
DNK	-7.40	0.19	-1.22	-0.30	-0.09	-0.25	0.12	-0.10
FIN	-2.61	0.11	-0.63	-0.17	-0.04	-0.21	0.05	-0.06
FRA	-4.60	0.23	-1.08	-0.24	-0.09	-0.21	0.13	-0.08
DEU	-3.11	0.15	-0.66	-0.17	-0.07	-0.17	0.10	-0.05
GRC	0.18	0.11	-0.43	-0.17	-0.04	-0.17	0.04	-0.06
IRL	1.12	0.02	-0.05	-0.08	0.11	-0.09	-0.03	-0.16
ITA	-0.45	0.19	-0.69	-0.20	-0.07	-0.19	0.09	-0.06
LUX	-3.72	0.18	-2.26	-0.39	-0.34	-0.97	-0.05	0.04
NLD	-2.53	0.09	-0.41	-0.16	0.10	-0.09	-0.02	-0.19
PRT	-3.91	0.15	-0.64	-0.13	-0.03	-0.10	0.06	-0.04
ESP	-0.81	0.04	-0.13	-0.03	0.01	-0.04	-0.01	-0.03
SWE	-3.86	0.18	-0.92	-0.21	-0.05	-0.13	0.10	-0.08
GBR	-2.54	0.18	-0.65	-0.11	-0.01	-0.03	0.07	-0.06
CYP	1.28	0.02	-0.08	-0.02	0.01	-0.07	-0.01	-0.02
CZE	2.74	0.01	-0.07	-0.02	0.00	-0.05	0.00	-0.01
EST	-1.63	0.27	-1.66	-0.67	-0.12	-0.46	0.13	-0.23
HUN	1.85	-0.02	0.10	0.03	0.02	-0.03	-0.02	0.00
LVA	-8.49	0.11	-0.45	-0.17	-0.03	-0.18	0.03	-0.07
LTU	-12.03	0.17	-0.68	-0.24	-0.05	-0.25	0.05	-0.09
MLT	-2.45	0.05	-0.61	-0.08	-0.05	-0.13	0.05	0.00
POL	2.89	-0.03	0.16	0.05	0.02	0.02	-0.02	0.01
SVK	0.10	0.07	-0.52	-0.16	-0.05	-0.21	0.04	-0.04
SVN	-0.21	0.05	-0.24	-0.07	-0.02	-0.09	0.02	-0.02
BGR	0.63	0.02	-0.11	-0.03	-0.01	-0.05	0.01	-0.01
ROM	-12.03	0.10	-0.39	-0.12	-0.03	-0.13	0.03	-0.05
EU	-2.52	0.14	-0.63	-0.17	-0.05	-0.15	0.09	-0.07

Table B.23: CCTB-WG20 for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-1.02	0.02	-0.31	-0.12	-0.03	-0.21	0.01	-0.04
BEL	-17.46	0.54	-5.92	0.10	-1.12	1.08	1.30	0.89
DNK	-5.00	0.16	-1.74	-0.37	-0.13	-0.30	0.18	-0.09
FIN	-2.73	0.09	-1.13	-0.32	-0.12	-0.43	0.08	-0.08
FRA	-5.91	0.17	-1.84	-0.26	-0.18	-0.29	0.19	-0.01
DEU	-4.24	0.11	-1.42	-0.31	-0.15	-0.37	0.16	-0.07
GRC	-3.20	0.09	-1.23	-0.45	-0.12	-0.50	0.12	-0.16
IRL	-0.70	0.02	-0.39	-0.24	-0.05	-0.54	-0.03	-0.09
ITA	-6.21	0.13	-1.73	-0.36	-0.18	-0.43	0.20	-0.06
LUX	-2.00	0.14	-3.20	-0.41	-1.21	-2.08	-0.29	0.86
NLD	-1.89	0.07	-1.08	-0.31	-0.21	-0.58	-0.01	0.01
PRT	-3.92	0.12	-1.35	-0.20	-0.06	-0.14	0.12	-0.05
ESP	-0.89	0.03	-0.36	-0.13	-0.03	-0.22	-0.01	-0.05
SWE	-4.27	0.14	-1.55	-0.23	-0.13	-0.17	0.17	-0.02
GBR	-3.65	0.13	-1.49	-0.16	-0.08	-0.04	0.15	-0.01
CYP	-0.54	0.02	-0.31	-0.11	-0.06	-0.28	0.00	-0.01
CZE	-0.66	0.01	-0.24	-0.09	-0.03	-0.20	0.02	-0.02
EST	-11.33	0.25	-2.62	-0.99	-0.05	-0.23	0.29	-0.47
HUN	0.30	-0.01	0.07	-0.03	0.02	-0.18	-0.04	-0.04
LVA	-3.45	0.10	-1.25	-0.45	-0.09	-0.44	0.10	-0.18
LTU	-5.06	0.15	-1.82	-0.62	-0.12	-0.58	0.15	-0.26
MLT	-1.52	0.05	-0.91	-0.19	-0.08	-0.28	0.06	-0.04
POL	0.60	-0.03	0.22	0.05	0.01	-0.04	-0.04	0.02
SVK	-2.28	0.07	-0.97	-0.37	-0.08	-0.41	0.09	-0.14
SVN	-1.80	0.05	-0.56	-0.18	-0.05	-0.22	0.05	-0.06
BGR	-0.67	0.02	-0.33	-0.12	-0.03	-0.18	0.02	-0.05
ROM	-2.89	0.09	-1.03	-0.31	-0.06	-0.30	0.08	-0.13
EU	-3.42	0.10	-1.25	-0.22	-0.13	-0.25	0.15	-0.01

Table B.24: CCTB-WG25 for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.10	0.00	0.04	-0.02	0.00	-0.11	-0.03	-0.01
BEL	-16.77	0.54	-5.84	0.06	-1.11	1.04	1.31	0.86
DNK	-4.48	0.14	-1.55	-0.32	-0.12	-0.25	0.16	-0.07
FIN	-2.12	0.07	-0.88	-0.25	-0.09	-0.34	0.06	-0.06
FRA	-5.34	0.15	-1.66	-0.22	-0.16	-0.25	0.18	0.00
DEU	-3.16	0.08	-1.06	-0.23	-0.11	-0.29	0.12	-0.05
GRC	-2.55	0.07	-0.95	-0.34	-0.10	-0.39	0.10	-0.11
IRL	-0.42	0.01	-0.24	-0.18	-0.04	-0.46	-0.04	-0.06
ITA	-5.11	0.11	-1.40	-0.28	-0.15	-0.35	0.17	-0.04
LUX	-1.64	0.11	-2.54	-0.33	-0.90	-1.65	-0.23	0.62
NLD	-1.35	0.05	-0.77	-0.23	-0.15	-0.47	-0.04	0.00
PRT	-3.09	0.10	-1.07	-0.16	-0.05	-0.11	0.10	-0.04
ESP	-0.10	0.00	-0.06	-0.06	0.00	-0.14	-0.04	-0.03
SWE	-3.61	0.12	-1.31	-0.19	-0.11	-0.13	0.15	-0.01
GBR	-2.87	0.11	-1.17	-0.12	-0.06	-0.04	0.12	-0.01
CYP	-0.37	0.01	-0.22	-0.08	-0.04	-0.22	0.00	-0.01
CZE	0.08	-0.01	0.07	0.01	-0.01	-0.08	-0.02	0.01
EST	-10.90	0.25	-2.52	-0.94	-0.05	-0.19	0.29	-0.45
HUN	0.82	-0.03	0.31	0.04	0.03	-0.10	-0.06	0.00
LVA	-3.00	0.09	-1.09	-0.39	-0.08	-0.38	0.09	-0.16
LTU	-4.58	0.14	-1.66	-0.57	-0.11	-0.52	0.14	-0.23
MLT	-0.96	0.03	-0.64	-0.14	-0.06	-0.20	0.04	-0.03
POL	1.24	-0.05	0.52	0.15	0.04	0.06	-0.07	0.06
SVK	-1.75	0.05	-0.73	-0.27	-0.06	-0.31	0.07	-0.10
SVN	-0.84	0.02	-0.26	-0.08	-0.03	-0.13	0.02	-0.03
BGR	-0.40	0.01	-0.20	-0.07	-0.02	-0.12	0.01	-0.02
ROM	-2.27	0.08	-0.84	-0.25	-0.05	-0.24	0.06	-0.11
EU	-2.80	0.08	-0.97	-0.16	-0.10	-0.18	0.12	0.00

Table B.25: CCTB-EUav for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.99	-0.10	1.22	0.32	0.11	0.25	-0.17	0.09
BEL	-14.10	0.51	-5.55	-0.06	-1.06	0.95	1.36	0.75
DNK	-1.93	0.07	-0.67	-0.12	-0.05	-0.03	0.09	-0.03
FIN	0.25	-0.01	0.10	0.03	0.00	0.00	-0.03	0.02
FRA	-2.23	0.07	-0.72	-0.08	-0.07	-0.06	0.08	0.01
DEU	1.09	-0.03	0.36	0.06	0.05	0.07	-0.07	-0.01
GRC	-0.41	0.00	-0.05	0.00	-0.02	-0.02	0.01	0.02
IRL	0.76	-0.03	0.40	0.08	0.01	-0.10	-0.09	0.04
ITA	-0.91	0.01	-0.15	-0.01	-0.03	-0.03	0.03	0.02
LUX	-0.25	0.02	0.02	-0.03	0.25	0.00	-0.03	-0.26
NLD	1.15	-0.04	0.57	0.09	0.12	-0.01	-0.17	-0.06
PRT	-0.76	0.02	-0.27	-0.02	-0.01	0.05	0.04	0.00
ESP	3.47	-0.11	1.29	0.24	0.13	0.22	-0.20	0.02
SWE	-0.85	0.03	-0.32	-0.03	-0.03	0.01	0.04	0.01
GBR	0.49	-0.02	0.23	0.01	0.02	-0.02	-0.04	-0.01
CYP	0.75	-0.03	0.34	0.07	0.02	0.04	-0.03	0.03
CZE	2.26	-0.08	0.99	0.33	0.07	0.28	-0.12	0.11
EST	-9.14	0.21	-2.10	-0.75	-0.05	0.00	0.28	-0.35
HUN	2.31	-0.09	1.00	0.26	0.06	0.17	-0.11	0.11
LVA	-1.74	0.05	-0.65	-0.23	-0.04	-0.19	0.06	-0.09
LTU	-3.39	0.11	-1.25	-0.42	-0.08	-0.35	0.11	-0.18
MLT	1.95	-0.05	0.61	0.05	0.06	0.11	-0.07	-0.03
POL	3.23	-0.13	1.45	0.46	0.12	0.41	-0.16	0.18
SVK	-0.07	0.00	0.05	0.04	-0.01	0.04	0.00	0.03
SVN	1.71	-0.06	0.59	0.18	0.04	0.15	-0.07	0.07
BGR	0.44	-0.02	0.22	0.08	0.01	0.08	-0.02	0.04
ROM	-0.67	0.03	-0.31	-0.09	-0.01	-0.05	0.02	-0.05
EU	-0.50	-0.01	0.14	0.07	0.00	0.08	0.00	0.03

Table B.26: CCTB-WG20 for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.91	0.03	-0.11	-0.06	0.00	-0.11	-0.01	-0.04
BEL	-12.01	0.72	-4.61	-0.36	-0.91	0.17	1.05	0.47
DNK	-4.79	0.16	-0.84	-0.06	-0.07	0.05	0.10	0.04
FIN	-2.76	0.09	-0.52	-0.11	-0.06	-0.17	0.04	-0.01
FRA	-5.53	0.19	-0.79	0.00	-0.07	0.10	0.13	0.06
DEU	-3.95	0.12	-0.52	-0.06	-0.06	-0.03	0.09	0.01
GRC	-3.17	0.09	-0.36	-0.13	-0.03	-0.14	0.04	-0.04
IRL	-0.59	0.02	-0.14	-0.18	0.06	-0.34	-0.04	-0.16
ITA	-5.92	0.14	-0.59	-0.06	-0.06	-0.03	0.09	0.02
LUX	-1.82	0.15	-2.26	-0.31	-0.56	-1.17	-0.14	0.31
NLD	-1.44	0.08	-0.47	-0.17	0.02	-0.21	-0.04	-0.12
PRT	-3.61	0.13	-0.59	-0.04	-0.03	0.01	0.06	0.01
ESP	-0.80	0.03	-0.16	-0.07	-0.01	-0.12	-0.01	-0.04
SWE	-3.65	0.16	-0.77	-0.04	-0.06	0.06	0.10	0.04
GBR	-2.52	0.16	-0.61	-0.05	-0.01	0.05	0.07	-0.02
CYP	-0.49	0.02	-0.16	-0.07	-0.02	-0.20	-0.01	-0.02
CZE	-0.67	0.01	-0.13	-0.06	-0.01	-0.13	0.00	-0.02
EST	-11.49	0.25	-0.88	-0.05	-0.03	0.44	0.15	0.01
HUN	0.28	-0.01	0.00	-0.05	0.01	-0.18	-0.03	-0.05
LVA	-3.37	0.10	-0.40	-0.13	-0.03	-0.13	0.03	-0.05
LTU	-5.07	0.15	-0.57	-0.17	-0.04	-0.15	0.05	-0.07
MLT	-1.72	0.04	-0.56	-0.08	-0.06	-0.14	0.04	0.01
POL	0.59	-0.03	0.05	-0.01	0.00	-0.10	-0.02	-0.01
SVK	-2.36	0.07	-0.43	-0.12	-0.04	-0.17	0.04	-0.03
SVN	-1.82	0.05	-0.22	-0.06	-0.02	-0.09	0.02	-0.02
BGR	-0.67	0.02	-0.16	-0.05	-0.02	-0.11	0.01	-0.02
ROM	-2.81	0.10	-0.36	-0.09	-0.02	-0.10	0.03	-0.04
EU	-3.08	0.12	-0.54	-0.06	-0.05	-0.04	0.09	0.01

Table B.27: CCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	-0.09	0.00	0.02	-0.03	0.01	-0.09	-0.03	-0.03
BEL	-11.06	0.71	-4.58	-0.44	-0.90	0.04	1.04	0.42
DNK	-4.29	0.15	-0.75	-0.04	-0.07	0.06	0.10	0.04
FIN	-2.14	0.07	-0.40	-0.08	-0.04	-0.14	0.03	-0.01
FRA	-4.98	0.17	-0.72	0.01	-0.07	0.10	0.12	0.06
DEU	-2.94	0.09	-0.39	-0.05	-0.04	-0.04	0.07	0.01
GRC	-2.53	0.07	-0.28	-0.10	-0.03	-0.11	0.03	-0.03
IRL	-0.35	0.01	-0.06	-0.14	0.06	-0.28	-0.04	-0.14
ITA	-4.86	0.11	-0.48	-0.05	-0.05	-0.03	0.08	0.02
LUX	-1.49	0.12	-1.82	-0.25	-0.41	-0.93	-0.09	0.21
NLD	-1.02	0.06	-0.33	-0.14	0.03	-0.18	-0.05	-0.11
PRT	-2.84	0.10	-0.47	-0.03	-0.02	0.01	0.05	0.01
ESP	-0.09	0.00	-0.03	-0.05	0.01	-0.10	-0.03	-0.04
SWE	-3.07	0.13	-0.66	-0.03	-0.06	0.06	0.09	0.04
GBR	-1.96	0.12	-0.48	-0.04	-0.01	0.03	0.05	-0.02
CYP	-0.34	0.01	-0.11	-0.05	-0.02	-0.15	-0.01	-0.02
CZE	0.08	-0.01	0.00	-0.02	0.00	-0.09	-0.01	-0.01
EST	-11.06	0.24	-0.84	-0.03	-0.03	0.45	0.15	0.02
HUN	0.76	-0.04	0.10	-0.02	0.02	-0.14	-0.04	-0.03
LVA	-2.92	0.09	-0.35	-0.11	-0.02	-0.11	0.03	-0.04
LTU	-4.58	0.14	-0.52	-0.15	-0.03	-0.13	0.05	-0.06
MLT	-1.09	0.02	-0.41	-0.07	-0.04	-0.11	0.03	0.00
POL	1.22	-0.05	0.16	0.02	0.01	-0.06	-0.03	0.00
SVK	-1.82	0.05	-0.33	-0.09	-0.03	-0.13	0.03	-0.02
SVN	-0.85	0.02	-0.11	-0.04	-0.01	-0.07	0.01	-0.01
BGR	-0.40	0.01	-0.10	-0.04	-0.01	-0.08	0.00	-0.01
ROM	-2.21	0.08	-0.29	-0.08	-0.02	-0.08	0.02	-0.03
EU	-2.48	0.09	-0.44	-0.05	-0.04	-0.03	0.07	0.01

Table B.28: CCTB-EUav for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.64	-0.10	0.49	0.08	0.06	0.02	-0.09	0.00
BEL	-7.33	0.67	-4.44	-0.72	-0.86	-0.42	1.02	0.22
DNK	-1.84	0.07	-0.32	0.00	-0.03	0.10	0.06	0.03
FIN	0.25	-0.01	0.05	0.01	0.01	-0.01	-0.02	0.00
FRA	-2.07	0.07	-0.32	0.02	-0.03	0.09	0.07	0.04
DEU	1.01	-0.03	0.15	0.01	0.03	0.00	-0.04	-0.02
GRC	-0.41	0.00	-0.01	0.00	-0.01	0.00	0.00	0.01
IRL	0.63	-0.03	0.28	0.03	0.07	-0.02	-0.05	-0.05
ITA	-0.86	0.01	-0.06	0.01	-0.01	0.01	0.02	0.02
LUX	-0.22	0.02	-0.01	-0.02	0.18	0.05	0.07	-0.19
NLD	0.85	-0.05	0.36	0.02	0.10	-0.02	-0.10	-0.08
PRT	-0.70	0.03	-0.13	0.01	-0.01	0.07	0.03	0.02
ESP	3.10	-0.12	0.61	0.04	0.08	-0.02	-0.13	-0.05
SWE	-0.71	0.03	-0.17	0.01	-0.02	0.05	0.03	0.03
GBR	0.32	-0.02	0.11	0.00	0.01	-0.02	-0.02	-0.01
CYP	0.68	-0.03	0.15	0.02	0.01	0.01	-0.01	0.01
CZE	2.27	-0.08	0.42	0.09	0.04	0.06	-0.06	0.01
EST	-9.30	0.21	-0.69	0.02	-0.04	0.52	0.15	0.05
HUN	2.13	-0.10	0.43	0.07	0.03	0.01	-0.06	0.01
LVA	-1.69	0.05	-0.20	-0.06	-0.01	-0.03	0.02	-0.02
LTU	-3.39	0.11	-0.39	-0.10	-0.02	-0.05	0.04	-0.04
MLT	2.24	-0.04	0.28	-0.04	0.04	-0.02	-0.05	-0.07
POL	3.16	-0.13	0.56	0.13	0.05	0.09	-0.07	0.04
SVK	-0.07	-0.01	0.03	0.02	0.00	0.03	0.00	0.01
SVN	1.74	-0.06	0.22	0.04	0.02	0.03	-0.03	0.01
BGR	0.44	-0.02	0.08	0.03	0.00	0.03	-0.01	0.01
ROM	-0.65	0.03	-0.11	-0.02	0.00	0.00	0.01	-0.01
EU	-0.29	-0.01	0.02	0.01	0.00	0.01	0.01	0.00

Appendix C Country tables CCCTB

Tables C.1 – C.28 show the effects of CCCTB reforms under the same alternative definitions of the common base. They are presented in the same order as the CCTB reforms (the B-tables). In addition, we show:

- Table C.21: CCTB-WG20 with no profit shifting
- Table C.22 – C.23: detailed tables behind Table 4.2; CCCTB-WG20 without loss-consolidation (C.22) and without reallocation (C.23)
- Tables C.24 - C.27: CCCTB-WG20 with alternative apportionment formula's.
- Tables C.28 - C.33: CCCTB-WG20, CCCTB-WG25 and CCCTB-EUav with tax haven and global discrete location choice
- Tables C.34 - C.37: CCCTB-WG25 with alternative apportionment formula's.

