European Commission

JRC TECHNICAL REPORTS

Falling Corporate Tax Rates in the EU: Is there a case for harmonisation?

JRC Working Papers on Taxation and Structural Reforms No 4/2016

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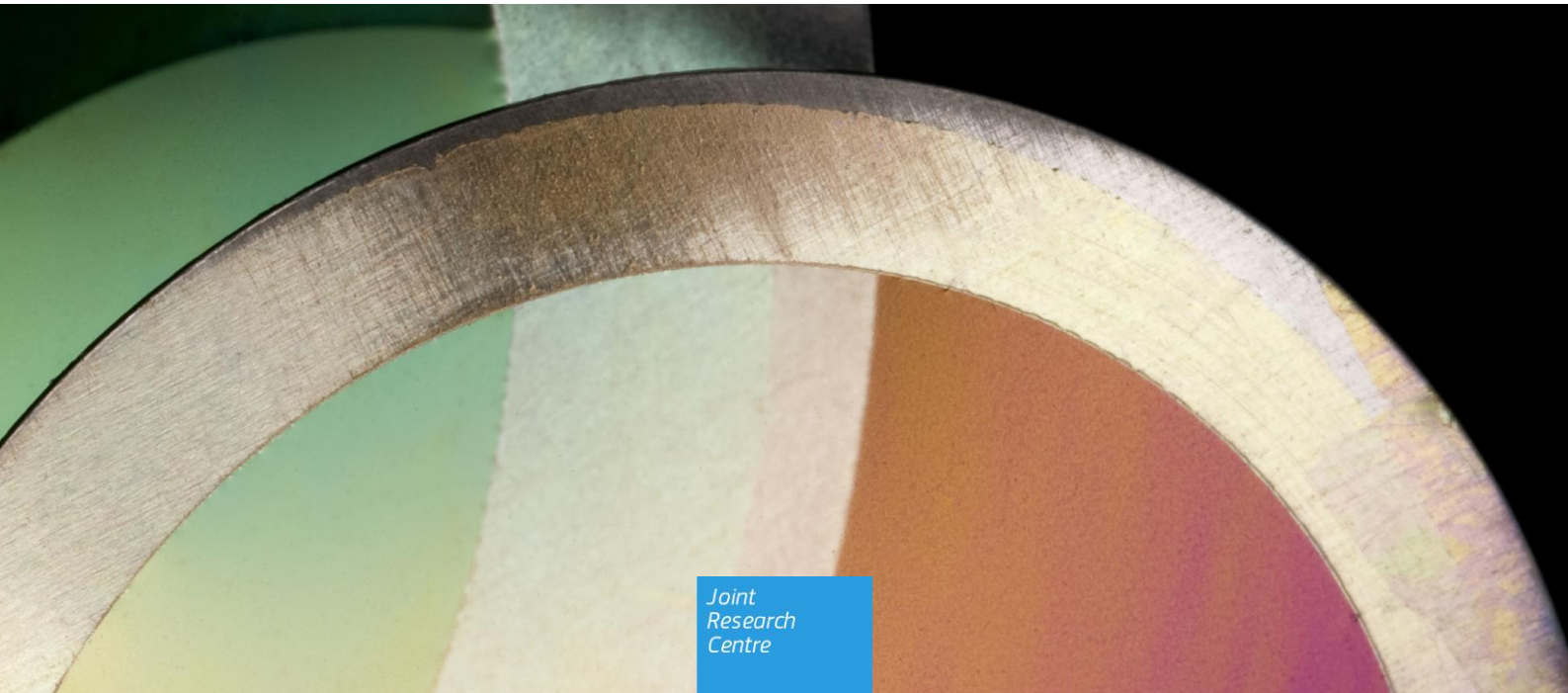
November 2016



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JRC Science Hub
https://ec.europa.eu/jrc

JRC104157

ISSN 1831-9408

Seville, Spain: European Commission, 2016

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How to cite: Álvarez-Martínez, M.T., Barrios, S., Gesualdo, M., d`Andria, D., Pontikakis, D., and Pycroft, J. (2016), Falling Corporate Tax Rates in the EU: Is there a case for harmonization?; JRC Working Papers on Taxation and Structural Reforms No 4/2016, JRC104157, European Commission, Joint Research Centre, Seville

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Abstract

In a globalised world economy where capital is highly mobile governments are eager to attract foreign investors by lowering their corporate tax rates. EU countries have been particularly active in this respect given that capital can move freely across EU member states´ borders thanks to reforms removing major obstacles to cross-border investments. Multinationals are therefore in a good position to exploit the tax loopholes associated with the complexity and multiplicity of tax regimes in the EU. As a result tax revenues and tax levels might be distorted and a closer coordination of tax rate setting might be warranted. In this paper we quantify the macroeconomic consequences of changing corporate tax rates depending on a given EU country specific situation, in particular in terms of economic size and tax level and structure, and we investigate the possible case for a closer coordination of corporate tax policies in the EU. We use a computable general equilibrium (CGE) model reflecting countries´ heterogeneity to assess the economic impact of corporate tax changes and the possible economic impacts of uncoordinated and coordinated tax policy reforms in the EU. The aim of this paper is to contribute to the ongoing debate about the desirability, modality and likely impact of alternative policy solutions to the challenges posed by tax competition and aggressive tax planning. We find that corporate income tax rates can generate substantial responses within the implementing country as well as beyond its own borders depending on the country size. Harmonisation of CIT rates would involve winners and losers and it may have costs for the EU and as such, may be best pursued gradually and as part of a broader package of corporate tax reform on tax bases and government transfers.