Table C.1: CCCTB-WG20 for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.08	0.03	-0.93	-0.15	-0.01	-0.42	0.00	-0.08
BEL	-22.88	0.94	-6.37	-0.33	-0.29	-1.09	0.20	0.03
DNK	-3.59	0.32	-2.44	-0.33	-0.05	-0.86	0.11	-0.15
FIN	-0.70	0.19	-1.66	-0.35	0.00	-0.59	0.04	-0.20
FRA	-2.72	0.19	-2.97	-0.71	-0.11	-0.66	0.18	-0.35
DEU	-2.17	0.05	-1.83	-0.45	-0.13	-0.40	0.12	-0.17
GRC	-1.98	0.10	-1.63	-0.52	-0.08	-0.67	0.10	-0.24
IRL	2.94	0.26	-2.46	-0.26	0.15	-1.55	0.03	-0.30
ITA	-3.94	0.17	-2.37	-0.57	-0.15	-0.63	0.18	-0.22
LUX	15.37	-0.11	0.12	0.86	1.42	-0.13	-3.46	-0.74
NLD	3.53	0.21	-2.99	-1.11	-0.18	-1.45	0.01	-0.49
PRT	-5.02	0.21	-1.76	0.42	-0.13	-0.46	0.17	0.45
ESP	1.37	0.01	-0.70	-0.16	0.08	-0.07	-0.04	-0.18
SWE	-2.85	0.19	-2.12	-0.18	-0.11	-0.53	0.11	0.00
GBR	-2.83	0.20	-1.89	-0.02	-0.12	-0.28	0.14	0.14
CYP	0.46	0.27	-1.06	0.31	0.05	-0.70	0.01	0.15
CZE	0.27	0.03	-0.29	0.27	0.10	-0.19	-0.05	0.05
EST	-11.64	0.27	-3.55	-0.66	-0.04	-1.79	0.26	-0.31
HUN	0.81	0.01	-0.07	0.60	0.08	-0.38	0.00	0.28
LVA	-3.04	0.12	-1.50	-0.27	-0.05	-0.68	0.13	-0.12
LTU	-4.58	0.18	-2.12	-0.50	-0.09	-0.87	0.18	-0.21
MLT	-0.97	-0.04	0.34	0.34	0.06	0.36	-0.12	0.17
POL	1.02	-0.02	0.31	0.48	0.10	-0.04	-0.04	0.21
SVK	-1.71	0.10	-0.62	0.07	0.07	-0.67	0.04	-0.02
SVN	-1.56	0.08	-0.63	-0.01	-0.02	-0.29	0.05	0.02
BGR	-0.73	0.02	-0.03	0.72	0.09	-0.69	0.12	0.37
ROM	-3.03	0.10	-1.33	0.21	-0.05	-0.65	0.19	0.17
EU	-1.82	0.13	-1.76	-0.24	-0.07	-0.48	0.10	-0.12

Table C.2: CCCTB-WG25 for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.92	-0.01	-0.47	0.02	0.02	-0.26	-0.05	-0.01
BEL	-22.60	0.91	-6.08	-0.22	-0.28	-1.02	0.19	0.08
DNK	-3.11	0.29	-2.12	-0.23	-0.03	-0.77	0.08	-0.12
FIN	-0.14	0.16	-1.28	-0.21	0.03	-0.46	0.00	-0.15
FRA	-2.14	0.17	-2.73	-0.64	-0.07	-0.58	0.15	-0.34
DEU	-1.32	0.01	-1.33	-0.28	-0.08	-0.24	0.06	-0.10
GRC	-1.39	0.07	-1.28	-0.37	-0.05	-0.52	0.06	-0.17
IRL	3.32	0.24	-2.18	-0.14	0.18	-1.44	0.00	-0.26
ITA	-3.04	0.13	-1.91	-0.42	-0.11	-0.48	0.13	-0.16
LUX	15.37	-0.13	1.28	1.34	1.81	0.48	-3.65	-0.78
NLD	4.16	0.18	-2.58	-0.97	-0.13	-1.31	-0.05	-0.45
PRT	-4.39	0.17	-1.37	0.50	-0.12	-0.37	0.14	0.49
ESP	2.04	-0.03	-0.28	-0.02	0.13	0.08	-0.10	-0.14
SWE	-2.25	0.16	-1.78	-0.08	-0.09	-0.44	0.07	0.04
GBR	-2.15	0.16	-1.51	0.06	-0.10	-0.21	0.10	0.17
CYP	0.67	0.26	-0.93	0.34	0.07	-0.66	-0.01	0.15
CZE	0.91	0.00	0.19	0.47	0.14	-0.01	-0.10	0.12
EST	-11.29	0.26	-3.29	-0.55	-0.03	-1.71	0.26	-0.26
HUN	1.30	-0.02	0.30	0.72	0.11	-0.27	-0.03	0.34
LVA	-2.61	0.10	-1.28	-0.19	-0.03	-0.60	0.12	-0.08
LTU	-4.12	0.16	-1.89	-0.41	-0.08	-0.79	0.16	-0.18
MLT	-0.42	-0.06	0.78	0.44	0.12	0.48	-0.19	0.16
POL	1.58	-0.05	0.73	0.64	0.14	0.10	-0.08	0.27
SVK	-1.24	0.07	-0.18	0.24	0.10	-0.52	0.01	0.05
SVN	-0.77	0.04	-0.20	0.14	0.01	-0.14	0.01	0.08
BGR	-0.47	0.01	0.22	0.80	0.11	-0.64	0.10	0.40
ROM	-2.49	0.07	-1.03	0.30	-0.03	-0.57	0.17	0.22
EU	-1.28	0.10	-1.37	-0.11	-0.03	-0.36	0.05	-0.07

Table C.3: CCCTB-EUav for all firms

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	4.76	-0.14	1.06	0.56	0.16	0.28	-0.25	0.19
BEL	-21.45	0.80	-5.14	0.08	-0.22	-0.78	0.12	0.21
DNK	-0.94	0.17	-0.52	0.27	0.08	-0.33	-0.07	0.09
FIN	2.03	0.04	0.20	0.29	0.17	0.04	-0.17	0.02
FRA	0.64	0.06	-1.31	-0.24	0.09	-0.14	-0.04	-0.22
DEU	1.95	-0.14	0.60	0.34	0.12	0.41	-0.20	0.12
GRC	0.53	-0.02	-0.13	0.11	0.07	-0.05	-0.07	0.00
IRL	7.50	0.17	-1.76	-0.20	0.11	-1.41	0.15	-0.23
ITA	0.30	-0.02	-0.22	0.12	0.06	0.09	-0.10	0.02
LUX	10.37	-0.21	7.31	4.27	3.58	3.63	-4.72	-0.44
NLD	6.91	0.04	-0.63	-0.28	0.11	-0.64	-0.30	-0.26
PRT	-2.37	0.07	-0.41	0.71	-0.04	-0.13	0.01	0.53
ESP	4.92	-0.18	1.68	0.62	0.35	0.74	-0.39	0.05
SWE	0.20	0.04	-0.33	0.34	0.02	-0.07	-0.11	0.19
GBR	0.70	-0.02	0.14	0.41	-0.01	0.07	-0.10	0.29
CYP	1.86	0.16	0.17	0.62	0.15	-0.38	-0.07	0.25
CZE	2.84	-0.10	1.58	1.02	0.29	0.53	-0.30	0.26
EST	-9.91	0.22	-2.29	-0.16	0.01	-1.40	0.21	-0.09
HUN	2.76	-0.09	1.35	1.05	0.20	0.06	-0.15	0.44
LVA	-1.38	0.06	-0.69	0.03	0.03	-0.39	0.06	-0.01
LTU	-2.96	0.12	-1.35	-0.23	-0.02	-0.61	0.11	-0.11
MLT	1.90	-0.17	3.03	0.98	0.39	1.09	-0.50	0.24
POL	3.37	-0.15	2.03	1.09	0.27	0.56	-0.22	0.43
SVK	0.31	0.00	1.25	0.76	0.24	-0.06	-0.13	0.22
SVN	1.38	-0.05	0.94	0.52	0.11	0.24	-0.12	0.22
BGR	0.35	-0.02	0.95	1.01	0.17	-0.45	0.04	0.48
ROM	-1.02	0.02	-0.28	0.51	0.03	-0.35	0.11	0.29
EU	0.58	-0.03	0.17	0.36	0.12	0.12	-0.15	0.09

Table C.4: CCCTB-WG20 for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	4.29	0.07	-0.61	-0.12	0.00	-0.37	-0.04	-0.07
BEL	-23.32	1.01	-4.44	0.35	-0.05	-0.17	0.06	0.24
DNK	-2.68	0.37	-1.49	0.03	-0.01	-0.50	0.04	0.03
FIN	1.51	0.27	-1.07	-0.13	0.01	-0.36	0.01	-0.09
FRA	-0.02	0.26	-1.53	-0.35	-0.06	-0.31	0.07	-0.17
DEU	-0.45	0.10	-0.67	-0.11	-0.04	-0.04	0.03	-0.04
GRC	-0.24	0.16	-0.62	-0.14	0.00	-0.25	0.01	-0.08
IRL	5.89	0.32	-1.91	-0.30	0.13	-1.63	0.00	-0.30
ITA	-2.38	0.22	-0.82	-0.14	-0.03	-0.14	0.03	-0.06
LUX	15.37	-0.02	0.72	1.28	2.57	1.27	-2.99	-1.57
NLD	8.13	0.26	-1.83	-0.92	0.06	-1.17	-0.15	-0.59
PRT	-6.35	0.20	-1.25	0.72	-0.05	-0.28	0.12	0.55
ESP	4.24	0.09	-0.45	-0.13	0.04	-0.09	-0.06	-0.12
SWE	-1.78	0.23	-1.23	0.08	-0.03	-0.24	0.04	0.08
GBR	-1.82	0.24	-0.96	0.18	-0.04	-0.04	0.07	0.17
CYP	1.89	0.30	-0.91	0.33	0.08	-0.64	0.01	0.13
CZE	1.56	0.09	-0.28	0.30	0.06	-0.18	-0.03	0.10
EST	-12.87	0.25	-1.73	0.45	0.02	-1.00	0.11	0.22
HUN	1.50	0.03	-0.19	0.61	0.07	-0.43	0.02	0.30
LVA	-2.67	0.13	-0.64	0.07	0.01	-0.36	0.06	0.04
LTU	-4.47	0.18	-0.81	0.00	-0.02	-0.40	0.07	0.01
MLT	-0.94	-0.02	0.60	0.50	0.09	0.47	-0.15	0.24
POL	1.87	0.02	0.08	0.43	0.08	-0.14	-0.01	0.19
SVK	-1.29	0.11	-0.13	0.35	0.08	-0.45	0.00	0.12
SVN	-1.63	0.08	-0.26	0.15	0.01	-0.16	0.01	0.08
BGR	-0.88	0.02	0.13	0.90	0.13	-0.74	0.11	0.45
ROM	-3.57	0.08	-0.76	0.51	0.01	-0.50	0.14	0.31
EU	-0.78	0.18	-0.88	0.01	0.00	-0.23	0.02	-0.02

Table C.5: CCCTB-WG25 for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.15	0.03	-0.42	-0.04	0.01	-0.30	-0.07	-0.04
BEL	-23.10	0.97	-4.24	0.44	-0.05	-0.14	0.05	0.29
DNK	-2.20	0.34	-1.31	0.09	0.00	-0.46	0.02	0.05
FIN	2.14	0.23	-0.87	-0.06	0.03	-0.29	-0.02	-0.06
FRA	0.67	0.24	-1.44	-0.33	-0.04	-0.28	0.04	-0.17
DEU	0.39	0.06	-0.49	-0.04	-0.02	0.02	-0.01	-0.01
GRC	0.43	0.13	-0.52	-0.09	0.01	-0.20	-0.01	-0.06
IRL	6.29	0.29	-1.75	-0.20	0.14	-1.55	-0.02	-0.26
ITA	-1.46	0.17	-0.68	-0.08	-0.01	-0.09	0.01	-0.04
LUX	15.37	-0.04	1.78	1.72	2.84	1.74	-3.22	-1.52
NLD	8.71	0.23	-1.66	-0.84	0.07	-1.12	-0.19	-0.55
PRT	-5.82	0.16	-1.01	0.78	-0.04	-0.23	0.10	0.58
ESP	4.96	0.06	-0.25	-0.06	0.08	-0.01	-0.10	-0.11
SWE	-1.24	0.20	-1.04	0.15	-0.02	-0.20	0.01	0.11
GBR	-1.31	0.20	-0.79	0.23	-0.03	-0.03	0.04	0.19
CYP	2.19	0.30	-0.83	0.34	0.09	-0.62	0.00	0.13
CZE	2.24	0.05	0.01	0.41	0.10	-0.08	-0.07	0.13
EST	-12.59	0.23	-1.55	0.53	0.03	-0.96	0.10	0.25
HUN	1.99	0.00	0.07	0.69	0.09	-0.36	0.00	0.33
LVA	-2.23	0.12	-0.54	0.12	0.01	-0.33	0.06	0.06
LTU	-4.01	0.17	-0.71	0.04	-0.01	-0.37	0.07	0.03
MLT	-0.19	-0.03	0.91	0.55	0.14	0.55	-0.20	0.21
POL	2.46	-0.02	0.33	0.51	0.10	-0.06	-0.03	0.22
SVK	-0.79	0.09	0.18	0.45	0.11	-0.37	-0.02	0.16
SVN	-0.87	0.04	-0.04	0.22	0.03	-0.09	-0.01	0.11
BGR	-0.62	0.00	0.33	0.95	0.14	-0.71	0.10	0.47
ROM	-3.08	0.06	-0.57	0.56	0.02	-0.46	0.14	0.34
EU	-0.24	0.14	-0.70	0.08	0.02	-0.18	-0.01	0.00

Table C.6: CCCTB-EUav for multinationals

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	4.09	-0.14	0.77	0.51	0.20	0.20	-0.35	0.12
BEL	-11.07	0.86	-4.95	-0.74	-0.62	-1.11	0.67	0.03
DNK	-0.10	0.20	-0.25	0.39	0.06	-0.21	-0.08	0.18
FIN	2.33	0.07	0.40	0.45	0.20	0.16	-0.26	0.07
FRA	1.80	0.12	-0.55	0.02	0.12	0.07	-0.16	-0.09
DEU	1.83	-0.14	0.63	0.40	0.16	0.45	-0.26	0.12
GRC	1.31	0.00	0.07	0.20	0.10	0.05	-0.13	0.02
IRL	3.96	0.17	-0.34	0.78	0.44	-0.66	-0.38	0.01
ITA	1.04	-0.01	0.04	0.19	0.09	0.18	-0.15	0.04
LUX	7.69	-0.19	7.86	5.05	3.76	4.20	-4.75	-0.08
NLD	5.52	0.04	0.26	0.28	0.29	-0.24	-0.66	-0.10
PRT	-1.94	0.07	-0.51	0.64	-0.06	-0.16	0.08	0.50
ESP	3.98	-0.19	1.67	0.75	0.45	0.78	-0.56	0.04
SWE	0.47	0.05	-0.09	0.43	0.04	0.01	-0.15	0.22
GBR	0.38	-0.02	0.07	0.43	0.01	0.08	-0.11	0.27
CYP	1.72	0.16	0.19	0.64	0.18	-0.35	-0.12	0.23
CZE	2.22	-0.12	1.47	1.01	0.35	0.50	-0.39	0.20
EST	-5.76	0.30	-1.72	-0.05	-0.24	-1.05	0.42	0.22
HUN	1.78	-0.12	1.13	1.03	0.26	-0.01	-0.20	0.38
LVA	-0.46	0.09	-0.32	0.17	0.03	-0.25	0.05	0.07
LTU	-1.38	0.17	-0.65	0.01	-0.03	-0.36	0.10	0.03
MLT	1.36	-0.18	3.09	1.03	0.44	1.11	-0.58	0.22
POL	2.21	-0.18	1.64	0.97	0.33	0.40	-0.27	0.31
SVK	0.45	0.00	1.28	0.78	0.25	-0.04	-0.15	0.22
SVN	0.66	-0.08	0.67	0.43	0.12	0.14	-0.11	0.16
BGR	0.12	-0.03	0.87	1.00	0.19	-0.51	0.04	0.45
ROM	-0.83	0.02	-0.17	0.54	0.02	-0.32	0.13	0.32
EU	0.87	-0.02	0.32	0.43	0.15	0.17	-0.22	0.11