1 Introduction

Corporate tax rates in developed economies are subject to intense public debate. Competition for mobile capital, including in particular foreign direct investment (FDI), has prompted a number of countries to envisage lowering their corporate tax rates in order to attract foreign investors after a period of relatively stable tax rates in the aftermath of the global financial crisis, see in particular Devereux et al., 2016, for recent evidence. The EU has been particularly exposed to these changes given that capital can move freely across borders and that reforms enacted over the past 20 years or so have tended to remove double taxation, see in particular Zodrow, 2003. Whether these policy changes are likely to be effective in attracting FDI and to impact significantly on tax revenues and GDP is still an unresolved issue for at least two important reasons. First corporate taxes are not the only determinant of FDI and the impact of tax competition and tax policy changes depends on many other features such as the degree of asymmetry of countries in terms of size and factor endowment, the existence of agglomeration economies, the existence of other tax categories, the degree of factor mobility and the complementarity between mobile and immobile factors, to name a few, see Nicodème, 2006, for a review. In addition the evidence suggests that despite the fall in corporate tax rates observed in developed economies, tax bases have been generally broadened to compensate tax revenues losses, see European Commission, 2015. Countries are also unlikely to face the same incentives in determining their preferred corporate rates or in favouring corporate tax rate harmonisation which could eventually lead to more efficient corporate tax setting at EU level. In particular differences in size are likely to exacerbate the cost of uncoordinated tax policy and leave the whole EU worse-off, see in particular Kanbur and Keen, 1993. One specific aspect influencing corporate tax policy preferences of a given country is the size of its economy. The literature indeed suggests that large vs. small countries usually face opposite interests when considering possible harmonisation of corporate tax policies, see Sorensen, 2004. Small countries are generally better off by setting low corporate tax rates in order to attract foreign capital while large economies can fix higher tax rates given that the home bias and local agglomeration economies act as a break on investment outflows. Small countries are therefore likely to be net losers from corporate tax harmonisation, be it through tax rate or tax base harmonisation, while the gains for large economies are likely to be modest. Yet, Brochner et al., 2007, suggest that even if one would have a precise idea of the net winner and losers of corporate tax rate harmonisation, the impact on GDP and on tax revenues may be opposite given that corporate tax changes requires the adjustment in other taxes to ensure budget neutrality and entail efficiency gain, such that the winners and losers group might change depending on whether one considers tax revenues or GDP (and employment) changes as criteria. Additionally, the cut in the statutory tax in one country will lead other countries to react and reduce their statutory tax rates in order to compete and attract mobile profits (see Deveraux et al., 2008). For all these reasons, there are increasing calls for greater coordination and transparency of corporate tax regimes at global levels.

There is evidence that the current system is unfair and inefficient. Uncoordinated national tax regimes can feature tax loopholes and inconsistencies in the treatment of corporate profits across borders that give rise to strategic tax planning by multinational corporations. There is growing recognition of these issues and a renewed impetus to address them. Attempts are being made to improve international coordination of national corporate tax policies through the OECD Base Erosion and Profit Shifting (BEPS) Project. The European Commission has also put forward an ambitious Action Plan on Corporate Taxation (EC, 2015) aimed at streamlining EU tax regimes.

In this paper, we evaluate the effects of hypothetical changes in corporate income tax (CIT) rate on EU economies using CORTAX, a computable general equilibrium (CGE) model. We focus on corporate rate only and do not consider the possibility for corporate tax base harmonisation. Considering both corporate tax rate and tax base harmonisation in the EU has been the object of previous studies which have devoted rather comprehensive analyses on the topic, see in particular Brochner et al.,2007, and Bettendorf et al. ,2010. Here we aim to highlight the potential consequences of changes in corporate tax rates for big and small economies and rationale for possible coordination of EU Member States´ policies in this respect only. On the other hand, previous literature about tax harmonization suggests the worse off situation for small economies after its implementation, but this conclusion has been derived from partial equilibrium models and there is no evidence obtained from a multiregional CGE evaluation. The model used in this paper captures the key features of the corporate tax regimes including investment decisions, loss compensation, multinational profit shifting and the debt-equity choice of firms.[1] CORTAX is a multi-regional model including all 28 EU member states, the USA and Japan. It encapsulates the behaviour of all economic agents, reflecting both the direct and indirect effects of policy changes on macroeconomic variables, such as GDP, investment and employment.

We simulate the impact of removing differences in corporate tax rates across EU countries and their effect on tax competition considering both coordinated and uncoordinated changes. First, we equalize the statutory CIT rates in all EU-28 and then we implement a reduction of 10 pp in CIT rates both for Ireland and Germany. These two countries embody two polar examples, since they are good representatives of small and large economies in the EU. For each of the three simulations, revenue neutrality is maintained by adjusting labour taxes to compensate for any increase or shortfall in revenues. In addition, a sensitivity analysis is performed, ensuring budget neutrality through adjustments in transfers to pensioners and government expenditure.

The first simulation reveals different effects for the countries evaluated depending on their initial starting points. The equalization of rates CIT rates in the EU-28 and the compensation of tax revenues with a shift to labour taxes raise the statutory rate in Ireland and it has a negative impact on GDP. However, the same policy for Germany has a positive impact due to the reduction of the CIT rate, which raises capital and GDP. The effects of the same tax cut in Ireland and Germany, once the countries have homogenized their CIT rates, show that the first obtains more benefits in terms of capital and GDP than the latter, and the costs associated to this policy for the rest of the EU are smaller when the country directly affected is small. With this evidence, we empirically reinforce the theoretical idea derived by Kanbur and Keen (1993) with a two country model. There is an asymmetry in the best responses of small and large countries to CIT reforms and for the case of the EU-28 the revenues from tax cuts are bigger when they are applied in small economies.

The remainder of the paper is as follows. In Section 2, we present the main characteristics of CORTAX and in Section 3 we describe the current CIT rates and the tax simulations. Section 4 displays the central results and Section 5 the results under alternative scenarios. Finally, the main conclusions are summarized in Section 6.

1 Note that the CORTAX model has also been used in Bettendorf et al. (2010) although we use an updated version of the model using more recent data for its calibration. Brochner et al (2007) use a similar previous version of CORTAX, namely the CETAX model. For a detailed explanation of the differences between these two models, see Bettendorf and van der Horst (2006).

2 The CORTAX model

CORTAX is the acronym of Corporate Taxation and it is a well-known CGE model originally developed by Bettendorf and van der Horst, 2006 and Bettendorf et al., 2009. As mentioned, it is based on the OECDTAX model (Sorensen, 2004) and it has been designed to simulate the economic impact of national and international tax policy reforms, including the international harmonisation of national tax policies.