Table C.7: CCCTB-WG20 for all firms with tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.36	0.02	-0.88	-0.17	-0.01	-0.39	0.01	-0.10
BEL	-23.58	0.85	-5.60	-0.14	-0.26	-0.92	0.17	0.11
DNK	-3.85	0.29	-2.17	-0.28	-0.03	-0.77	0.09	-0.14
FIN	-0.79	0.17	-1.51	-0.33	0.00	-0.54	0.04	-0.19
FRA	-3.77	0.16	-2.52	-0.55	-0.11	-0.53	0.16	-0.24
DEU	-3.43	0.04	-1.46	-0.28	-0.15	-0.30	0.11	-0.05
GRC	-2.36	0.09	-1.45	-0.44	-0.07	-0.59	0.09	-0.19
IRL	3.82	0.24	-2.36	-0.33	0.20	-1.45	0.01	-0.39
ITA	-5.47	0.13	-1.86	-0.37	-0.15	-0.48	0.14	-0.09
LUX	10.37	-0.12	1.02	1.71	1.18	0.24	-3.22	0.09
NLD	4.25	0.17	-2.89	-1.16	-0.17	-1.40	0.03	-0.52
PRT	-5.27	0.19	-1.54	0.41	-0.10	-0.39	0.14	0.40
ESP	1.30	0.00	-0.68	-0.17	0.03	-0.09	-0.01	-0.14
SWE	-3.25	0.17	-1.87	-0.13	-0.10	-0.45	0.10	0.01
GBR	-3.37	0.17	-1.64	0.01	-0.11	-0.21	0.12	0.15
CYP	0.78	0.26	-0.95	0.28	0.08	-0.63	0.00	0.09
CZE	0.43	0.03	-0.28	0.21	0.10	-0.17	-0.04	0.02
EST	-12.07	0.26	-3.18	-0.53	0.00	-1.64	0.22	-0.28
HUN	1.21	0.01	-0.02	0.53	0.11	-0.32	-0.01	0.21
LVA	-3.20	0.12	-1.38	-0.25	-0.03	-0.62	0.11	-0.12
LTU	-4.91	0.17	-1.94	-0.44	-0.08	-0.79	0.16	-0.19
MLT	-1.89	-0.06	0.26	0.39	-0.03	0.32	-0.06	0.29
POL	1.32	-0.01	0.29	0.41	0.11	-0.03	-0.04	0.15
SVK	-1.73	0.09	-0.51	0.06	0.09	-0.59	0.03	-0.04
SVN	-1.71	0.08	-0.55	0.00	-0.02	-0.25	0.05	0.02
BGR	-0.63	0.02	0.08	0.66	0.13	-0.58	0.08	0.30
ROM	-3.10	0.09	-1.19	0.19	-0.02	-0.57	0.15	0.13
EU	-2.21	0.11	-1.50	-0.17	-0.07	-0.40	0.09	-0.06

Table C.8: CCCTB-WG20 for multinationals with tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.23	0.08	-0.60	-0.16	0.00	-0.37	-0.03	-0.10
BEL	-23.45	0.93	-3.99	0.43	-0.05	-0.14	0.07	0.29
DNK	-2.30	0.35	-1.38	0.01	0.00	-0.47	0.04	0.01
FIN	1.96	0.25	-1.03	-0.16	0.00	-0.35	0.01	-0.10
FRA	-0.81	0.24	-1.39	-0.30	-0.05	-0.25	0.07	-0.14
DEU	-1.79	0.09	-0.60	-0.05	-0.05	-0.01	0.04	0.02
GRC	-0.29	0.15	-0.59	-0.14	0.00	-0.24	0.01	-0.08
IRL	7.90	0.31	-1.82	-0.42	0.13	-1.61	-0.01	-0.38
ITA	-3.73	0.18	-0.72	-0.08	-0.04	-0.10	0.04	-0.02
LUX	15.37	-0.02	0.28	0.98	2.12	0.90	-2.51	-1.35
NLD	9.65	0.23	-1.83	-0.99	0.03	-1.21	-0.13	-0.60
PRT	-5.90	0.20	-1.09	0.67	-0.03	-0.23	0.10	0.48
ESP	4.27	0.08	-0.48	-0.15	0.01	-0.12	-0.03	-0.10
SWE	-1.68	0.22	-1.12	0.08	-0.03	-0.21	0.04	0.07
GBR	-1.90	0.22	-0.86	0.17	-0.04	-0.03	0.06	0.16
CYP	2.93	0.31	-0.82	0.28	0.11	-0.58	0.01	0.07
CZE	2.25	0.11	-0.30	0.22	0.06	-0.19	-0.03	0.06
EST	-12.89	0.24	-1.54	0.51	0.05	-0.94	0.09	0.22
HUN	2.52	0.05	-0.15	0.52	0.09	-0.37	0.01	0.23
LVA	-2.60	0.13	-0.59	0.08	0.02	-0.33	0.05	0.03
LTU	-4.58	0.18	-0.74	0.01	0.00	-0.37	0.06	0.01
MLT	-2.02	-0.04	0.57	0.51	0.04	0.42	-0.10	0.29
POL	2.66	0.04	0.05	0.36	0.08	-0.12	-0.01	0.14
SVK	-0.83	0.13	-0.09	0.30	0.10	-0.40	-0.01	0.09
SVN	-1.47	0.08	-0.24	0.13	0.02	-0.14	0.01	0.06
BGR	-0.51	0.03	0.24	0.83	0.16	-0.62	0.07	0.38
ROM	-3.29	0.09	-0.65	0.47	0.03	-0.42	0.11	0.26
EU	-0.57	0.16	-0.80	0.02	-0.01	-0.20	0.02	-0.01

Table C.9: CCCTB-WG20 for all firms with discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.03	0.10	-1.22	-0.41	-0.08	-0.82	0.04	-0.17
BEL	-22.92	1.01	-6.04	0.46	-0.40	-0.71	0.20	0.57
DNK	-3.63	0.38	-3.53	-0.79	-0.28	-1.59	0.17	-0.20
FIN	-0.76	0.25	-2.37	-0.57	-0.17	-1.03	0.10	-0.18
FRA	-2.79	0.22	-2.91	-0.52	-0.12	-0.52	0.19	-0.22
DEU	-2.23	0.10	-1.60	-0.11	0.01	0.07	0.17	-0.08
GRC	-1.95	0.12	-1.85	-0.59	-0.10	-0.80	0.12	-0.25
IRL	2.83	0.29	-3.28	-1.97	-0.77	-4.10	0.07	-0.39
ITA	-3.96	0.20	-2.36	-0.34	-0.11	-0.34	0.23	-0.12
LUX	10.37	0.01	1.26	1.51	2.23	0.65	-3.74	-1.07
NLD	4.20	0.28	-4.12	-1.95	-0.29	-2.47	0.12	-0.87
PRT	-5.08	0.25	-1.80	0.01	-0.21	-0.97	0.08	0.28
ESP	1.45	0.05	-0.55	-0.02	0.16	0.13	-0.03	-0.16
SWE	-2.88	0.24	-2.59	-0.43	-0.19	-0.90	0.14	-0.08
GBR	-2.87	0.22	-1.94	-0.10	-0.14	-0.42	0.14	0.11
CYP	0.46	0.35	-2.04	-0.44	-0.49	-1.78	0.02	0.24
CZE	0.28	0.04	-1.01	-0.17	-0.03	-0.75	0.00	-0.06
EST	-11.76	0.30	-4.35	-1.28	-0.18	-2.34	0.22	-0.50
HUN	0.80	0.03	-0.75	-0.21	-0.09	-1.05	-0.05	-0.05
LVA	-3.04	0.15	-1.75	-0.55	-0.17	-0.90	0.11	-0.18
LTU	-4.51	0.19	-2.32	-0.74	-0.16	-0.95	0.16	-0.29
MLT	-0.94	0.04	2.09	1.00	0.24	1.08	-0.18	0.41
POL	1.01	-0.01	-0.23	0.07	-0.01	-0.42	-0.07	0.05
SVK	-1.70	0.10	-2.03	-0.57	-0.17	-1.18	0.09	-0.17
SVN	-1.59	0.09	-1.01	-0.24	-0.10	-0.60	0.05	-0.05
BGR	-0.87	0.03	-1.18	-0.19	-0.13	-1.13	0.00	0.00
ROM	-2.99	0.11	-1.37	-0.31	-0.11	-0.82	0.06	-0.09
EU	-2.00	0.16	-1.90	-0.28	-0.08	-0.51	0.12	-0.10

Table C.10: CCCTB-WG20 for multinationals with discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	4.23	0.16	-0.78	-0.34	-0.01	-0.68	-0.02	-0.20
BEL	-23.40	1.09	-4.36	1.09	-0.13	0.14	0.08	0.73
DNK	-2.86	0.43	-2.45	-0.39	-0.21	-1.17	0.08	-0.02
FIN	1.44	0.33	-1.59	-0.31	-0.11	-0.70	0.04	-0.08
FRA	-0.16	0.29	-1.59	-0.21	-0.09	-0.22	0.09	-0.05
DEU	-0.56	0.16	-0.61	0.18	0.06	0.35	0.10	0.06
GRC	-0.23	0.19	-0.83	-0.20	-0.03	-0.38	0.03	-0.09
IRL	5.82	0.34	-2.04	-1.68	-0.48	-3.66	-0.15	-0.51
ITA	-2.40	0.25	-0.93	0.05	-0.01	0.08	0.10	0.04
LUX	15.37	0.11	0.02	0.64	2.86	0.99	-2.79	-2.30
NLD	8.14	0.34	-2.66	-1.60	0.02	-2.02	-0.14	-0.94
PRT	-6.43	0.25	-1.26	0.29	-0.15	-0.82	0.05	0.39
ESP	4.27	0.15	-0.40	0.00	0.10	0.08	-0.02	-0.10
SWE	-1.79	0.29	-1.57	-0.14	-0.10	-0.56	0.06	0.00
GBR	-1.86	0.27	-0.98	0.11	-0.04	-0.17	0.07	0.13
CYP	1.95	0.40	-1.71	-0.39	-0.40	-1.63	-0.01	0.18
CZE	1.53	0.10	-0.91	-0.11	-0.04	-0.71	0.00	-0.02
EST	-13.02	0.29	-2.38	-0.11	-0.12	-1.52	0.08	0.06
HUN	1.51	0.05	-0.83	-0.22	-0.08	-1.08	-0.06	-0.05
LVA	-2.65	0.17	-0.80	-0.19	-0.10	-0.53	0.03	-0.03
LTU	-4.25	0.20	-0.88	-0.21	-0.07	-0.43	0.05	-0.06
MLT	-0.88	0.07	2.11	1.12	0.23	1.08	-0.19	0.50
POL	1.89	0.02	-0.45	0.01	-0.02	-0.51	-0.05	0.03
SVK	-1.25	0.13	-1.38	-0.26	-0.13	-0.90	0.03	-0.04
SVN	-1.71	0.09	-0.64	-0.09	-0.07	-0.47	0.02	0.01
BGR	-1.20	0.03	-1.04	-0.08	-0.10	-1.14	-0.01	0.04
ROM	-3.47	0.09	-0.69	-0.06	-0.06	-0.62	0.02	0.02
EU	-0.81	0.22	-1.04	-0.05	-0.02	-0.27	0.04	-0.01

Table C.11: CCCTB-WG20 for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.21	0.08	-1.08	-0.37	-0.05	-0.69	0.03	-0.18
BEL	-23.61	0.91	-5.30	0.56	-0.36	-0.58	0.16	0.60
DNK	-3.86	0.33	-3.08	-0.67	-0.23	-1.38	0.14	-0.18
FIN	-0.90	0.21	-2.07	-0.50	-0.14	-0.89	0.08	-0.16
FRA	-3.82	0.18	-2.47	-0.38	-0.13	-0.41	0.16	-0.13
DEU	-3.46	0.07	-1.26	0.01	-0.03	0.12	0.14	0.03
GRC	-2.32	0.11	-1.62	-0.49	-0.09	-0.70	0.10	-0.20
IRL	3.39	0.25	-3.02	-1.76	-0.61	-3.55	0.09	-0.43
ITA	-5.47	0.15	-1.84	-0.16	-0.11	-0.21	0.18	0.00
LUX	10.37	-0.03	0.59	1.20	1.49	0.10	-3.18	-0.57
NLD	4.94	0.23	-3.83	-1.86	-0.26	-2.25	0.09	-0.84
PRT	-5.26	0.22	-1.60	0.04	-0.18	-0.83	0.07	0.25
ESP	1.37	0.03	-0.53	-0.04	0.11	0.10	0.00	-0.13
SWE	-3.29	0.21	-2.24	-0.34	-0.16	-0.75	0.12	-0.06
GBR	-3.39	0.19	-1.67	-0.05	-0.12	-0.32	0.12	0.12
CYP	0.65	0.31	-1.77	-0.35	-0.38	-1.45	0.02	0.18
CZE	0.42	0.04	-0.88	-0.15	-0.01	-0.64	0.00	-0.07
EST	-12.06	0.28	-3.90	-1.15	-0.14	-2.11	0.20	-0.47
HUN	1.13	0.03	-0.65	-0.17	-0.05	-0.86	-0.03	-0.05
LVA	-3.20	0.13	-1.61	-0.51	-0.15	-0.80	0.11	-0.17
LTU	-4.85	0.18	-2.14	-0.67	-0.15	-0.86	0.15	-0.26
MLT	-1.92	0.00	1.59	0.93	0.11	0.89	-0.10	0.50
POL	1.30	-0.01	-0.20	0.07	0.01	-0.34	-0.05	0.03
SVK	-1.74	0.10	-1.75	-0.50	-0.14	-1.02	0.09	-0.16
SVN	-1.72	0.08	-0.88	-0.20	-0.09	-0.51	0.05	-0.04
BGR	-0.69	0.03	-1.00	-0.16	-0.10	-0.94	0.01	-0.01
ROM	-3.01	0.10	-1.28	-0.29	-0.10	-0.72	0.07	-0.09
EU	-2.21	0.14	-1.61	-0.20	-0.08	-0.41	0.10	-0.05

Table C.12: CCCTB-WG25 for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.26	0.04	-0.67	-0.23	-0.02	-0.55	-0.02	-0.12
BEL	-23.29	0.88	-5.02	0.69	-0.36	-0.52	0.14	0.67
DNK	-3.28	0.31	-2.82	-0.58	-0.21	-1.30	0.11	-0.14
FIN	-0.21	0.18	-1.75	-0.38	-0.11	-0.78	0.05	-0.12
FRA	-3.09	0.17	-2.29	-0.33	-0.10	-0.35	0.12	-0.12
DEU	-2.37	0.04	-0.86	0.13	0.01	0.25	0.09	0.07
GRC	-1.63	0.08	-1.31	-0.36	-0.06	-0.57	0.07	-0.15
IRL	3.85	0.23	-2.82	-1.67	-0.60	-3.47	0.06	-0.39
ITA	-4.34	0.12	-1.49	-0.06	-0.07	-0.09	0.14	0.03
LUX	10.37	-0.04	1.67	1.63	1.89	0.70	-3.33	-0.65
NLD	5.81	0.20	-3.49	-1.75	-0.21	-2.13	0.05	-0.82
PRT	-4.51	0.18	-1.26	0.12	-0.16	-0.75	0.05	0.29
ESP	2.29	0.00	-0.20	0.06	0.15	0.22	-0.05	-0.11
SWE	-2.57	0.18	-1.96	-0.25	-0.14	-0.68	0.09	-0.02
GBR	-2.56	0.15	-1.35	0.02	-0.11	-0.28	0.09	0.15
CYP	0.90	0.31	-1.69	-0.33	-0.38	-1.44	0.02	0.19
CZE	1.21	0.01	-0.49	0.01	0.03	-0.49	-0.05	-0.02
EST	-11.69	0.27	-3.69	-1.04	-0.13	-2.04	0.20	-0.42
HUN	1.71	0.00	-0.36	-0.07	-0.03	-0.77	-0.06	-0.01
LVA	-2.73	0.12	-1.43	-0.43	-0.14	-0.73	0.09	-0.14
LTU	-4.35	0.16	-1.95	-0.60	-0.14	-0.80	0.14	-0.23
MLT	-1.20	-0.01	1.94	1.00	0.17	0.98	-0.16	0.48
POL	1.98	-0.04	0.14	0.19	0.04	-0.22	-0.09	0.08
SVK	-1.19	0.08	-1.45	-0.37	-0.11	-0.91	0.06	-0.11
SVN	-0.79	0.05	-0.52	-0.08	-0.06	-0.39	0.01	0.01
BGR	-0.40	0.02	-0.84	-0.10	-0.09	-0.90	0.00	0.02
ROM	-2.40	0.08	-1.05	-0.21	-0.08	-0.65	0.05	-0.06
EU	-1.56	0.11	-1.29	-0.10	-0.05	-0.32	0.06	-0.02

Table C.13: CCCTB-EUav for all firms with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.94	-0.08	0.67	0.22	0.11	-0.09	-0.18	0.03
BEL	-21.98	0.79	-4.13	1.05	-0.33	-0.30	0.09	0.86
DNK	-0.63	0.20	-1.45	-0.14	-0.11	-0.92	-0.01	0.03
FIN	2.52	0.08	-0.51	0.04	0.01	-0.34	-0.09	0.02
FRA	0.51	0.08	-1.17	-0.04	0.05	-0.01	-0.03	-0.07
DEU	2.04	-0.08	0.65	0.58	0.19	0.76	-0.11	0.20
GRC	0.70	0.00	-0.31	0.05	0.04	-0.16	-0.04	-0.01
IRL	5.87	0.15	-1.90	-1.28	-0.51	-3.13	-0.05	-0.24
ITA	0.12	0.00	-0.19	0.32	0.07	0.34	-0.03	0.13
LUX	10.37	-0.09	5.98	3.29	3.41	3.02	-3.95	-0.97
NLD	9.69	0.08	-1.82	-1.20	0.03	-1.54	-0.16	-0.72
PRT	-1.98	0.09	-0.46	0.31	-0.10	-0.56	-0.04	0.33
ESP	6.41	-0.11	1.35	0.52	0.35	0.74	-0.28	-0.02
SWE	0.50	0.07	-0.78	0.09	-0.06	-0.39	-0.06	0.12
GBR	1.08	0.00	0.09	0.32	-0.02	-0.07	-0.08	0.24
CYP	2.26	0.21	-1.01	-0.11	-0.37	-1.28	-0.03	0.33
CZE	3.68	-0.07	0.61	0.43	0.16	-0.05	-0.20	0.08
EST	-10.20	0.23	-2.84	-0.63	-0.09	-1.79	0.16	-0.24
HUN	3.47	-0.06	0.42	0.19	0.03	-0.52	-0.15	0.08
LVA	-1.39	0.08	-0.96	-0.24	-0.09	-0.55	0.05	-0.06
LTU	-3.09	0.13	-1.53	-0.43	-0.10	-0.64	0.10	-0.17
MLT	1.98	-0.08	3.90	1.43	0.41	1.50	-0.43	0.50
POL	4.16	-0.12	1.19	0.57	0.16	0.17	-0.21	0.21
SVK	0.61	0.01	-0.48	0.02	-0.02	-0.56	-0.04	0.03
SVN	1.82	-0.04	0.44	0.25	0.04	-0.06	-0.09	0.12
BGR	0.51	-0.01	-0.38	0.08	-0.05	-0.77	-0.03	0.09
ROM	-0.73	0.03	-0.48	-0.03	-0.03	-0.47	0.00	0.01
EU	0.90	0.00	-0.05	0.26	0.08	0.06	-0.10	0.09

Table C.14: CCCTB-WG20 for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.05	0.15	-0.70	-0.32	0.00	-0.59	-0.02	-0.20
BEL	-23.49	0.98	-3.92	1.07	-0.13	0.11	0.07	0.72
DNK	-2.41	0.39	-2.15	-0.34	-0.16	-1.02	0.07	-0.04
FIN	1.85	0.30	-1.41	-0.30	-0.08	-0.62	0.03	-0.10
FRA	-0.91	0.26	-1.43	-0.17	-0.08	-0.17	0.08	-0.03
DEU	-1.87	0.13	-0.52	0.21	0.04	0.34	0.08	0.10
GRC	-0.27	0.18	-0.76	-0.18	-0.02	-0.34	0.03	-0.09
IRL	7.70	0.32	-1.78	-1.51	-0.35	-3.17	-0.12	-0.54
ITA	-3.76	0.20	-0.79	0.10	-0.02	0.11	0.08	0.07
LUX	15.37	0.07	-0.32	0.48	2.27	0.61	-2.43	-1.85
NLD	9.73	0.29	-2.51	-1.55	-0.01	-1.93	-0.13	-0.88
PRT	-5.91	0.23	-1.09	0.28	-0.12	-0.68	0.04	0.34
ESP	4.25	0.12	-0.40	-0.03	0.07	0.05	-0.01	-0.08
SWE	-1.68	0.26	-1.37	-0.12	-0.07	-0.47	0.05	-0.01
GBR	-1.88	0.24	-0.86	0.12	-0.04	-0.13	0.06	0.13
CYP	2.82	0.37	-1.44	-0.31	-0.28	-1.30	0.00	0.09
CZE	2.21	0.11	-0.82	-0.11	-0.03	-0.62	0.00	-0.03
EST	-12.88	0.28	-2.05	-0.06	-0.08	-1.34	0.07	0.05
HUN	2.45	0.07	-0.72	-0.17	-0.05	-0.89	-0.04	-0.06
LVA	-2.57	0.16	-0.72	-0.17	-0.08	-0.45	0.03	-0.03
LTU	-4.37	0.20	-0.80	-0.19	-0.06	-0.39	0.05	-0.06
MLT	-2.09	0.02	1.75	1.03	0.15	0.90	-0.13	0.52
POL	2.67	0.04	-0.41	0.01	-0.01	-0.43	-0.03	0.01
SVK	-0.80	0.14	-1.17	-0.23	-0.10	-0.77	0.03	-0.05
SVN	-1.50	0.09	-0.55	-0.07	-0.05	-0.40	0.02	0.01
BGR	-0.64	0.04	-0.84	-0.06	-0.07	-0.93	0.00	0.03
ROM	-3.07	0.10	-0.62	-0.05	-0.05	-0.52	0.02	0.02
EU	-0.59	0.19	-0.93	-0.02	-0.02	-0.22	0.04	0.00

Table C.15: CCCTB-WG25 for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	6.16	0.11	-0.56	-0.26	0.02	-0.54	-0.04	-0.17
BEL	-23.21	0.95	-3.70	1.19	-0.14	0.15	0.06	0.80
DNK	-1.79	0.37	-2.00	-0.29	-0.15	-0.99	0.05	-0.02
FIN	2.66	0.27	-1.27	-0.24	-0.07	-0.56	0.02	-0.08
FRA	-0.04	0.24	-1.36	-0.15	-0.06	-0.15	0.06	-0.04
DEU	-0.82	0.09	-0.35	0.27	0.06	0.40	0.05	0.12
GRC	0.53	0.15	-0.67	-0.13	-0.01	-0.30	0.02	-0.07
IRL	8.24	0.30	-1.72	-1.46	-0.35	-3.15	-0.13	-0.51
ITA	-2.60	0.16	-0.66	0.14	0.00	0.16	0.06	0.09
LUX	15.37	0.06	0.72	0.90	2.58	1.12	-2.63	-1.85
NLD	10.62	0.26	-2.39	-1.50	-0.01	-1.90	-0.16	-0.85
PRT	-5.25	0.19	-0.91	0.33	-0.11	-0.65	0.03	0.36
ESP	5.25	0.09	-0.23	0.02	0.10	0.11	-0.05	-0.08
SWE	-0.99	0.23	-1.24	-0.06	-0.06	-0.45	0.03	0.02
GBR	-1.22	0.20	-0.72	0.16	-0.03	-0.13	0.03	0.15
CYP	3.19	0.37	-1.42	-0.30	-0.28	-1.30	-0.01	0.11
CZE	3.09	0.08	-0.63	-0.03	0.00	-0.55	-0.03	-0.01
EST	-12.56	0.27	-1.92	0.01	-0.07	-1.31	0.07	0.08
HUN	3.06	0.04	-0.58	-0.12	-0.04	-0.85	-0.05	-0.04
LVA	-2.07	0.14	-0.66	-0.14	-0.08	-0.43	0.03	-0.02
LTU	-3.84	0.18	-0.75	-0.16	-0.05	-0.37	0.04	-0.05
MLT	-1.15	0.02	1.99	1.06	0.20	0.97	-0.18	0.49
POL	3.41	0.01	-0.26	0.07	0.01	-0.37	-0.05	0.03
SVK	-0.19	0.11	-1.02	-0.17	-0.08	-0.72	0.02	-0.03
SVN	-0.59	0.06	-0.39	-0.02	-0.04	-0.35	0.00	0.03
BGR	-0.34	0.03	-0.76	-0.02	-0.07	-0.92	0.00	0.04
ROM	-2.48	0.08	-0.53	-0.01	-0.04	-0.50	0.02	0.03
EU	0.09	0.16	-0.79	0.02	-0.01	-0.19	0.01	0.02

Table C.16: CCCTB-EUav for multinationals with tax haven and discrete location

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	10.28	-0.03	0.00	-0.06	0.08	-0.36	-0.14	-0.11
BEL	-21.99	0.85	-3.00	1.50	-0.16	0.26	0.02	0.99
DNK	0.86	0.25	-1.13	0.00	-0.09	-0.79	-0.03	0.10
FIN	5.96	0.16	-0.65	-0.03	0.00	-0.35	-0.06	-0.02
FRA	3.83	0.14	-0.80	0.00	0.03	0.02	-0.05	-0.02
DEU	3.52	-0.05	0.42	0.51	0.18	0.65	-0.09	0.16
GRC	3.30	0.07	-0.32	0.03	0.04	-0.15	-0.03	-0.02
IRL	10.55	0.20	-1.37	-1.25	-0.34	-3.05	-0.19	-0.39
ITA	2.11	0.04	-0.13	0.30	0.08	0.33	-0.04	0.12
LUX	10.37	-0.02	6.23	3.56	3.88	3.59	-3.81	-1.24
NLD	14.37	0.12	-1.56	-1.19	0.06	-1.67	-0.31	-0.74
PRT	-2.63	0.10	-0.47	0.42	-0.09	-0.54	-0.03	0.40
ESP	7.01	-0.10	1.13	0.56	0.33	0.64	-0.33	0.02
SWE	1.88	0.11	-0.59	0.15	-0.03	-0.35	-0.08	0.11
GBR	1.58	0.02	-0.03	0.32	0.00	-0.11	-0.08	0.22
CYP	4.80	0.26	-1.10	-0.17	-0.31	-1.26	-0.03	0.23
CZE	6.05	0.01	-0.06	0.19	0.09	-0.33	-0.12	0.02
EST	-11.28	0.22	-1.36	0.30	-0.04	-1.21	0.05	0.20
HUN	5.10	-0.03	-0.20	0.00	0.00	-0.74	-0.10	0.00
LVA	-0.57	0.10	-0.50	-0.05	-0.06	-0.37	0.01	0.02
LTU	-2.42	0.15	-0.62	-0.10	-0.04	-0.31	0.03	-0.02
MLT	2.71	-0.04	3.53	1.33	0.40	1.32	-0.40	0.45
POL	5.93	-0.08	0.25	0.25	0.08	-0.21	-0.12	0.08
SVK	1.91	0.05	-0.53	0.02	-0.02	-0.58	-0.03	0.03
SVN	2.17	-0.03	0.05	0.12	0.01	-0.22	-0.05	0.07
BGR	0.69	0.00	-0.52	0.07	-0.04	-0.89	-0.02	0.08
ROM	-0.74	0.03	-0.30	0.06	-0.02	-0.43	-0.01	0.06
EU	2.42	0.04	-0.13	0.24	0.08	0.00	-0.11	0.08

Table C.17: CCCTB-WG20 for all firms with weaker investment response

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.09	0.03	-0.66	-0.15	-0.02	-0.34	0.01	-0.08
BEL	-22.80	0.94	-4.63	-0.33	-0.30	-0.59	0.22	0.03
DNK	-3.60	0.32	-1.73	-0.33	-0.06	-0.67	0.12	-0.14
FIN	-0.72	0.19	-1.16	-0.35	-0.01	-0.45	0.05	-0.20
FRA	-2.73	0.19	-2.15	-0.72	-0.12	-0.46	0.21	-0.34
DEU	-2.18	0.05	-1.34	-0.45	-0.14	-0.27	0.14	-0.16
GRC	-1.98	0.10	-1.20	-0.52	-0.09	-0.52	0.11	-0.23
IRL	2.94	0.26	-1.69	-0.27	0.14	-1.28	0.04	-0.30
ITA	-3.93	0.17	-1.75	-0.58	-0.17	-0.47	0.20	-0.21
LUX	15.37	-0.11	0.67	0.90	1.47	0.08	-3.45	-0.77
NLD	3.52	0.21	-2.16	-1.11	-0.19	-1.20	0.03	-0.48
PRT	-5.00	0.21	-1.28	0.41	-0.13	-0.36	0.18	0.45
ESP	1.36	0.01	-0.46	-0.16	0.07	-0.01	-0.03	-0.17
SWE	-2.85	0.19	-1.52	-0.18	-0.12	-0.39	0.12	0.00
GBR	-2.80	0.20	-1.37	-0.03	-0.13	-0.19	0.15	0.14
CYP	0.46	0.27	-0.72	0.31	0.05	-0.63	0.01	0.15
CZE	0.26	0.03	-0.16	0.27	0.09	-0.14	-0.04	0.06
EST	-11.65	0.27	-2.53	-0.67	-0.04	-1.42	0.28	-0.31
HUN	0.81	0.01	0.00	0.60	0.08	-0.36	0.00	0.29
LVA	-3.04	0.12	-1.08	-0.28	-0.05	-0.54	0.14	-0.12
LTU	-4.58	0.18	-1.55	-0.51	-0.10	-0.69	0.19	-0.21
MLT	-1.00	-0.05	0.33	0.36	0.06	0.36	-0.12	0.18
POL	1.01	-0.02	0.27	0.49	0.10	-0.05	-0.04	0.21
SVK	-1.72	0.09	-0.39	0.08	0.07	-0.59	0.05	-0.01
SVN	-1.56	0.08	-0.45	-0.01	-0.02	-0.24	0.06	0.02
BGR	-0.74	0.02	0.04	0.74	0.09	-0.69	0.12	0.38
ROM	-3.03	0.10	-0.95	0.21	-0.05	-0.55	0.19	0.17
EU	-1.82	0.13	-1.27	-0.24	-0.08	-0.36	0.11	-0.11

Table C.18: CCCTB-WG20 for multinationals with weaker investment response

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	4.32	0.07	-0.43	-0.12	0.00	-0.31	-0.04	-0.07
BEL	-23.25	1.01	-3.17	0.35	-0.05	0.20	0.07	0.24
DNK	-2.71	0.36	-1.04	0.03	-0.02	-0.38	0.05	0.04
FIN	1.45	0.26	-0.74	-0.13	0.00	-0.26	0.02	-0.08
FRA	-0.04	0.26	-1.10	-0.36	-0.07	-0.21	0.08	-0.17
DEU	-0.46	0.10	-0.48	-0.11	-0.05	0.01	0.03	-0.03
GRC	-0.23	0.16	-0.45	-0.14	-0.01	-0.19	0.01	-0.08
IRL	5.89	0.32	-1.30	-0.31	0.12	-1.42	0.01	-0.30
ITA	-2.36	0.22	-0.59	-0.15	-0.03	-0.08	0.04	-0.06
LUX	15.37	-0.03	1.39	1.30	2.60	1.50	-2.97	-1.58
NLD	8.10	0.26	-1.27	-0.92	0.05	-0.99	-0.14	-0.58
PRT	-6.31	0.20	-0.88	0.71	-0.05	-0.21	0.12	0.55
ESP	4.21	0.09	-0.29	-0.13	0.04	-0.04	-0.05	-0.11
SWE	-1.78	0.23	-0.86	0.08	-0.04	-0.15	0.05	0.08
GBR	-1.77	0.24	-0.68	0.17	-0.04	0.00	0.07	0.16
CYP	1.90	0.30	-0.60	0.32	0.08	-0.57	0.01	0.13
CZE	1.53	0.09	-0.16	0.30	0.06	-0.14	-0.03	0.10
EST	-12.88	0.25	-1.21	0.45	0.02	-0.81	0.11	0.22
HUN	1.50	0.03	-0.09	0.61	0.07	-0.40	0.02	0.30
LVA	-2.68	0.13	-0.45	0.07	0.00	-0.30	0.06	0.04
LTU	-4.48	0.18	-0.58	0.00	-0.02	-0.33	0.08	0.02
MLT	-1.02	-0.03	0.53	0.52	0.09	0.45	-0.15	0.25
POL	1.85	0.02	0.10	0.43	0.08	-0.13	-0.01	0.20
SVK	-1.32	0.11	-0.03	0.36	0.08	-0.42	0.00	0.13
SVN	-1.63	0.08	-0.17	0.14	0.01	-0.13	0.02	0.08
BGR	-0.90	0.02	0.16	0.92	0.13	-0.74	0.11	0.46
ROM	-3.56	0.08	-0.52	0.51	0.00	-0.44	0.15	0.31
EU	-0.79	0.18	-0.61	0.01	-0.01	-0.16	0.02	-0.02

Table C.19: CCCTB-WG20 for all firms with smaller share of fixed factor

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.04	0.02	-0.93	-0.18	-0.01	-0.41	-0.01	-0.10
BEL	-25.73	0.92	-6.00	-0.14	-0.27	-0.75	0.18	0.12
DNK	-4.05	0.30	-2.30	-0.36	-0.05	-0.85	0.10	-0.17
FIN	-0.86	0.18	-1.47	-0.37	0.02	-0.57	0.01	-0.24
FRA	-3.27	0.17	-2.71	-0.66	-0.08	-0.59	0.17	-0.34
DEU	-2.52	0.04	-1.64	-0.39	-0.10	-0.31	0.11	-0.16
GRC	-2.19	0.09	-1.53	-0.51	-0.06	-0.63	0.09	-0.24
IRL	7.50	0.30	-4.30	-1.73	-0.19	-2.62	0.58	-0.81
ITA	-4.53	0.15	-2.19	-0.51	-0.13	-0.54	0.18	-0.20
LUX	10.37	-0.08	1.77	1.40	1.37	0.34	-3.61	-0.34
NLD	3.68	0.21	-2.79	-1.16	-0.09	-1.42	-0.05	-0.59
PRT	-5.70	0.22	-1.95	0.41	-0.17	-0.48	0.23	0.49
ESP	1.40	0.00	-0.49	-0.16	0.14	0.00	-0.11	-0.23
SWE	-3.35	0.19	-2.03	-0.18	-0.11	-0.50	0.12	-0.01
GBR	-3.56	0.19	-1.90	0.00	-0.14	-0.23	0.17	0.17
CYP	0.40	0.28	-1.20	0.22	0.03	-0.76	0.00	0.11
CZE	0.29	0.03	-0.23	0.22	0.12	-0.18	-0.09	0.00
EST	-11.18	0.23	-3.13	-0.55	-0.05	-1.73	0.27	-0.24
HUN	0.88	0.01	-0.17	0.51	0.06	-0.43	0.00	0.25
LVA	-3.34	0.11	-1.47	-0.26	-0.04	-0.69	0.14	-0.12
LTU	-5.01	0.17	-2.00	-0.47	-0.08	-0.86	0.18	-0.21
MLT	-1.03	-0.07	0.89	0.37	0.12	0.42	-0.19	0.12
POL	1.09	-0.01	0.30	0.43	0.09	-0.08	-0.05	0.18
SVK	-1.83	0.09	-0.45	0.02	0.08	-0.71	0.02	-0.06
SVN	-1.77	0.08	-0.58	-0.02	-0.03	-0.28	0.06	0.01
BGR	-0.76	0.02	-0.11	0.76	0.04	-1.05	0.16	0.44
ROM	-3.36	0.09	-1.50	0.24	-0.09	-0.79	0.24	0.23
EU	-2.12	0.12	-1.66	-0.23	-0.06	-0.45	0.10	-0.12