The model accounts for all economic transactions between firms, households, government and the foreign sector. In CORTAX, each country has the same structure in terms of consumption, savings, production and public finances. Countries are linked to each other via international trade in goods markets and investment by multinationals (MNEs). Firms are divided into three categories: MNE´s headquarters, their subsidiaries located abroad and domestic firms that only produce in their country of residence. Multinationals and domestic firms differ to the extent that the former optimise profits globally and are engaged in profit shifting activities across borders. On the other hand, domestic firms pay their corporate taxes in their country of residence according to the revenues generated in this country only. The production function is a Cobb Douglas combination of the fixed factor and the value added, which is a CES aggregate of labour and capital. The only difference between domestic and multinational headquarters and the subsidiaries is the role of intermediate inputs. The parent company can shift profits to countries with low CIT rates charging a transfer price for intermediate deliveries that deviates from the equivalent price that would be charged if it had been an inter-firm transaction (the 'arms-length' price). In order to ensure an interior solution, a convex cost function is specified to describe the costs associated with the manipulation of transfer prices. In this way, profit shifting to countries with very low corporate tax rates becomes increasingly costly at the margin. These costs are defined as:

$$c_q = \frac{\left|p_q - 1\right|^{1+\varepsilon_q}}{1+\varepsilon_q}$$

While the expression for transfer price is as follows:

$$\frac{\partial c_q}{\partial p_q}(1-\tau_\pi^m) = \tau_\pi^f - \tau_\pi^m$$

With c_q cost of shifting profits, p_q transfer price, τ_π^m tax rate at headquarter level and τ_π^{mf} tax rate at subsidiary level.

The model also captures the role of tax havens through the relation between domestic CIT rates and an extremely low tax rate.

$$\pi = A\left(\tau_p - \tau_{ph}\right)^{1+\gamma}$$

Where τ_{ph} is the low CIT rate in the tax haven and γ is the elasticity of profit shifting to the tax haven. A is a parameter for the calibration.

This is an overlapping generation model of two households, old and young, and they both maximize their inter-temporal utility subject to their budget constraint. The optimal consumption path and labour supply are obtained from the first order conditions. Households´ savings are allocated to bonds and stocks, which are

imperfect substitutes and have different rates of return. The returns to assets are determined on world markets and are assumed to be the same irrespective of the residence of their owner.

Government is an intermediate agent in CORTAX. There is a balanced budget where consumption and public debt are fixed proportions of GDP and lump-sum transfers are also fixed. In this case, the issue of new debt due to economic growth covers the increase of public deficit. On the other hand, tax revenues include indirect taxes on consumption and direct taxes of income from corporate and labour, dividends, capital gains and interest. Government consumption and government debt as a share of GDP are maintained constant after a reform. The foreign sector is represented through the current account. Further details on the model can be obtained in Bettendorf et al., 2009.

Additionally, we have extended the model to capture how European countries compete for foreign capital base on the tax reforms simulated in the paper. The idea is that multinationals in the rest of the world want to invest in Europe, but they can to choose the country based, for instance, on the statutory CIT rate. Hence, the amount of capital coming from Japan and the US can be fixed in the model fixing stocks (bw_{EU}) and equities(bw_{EU})

$$bw_{EU} = \sum_{S=EU28} bw\,\gamma_s$$

$$ew_{EU} = \sum_{S=EU28} ew\,\gamma_s$$

With bw and ew being the holdings of foreign bonds and equities, correspondingly, and γ_s the share of each country in world population[2]. On the other hand, if the assets accruing to the EU are fixed the interest rates associated to these bonds-equities should change to adjust the market. The interest rates for all countries are defined as:

$$r_{wb}^{s} = \begin{cases} r_{wb0}^{s} & s \neq EU28 \\ r_{wb0}^{s} + r_{wb0}^{EU} & s = EU28 \end{cases}$$

Where r_{wb0}^{s} is the world rate of return on the base year and r_{wb0}^{EU} is a wedge that adjust for the European countries. The same definition is applied for the interest rate of equities.

An effort has been made in the calibration of the model for the base year 2012. The data used has been obtained from different data sources as Orbis, Eurostat, ZEW, EUROMOD, etc. (see Álvarez-Martínez et al., 2016) and the procedure followed is the one detailed in Bettendorf et al., 2009. In what follows, the effects of reforms are presented as changes in GDP, investment, fiscal revenue and households` welfare, which is measured as the compensating variation.

[2] In the model, all variables are defined in per capita terms.

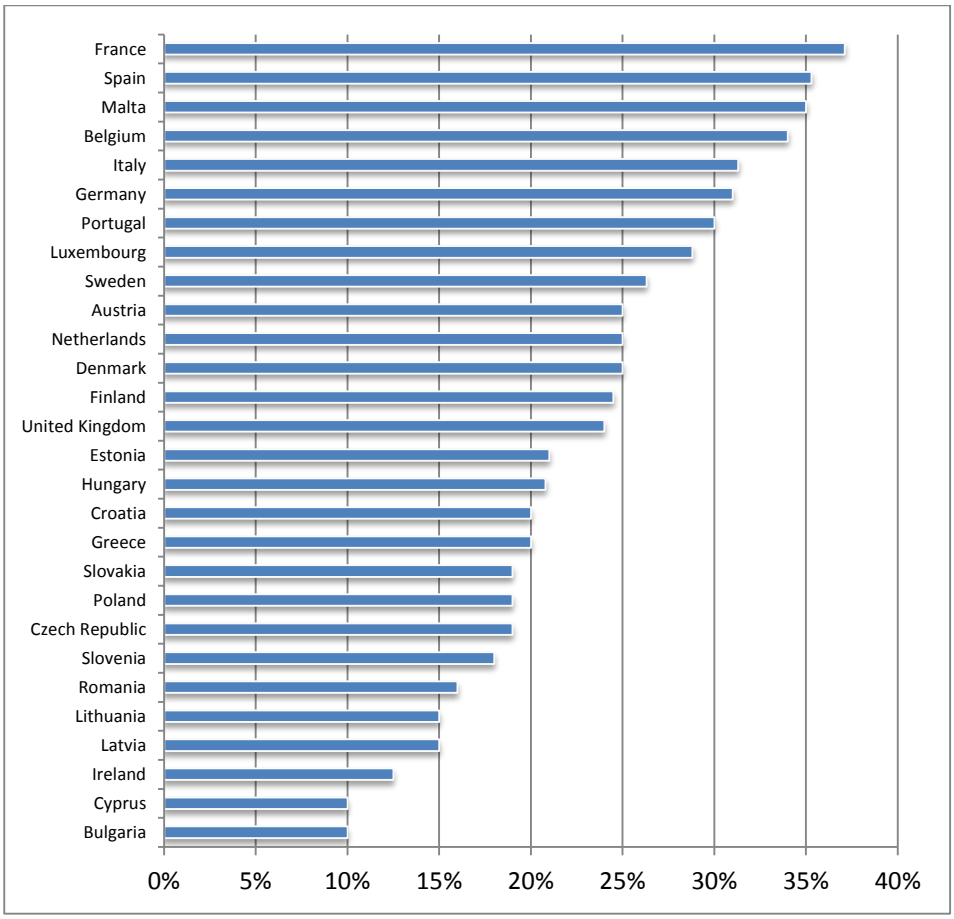
3 CIT rates and simulations

In a model designed to appraise the impact of tax reforms, the initial structure of the tax systems concerned is extremely important. In the present calibration, CORTAX is using tax data for 2012, implying that subsequent simulations of EU reforms produce outcomes relative to tax systems as they were in 2012. Figure 3.1 displays the statutory CIT rates across the EU. The EU average is 27.7% but they range from a high 37% in France to a low 10% in Cyprus and Bulgaria.

Using as starting point the statutory rates in Figure 3.1, we simulate an equalization of these rates to the EU average, 27.7%, which leads to tax rates cuts and increases depending on the country. In the paper, we take Germany and Ireland as representative examples of large and small economies, respectively. For the first country, this coordinated policy will imply a reduction of the actual statutory rate, while for Ireland the reform will lead to significant increase of the CIT rates. In this case, the magnitude of the shock is different and their effects are not directly comparable. For this reason, once the scenario is the same and the statutory rates are the same for all countries, we compare the effects of reducing this rate in 10 percentage points (pp) for Ireland and Germany in isolation in two different simulations, without any coordination. In all cases, the variation in CIT revenues is compensated with a change in labour taxes in the central case in order to keep balanced public budget. Additionally sensitivity simulations are performed in the Annex using as compensating variable public expenditure and transfers to old households.

The policy interest is currently focused on three main variables: capital, GDP and profit shifting. The aim is to compare how countries with different sizes are able to attract foreign investment and foster GDP. Ireland, with a small CIT rate attempts to attract foreign direct investment and raise employment and GDP. In many cases, the increase of capital is due to profit shifting not only from the US and Asian countries but also from other European countries. In order to better evaluate the costs of tax cuts of unilateral countries on the rest of the EU, we modify CORTAX and fixed the FDI accruing to the EU from the rest of the world. We perform the three previous simulations modifying the standard version of CORTAX and restrict available FDI through the introduction of a new interest rate for bonds and equities in the EU.

Figure 3.1 Corporate tax rates in EU countries, 2012



4 Policy simulations

The main tables in the section display the effects on capital, employment, GDP, tax revenues and welfare by country, as well as, inbound and outbound flows across EU countries and the percentage variation of profit shifting from domestic firms to the tax haven.

4.1 Coordinated tax policies: Equalisation of CIT rates in the EU-28

The aim of this is simulation is to equalize the CIT rates in all EU countries and to establish the baseline for the following simulation on tax reductions. The results are displayed in Tables 4.1-4.2. The first column of Table 4.1 lists all the countries included in the model and the other columns include the percentage points (pp) variation in the CIT rate and the cost of capital, the percentage variation (%) of capital, wage, employment and GDP and the variation in percentage of GDP of CIT revenues, total tax revenues and Welfare. The last column captures the percentage variation (%) of profit shifting by domestic firms to tax havens. In this case, all Statutory CIT rates are equal to the EU average rate, 27.7%. The higher increases in the tax rates are observed in Bulgaria and Cyprus, which increase in 17.7 pp, followed by Ireland, 15.2 pp., Latvia and Lithuania, 12.7 pp. On the other hand, the highest reductions are registered in France, Spain and Malta, around 9-7 pp. In these three countries, the fall of CIT rates reduces the cost of capital and it raises capital around 3%. The wage

increases and since labour tax rise, employment falls. The effects on employment for Spain and France are the same. However, the positive effect on capital prevails and raises GDP in 0.9 in France and around 1.2% in Spain and Malta. The opposite happens when CIT rates increase and raise the cost of capital. In Ireland, the increase of the cost of capital reduces investment and capital in almost 5%. Despite the increase of employment, labour tax falls and also wages, the negative effects are bigger and they cut down GDP and welfare. The negative evolution of welfare is also related to the significant increase in profit shifting activities by domestic firms, which affects production, employment and consequently GDP and household utility. For the case of welfare, those countries in Figure 2.1 that have a small tax rate when they move to higher tax rates show increases of profit shifting over 150%. This is the case of Cyprus and Bulgaria.

Looking at the effects on EU average, the positive effects observed in those countries that reduce the CIT are not enough to compensate the negative impact of raising the tax rate in other countries as Ireland, Cyprus, Poland and Bulgaria, the countries that suffer the biggest variations in GDP. In average, the EU GDP falls in 0.12 % while EU Welfare is almost not affected. The impact in total revenues is negligible as a percentage of GDP.