Table C.20: CCCTB-WG20 for multinationals with smaller share of fixed factor

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.17	0.07	-0.53	-0.15	0.01	-0.37	-0.05	-0.10
BEL	-7.52	0.96	-4.19	0.42	-0.03	0.27	0.05	0.26
DNK	-7.40	0.34	-1.41	-0.04	-0.02	-0.46	0.04	0.00
FIN	-2.61	0.24	-0.99	-0.17	0.01	-0.35	0.00	-0.11
FRA	-4.60	0.21	-1.31	-0.32	-0.06	-0.26	0.07	-0.15
DEU	-3.11	0.08	-0.56	-0.09	-0.03	0.00	0.03	-0.03
GRC	0.18	0.14	-0.55	-0.15	0.00	-0.22	0.00	-0.09
IRL	1.12	0.30	-1.53	-0.54	0.14	-1.72	-0.06	-0.45
ITA	-0.45	0.19	-0.71	-0.13	-0.03	-0.09	0.04	-0.06
LUX	-3.72	-0.05	0.61	0.58	2.16	0.84	-2.62	-1.61
NLD	-2.53	0.24	-1.36	-0.89	0.16	-1.15	-0.25	-0.65
PRT	-3.91	0.20	-1.60	0.68	-0.09	-0.33	0.16	0.57
ESP	-0.81	0.07	-0.25	-0.15	0.07	-0.06	-0.09	-0.15
SWE	-3.86	0.22	-1.17	0.05	-0.04	-0.19	0.05	0.06
GBR	-2.54	0.23	-1.01	0.16	-0.05	0.02	0.09	0.17
CYP	1.28	0.30	-1.01	0.21	0.05	-0.69	0.01	0.09
CZE	2.74	0.09	-0.27	0.21	0.07	-0.19	-0.05	0.04
EST	-1.63	0.20	-1.65	0.38	-0.01	-1.02	0.11	0.20
HUN	1.85	0.03	-0.28	0.49	0.05	-0.47	0.02	0.25
LVA	-8.49	0.13	-0.67	0.05	0.00	-0.38	0.06	0.03
LTU	-12.03	0.17	-0.78	-0.02	-0.02	-0.41	0.07	0.01
MLT	-2.45	-0.05	1.06	0.49	0.15	0.52	-0.22	0.17
POL	2.89	0.03	0.07	0.35	0.06	-0.17	-0.02	0.16
SVK	0.10	0.11	-0.08	0.25	0.07	-0.49	-0.01	0.08
SVN	-0.21	0.07	-0.25	0.11	0.01	-0.16	0.01	0.06
BGR	0.63	0.02	0.06	0.89	0.06	-1.08	0.15	0.49
ROM	-12.03	0.07	-1.03	0.49	-0.05	-0.66	0.19	0.35
EU	-2.52	0.16	-0.80	0.00	0.00	-0.21	0.02	-0.03

Table C.21: Decomposition CCCTB-WG20 for multinationals: no transfer pricing

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.17	0.05	-0.22	-0.12	0.02	-0.24	0.01	-0.09
BEL	-7.52	0.72	-4.75	-1.54	-0.56	-1.14	0.77	-0.48
DNK	-7.40	0.23	-1.42	-0.42	-0.06	-0.51	0.10	-0.20
FIN	-2.61	0.14	-0.80	-0.27	-0.03	-0.32	0.05	-0.13
FRA	-4.60	0.22	-1.05	-0.26	-0.06	-0.16	0.11	-0.11
DEU	-3.11	0.10	-0.45	-0.07	-0.05	0.04	0.09	0.00
GRC	0.18	0.11	-0.44	-0.18	-0.04	-0.19	0.04	-0.07
IRL	1.12	0.08	-0.38	-0.48	0.18	-1.05	-0.04	-0.46
ITA	-0.45	0.16	-0.60	-0.15	-0.06	-0.10	0.08	-0.04
LUX	-3.72	0.47	-4.42	-1.85	-0.31	-1.85	0.05	-1.05
NLD	-2.53	0.23	-1.09	-0.70	0.24	-0.59	-0.06	-0.62
PRT	-3.91	0.18	-0.75	-0.21	-0.02	-0.35	0.04	-0.11
ESP	-0.81	0.02	-0.12	-0.01	-0.01	0.05	0.03	0.00
SWE	-3.86	0.20	-1.02	-0.30	0.00	-0.24	0.09	-0.18
GBR	-2.54	0.21	-0.75	-0.22	0.02	-0.12	0.04	-0.17
CYP	1.28	0.07	-0.32	-0.17	0.03	-0.57	0.00	-0.14
CZE	2.74	0.03	-0.20	-0.08	-0.01	-0.20	0.01	-0.03
EST	-1.63	0.28	-1.74	-0.73	-0.11	-0.81	0.11	-0.28
HUN	1.85	0.04	-0.18	-0.14	0.04	-0.43	-0.02	-0.13
LVA	-8.49	0.12	-0.50	-0.20	-0.04	-0.31	0.03	-0.09
LTU	-12.03	0.18	-0.72	-0.27	-0.05	-0.36	0.05	-0.11
MLT	-2.45	-0.02	-0.39	0.02	-0.08	0.18	0.07	0.10
POL	2.89	-0.01	0.03	-0.01	0.01	-0.15	-0.01	-0.02
SVK	0.10	0.10	-0.70	-0.25	-0.06	-0.47	0.05	-0.08
SVN	-0.21	0.07	-0.31	-0.11	-0.02	-0.20	0.03	-0.04
BGR	0.63	0.03	-0.23	-0.09	-0.02	-0.30	0.01	-0.04
ROM	-12.03	0.12	-0.46	-0.16	-0.03	-0.32	0.03	-0.07
EU	-2.52	0.14	-0.64	-0.19	-0.03	-0.17	0.07	-0.11

Table C.22: Decomposition CCCTB-WG20 for multinationals: consolidation of profits with formula apportionment and reduction of compliance costs

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.47	0.08	-0.47	-0.22	-0.04	-0.37	0.04	-0.10
BEL	-24.32	1.00	-4.51	-1.81	0.13	-0.06	0.05	-1.14
DNK	-4.59	0.35	-1.99	-0.63	-0.11	-0.64	0.09	-0.28
FIN	-0.98	0.24	-1.14	-0.40	-0.08	-0.43	0.08	-0.16
FRA	-2.97	0.22	-1.06	-0.20	-0.12	-0.17	0.16	-0.02
DEU	-3.63	0.06	-0.15	0.13	-0.07	0.19	0.16	0.15
GRC	-2.37	0.11	-0.49	-0.19	-0.04	-0.22	0.05	-0.07
IRL	4.15	0.37	-1.92	-1.91	-0.05	-2.57	-0.12	-1.07
ITA	-5.43	0.14	-0.49	-0.04	-0.07	-0.01	0.12	0.04
LUX	15.37	0.43	-0.61	-1.06	1.75	0.43	-1.86	-2.43
NLD	5.60	0.26	-1.37	-0.78	0.03	-0.93	0.00	-0.48
PRT	-8.26	0.16	-1.00	-0.25	-0.11	-0.43	0.03	-0.03
ESP	1.15	0.04	0.28	0.16	-0.02	0.19	0.11	0.12
SWE	-4.00	0.20	-1.22	-0.30	-0.08	-0.22	0.10	-0.10
GBR	-3.99	0.19	-0.73	-0.06	-0.05	0.08	0.12	0.03
CYP	0.71	0.32	-1.57	-0.62	-0.18	-1.09	-0.01	-0.22
CZE	-0.77	0.00	-0.44	-0.14	-0.07	-0.30	0.04	-0.01
EST	-13.58	0.22	-2.23	-0.95	-0.16	-1.02	0.02	-0.34
HUN	-0.14	-0.01	-0.63	-0.27	-0.08	-0.67	-0.02	-0.09
LVA	-3.61	0.11	-0.64	-0.26	-0.07	-0.39	0.02	-0.09
LTU	-5.46	0.14	-0.80	-0.28	-0.07	-0.39	0.03	-0.10
MLT	-4.07	-0.12	1.50	0.55	-0.03	0.56	0.03	0.40
POL	-0.07	-0.05	-0.19	-0.06	-0.05	-0.26	-0.01	0.01
SVK	-2.84	0.06	-1.24	-0.37	-0.14	-0.63	0.04	-0.08
SVN	-2.84	0.02	-0.34	-0.08	-0.06	-0.21	0.02	0.01
BGR	-1.68	-0.01	-0.57	-0.16	-0.07	-0.41	-0.02	-0.03
ROM	-4.61	0.05	-0.48	-0.16	-0.06	-0.36	-0.01	-0.04
EU	-2.66	0.13	-0.62	-0.14	-0.06	-0.13	0.10	-0.05

Table C.23: Decomposition CCCTB-WG20 for multinationals: consolidation of profits with formula apportionment and reduction of compliance costs, but firms do not reallocate in response to formula

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.17	0.08	-0.47	-0.22	-0.04	-0.37	0.04	-0.10
BEL	-7.52	1.00	-4.51	-1.81	0.13	-0.06	0.05	-1.14
DNK	-7.40	0.35	-1.99	-0.63	-0.11	-0.64	0.09	-0.28
FIN	-2.61	0.24	-1.14	-0.40	-0.08	-0.43	0.08	-0.16
FRA	-4.60	0.22	-1.06	-0.20	-0.12	-0.17	0.16	-0.02
DEU	-3.11	0.06	-0.15	0.13	-0.07	0.19	0.16	0.15
GRC	0.18	0.11	-0.49	-0.19	-0.04	-0.22	0.05	-0.07
IRL	1.12	0.37	-1.92	-1.91	-0.05	-2.57	-0.12	-1.07
ITA	-0.45	0.14	-0.49	-0.04	-0.07	-0.01	0.12	0.04
LUX	-3.72	0.43	-0.61	-1.06	1.75	0.43	-1.86	-2.43
NLD	-2.53	0.26	-1.37	-0.78	0.03	-0.93	0.00	-0.48
PRT	-3.91	0.16	-1.00	-0.25	-0.11	-0.43	0.03	-0.03
ESP	-0.81	0.04	0.28	0.16	-0.02	0.19	0.11	0.12
SWE	-3.86	0.20	-1.22	-0.30	-0.08	-0.22	0.10	-0.10
GBR	-2.54	0.19	-0.73	-0.06	-0.05	0.08	0.12	0.03
CYP	1.28	0.32	-1.57	-0.62	-0.18	-1.09	-0.01	-0.22
CZE	2.74	0.00	-0.44	-0.14	-0.07	-0.30	0.04	-0.01
EST	-1.63	0.22	-2.23	-0.95	-0.16	-1.02	0.02	-0.34
HUN	1.85	-0.01	-0.63	-0.27	-0.08	-0.67	-0.02	-0.09
LVA	-8.49	0.11	-0.64	-0.26	-0.07	-0.39	0.02	-0.09
LTU	-12.03	0.14	-0.80	-0.28	-0.07	-0.39	0.03	-0.10
MLT	-2.45	-0.12	1.50	0.55	-0.03	0.56	0.03	0.40
POL	2.89	-0.05	-0.19	-0.06	-0.05	-0.26	-0.01	0.01
SVK	0.10	0.06	-1.24	-0.37	-0.14	-0.63	0.04	-0.08
SVN	-0.21	0.02	-0.34	-0.08	-0.06	-0.21	0.02	0.01
BGR	0.63	-0.01	-0.57	-0.16	-0.07	-0.41	-0.02	-0.03
ROM	-12.03	0.05	-0.48	-0.16	-0.06	-0.36	-0.01	-0.04
EU	-2.52	0.13	-0.62	-0.14	-0.06	-0.13	0.10	-0.05

Table C.24: CCCTB-WG20 for all firms, formula apportionment on payroll (1/6), employment (1/6), capital (1/3) and output (1/3)

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	0.91	0.04	-0.93	-0.11	-0.01	-0.42	0.01	-0.05
BEL	-23.16	0.94	-6.36	-0.14	-0.32	-1.12	0.21	0.15
DNK	-3.63	0.32	-2.45	-0.31	-0.05	-0.87	0.11	-0.14
FIN	-0.66	0.21	-1.71	-0.35	0.00	-0.61	0.05	-0.21
FRA	-2.91	0.19	-2.92	-0.67	-0.12	-0.65	0.19	-0.31
DEU	-2.22	0.06	-1.84	-0.44	-0.14	-0.41	0.13	-0.16
GRC	-1.98	0.11	-1.66	-0.52	-0.08	-0.68	0.10	-0.23
IRL	2.87	0.26	-2.48	-0.21	0.15	-1.55	0.03	-0.27
ITA	-3.89	0.18	-2.41	-0.57	-0.15	-0.64	0.19	-0.22
LUX	15.37	-0.09	-0.13	0.50	1.12	-0.43	-3.06	-0.72
NLD	3.39	0.21	-2.96	-1.07	-0.18	-1.44	0.02	-0.47
PRT	-4.48	0.23	-1.86	0.31	-0.11	-0.46	0.15	0.35
ESP	1.59	0.01	-0.80	-0.21	0.09	-0.10	-0.04	-0.22
SWE	-2.96	0.20	-2.13	-0.15	-0.12	-0.54	0.12	0.02
GBR	-3.00	0.20	-1.87	0.01	-0.13	-0.27	0.15	0.17
CYP	0.35	0.27	-1.06	0.35	0.05	-0.70	0.01	0.18
CZE	0.61	0.05	-0.45	0.13	0.13	-0.22	-0.06	-0.05
EST	-11.22	0.28	-3.69	-1.04	-0.03	-1.71	0.23	-0.52
HUN	1.11	0.02	-0.16	0.46	0.10	-0.37	-0.02	0.18
LVA	-2.94	0.12	-1.52	-0.35	-0.05	-0.66	0.12	-0.16
LTU	-4.45	0.19	-2.17	-0.58	-0.09	-0.85	0.17	-0.26
MLT	-0.65	-0.01	0.17	0.27	0.07	0.31	-0.11	0.10
POL	1.27	-0.01	0.21	0.38	0.12	-0.05	-0.06	0.13
SVK	-1.50	0.10	-0.78	-0.06	0.08	-0.66	0.03	-0.09
SVN	-1.42	0.09	-0.69	-0.04	-0.02	-0.30	0.05	-0.01
BGR	-0.51	0.03	-0.09	0.38	0.09	-0.43	0.04	0.15
ROM	-2.70	0.10	-1.28	0.01	-0.02	-0.54	0.12	0.02
EU	-1.73	0.14	-1.79	-0.26	-0.07	-0.48	0.10	-0.12

Table C.25: CCCTB-WG20 for all firms, formula apportionment on payroll (1/4), employment (1/4) and capital (1/2)

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	0.93	0.03	-0.90	-0.12	-0.02	-0.41	0.01	-0.05
BEL	-23.20	0.92	-5.72	-0.12	-0.33	-0.95	0.21	0.18
DNK	-3.63	0.32	-2.33	-0.32	-0.06	-0.84	0.11	-0.14
FIN	-0.69	0.20	-1.66	-0.35	0.00	-0.60	0.04	-0.20
FRA	-2.69	0.19	-3.04	-0.72	-0.10	-0.67	0.19	-0.36
DEU	-2.33	0.06	-1.89	-0.42	-0.14	-0.42	0.13	-0.15
GRC	-2.00	0.11	-1.63	-0.52	-0.08	-0.67	0.10	-0.23
IRL	2.68	0.25	-2.06	-0.10	0.13	-1.40	0.04	-0.20
ITA	-3.98	0.17	-2.40	-0.56	-0.15	-0.64	0.18	-0.21
LUX	15.37	-0.11	0.24	1.23	1.87	0.26	-3.98	-0.92
NLD	3.23	0.21	-2.92	-1.04	-0.19	-1.43	0.02	-0.43
PRT	-4.59	0.22	-1.68	0.33	-0.12	-0.43	0.15	0.37
ESP	1.49	0.01	-0.85	-0.19	0.09	-0.11	-0.04	-0.21
SWE	-2.93	0.19	-2.07	-0.16	-0.12	-0.52	0.12	0.01
GBR	-2.69	0.20	-1.90	-0.04	-0.12	-0.28	0.14	0.12
CYP	0.46	0.27	-0.86	0.30	0.05	-0.66	0.01	0.14
CZE	0.45	0.04	-0.35	0.20	0.11	-0.20	-0.05	0.00
EST	-11.56	0.28	-3.25	-0.73	-0.04	-1.65	0.26	-0.35
HUN	1.01	0.01	0.00	0.51	0.10	-0.34	-0.01	0.22
LVA	-2.99	0.12	-1.44	-0.30	-0.05	-0.65	0.13	-0.14
LTU	-4.51	0.18	-2.09	-0.54	-0.09	-0.84	0.17	-0.24
MLT	-0.76	-0.02	0.08	0.29	0.07	0.29	-0.11	0.12
POL	1.17	-0.01	0.30	0.42	0.11	-0.03	-0.05	0.16
SVK	-1.63	0.10	-0.57	0.02	0.07	-0.63	0.04	-0.04
SVN	-1.45	0.09	-0.65	-0.03	-0.02	-0.29	0.05	0.00
BGR	-0.62	0.03	0.13	0.55	0.10	-0.50	0.08	0.25
ROM	-2.84	0.10	-1.21	0.10	-0.03	-0.56	0.15	0.09
EU	-1.79	0.13	-1.77	-0.25	-0.07	-0.48	0.10	-0.12

Table C.26: CCCTB-WG20 for all firms, formula apportionment on payroll (1/3), capital (1/3) and output (1/3)

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	0.75	0.05	-0.93	-0.07	-0.02	-0.42	0.02	-0.03
BEL	-23.42	0.93	-6.35	0.05	-0.34	-1.15	0.21	0.28
DNK	-3.66	0.32	-2.45	-0.30	-0.06	-0.87	0.12	-0.13
FIN	-0.62	0.22	-1.75	-0.36	0.01	-0.62	0.05	-0.22
FRA	-3.10	0.18	-2.87	-0.63	-0.13	-0.65	0.20	-0.28
DEU	-2.27	0.06	-1.84	-0.42	-0.14	-0.41	0.14	-0.15
GRC	-1.98	0.11	-1.68	-0.52	-0.08	-0.68	0.11	-0.23
IRL	2.80	0.26	-2.49	-0.16	0.15	-1.54	0.04	-0.24
ITA	-3.84	0.18	-2.44	-0.58	-0.15	-0.65	0.19	-0.22
LUX	15.37	-0.09	-0.40	0.15	0.80	-0.74	-2.67	-0.66
NLD	3.24	0.21	-2.91	-1.03	-0.18	-1.42	0.03	-0.44
PRT	-3.92	0.24	-1.95	0.19	-0.09	-0.47	0.13	0.24
ESP	1.81	0.02	-0.88	-0.27	0.11	-0.11	-0.05	-0.27
SWE	-3.07	0.20	-2.12	-0.12	-0.12	-0.53	0.13	0.04
GBR	-3.17	0.20	-1.85	0.04	-0.14	-0.27	0.16	0.20
CYP	0.24	0.27	-1.07	0.38	0.04	-0.70	0.01	0.21
CZE	0.96	0.06	-0.62	0.00	0.16	-0.26	-0.07	-0.15
EST	-10.77	0.30	-3.88	-1.38	-0.04	-1.68	0.21	-0.70
HUN	1.42	0.03	-0.24	0.33	0.12	-0.37	-0.04	0.09
LVA	-2.83	0.13	-1.56	-0.42	-0.05	-0.66	0.11	-0.20
LTU	-4.32	0.19	-2.23	-0.65	-0.09	-0.85	0.16	-0.30
MLT	-0.32	0.02	0.03	0.21	0.10	0.28	-0.11	0.03
POL	1.53	0.00	0.10	0.27	0.14	-0.06	-0.07	0.05
SVK	-1.29	0.11	-0.95	-0.19	0.08	-0.67	0.03	-0.16
SVN	-1.27	0.09	-0.75	-0.08	-0.01	-0.31	0.05	-0.04
BGR	-0.28	0.04	-0.26	0.13	0.07	-0.34	0.01	0.02
ROM	-2.34	0.12	-1.31	-0.16	-0.01	-0.51	0.09	-0.09
EU	-1.64	0.14	-1.81	-0.28	-0.07	-0.48	0.11	-0.11

Table C.27: CCCTB-WG20 for all firms, formula apportionment on payroll (1/2) and capital (1/2)

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	0.68	0.05	-0.89	-0.06	-0.02	-0.41	0.02	-0.02
BEL	-23.59	0.92	-5.68	0.17	-0.37	-0.99	0.21	0.37
DNK	-3.68	0.32	-2.34	-0.30	-0.06	-0.84	0.12	-0.12
FIN	-0.63	0.21	-1.73	-0.36	0.00	-0.61	0.05	-0.22
FRA	-2.98	0.18	-2.95	-0.66	-0.12	-0.66	0.20	-0.31
DEU	-2.40	0.06	-1.89	-0.40	-0.15	-0.43	0.14	-0.13
GRC	-2.00	0.11	-1.66	-0.52	-0.08	-0.68	0.11	-0.23
IRL	2.58	0.25	-2.07	-0.03	0.13	-1.39	0.05	-0.15
ITA	-3.91	0.18	-2.45	-0.57	-0.15	-0.66	0.19	-0.22
LUX	15.37	-0.11	-0.15	0.70	1.38	-0.21	-3.38	-0.83
NLD	3.02	0.21	-2.86	-0.98	-0.20	-1.41	0.03	-0.39
PRT	-3.75	0.24	-1.84	0.16	-0.08	-0.45	0.12	0.21
ESP	1.83	0.02	-0.99	-0.27	0.11	-0.14	-0.05	-0.27
SWE	-3.09	0.20	-2.05	-0.12	-0.13	-0.52	0.13	0.05
GBR	-2.95	0.20	-1.86	0.00	-0.14	-0.28	0.16	0.17
CYP	0.30	0.27	-0.86	0.35	0.04	-0.65	0.01	0.19
CZE	0.97	0.06	-0.60	-0.01	0.16	-0.25	-0.07	-0.15
EST	-10.91	0.29	-3.56	-1.28	-0.04	-1.59	0.21	-0.65
HUN	1.47	0.03	-0.15	0.31	0.12	-0.34	-0.04	0.07
LVA	-2.83	0.13	-1.50	-0.42	-0.05	-0.64	0.11	-0.20
LTU	-4.32	0.19	-2.18	-0.65	-0.09	-0.84	0.16	-0.30
MLT	-0.27	0.02	-0.15	0.19	0.10	0.23	-0.11	0.02
POL	1.55	0.00	0.14	0.26	0.14	-0.05	-0.07	0.05
SVK	-1.31	0.11	-0.83	-0.18	0.08	-0.64	0.03	-0.16
SVN	-1.23	0.10	-0.74	-0.09	-0.01	-0.30	0.05	-0.05
BGR	-0.27	0.04	-0.15	0.13	0.07	-0.32	0.01	0.02
ROM	-2.31	0.12	-1.25	-0.17	-0.01	-0.49	0.09	-0.10
EU	-1.65	0.14	-1.81	-0.28	-0.07	-0.48	0.10	-0.11

Table C.28: CCCTB-WG20 for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	1.36	0.06	-1.05	-0.32	-0.05	-0.64	0.01	-0.15
BEL	-23.58	0.91	-5.05	1.20	-0.51	0.91	0.28	1.08
DNK	-3.85	0.32	-2.62	-0.42	-0.15	-1.02	0.12	-0.11
FIN	-0.79	0.20	-1.79	-0.38	-0.09	-0.72	0.05	-0.15
FRA	-3.77	0.19	-2.40	-0.33	-0.09	-0.31	0.15	-0.13
DEU	-3.43	0.06	-1.29	-0.02	-0.06	0.08	0.13	0.03
GRC	-2.36	0.10	-1.52	-0.46	-0.08	-0.63	0.10	-0.19
IRL	3.82	0.25	-3.03	-1.67	-0.30	-3.35	0.05	-0.67
ITA	-5.47	0.14	-1.86	-0.19	-0.12	-0.24	0.17	-0.01
LUX	10.37	-0.05	0.77	1.72	1.11	0.13	-3.25	0.17
NLD	4.25	0.21	-3.33	-1.50	-0.30	-1.96	0.01	-0.60
PRT	-5.27	0.21	-1.62	0.24	-0.15	-0.63	0.11	0.35
ESP	1.30	0.02	-0.50	-0.04	0.10	0.09	-0.02	-0.12
SWE	-3.25	0.20	-2.08	-0.13	-0.15	-0.52	0.12	0.07
GBR	-3.37	0.19	-1.73	0.10	-0.12	-0.12	0.14	0.22
CYP	0.78	0.30	-1.76	-0.33	-0.30	-1.51	0.02	0.11
CZE	0.43	0.04	-0.62	0.01	0.04	-0.44	-0.02	-0.03
EST	-12.07	0.27	-3.55	-0.82	-0.08	-1.84	0.21	-0.35
HUN	1.21	0.02	-0.57	-0.03	0.00	-0.85	-0.03	-0.02
LVA	-3.20	0.13	-1.58	-0.44	-0.12	-0.78	0.11	-0.16
LTU	-4.91	0.17	-2.12	-0.59	-0.13	-0.90	0.15	-0.23
MLT	-1.89	-0.02	1.59	0.89	0.10	0.88	-0.11	0.49
POL	1.32	-0.01	-0.09	0.16	0.04	-0.31	-0.05	0.06
SVK	-1.73	0.10	-1.43	-0.34	-0.07	-0.97	0.07	-0.13
SVN	-1.71	0.08	-0.74	-0.11	-0.06	-0.40	0.05	-0.01
BGR	-0.63	0.03	-0.66	0.04	-0.03	-0.76	0.03	0.05
ROM	-3.10	0.10	-1.29	-0.14	-0.07	-0.74	0.09	-0.02
EU	-2.21	0.13	-1.55	-0.12	-0.08	-0.32	0.10	0.00

Table C.29: CCCTB-WG25 for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	2.41	0.02	-0.65	-0.20	-0.01	-0.52	-0.03	-0.11
BEL	-23.26	0.88	-4.82	1.26	-0.50	0.92	0.27	1.11
DNK	-3.27	0.30	-2.39	-0.37	-0.13	-0.97	0.10	-0.09
FIN	-0.10	0.17	-1.50	-0.29	-0.06	-0.63	0.02	-0.12
FRA	-3.04	0.17	-2.24	-0.31	-0.06	-0.28	0.12	-0.14
DEU	-2.34	0.03	-0.91	0.07	-0.02	0.17	0.09	0.06
GRC	-1.66	0.08	-1.21	-0.33	-0.05	-0.50	0.07	-0.15
IRL	4.29	0.23	-2.81	-1.59	-0.28	-3.28	0.03	-0.65
ITA	-4.33	0.11	-1.51	-0.10	-0.09	-0.15	0.13	0.01
LUX	10.37	-0.06	1.85	2.05	1.60	0.73	-3.40	-0.07
NLD	5.08	0.18	-2.99	-1.42	-0.22	-1.85	-0.03	-0.63
PRT	-4.52	0.17	-1.28	0.29	-0.14	-0.58	0.08	0.37
ESP	2.21	-0.01	-0.20	0.04	0.14	0.17	-0.07	-0.11
SWE	-2.52	0.17	-1.81	-0.08	-0.13	-0.49	0.08	0.08
GBR	-2.54	0.15	-1.39	0.14	-0.10	-0.12	0.10	0.22
CYP	1.03	0.29	-1.67	-0.31	-0.29	-1.49	0.01	0.10
CZE	1.22	0.01	-0.25	0.15	0.07	-0.31	-0.06	0.01
EST	-11.70	0.26	-3.35	-0.74	-0.07	-1.78	0.21	-0.32
HUN	1.78	0.00	-0.27	0.06	0.02	-0.78	-0.06	0.02
LVA	-2.73	0.11	-1.40	-0.37	-0.10	-0.72	0.09	-0.13
LTU	-4.42	0.16	-1.93	-0.52	-0.11	-0.83	0.14	-0.20
MLT	-1.16	-0.03	1.83	0.92	0.15	0.94	-0.17	0.45
POL	2.00	-0.04	0.25	0.28	0.07	-0.20	-0.08	0.11
SVK	-1.18	0.08	-1.12	-0.22	-0.04	-0.86	0.04	-0.08
SVN	-0.77	0.05	-0.39	0.01	-0.03	-0.29	0.01	0.03
BGR	-0.35	0.02	-0.50	0.09	-0.02	-0.71	0.02	0.07
ROM	-2.50	0.08	-1.05	-0.07	-0.06	-0.68	0.08	0.01
EU	-1.56	0.10	-1.25	-0.05	-0.05	-0.25	0.06	0.02

Table C.30: CCCTB-EUav for all firms, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	6.11	-0.09	0.70	0.20	0.13	-0.10	-0.20	0.00
BEL	-21.94	0.78	-4.13	1.35	-0.42	0.94	0.24	1.10
DNK	-0.63	0.18	-1.18	-0.06	-0.04	-0.70	-0.01	0.00
FIN	2.67	0.07	-0.38	0.05	0.07	-0.27	-0.10	-0.04
FRA	0.56	0.08	-1.22	-0.14	0.07	-0.07	-0.02	-0.14
DEU	2.07	-0.09	0.56	0.44	0.15	0.57	-0.12	0.14
GRC	0.66	0.00	-0.25	0.06	0.05	-0.11	-0.04	-0.01
IRL	6.37	0.15	-1.80	-1.26	-0.17	-2.98	-0.08	-0.57
ITA	0.14	0.00	-0.20	0.22	0.06	0.22	-0.04	0.08
LUX	10.37	-0.12	6.07	3.30	3.39	2.96	-3.98	-0.96
NLD	8.83	0.07	-1.37	-1.03	0.12	-1.33	-0.23	-0.70
PRT	-1.99	0.08	-0.44	0.39	-0.06	-0.45	-0.03	0.34
ESP	6.30	-0.12	1.23	0.41	0.32	0.57	-0.28	-0.06
SWE	0.56	0.06	-0.67	0.12	-0.02	-0.32	-0.07	0.10
GBR	1.09	-0.01	0.10	0.30	-0.01	-0.07	-0.08	0.21
CYP	2.41	0.19	-0.88	-0.13	-0.22	-1.28	-0.04	0.15
CZE	3.69	-0.07	0.78	0.52	0.19	0.06	-0.22	0.09
EST	-10.21	0.22	-2.59	-0.47	-0.05	-1.59	0.17	-0.20
HUN	3.57	-0.07	0.51	0.28	0.07	-0.57	-0.15	0.10
LVA	-1.38	0.07	-0.92	-0.20	-0.06	-0.55	0.05	-0.07
LTU	-3.15	0.12	-1.51	-0.38	-0.07	-0.69	0.10	-0.16
MLT	2.03	-0.09	3.28	1.18	0.36	1.26	-0.39	0.39
POL	4.19	-0.13	1.30	0.63	0.18	0.17	-0.21	0.23
SVK	0.63	0.01	-0.16	0.14	0.05	-0.54	-0.06	0.04
SVN	1.84	-0.04	0.54	0.29	0.06	0.00	-0.10	0.13
BGR	0.56	-0.02	-0.05	0.24	0.02	-0.59	-0.02	0.13
ROM	-0.85	0.03	-0.45	0.09	-0.01	-0.51	0.02	0.06
EU	0.91	0.00	-0.04	0.24	0.09	0.04	-0.10	0.06

Table C.31: CCCTB-WG20 for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.23	0.12	-0.69	-0.31	0.00	-0.60	-0.04	-0.19
BEL	-23.45	0.99	-3.05	1.84	-0.15	2.12	0.07	1.18
DNK	-2.30	0.39	-1.78	-0.17	-0.09	-0.73	0.06	-0.01
FIN	1.96	0.28	-1.31	-0.25	-0.05	-0.53	0.03	-0.10
FRA	-0.81	0.27	-1.40	-0.18	-0.04	-0.15	0.08	-0.07
DEU	-1.79	0.12	-0.54	0.14	0.02	0.26	0.07	0.08
GRC	-0.29	0.17	-0.66	-0.16	-0.01	-0.27	0.02	-0.08
IRL	7.90	0.33	-1.87	-1.52	-0.15	-3.19	-0.13	-0.74
ITA	-3.73	0.19	-0.78	0.05	-0.02	0.06	0.07	0.05
LUX	15.37	0.05	-0.07	0.74	2.20	0.69	-2.51	-1.60
NLD	9.65	0.28	-1.97	-1.34	0.05	-1.69	-0.21	-0.82
PRT	-5.90	0.22	-1.13	0.44	-0.08	-0.52	0.07	0.40
ESP	4.27	0.11	-0.40	-0.08	0.06	-0.03	-0.03	-0.10
SWE	-1.68	0.25	-1.33	0.00	-0.06	-0.34	0.05	0.06
GBR	-1.90	0.23	-0.93	0.20	-0.04	-0.02	0.07	0.18
CYP	2.93	0.35	-1.45	-0.31	-0.21	-1.38	-0.01	0.02
CZE	2.25	0.11	-0.65	0.00	0.01	-0.48	-0.01	-0.01
EST	-12.89	0.26	-1.80	0.20	-0.02	-1.08	0.07	0.13
HUN	2.52	0.06	-0.68	-0.06	-0.01	-0.92	-0.03	-0.02
LVA	-2.60	0.15	-0.72	-0.12	-0.05	-0.46	0.04	-0.03
LTU	-4.58	0.18	-0.87	-0.13	-0.04	-0.45	0.05	-0.04
MLT	-2.02	0.00	1.58	0.92	0.14	0.84	-0.14	0.46
POL	2.66	0.04	-0.33	0.09	0.01	-0.42	-0.03	0.04
SVK	-0.83	0.13	-0.97	-0.11	-0.05	-0.76	0.02	-0.02
SVN	-1.47	0.09	-0.44	0.00	-0.03	-0.31	0.01	0.02
BGR	-0.51	0.03	-0.53	0.14	-0.01	-0.76	0.02	0.09
ROM	-3.29	0.09	-0.69	0.10	-0.03	-0.58	0.05	0.08
EU	-0.57	0.19	-0.88	0.02	-0.01	-0.17	0.03	0.02