Table 4.1 Economic effects of equalizing CIT rates in the EU

	CIT_rate	CoC	Capital	Employm.	GDP	Rev_CIT	Rev_tax	Welfare	Prof_shift
	pp	pp	%	%	%	% of GDP	% of GDP	% of GDP	%
AUT	2.7	0.07	-0.93	0.07	-0.41	0.32	-0.01	-0.12	14.71
BEL	-6.3	-0.01	-0.02	-0.18	-0.04	-0.12	0	0.06	-23.03
DNK	2.7	0.06	-0.74	0.05	-0.27	0.23	0	-0.1	14.71
FIN	3.2	0.07	-0.7	0.09	-0.22	0.26	0	-0.08	18.18
FRA	-9.4	-0.26	2.71	-0.17	0.9	-0.72	0.01	0.43	-30.56
DEU	-3.3	-0.08	1.11	-0.08	0.33	-0.38	0	0.12	-13.65
GRC	7.7	0.1	-1.18	0.36	-0.27	0.67	0	-0.04	59.18
HRV	7.7	-0.04	0.67	0.15	0.13	0.03	0	0.06	59.18
IRL	15.2	0.36	-4.91	0.34	-2.51	1.82	-0.03	-0.62	271.43
ITA	-3.6	-0.02	0.1	-0.17	-0.07	-0.19	0	-0.04	-14.60
LUX	-1.1	-0.03	0.15	-0.28	-0.07	-0.27	0	-0.04	-4.88
NLD	2.7	0.07	-0.61	0.01	-0.45	0.13	-0.01	-0.18	14.71
PRT	-2.3	-0.03	0.41	-0.06	0.07	-0.19	0	0.01	-9.65
ESP	-7.6	-0.26	3.5	-0.17	1.2	-1.07	0.02	0.51	-26.42
SWE	1.4	0.02	-0.29	0.03	-0.07	0.11	0	-0.01	7.34
GBR	3.7	0.23	-2.55	0.02	-0.89	0.55	-0.01	-0.34	21.24
CYP	17.7	0.26	-3.82	0.42	-1.66	1.71	-0.02	-0.13	532.43
CZE	8.7	0.22	-2.84	0.22	-1.14	1.09	-0.02	-0.26	72.06
EST	6.7	0.04	0.01	0.27	0	0.29	0	-0.02	47.17
HUN	6.9	0.18	-2.38	0.18	-0.94	0.89	-0.01	-0.24	50.00
LVA	12.7	0.06	-0.38	0.57	0.07	0.65	0	0.12	157.14
LTU	12.7	0.08	-0.67	0.5	-0.06	0.74	0	0.03	157.14
MLT	-7.3	-0.19	2.55	-0.1	1.37	-0.67	0.02	0.46	-25.48
POL	8.7	0.31	-4.17	0.24	-1.58	1.47	-0.03	-0.41	72.06
SVK	8.7	0.06	-0.75	0.32	-0.26	0.55	0	0.01	72.06
SVN	9.7	0.17	-1.82	0.26	-0.54	0.77	-0.01	-0.09	87.20
BGR	17.7	0.29	-4.07	0.57	-1.44	1.92	-0.03	-0.17	532.43
ROM	11.7	0.2	-2.71	0.47	-0.87	1.28	-0.01	-0.1	129.41
USA	0	0	0	0	0	0	0	0	0.00
JPN	0	0	0	0	0	0	0	0	0.00
EU	**0**	**0.01**	**-0.18**	**0.01**	**-0.12**	**-0.02**	**0.00**	**0.03**	-

In this simulation, profit shifting by multinationals among European countries does not exist and all the impact in production by type of firms is explained by the general equilibrium effects of the tax reform. Depending on the initial tax rate in each country and their variation, the impact on production by type of firm and by country will be different. A clear example is the opposite effects on the two representative economies evaluated in this paper, Ireland and Germany, that can be observe in Table 4.2.

Table 4.2 Effect on production by category of firm –CIT change in the EU

	Ireland	Germany
Domestic	-6.265	1.224
Multinational headquarters	2.601	-1.741
Multinational subsidiary	1.278	0.683

4.2 Reductions of the statutory CIT rate in Ireland and Germany

The baseline of this simulation is the case where all countries have the same statutory rate, which is 27.7%, and there is no profit shifting between countries because there is no competition on taxes. In this situation, we compare the effects that a shock of the same magnitude has in Ireland and Germany. First, we evaluate the effects of changing the CIT rate in isolation in each country and second, we compare the national and international results of the two simulations.

A CIT rate fall of 10 pp in Ireland

The statutory CIT rate Ireland is among the three lowest in the EU, around 12.5 % (Figure 2.1). However, in the baseline of the current simulation all counties have the same tax rate, 27.7%. The economic effects of reducing in isolation corporate taxation in Ireland in 10 pp and compensating the effects on revenues with labour tax are displayed in Table 4.3-4.5. In this study, the main objective is to capture the effects on profit shifting directly caused by the tax policy and for this reason we mainly focus the attention on domestic firms. However, the effect of this tax reform also affects multinationals and both profit shifting and production are detailed and disaggregated at country level and by type of firm, respectively, in Tables 4.3 and 4.4

In this simulation, the CIT in Ireland falls 10 pp and reduces the cost of capital in 0.24 pp, what raises the demand of capital. The marginal productivity of labour increases and also wages do. The labour tax rate increases as a consequence of the reduction in CIT rates in Ireland. The raise of wages cut down employment but the positive effect of capital is bigger and boosts GDP in 1.64%. This is the country directly affected and the one that register the most significant effects. The spillover effects of this policy do not have relevant effects in other countries. Only Luxembourg seems to slightly react to the shock, with a decrease of capital and employment of 0.1% and a reduction of GDP in 0.15%. The reason is that Luxembourg has relation with all countries through FDI flows. In all other countries, the impact is negligible.

In relation to tax revenues, the reduction of the CIT rate reduces CIT revenues as percentage of GDP in 1.15% but due to the increase of labour taxes to keep constant public budget total tax revenues increases in 0.02% of GDP. Welfare in Ireland raises 0.5% of GDP and this can be related to the impact on profit shifting. Domestic firms reduce their fraud practices in 48.3%, which is the percentage of the CIT base that is now kept in Ireland. The smaller is the difference between the domestic CIT rate and the tax haven rate, the smaller is the profit shifted[3]. In the model, the elasticity of profit shifting to the tax rate is 0.9. Looking at table 4.4, we can also observe the direct effect of changing the CIT rate in Ireland on profit shifting practices implemented by subsidiaries. There is a significant increase in profit shifting coming from other countries to Ireland at the same

[3] If we had not included the tax haven in the analysis, the results would have been quite similar but with smaller reductions in welfare. In relation to the EU, there are not big changes.

time that there is no profits shifted from Ireland to other countries. These results help to explain the changes in production by types of firms. Domestic firms are the most affected by the reduction of the CIT rate in Ireland, what leads to an increase in their production of more than 5 %, while multinationals, headquarters and subsidiaries, reduce their output in 2% (Table 4.5).

Table 4.3 Economic effects of reducing CIT rates in Ireland

	CIT_rate	CoC	Capital	Employm.	GDP	Rev_CIT	Rev_tax	Welfare	Prof_Shift
	pp	pp	%	%	%	% of GDP	% of GDP	% of GDP	%
AUT	0	0	0	0	0	0	0	0	0
BEL	0	0	0	0	0	0	0	0	0
DNK	0	0	-0.01	0	0	-0.01	0	0	0
FIN	0	0	-0.01	-0.01	-0.01	-0.01	0	-0.01	0
FRA	0	0	0	0	0	0	0	0	0
DEU	0	0	0	0	0	0	0	0	0
GRC	0	0	0	0	-0.01	0	0	0	0
HRV	0	0	0	0	0	0	0	0	0
IRL	-10	-0.24	3.3	-0.19	1.64	-1.15	0.02	0.5	-48.3
ITA	0	0	0	0	0	0	0	0	0
LUX	0	0	-0.09	-0.1	-0.15	-0.07	0	-0.08	0
NLD	0	0	-0.01	-0.01	-0.04	-0.02	0	-0.02	0
PRT	0	0	0	0	-0.01	0	0	0	0
ESP	0	0	0	0	-0.01	0	0	0	0
SWE	0	0	0	0	-0.02	0	0	-0.01	0
GBR	0	0	0	0	-0.01	-0.01	0	0	0
CYP	0	0	0	0	0	0	0	0	0
CZE	0	0	0	0	0	0	0	0	0
EST	0	0	0	0	-0.01	0	0	0	0
HUN	0	0	0	0	0	0	0	0	0
LVA	0	0	0	0	-0.01	0	0	0	0
LTU	0	0	0	0	0	0	0	0	0
MLT	0	0	0	0	0	0	0	0	0
POL	0	0	0	0	0	0	0	0	0
SVK	0	0	0	0	0	0	0	0	0
SVN	0	0	0	0	0	0	0	0	0
BGR	0	0	0	0	-0.01	0	0	-0.01	0
ROM	0	0	0	0	-0.01	0	0	0	0
USA	0	0	0	0	-0.01	0	0	0	0
JPN	0	0	0	0	0	0	0	0	0
EU	-0.07	0.00	0.03	0.00	0.01	-0.02	0.00	0.00	

Table 4.4 Profit shifting to subsidiaries (Million Euro)- CIT change in Ireland

Profit shifting from headquarters to subsidiaries						
	Baseline		CIT reform in Ireland			
	IN	OUT	IN		OUT	
	Euro millions	Euro millions	Euro millions	% of tax base	Euro millions	% of tax base
Ireland	0	0	1184	8.97	0	-
Rest of EU	0	0	0		-1184	-0.17

Table 4.5 Effect on production by category of firm – CIT change in Ireland

	Ireland
Domestic	5.849
Multinational headquarters	-1.504
Multinational subsidiary	-2.349

A CIT rate fall of 10 pp in Germany

The effects on Germany and the rest of the EU are bigger than in previous simulation. The reduction of the statutory CIT rate reduces the cost of capital and boost investment and capital in 3.05%. The raise of capital spurs the marginal productivity of labour and raises wages, but the increase of the tax on labour to compensate the reduction of CIT increases the cost of labour and reduces employment in 0.34%. Nevertheless, the positive effects of capital are translated to production and GDP increases in 0.88 in Germany. This result is according to expected since corporate taxation is more distortionary than taxes on labour.

This independent decision of Germany also has effects on these variables for 22 countries, out of the 30 in Table 4.6. Germany is the biggest economy in the EU and it has connections with all other countries. The impact of tax reforms on the EU-weighted average is bigger than the case of Ireland. Regarding employment, in all other countries the influence is negative and rather small. GDP only increases in Germany and it is negative in the rest of countries but on average is positive, 0.19%.

The reduction of the CIT rate in Germany has the same positive effects on profit shifting by domestic firms, it decreases in 48%, while it has no impact in other economies. The reduction of profit shifting has a positive impact and affects employment and wages. The inclusion of the tax haven slows down the reduction of employment, which has a direct effect on consumption and welfare. In this simulation, welfare in Germany increases in 0.2 as a percentage of GDP[4].

[4] Removing the tax haven from the analysis would lead to slightly negative effects on this variable