Table C.32: CCCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	6.34	0.08	-0.53	-0.26	0.01	-0.55	-0.06	-0.17
BEL	-23.16	0.96	-2.89	1.88	-0.16	2.10	0.07	1.21
DNK	-1.69	0.36	-1.66	-0.14	-0.08	-0.72	0.04	0.00
FIN	2.77	0.25	-1.17	-0.21	-0.04	-0.49	0.01	-0.09
FRA	0.07	0.25	-1.34	-0.19	-0.03	-0.15	0.06	-0.09
DEU	-0.74	0.08	-0.38	0.18	0.04	0.29	0.04	0.08
GRC	0.52	0.14	-0.58	-0.11	0.00	-0.24	0.01	-0.06
IRL	8.45	0.30	-1.78	-1.48	-0.14	-3.16	-0.14	-0.73
ITA	-2.56	0.16	-0.65	0.08	-0.01	0.08	0.05	0.06
LUX	15.37	0.04	0.94	1.08	2.55	1.17	-2.70	-1.71
NLD	10.48	0.25	-1.84	-1.31	0.08	-1.65	-0.24	-0.82
PRT	-5.24	0.18	-0.93	0.47	-0.08	-0.50	0.05	0.41
ESP	5.26	0.09	-0.25	-0.04	0.09	0.00	-0.06	-0.11
SWE	-0.99	0.22	-1.18	0.03	-0.05	-0.35	0.03	0.06
GBR	-1.23	0.19	-0.77	0.21	-0.03	-0.05	0.05	0.18
CYP	3.31	0.34	-1.41	-0.31	-0.20	-1.38	-0.01	0.01
CZE	3.13	0.08	-0.46	0.07	0.03	-0.42	-0.04	0.01
EST	-12.57	0.25	-1.66	0.25	-0.02	-1.06	0.07	0.15
HUN	3.14	0.03	-0.52	-0.01	0.00	-0.89	-0.04	0.00
LVA	-2.10	0.13	-0.65	-0.09	-0.05	-0.44	0.03	-0.01
LTU	-4.07	0.17	-0.79	-0.11	-0.04	-0.43	0.05	-0.03
MLT	-1.06	0.00	1.70	0.92	0.18	0.86	-0.18	0.42
POL	3.40	0.01	-0.17	0.14	0.03	-0.37	-0.05	0.06
SVK	-0.22	0.11	-0.80	-0.05	-0.03	-0.72	0.01	0.00
SVN	-0.55	0.06	-0.28	0.05	-0.01	-0.27	0.00	0.04
BGR	-0.20	0.02	-0.44	0.16	0.00	-0.75	0.01	0.10
ROM	-2.72	0.07	-0.57	0.13	-0.02	-0.56	0.04	0.10
EU	0.12	0.16	-0.74	0.05	0.00	-0.15	0.00	0.02

Table C.33: CCCTB-EUav for multinationals, location choice includes USA and JPN & tax haven

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	10.48	-0.04	0.04	-0.09	0.09	-0.39	-0.16	-0.14
BEL	-21.94	0.84	-2.41	1.94	-0.15	2.00	0.05	1.24
DNK	0.94	0.23	-0.93	0.02	-0.02	-0.63	-0.03	0.04
FIN	6.10	0.14	-0.61	-0.06	0.04	-0.33	-0.07	-0.08
FRA	3.94	0.15	-0.85	-0.13	0.06	-0.10	-0.05	-0.13
DEU	3.59	-0.05	0.32	0.34	0.14	0.43	-0.11	0.09
GRC	3.27	0.06	-0.27	0.04	0.04	-0.11	-0.04	-0.02
IRL	10.80	0.20	-1.29	-1.29	-0.09	-3.02	-0.21	-0.66
ITA	2.15	0.04	-0.13	0.20	0.07	0.20	-0.06	0.06
LUX	10.37	-0.04	6.30	3.41	4.03	3.54	-3.82	-1.52
NLD	13.99	0.11	-1.06	-1.09	0.22	-1.43	-0.37	-0.82
PRT	-2.63	0.08	-0.44	0.46	-0.04	-0.45	-0.03	0.36
ESP	7.01	-0.09	0.92	0.40	0.30	0.41	-0.33	-0.04
SWE	1.92	0.10	-0.53	0.11	0.02	-0.35	-0.09	0.05
GBR	1.59	0.01	-0.01	0.28	0.01	-0.15	-0.09	0.17
CYP	4.94	0.23	-0.98	-0.20	-0.17	-1.29	-0.04	0.05
CZE	6.10	0.01	0.06	0.24	0.11	-0.26	-0.13	0.02
EST	-11.30	0.21	-1.15	0.42	0.01	-0.99	0.05	0.21
HUN	5.23	-0.03	-0.11	0.09	0.03	-0.80	-0.10	0.02
LVA	-0.60	0.09	-0.47	-0.03	-0.03	-0.39	0.01	0.00
LTU	-2.64	0.14	-0.64	-0.06	-0.02	-0.39	0.03	-0.02
MLT	2.81	-0.06	2.75	1.03	0.34	1.03	-0.36	0.31
POL	5.93	-0.08	0.36	0.31	0.10	-0.21	-0.12	0.10
SVK	1.90	0.05	-0.27	0.12	0.03	-0.59	-0.05	0.04
SVN	2.21	-0.03	0.14	0.16	0.04	-0.16	-0.06	0.07
BGR	0.82	-0.01	-0.19	0.22	0.02	-0.71	-0.01	0.12
ROM	-1.02	0.02	-0.28	0.18	0.01	-0.50	0.01	0.11
EU	2.44	0.03	-0.11	0.19	0.09	-0.04	-0.12	0.03

**Table C.34: CCCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven;
formula apportionment on payroll (1/6), employment (1/6), capital (1/3) and output (1/3)**

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.84	0.10	-0.53	-0.22	0.03	-0.53	-0.05	-0.16
BEL	-23.54	0.95	-2.92	2.09	-0.20	2.08	0.06	1.36
DNK	-1.78	0.36	-1.66	-0.13	-0.08	-0.72	0.04	0.01
FIN	2.90	0.27	-1.21	-0.22	-0.03	-0.50	0.01	-0.10
FRA	-0.45	0.24	-1.30	-0.14	-0.04	-0.13	0.06	-0.05
DEU	-0.89	0.08	-0.38	0.20	0.03	0.29	0.04	0.10
GRC	0.52	0.15	-0.60	-0.11	0.00	-0.24	0.01	-0.06
IRL	8.26	0.30	-1.79	-1.45	-0.15	-3.15	-0.14	-0.70
ITA	-2.39	0.17	-0.67	0.08	0.00	0.08	0.05	0.05
LUX	15.37	0.05	0.78	0.84	2.35	1.00	-2.38	-1.68
NLD	10.11	0.25	-1.81	-1.27	0.07	-1.62	-0.23	-0.79
PRT	-4.14	0.20	-0.94	0.33	-0.06	-0.50	0.03	0.30
ESP	5.94	0.10	-0.33	-0.10	0.09	-0.03	-0.06	-0.15
SWE	-1.20	0.23	-1.17	0.06	-0.04	-0.33	0.04	0.08
GBR	-1.55	0.19	-0.77	0.26	-0.04	-0.02	0.06	0.22
CYP	2.98	0.35	-1.41	-0.27	-0.19	-1.36	-0.01	0.02
CZE	4.24	0.13	-0.65	-0.07	0.03	-0.48	-0.03	-0.06
EST	-11.79	0.27	-1.69	-0.11	-0.04	-0.93	0.06	-0.02
HUN	3.96	0.06	-0.62	-0.11	-0.01	-0.90	-0.04	-0.06
LVA	-1.77	0.14	-0.67	-0.14	-0.05	-0.44	0.03	-0.04
LTU	-3.68	0.18	-0.83	-0.16	-0.04	-0.43	0.04	-0.06
MLT	-0.29	0.04	1.41	0.82	0.18	0.80	-0.16	0.35
POL	4.25	0.04	-0.30	0.05	0.03	-0.40	-0.04	0.01
SVK	0.41	0.13	-0.97	-0.16	-0.05	-0.74	0.02	-0.05
SVN	-0.09	0.07	-0.34	0.01	-0.01	-0.28	0.00	0.02
BGR	0.40	0.04	-0.53	-0.02	-0.03	-0.62	0.00	0.01
ROM	-1.81	0.09	-0.56	-0.02	-0.02	-0.49	0.02	0.01
EU	0.36	0.16	-0.76	0.04	0.00	-0.15	0.01	0.03

**Table C.35: CCCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven;
formula apportionment on payroll (1/4), employment (1/4) and capital (1/2)**

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.86	0.09	-0.53	-0.23	0.01	-0.54	-0.05	-0.15
BEL	-23.58	0.94	-2.34	2.12	-0.21	2.23	0.07	1.39
DNK	-1.78	0.36	-1.56	-0.13	-0.09	-0.70	0.05	0.01
FIN	2.78	0.25	-1.18	-0.21	-0.04	-0.50	0.01	-0.08
FRA	0.11	0.25	-1.39	-0.19	-0.03	-0.16	0.05	-0.09
DEU	-1.19	0.08	-0.41	0.23	0.03	0.29	0.04	0.11
GRC	0.44	0.15	-0.58	-0.10	0.00	-0.24	0.01	-0.06
IRL	7.81	0.29	-1.66	-1.38	-0.16	-3.08	-0.12	-0.64
ITA	-2.69	0.16	-0.67	0.09	-0.01	0.08	0.05	0.06
LUX	15.37	0.03	1.02	1.35	2.84	1.44	-3.09	-1.79
NLD	9.76	0.25	-1.87	-1.23	0.06	-1.63	-0.22	-0.77
PRT	-4.37	0.19	-0.75	0.36	-0.07	-0.46	0.04	0.33
ESP	5.64	0.10	-0.39	-0.08	0.09	-0.04	-0.06	-0.14
SWE	-1.15	0.22	-1.11	0.05	-0.05	-0.32	0.04	0.08
GBR	-0.96	0.19	-0.74	0.19	-0.03	-0.06	0.04	0.16
CYP	3.33	0.34	-1.30	-0.31	-0.20	-1.35	-0.01	0.01
CZE	3.72	0.11	-0.55	0.00	0.03	-0.45	-0.03	-0.03
EST	-12.43	0.25	-1.34	0.19	-0.02	-0.91	0.07	0.12
HUN	3.68	0.05	-0.52	-0.08	-0.01	-0.88	-0.04	-0.04
LVA	-1.95	0.13	-0.62	-0.11	-0.05	-0.43	0.03	-0.02
LTU	-3.87	0.18	-0.77	-0.13	-0.04	-0.42	0.05	-0.04
MLT	-0.61	0.02	1.46	0.86	0.18	0.81	-0.17	0.38
POL	3.90	0.03	-0.22	0.09	0.03	-0.38	-0.04	0.03
SVK	0.04	0.12	-0.80	-0.09	-0.04	-0.71	0.01	-0.02
SVN	-0.21	0.07	-0.30	0.02	-0.01	-0.27	0.00	0.03
BGR	0.11	0.03	-0.40	0.07	-0.01	-0.65	0.01	0.05
ROM	-2.20	0.08	-0.50	0.04	-0.02	-0.50	0.03	0.05
EU	0.21	0.16	-0.74	0.04	0.00	-0.15	0.01	0.02

**Table C.36: CCCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven;
formula apportionment on payroll (1/3), capital (1/3) and output (1/3)**

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.36	0.10	-0.52	-0.18	0.04	-0.51	-0.05	-0.14
BEL	-23.89	0.94	-2.95	2.30	-0.24	2.06	0.06	1.52
DNK	-1.86	0.36	-1.65	-0.12	-0.08	-0.71	0.04	0.01
FIN	3.02	0.27	-1.23	-0.23	-0.02	-0.50	0.01	-0.11
FRA	-0.95	0.23	-1.26	-0.09	-0.05	-0.10	0.07	-0.01
DEU	-1.05	0.08	-0.37	0.22	0.03	0.31	0.04	0.11
GRC	0.52	0.16	-0.61	-0.11	0.00	-0.25	0.02	-0.06
IRL	8.06	0.29	-1.79	-1.43	-0.16	-3.14	-0.14	-0.68
ITA	-2.21	0.17	-0.68	0.07	0.00	0.08	0.05	0.04
LUX	15.37	0.05	0.58	0.63	2.10	0.78	-2.08	-1.58
NLD	9.75	0.25	-1.79	-1.22	0.06	-1.60	-0.22	-0.76
PRT	-2.92	0.22	-0.95	0.20	-0.04	-0.50	0.02	0.19
ESP	6.64	0.12	-0.40	-0.16	0.10	-0.06	-0.07	-0.19
SWE	-1.42	0.23	-1.15	0.10	-0.04	-0.30	0.04	0.10
GBR	-1.87	0.18	-0.77	0.30	-0.05	0.02	0.07	0.26
CYP	2.65	0.35	-1.40	-0.23	-0.18	-1.35	0.00	0.04
CZE	5.47	0.18	-0.84	-0.20	0.03	-0.55	-0.02	-0.13
EST	-10.87	0.29	-1.76	-0.42	-0.06	-0.89	0.05	-0.16
HUN	4.86	0.08	-0.72	-0.21	-0.01	-0.93	-0.04	-0.11
LVA	-1.42	0.15	-0.70	-0.19	-0.05	-0.45	0.03	-0.06
LTU	-3.27	0.20	-0.87	-0.22	-0.05	-0.44	0.05	-0.08
MLT	0.52	0.08	1.16	0.73	0.19	0.75	-0.16	0.27
POL	5.19	0.07	-0.43	-0.04	0.02	-0.44	-0.04	-0.04
SVK	1.08	0.16	-1.13	-0.26	-0.06	-0.77	0.03	-0.09
SVN	0.38	0.09	-0.40	-0.03	-0.01	-0.30	0.00	-0.01
BGR	1.10	0.06	-0.68	-0.16	-0.06	-0.61	0.01	-0.04
ROM	-0.76	0.12	-0.60	-0.13	-0.03	-0.48	0.01	-0.05
EU	0.65	0.17	-0.79	0.03	0.00	-0.14	0.01	0.03

**Table C.37: CCCTB-WG25 for multinationals, location choice includes USA and JPN & tax haven;
formula apportionment on payroll (1/2) and capital (1/2)**

	CIT_rate	CoC	Capital	Wage	Employm.	GDP	Rev_CIT	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(y)
AUT	5.13	0.10	-0.50	-0.16	0.03	-0.50	-0.04	-0.13
BEL	-24.09	0.93	-2.35	2.44	-0.28	2.19	0.06	1.63
DNK	-1.91	0.35	-1.55	-0.11	-0.09	-0.69	0.05	0.03
FIN	2.97	0.27	-1.22	-0.22	-0.03	-0.50	0.01	-0.10
FRA	-0.66	0.23	-1.31	-0.12	-0.04	-0.12	0.06	-0.04
DEU	-1.42	0.07	-0.39	0.25	0.03	0.31	0.04	0.13
GRC	0.44	0.15	-0.60	-0.10	0.00	-0.24	0.02	-0.06
IRL	7.54	0.28	-1.66	-1.34	-0.18	-3.06	-0.12	-0.61
ITA	-2.43	0.17	-0.69	0.08	0.00	0.08	0.05	0.05
LUX	15.37	0.03	0.73	1.01	2.45	1.12	-2.61	-1.65
NLD	9.22	0.25	-1.83	-1.17	0.05	-1.59	-0.21	-0.72
PRT	-2.53	0.22	-0.81	0.16	-0.04	-0.48	0.02	0.17
ESP	6.69	0.12	-0.50	-0.17	0.10	-0.09	-0.07	-0.20
SWE	-1.47	0.23	-1.07	0.11	-0.05	-0.28	0.04	0.11
GBR	-1.46	0.19	-0.72	0.25	-0.04	-0.01	0.06	0.22
CYP	2.82	0.35	-1.28	-0.25	-0.18	-1.33	0.00	0.03
CZE	5.53	0.18	-0.84	-0.21	0.03	-0.55	-0.02	-0.13
EST	-11.17	0.28	-1.52	-0.33	-0.06	-0.81	0.05	-0.12
HUN	5.02	0.09	-0.69	-0.22	-0.01	-0.92	-0.03	-0.12
LVA	-1.44	0.15	-0.68	-0.18	-0.05	-0.44	0.03	-0.06
LTU	-3.27	0.20	-0.84	-0.22	-0.05	-0.43	0.05	-0.08
MLT	0.60	0.08	1.05	0.72	0.19	0.74	-0.16	0.27
POL	5.29	0.07	-0.42	-0.05	0.02	-0.44	-0.03	-0.04
SVK	1.03	0.16	-1.07	-0.25	-0.06	-0.75	0.03	-0.08
SVN	0.51	0.09	-0.39	-0.04	-0.01	-0.29	0.00	-0.01
BGR	1.12	0.06	-0.64	-0.16	-0.06	-0.60	0.01	-0.04
ROM	-0.66	0.12	-0.57	-0.14	-0.04	-0.48	0.01	-0.05
EU	0.62	0.17	-0.78	0.03	0.00	-0.14	0.01	0.04

Appendix D Country tables EUCIT

Tables D.1 – D.6 show the effects of EUCIT reforms with the following order:

- Tables D.1 - D.3: EUCIT reforms for all firms with a rate fixed at 24.2%
- Tables D.4 - D.6: EUCIT reforms for all firms with rate adjusted to achieve budget neutrality on average for the EU

Table D.1: EUCIT-WG20 for all firms (rate at 24.2%)

	CIT_rate	CoC	Capital	Wage	Employment	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	-0.77	0.02	-0.31	0.17	-0.01	-0.22	-0.23	0.40	-0.09
BEL	-9.76	0.87	-10.50	-3.30	-1.12	-3.20	1.78	-0.53	-0.84
DNK	-0.77	0.35	-3.56	-1.04	-0.22	-1.30	0.51	-0.14	-0.36
FIN	-1.77	0.13	-1.27	-0.12	-0.10	-0.52	-0.12	0.49	-0.20
FRA	-9.10	0.03	-0.33	0.55	-0.10	0.10	-0.64	1.07	-0.13
DEU	-12.18	-0.17	2.21	1.65	0.12	1.06	-1.22	1.38	0.20
GRC	-0.77	0.18	-2.41	-0.87	-0.18	-1.01	0.33	-0.08	-0.30
IRL	11.73	0.35	-5.43	-2.81	-0.19	-3.06	1.28	-1.46	-0.79
ITA	-13.07	-0.09	1.13	1.12	0.01	0.55	-0.99	1.27	0.01
LUX	-5.40	-0.41	2.74	6.54	-1.84	-0.63	-5.45	7.60	2.20
NLD	-1.27	0.08	-1.40	0.09	-0.59	-1.03	-0.66	1.98	-0.34
PRT	-2.27	0.19	-1.92	-0.23	-0.04	-0.46	0.38	-0.64	0.25
ESP	-8.76	-0.33	4.00	2.41	0.24	1.59	-1.58	1.86	0.27
SWE	-3.77	0.16	-1.73	-0.10	-0.13	-0.41	0.00	0.19	-0.03
GBR	-5.77	0.09	-0.84	0.26	-0.04	0.12	-0.14	0.14	0.14
CYP	14.23	0.62	-5.65	-2.19	0.02	-1.87	1.76	-2.41	-0.14
CZE	0.23	0.04	-0.23	0.18	0.11	-0.13	-0.04	-0.12	0.04
EST	2.23	0.73	-9.12	-4.70	-0.49	-3.98	2.50	-3.15	-0.66
HUN	8.23	0.27	-2.70	-1.14	0.04	-1.14	1.05	-1.65	0.06
LVA	9.23	0.57	-6.58	-3.06	-0.31	-2.53	2.01	-2.43	-0.35
LTU	6.23	0.65	-7.06	-3.04	-0.35	-2.57	1.90	-2.02	-0.46
MLT	-10.77	-0.46	4.78	2.86	0.06	1.66	-1.67	1.93	0.76
POL	5.23	0.16	-1.54	-0.68	0.06	-0.64	0.65	-1.07	0.08
SVK	5.23	0.39	-4.20	-2.23	-0.13	-1.99	1.32	-1.84	-0.28
SVN	1.23	0.20	-1.74	-0.59	-0.06	-0.62	0.43	-0.50	-0.06
BGR	14.23	0.61	-6.37	-3.09	-0.21	-2.47	2.48	-3.48	0.00
ROM	8.23	0.46	-4.54	-1.79	0.02	-1.37	1.49	-2.19	0.02
EU	-5.30	0.05	-0.39	0.35	-0.03	-0.01	-0.46	0.43	0.01

Table D.2: EUCIT-WG25 for all firms (rate at 24.2%)

	CIT_rate	CoC	Capital	Wage	Employm	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	-0.77	-0.04	0.40	0.45	0.04	0.04	-0.37	0.46	0.00
BEL	-9.76	0.82	-9.94	-3.08	-1.06	-2.99	1.68	-0.52	-0.75
DNK	-0.77	0.30	-3.03	-0.84	-0.18	-1.13	0.40	-0.09	-0.30
FIN	-1.77	0.08	-0.66	0.13	-0.05	-0.31	-0.24	0.52	-0.12
FRA	-9.10	0.00	0.07	0.68	-0.07	0.22	-0.73	1.13	-0.10
DEU	-12.18	-0.22	2.83	1.88	0.17	1.27	-1.34	1.43	0.27
GRC	-0.77	0.13	-1.70	-0.54	-0.11	-0.71	0.18	-0.01	-0.21
IRL	11.73	0.31	-4.85	-2.52	-0.15	-2.82	1.15	-1.33	-0.71
ITA	-13.07	-0.14	1.71	1.33	0.06	0.75	-1.11	1.32	0.07
LUX	-5.40	-0.46	3.40	6.80	-1.75	-0.38	-5.55	7.62	2.29
NLD	-1.27	0.04	-0.86	0.33	-0.56	-0.84	-0.78	2.08	-0.27
PRT	-2.27	0.13	-1.34	-0.07	-0.02	-0.33	0.28	-0.53	0.28
ESP	-8.76	-0.37	4.52	2.61	0.27	1.76	-1.69	1.96	0.31
SWE	-3.77	0.11	-1.19	0.09	-0.09	-0.24	-0.10	0.23	0.03
GBR	-5.77	0.04	-0.36	0.39	-0.03	0.22	-0.23	0.25	0.16
CYP	14.23	0.57	-5.27	-2.05	0.04	-1.77	1.67	-2.30	-0.13
CZE	0.23	-0.03	0.56	0.55	0.17	0.18	-0.21	-0.02	0.13
EST	2.23	0.68	-8.44	-4.34	-0.45	-3.68	2.35	-3.00	-0.58
HUN	8.23	0.20	-1.98	-0.87	0.09	-0.90	0.90	-1.58	0.14
LVA	9.23	0.50	-5.84	-2.72	-0.25	-2.23	1.84	-2.31	-0.26
LTU	6.23	0.58	-6.33	-2.73	-0.30	-2.29	1.75	-1.90	-0.38
MLT	-10.77	-0.50	5.22	3.00	0.08	1.77	-1.77	2.06	0.76
POL	5.23	0.09	-0.78	-0.35	0.13	-0.35	0.49	-0.97	0.17
SVK	5.23	0.33	-3.42	-1.85	-0.06	-1.66	1.16	-1.72	-0.18
SVN	1.23	0.12	-0.93	-0.27	0.00	-0.34	0.27	-0.41	0.03
BGR	14.23	0.55	-5.69	-2.80	-0.15	-2.21	2.33	-3.37	0.08
ROM	8.23	0.39	-3.79	-1.51	0.05	-1.14	1.33	-2.01	0.07
EU	-5.30	0.00	0.20	0.57	0.01	0.19	-0.57	0.51	0.07

Table D.3: EUCIT-EUav for all firms (rate at 24.2%)

	CIT_rate	CoC	Capital	Wage	Employm	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	-0.77	-0.20	2.42	1.25	0.21	0.75	-0.80	0.69	0.22
BEL	-9.76	0.66	-8.17	-2.39	-0.90	-2.35	1.31	-0.35	-0.55
DNK	-0.77	0.10	-0.78	0.00	-0.03	-0.40	-0.03	0.08	-0.01
FIN	-1.77	-0.10	1.42	0.95	0.12	0.43	-0.65	0.68	0.14
FRA	-9.10	-0.18	1.98	1.31	0.07	0.79	-1.10	1.32	0.07
DEU	-12.18	-0.37	4.85	2.62	0.33	1.94	-1.75	1.68	0.47
GRC	-0.77	-0.03	0.33	0.41	0.09	0.14	-0.26	0.26	0.03
IRL	11.73	0.16	-2.65	-1.42	-0.01	-1.93	0.67	-0.85	-0.43
ITA	-13.07	-0.28	3.56	2.00	0.21	1.36	-1.50	1.54	0.23
LUX	-5.40	-0.63	5.83	7.75	-1.45	0.55	-5.95	7.74	2.62
NLD	-1.27	-0.13	1.31	1.28	-0.45	-0.09	-1.22	2.44	0.02
PRT	-2.27	-0.01	0.09	0.33	0.02	-0.02	-0.05	-0.14	0.28
ESP	-8.76	-0.54	6.60	3.41	0.38	2.43	-2.13	2.36	0.48
SWE	-3.77	-0.05	0.77	0.75	0.05	0.35	-0.49	0.39	0.22
GBR	-5.77	-0.13	1.43	0.88	0.00	0.59	-0.57	0.64	0.23
CYP	14.23	0.34	-3.05	-1.29	0.11	-1.16	1.24	-1.87	0.07
CZE	0.23	-0.18	2.61	1.50	0.33	0.99	-0.69	0.36	0.32
EST	2.23	0.49	-6.17	-3.14	-0.29	-2.70	1.80	-2.46	-0.32
HUN	8.23	0.04	-0.16	-0.18	0.23	-0.28	0.49	-1.29	0.29
LVA	9.23	0.34	-4.03	-1.92	-0.10	-1.52	1.42	-1.95	-0.09
LTU	6.23	0.43	-4.74	-2.05	-0.18	-1.70	1.38	-1.59	-0.24
MLT	-10.77	-0.64	7.19	3.65	0.15	2.28	-2.17	2.52	0.86
POL	5.23	-0.09	1.32	0.52	0.31	0.44	0.03	-0.62	0.37
SVK	5.23	0.15	-1.24	-0.78	0.11	-0.76	0.67	-1.28	0.06
SVN	1.23	-0.06	0.95	0.44	0.15	0.30	-0.13	-0.16	0.21
BGR	14.23	0.38	-3.85	-2.02	0.00	-1.52	1.90	-3.01	0.24
ROM	8.23	0.22	-2.12	-0.88	0.12	-0.64	0.94	-1.55	0.17
EU	-5.30	-0.17	2.14	1.28	0.14	0.81	-0.97	0.81	0.23

Table D.4: EUCIT-WG20 for all firms (rate at 27.9%)

	CIT_rate	CoC	Capital	Wage	Employment	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	2.93	0.14	-1.74	-0.51	-0.09	-0.74	0.24	-0.10	-0.18
BEL	-6.06	1.03	-11.98	-3.99	-1.18	-3.79	2.24	-0.99	-0.98
DNK	2.93	0.53	-5.11	-1.78	-0.23	-1.82	1.03	-0.81	-0.50
FIN	1.93	0.32	-3.04	-0.99	-0.15	-1.13	0.46	-0.13	-0.39
FRA	-5.40	0.21	-2.05	-0.14	-0.14	-0.42	-0.16	0.59	-0.27
DEU	-8.48	-0.05	0.66	0.96	0.05	0.52	-0.73	0.84	0.11
GRC	2.93	0.35	-4.46	-1.99	-0.33	-1.87	1.01	-0.82	-0.46
IRL	15.43	0.48	-7.14	-3.82	-0.25	-3.81	1.80	-2.16	-0.99
ITA	-9.37	0.03	-0.32	0.49	-0.06	0.06	-0.52	0.79	-0.06
LUX	-1.70	-0.17	2.44	5.57	-0.66	-0.12	-5.05	7.14	0.55
NLD	2.43	0.22	-2.93	-0.80	-0.50	-1.61	-0.14	1.27	-0.61
PRT	1.43	0.31	-3.15	-0.64	-0.03	-0.71	0.80	-1.24	0.30
ESP	-5.06	-0.18	2.18	1.55	0.19	0.97	-1.02	1.18	0.15
SWE	-0.07	0.30	-3.23	-0.72	-0.19	-0.93	0.47	-0.28	-0.12
GBR	-2.07	0.18	-1.98	-0.15	-0.04	-0.26	0.22	-0.36	0.15
CYP	17.93	0.80	-7.14	-2.83	0.06	-2.24	2.25	-3.07	-0.23
CZE	3.93	0.22	-2.29	-0.97	0.02	-0.96	0.65	-0.94	-0.12
EST	5.93	0.89	-10.74	-5.67	-0.54	-4.69	3.15	-4.20	-0.68
HUN	11.93	0.42	-4.25	-1.87	-0.01	-1.65	1.60	-2.35	0.00
LVA	12.93	0.73	-8.30	-3.94	-0.39	-3.18	2.61	-3.21	-0.43
LTU	9.93	0.83	-8.89	-3.95	-0.43	-3.23	2.53	-2.77	-0.55
MLT	-7.07	-0.27	3.12	2.05	0.11	1.18	-1.08	1.11	0.62
POL	8.93	0.33	-3.32	-1.58	-0.01	-1.29	1.28	-1.86	-0.01
SVK	8.93	0.58	-5.99	-3.35	-0.18	-2.79	2.01	-2.83	-0.41
SVN	4.93	0.37	-3.32	-1.28	-0.12	-1.14	0.96	-1.11	-0.13
BGR	17.93	0.79	-8.07	-3.96	-0.29	-3.11	3.13	-4.34	-0.05
ROM	11.93	0.60	-5.83	-2.38	0.04	-1.72	1.98	-2.93	0.02
EU	-1.60	0.19	-1.95	-0.37	-0.08	-0.54	0.03	-0.17	-0.09

Table D.5: EUCIT-WG25 for all firms (rate at 28.4%)

	CIT_rate	CoC	Capital	Wage	Employment	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	3.43	0.08	-1.09	-0.26	-0.03	-0.50	0.14	-0.10	-0.08
BEL	-5.56	0.99	-11.52	-3.82	-1.12	-3.62	2.18	-1.04	-0.90
DNK	3.43	0.50	-4.69	-1.64	-0.19	-1.68	0.97	-0.83	-0.44
FIN	2.43	0.28	-2.55	-0.82	-0.09	-0.95	0.40	-0.19	-0.31
FRA	-4.90	0.18	-1.80	-0.07	-0.11	-0.34	-0.20	0.60	-0.26
DEU	-7.98	-0.09	1.17	1.14	0.10	0.70	-0.80	0.84	0.18
GRC	3.43	0.30	-3.90	-1.74	-0.27	-1.63	0.93	-0.83	-0.36
IRL	15.93	0.44	-6.68	-3.60	-0.21	-3.62	1.72	-2.11	-0.93
ITA	-8.87	-0.02	0.18	0.66	-0.01	0.23	-0.60	0.79	0.00
LUX	-1.20	-0.19	3.19	5.76	-0.41	0.25	-5.12	7.10	0.45
NLD	2.93	0.19	-2.50	-0.63	-0.46	-1.46	-0.21	1.29	-0.56
PRT	1.93	0.25	-2.62	-0.49	-0.01	-0.59	0.73	-1.19	0.34
ESP	-4.56	-0.21	2.57	1.68	0.22	1.09	-1.08	1.21	0.18
SWE	0.43	0.26	-2.79	-0.58	-0.15	-0.80	0.41	-0.31	-0.06
GBR	-1.57	0.14	-1.55	-0.05	-0.03	-0.19	0.16	-0.30	0.18
CYP	18.43	0.77	-6.89	-2.76	0.08	-2.17	2.21	-3.03	-0.23
CZE	4.43	0.17	-1.63	-0.68	0.09	-0.69	0.55	-0.94	-0.03
EST	6.43	0.84	-10.15	-5.36	-0.49	-4.43	3.05	-4.17	-0.58
HUN	12.43	0.36	-3.60	-1.64	0.05	-1.43	1.50	-2.36	0.09
LVA	13.43	0.67	-7.64	-3.66	-0.32	-2.91	2.50	-3.17	-0.34
LTU	10.43	0.77	-8.28	-3.70	-0.37	-2.99	2.43	-2.74	-0.47
MLT	-6.57	-0.28	3.42	2.11	0.14	1.26	-1.13	1.16	0.61
POL	9.43	0.27	-2.64	-1.32	0.06	-1.03	1.17	-1.85	0.09
SVK	9.43	0.52	-5.30	-3.05	-0.11	-2.51	1.91	-2.81	-0.31
SVN	5.43	0.29	-2.56	-1.00	-0.05	-0.86	0.83	-1.09	-0.03
BGR	18.43	0.73	-7.48	-3.74	-0.22	-2.89	3.04	-4.33	0.03
ROM	12.43	0.53	-5.11	-2.11	0.08	-1.49	1.86	-2.82	0.09
EU	-1.10	0.14	-1.46	-0.20	-0.03	-0.38	-0.04	-0.15	-0.04

Table D.6: EUCIT-EUav for all firms (rate at 30.9%)

	CIT_rate	CoC	Capital	Wage	Employm	GDP	Rev_CIT	Cons_tax	Welfare
	(a)	(a)	(r)	(r)	(r)	(r)	(y)	(a)	(y)
AUT	5.93	-0.07	0.69	0.38	0.15	0.13	-0.13	-0.12	0.16
BEL	-3.06	0.88	-10.13	-3.34	-0.92	-3.13	1.97	-1.12	-0.73
DNK	5.93	0.34	-2.68	-1.00	0.02	-1.04	0.74	-1.06	-0.15
FIN	4.93	0.15	-0.95	-0.29	0.11	-0.36	0.23	-0.40	-0.09
FRA	-2.40	0.06	-0.44	0.31	0.05	0.08	-0.37	0.55	-0.13
DEU	-5.48	-0.22	2.85	1.68	0.28	1.26	-1.02	0.82	0.37
GRC	5.93	0.19	-2.59	-1.21	-0.09	-1.06	0.81	-0.99	-0.14
IRL	18.43	0.31	-4.87	-2.79	-0.05	-2.90	1.42	-1.92	-0.70
ITA	-6.37	-0.14	1.69	1.15	0.15	0.75	-0.81	0.75	0.17
LUX	1.30	-0.26	6.29	6.44	0.75	1.82	-5.42	6.97	-0.16
NLD	5.43	0.05	-0.59	0.06	-0.25	-0.81	-0.47	1.31	-0.35
PRT	4.43	0.14	-1.50	-0.22	0.05	-0.33	0.57	-1.05	0.38
ESP	-2.06	-0.33	4.12	2.19	0.35	1.57	-1.29	1.30	0.32
SWE	2.93	0.12	-1.16	-0.10	0.00	-0.34	0.19	-0.41	0.14
GBR	0.93	-0.03	0.12	0.35	0.01	0.07	-0.07	-0.08	0.28
CYP	20.93	0.57	-4.92	-2.16	0.21	-1.60	1.98	-2.91	-0.04
CZE	6.93	0.07	-0.25	-0.17	0.25	-0.14	0.37	-0.99	0.11
EST	8.93	0.68	-8.17	-4.39	-0.31	-3.56	2.76	-4.17	-0.24
HUN	14.93	0.24	-2.17	-1.18	0.21	-0.92	1.32	-2.42	0.25
LVA	15.93	0.55	-6.36	-3.16	-0.16	-2.37	2.34	-3.21	-0.16
LTU	12.93	0.69	-7.38	-3.39	-0.25	-2.63	2.36	-2.85	-0.34
MLT	-4.07	-0.35	5.02	2.44	0.27	1.63	-1.29	1.27	0.62
POL	11.93	0.13	-1.00	-0.73	0.26	-0.39	0.98	-1.91	0.30
SVK	11.93	0.40	-3.50	-2.35	0.10	-1.80	1.72	-2.89	-0.07
SVN	7.93	0.15	-1.05	-0.49	0.12	-0.32	0.64	-1.17	0.16
BGR	20.93	0.62	-6.13	-3.28	-0.06	-2.38	2.91	-4.42	0.22
ROM	14.93	0.39	-3.69	-1.63	0.19	-1.03	1.66	-2.69	0.23
EU	1.40	0.01	0.10	0.30	0.12	0.11	-0.25	-0.14	0.13