Table 4.6 Economic effects of reducing CIT rates in Germany

	CIT_rate	CoC	Capital	Employm.	GDP	Rev_CIT	Rev_tax	Welfare	Prof_shift
	pp	pp	%	%	%	% of GDP	% of GDP	% of GDP	%
AUT	0	0	-0.05	-0.06	-0.16	-0.05	0	-0.06	0
BEL	0	0	-0.01	-0.01	-0.04	-0.01	0	-0.01	0
DNK	0	0	-0.02	-0.02	-0.06	-0.02	-0.01	-0.02	0
FIN	0	0	-0.02	-0.02	-0.04	-0.01	0	-0.01	0
FRA	0	0	-0.02	-0.02	-0.07	-0.02	0	-0.03	0
DEU	-10.0	-0.24	3.05	-0.34	0.88	-1.15	0.02	0.2	-48.2906
GRC	0	0	0	0	-0.02	0	0	0	0
HRV	0	0	0	0	-0.03	0	0	-0.01	0
IRL	0	0	-0.01	-0.02	-0.06	-0.01	0	-0.02	0
ITA	0	0	-0.01	-0.01	-0.02	-0.01	0	-0.01	0
LUX	0	0	-0.22	-0.23	-0.26	-0.12	-0.01	-0.1	0
NLD	0	0	-0.02	-0.03	-0.13	-0.04	0	-0.04	0
PRT	0	0	0	0	-0.02	-0.01	0	-0.01	0
ESP	0	0	-0.01	-0.01	-0.03	-0.01	0	-0.01	0
SWE	0	0	-0.02	-0.02	-0.07	-0.02	0	-0.03	0
GBR	0	0	-0.01	-0.01	-0.06	-0.02	0	-0.02	0
CYP	0	0	0	0	0	0	0	0	0
CZE	0	0	0	-0.01	-0.05	-0.02	0	-0.02	0
EST	0	0	0	0	-0.01	0	0	0	0
HUN	0	0	-0.01	-0.01	-0.09	-0.02	0	-0.03	0
LVA	0	0	0	0	-0.01	0	0	-0.01	0
LTU	0	0	0	0	-0.02	0	0	0	0
MLT	0	0	0.02	0	-0.42	-0.11	-0.01	-0.11	0
POL	0	0	0	0	-0.03	-0.01	0	-0.01	0
SVK	0	0	0	0	-0.03	-0.01	0	0	0
SVN	0	0	0	0	-0.02	0	0	0	0
BGR	0	0	0	0	-0.02	0	0	-0.01	0
ROM	0	0	0	0	-0.02	0	-0.01	-0.01	0
USA	0	0	0	0	-0.01	-0.01	0	0	0
JPN	0	0	0	0	-0.01	0	0	0	0
EU	**-**	**-0.04**	**0.50**	**-0.07**	**0.11**	**-0.25**	**0.00**	**0.03**	**-**

In relation to profit shifting by subsidiaries, there is an increase in the profits shifted into the country and no profit shifted out of Germany. Total profits shifted to Germany represent almost 5% of the tax base and the cost for the rest of the EU of this policy is 1% of the total tax base. As expected, the level of domestic output

increases in Germany in almost 2%, but they are the multinational subsidiaries the most positively affected, with an increase of 7.3%, see Table 4.8.

Table 4.7 Profit shifting to subsidiaries (Million Euro)- CIT change in Germany

Profit shifting from headquarters to subsidiaries						
	Baseline		CIT reform in Germany			
	IN	OUT	IN		OUT	
	Euro millions	Euro millions	Euro millions	% of tax base	Euro millions	% of tax base
Germany	0	0	6030	4.63%	-	
Rest of EU	0	0	0		-6030	-1.03%

Table 4.8 Effect on production by category of firm – CIT change in Germany

	Germany
Domestic	1.859
Multinational headquarters	-3.766
Multinational subsidiary	7.367

Tax cuts: small vs big economies

The difference among the CIT rate in Ireland and tax rate in Germany, which is around 31%, is 19 percentage points. Based on the idea that countries compete to attract mobile capital and profits, the evaluation of the same shock using a CGE model will lead to different results on investment, GDP and profit shifting depending on the country. These results are observed in Tables 4.3 and Table 4.6. The change in the CIT rate, the cost of capital, and tax revenues is the same in both countries[5]. However, the same tax reform shows different results in capital, employment, GDP, welfare and profit shifting from multinationals. The increase of capital is slightly bigger in Ireland, but the fall of employment is much smaller than in Germany, what rises more significantly GDP in Ireland, 1.64%, compare to Germany, 0.88%. In the last twenty years, small European countries have had CIT rates below the European average keeping a large share of corporate tax revenues as a share of GDP. This has been particular the case for Ireland, which has attracted a big amount of foreign capital, and this can be observed in the profit shifting results discussed. The same policy attracts more profit shifting to Ireland, 8.97% of the tax base, than to Germany, 4.67%, at the same time that the cost for the rest of the EU is smaller for first, 0.17%, than for the latter, 1.3%. Hence, this analysis empirically confirms the problems face for a tax rate harmonization in the EU and the need to complement this policy with other instruments in order to correct the asymmetries. These results provide a good guide to answer the question on the title. The differences on economic size have a strong impact on GDP across EU what makes difficult a pure equalization on statutory

[5] All variables displayed as percentage of GDP take as reference GDP in the baseline, this is why the shock generates the same variation in CIT revenues in both countries despite the different percentage variation in GDP.

rates without considering as a part of a broader package to be implemented gradually. On these regard, there are previous studies that suggest the introduction of redistributive transfers among member states (Köthenbürger, 2002, Verdonck, 2004) or a dual tier capital taxation (Haufler and Lülfesmann, 2015).

4.3 Sensitivity analysis

In previous simulations, we have assumed there is a government balance neutrality using taxes on labour as the compensating variable for changes in CIT rates. The effects of the same simulations have been evaluated assuming two other scenarios. First, reducing the transfers to old (Tables A.1-A.3) and second, reducing government expenditure (Tables A.4-A.6). Tables are displayed in the Annex.

Table A.1 presents the negative values for capital, employment and GDP and small positive effects in welfare. Although countries like Belgium, France and Germany reduce their CIT rates, the positive effects on their macro variables are not enough to compensate the negative results in other countries. In Table A.2, where the CIT for Ireland falls, the sensitivity analysis shows similar results to the central case for most of the variables. There are differences in employment and in GDP due to the close rule. The increase of these variables is bigger because labour tax do not change. The impact on GDP and welfare is different depending on the scenario also when simulating a reduction of CIT for Germany. If the compensating variable is transfers to old, there are higher increases in these variables both for Germany and the EU. The positive effects on capital and employment raise GDP and compensate for the negative direct effect of transfers to households. However, these positive effects for the EU average does not hold when the CIT rates are homogenize in all countries and compensated with government expenditures.

The results of the simulations in Table A.5 and Table A.6 show figures very similar to those of the central case. It is the reduction of CIT for Germany compensated with government expenditures, Table A.6, what differs more from the central case. The reason is that reducing government expenditures does not have a negative effect on employment and does not directly affect welfare. Consequently, the positive effects on capital and employment raise GDP and Welfare. Given the weight of Germany in the EU, these positive results are transferred to the EU average. In all cases, the impact on profit sifting among EU countries is the same that in the base case. The reason is that what drives these effects are the differences in CIT rates and not the type of tax rates or public spending that compensate public budget.

5 Simulations under fixed capital from the RoW

The assumption that capital accruing from the rest of the world is imposed with the idea of evaluating how capital in European countries compete based on statutory CIT rates. When a country reduces the CIT rate, its main idea is to attract foreign capital and consequently to compete with other European countries that may also result appealing. Foreign multinationals want to have a presence in the European market, but the location of their capital and profits is affected by the statutory tax rates (Deveraux et al, 2008). In recent years, this tax competition has been exacerbated and large economies are concerned about how international capital moves to small countries with low statutory rates.

In this section, the amount of capital accruing to the EU is fixed and it allows to better compare how unilateral reductions of the statutory CIT rates affect capital allocation. Table 5.1 shows the results on the main macro variables of simulating tax falls in Ireland and Germany with capital fixed and mobile. The only

difference between them is in capital for the rest of the world. The cost for the rest of the EU of unilateral changes on CIT rates is still smaller for Ireland than for Germany, but in both cases there is a reduction of capital now. The cost for the EU of lower taxes in Germany is significant bigger, -0.62%, while the amount of capital accruing to this country is lower than in the case with mobile capital. This simulation seems to better capture the impact of tax competition across EU countries.

Table 5.1 Profit shifting to subsidiaries (Million Euro)- CIT change in Ireland and Germany

Fixed capita from the Rest of the World							
	CIT_rate	**CoC**	**Capital**	**Employm.**	**GDP**	**Rev_CIT**	**Welfare**
	pp	**pp**	**%**	**%**	**%**	**% of GDP**	**% of GDP**
Ireland	-10.0	-0.25	3.26	-0.19	1.63	0.17	0.5
Rest of EU	-	0.00	-0.04	0.00	-0.02	0.00	-0.01
Germany	-10.0	-0.19	2.42	-0.37	0.69	-1.15	0.08
Rest of EU	-	0.05	-0.62	-0.04	-0.25	0.01	-0.09
Mobile capita from the Rest of the World							
	CIT_rate	**CoC**	**Capital**	**Employm.**	**GDP**	**Rev_CIT**	**Welfare**
	pp	**pp**	**%**	**%**	**%**	**% of GDP**	**% of GDP**
Ireland	-10.0	-0.24	3.30	-0.19	1.64	-1.15	0.5
Rest of EU	-	0.00	-0.00	0.00	-0.01	0.00	-0.00
Germany	-10.0	-0.24	3.05	-0.34	0.88	-1.15	0.2
Rest of EU	-	0.05	-0.62	-0.04	-0.05	0.01	-0.02

6 Conclusions

Uncoordinated national tax regimes have resulted into a broad range of statutory CIT rates across EU, with values ranging from 10% to 37%. This has led to strategic tax planning by multinational corporations with the aim to reduce the tax burden. On this regard, evidence suggests a rise to the bottom, with countries competing over profits by reducing their statutory tax rates on corporate profits.

This paper evaluates the economic impact of changing the corporate income tax rate in the EU, accounting for the role played by profit shifting. The analysis is performed using CORTAX, a computable general equilibrium model featuring 28 EU member states, USA, Japan and a tax haven, designed to evaluate the economic impact of corporate tax reforms. The aim is to contribute to the ongoing debate about the desirability and likely impact of alternative policy solutions to the challenges posed by aggressive tax planning and tax competition. . Harmonisation of CIT rates would involve winners and losers as a consequence of the asymmetry of countries in terms of size and factor endowment and it may have costs for the EU.

Results accounts for the main channels through which the policy reform affects the economy such as: profit shifting, investment distortion, and tax shift between corporate and labour. Coordinated tax reform

removes the incentive to engage in profit shifting across EU and causes some countries to be better off while others to be worse off. Uncoordinated tax reforms significantly impact the country-specific national economy, although generate a negligible impact on the aggregate EU macro variables because of spillover effects. In conclusion, results suggest that, across all reform scenarios, countries are better off when moving from a high to a lower CIT tax rate. On the other hand, the improvement on their macro variables and the impact for the rest of the world is different depending on the size of the country where the CIT reduction is applied. Comparing the same policy in Ireland and Germany, the small economy shows higher effects in capital, employment, GDP, welfare and profit shifting from multinationals while the cost for the EU is smaller. The empirical results derived in this analysis reinforce the significant effects of size in a rise to the bottom competition.

All simulations have been evaluated under alternative model closures, using as compensating variable tax on labour in the central case and transfers to old and government expenditures in the sensitivity analysis. These variables change in order to counteract the positive and negative effect the CIT reform may have on government budget balance. In general, results are quite robust and differences on economic size have a strong impact on GDP across EU what makes difficult a pure equalization on statutory rates without considering additionally policies that would be implemented gradually.

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List of abbreviations and definitions

AUT- Austria
BEL- Belgium
BEPS- Base Erosion and Profit Shifting
BGR- Bulgaria
CGE- Computable General Equilibrium
CIT- Corporate Income Tax
CoC- cost of capital
CORTAX- Corporate Taxation
CYP- Cyprus
CZE- Czech Republic
DEU- Germany
DNK- Denmark
Employm.- Employment
ESP- Spain
EST- Estonia
EU – European Union
FDI- Foreign Direct Investment
FIN- Finland
FRA- France
GBR- United Kingdom
GDP- Gross Domestic Product
GRC- Greece
HRV- Croatia
HUN- Hungary
IRL- Ireland
ITA- Italy
JPN- Japan
LTU- Lithuania
LUX- Luxembourg
LVA- Latvia
MLT- Malta
MNEs- Multinationals
NLD- Netherlands
OECD-
POL- Poland
Prof_Shif- profit shifting

PRT- Portugal

Rev_CIT- Revenues from the Corporate Income Tax

Rev_TAX- Revenues from taxation

ROM- Romania

RoW- Rest of the World

SVK- Slovakia

SVN- Slovenia

SWE- Sweden

USA- United States of America

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