

Is there a “Race to the Bottom” in Corporate Taxes?
An Overview of Recent Research

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Statutory rates of corporation tax in developed countries have fallen substantially over the last two decades. The average rate amongst OECD countries in the early 1980s was nearly 50%; by 2001 this had fallen to under 35%. In 1992, the European Union's Ruding Committee recommended a minimum rate of 30% - then lower than any rate in Europe (with the exception of a special rate for manufacturing in Ireland). Ten years later, already one third of the members of the European Union have a rate at or below this level.

One possible reason for these declining rates is a process of tax competition: countries compete with each other to attract inward flows of capital by reducing their tax rates on corporate profit. This has led to a number of attempts at international coordination in order to maintain revenue from corporation taxes. Both the European Union and the OECD introduced initiatives in the late 1990s designed to combat what they see as "harmful" tax competition (see European Commission, 1992, 1997, 1998; OECD 1998, 2001).

For example, in 1997, the OECD introduced an initiative which defined a tax haven as a country with the following characteristics: very low or no tax on corporate or personal income, lack of exchange of information with other tax authorities, lack of transparency, no substantial activities. Subsequently, the OECD has produced a list of countries considered to be tax havens and is currently in negotiation with these countries to persuade them to modify their tax practices¹. The EU have agreed on a Code of Conduct for business taxation, which aims at eliminating specific aspects of tax regimes which are deemed to be “harmful” – essentially where the rate of tax on an activity or a tax payer is lower than the normal rate.

More recently, the European Commission (2001) has proposed extensive changes in the for of corporation tax, although these proposals are a response to what are perceived as “obstacles” to doing business in Europe, rather than the threat of tax competition. The most far-reaching proposal is to consolidate the activities of a company across all of its European activities: companies would no longer have to calculate the taxable profit earned in each Member State, but only the total taxable profit earned in the EU as a whole. The Commission considered various ways in which this total taxable profit could then be allocated to individual member states.

The notion that there is increasing competitive pressure on governments to reduce their corporation tax rates has also been the subject of a growing theoretical literature in economics - surveyed by Wilson (1999). But there have been no detailed attempts

¹ So far, around 30 countries have cooperated, but there are still some seven countries (Andorra, Lichtenstein, Liberia, Morocco, the Marshall Islands, Nauru, and Vanatu) that have yet to do so (see Kondo, 2002).

to examine whether there is any empirical evidence of such international competition in taxes on corporate income.

In a project funded by the ESRC, we have been investigating this issue, and this article reports on our progress so far. We begin at the beginning by emphasizing that there is no single “rate” of corporate tax. The corporate tax system is complex: at a minimum, it comprises a statutory tax rate, which is applied to taxable profit; the definition of taxable profit, however, is typically complex. One important element is the proportion of capital expenditures that can be set against profit in any year (the capital allowance). This allowance is usually determined in the corporate tax code: for example, the UK currently has a statutory rate of 30%, and depreciation allowances of 25% for investment in plant and machinery, 4% for investment in industrial buildings, but no allowance at all for investment in commercial buildings.

This means that the statutory rate is not usually the rate which affects decision-making by firms. In particular, it is usually argued that the *effective marginal tax rate*, - which is the excess of the marginal cost of capital² with the tax over that cost without the tax (appropriately normalized) - determines marginal or incremental investment of firms already based in a country. On the other hand, the decision whether to locate in county A rather than country B at all is governed by the *effective average tax rate*, which is the ratio of corporate tax paid to pre-tax profit (Devereux and Griffith, 2003). Both the effective marginal and average rates differ from the statutory rate, and are lower the more generous allowances are. These rates also depend on the type of financing: debt, new equity, or retained earnings.

The first contribution of our project is to calculate the effective marginal and average tax rates for 21 OECD countries over the period 1983-2000. These calculations extend previous work done at the IFS, and are described in more detail in Devereux, Lockwood and Redoano (2002), and Devereux, Griffith and Klemm (2002). Overall, the picture is one of a downward trend in these effective rates over the sample period, although the effect is not as strong as in the case of statutory rates³.

Having done this, we are in a position to start thinking about tax competition. The first step is to define terms. We say that there is strategic interaction amongst the corporate tax rates (whether statutory, effective average or marginal) in different countries if there is empirical evidence that current or lagged values of other countries tax rates can help predict the current values of a given country.

However, merely observing strategic interaction does not conclusively establish that there is a “race to the bottom” in the usual meaning of the term. Economists believe that there are (at least) three reasons why we may observe strategic interaction in the setting of any given tax rate.

The first is that genuine tax competition is taking place – that is, countries are cutting tax rates in response to others’ cuts in order to attract inward investment. Technically, therefore, competition is over the internationally mobile tax base of the corporate

² The *marginal cost of capital* is the pre-tax rate of return required on the marginally profitable investment project and can be defined either with or without a corporate tax system.

³ This data is available at <http://www.ifs.org.uk/corptaxindex.shtml>

tax. Tax competition is, in our view, what is meant when commentators talk about the “race to the bottom”.

The second is that yardstick competition is taking place. This arises when voters judge incumbent policy-makers on their competence by comparing tax rates set in their jurisdiction relative to those set in neighboring or otherwise similar jurisdictions. If the incumbent sets a high tax relative to the voters’ comparators, she risks being voted out of office. Anticipating this, policy-makers tend to follow each other in tax-setting.

The third is that there is a common intellectual trend at work: that is, some influential country e.g. the US introduces an innovation in tax policy which then spreads internationally, through the influence of the media and personal contact between policy-makers in different countries.

Any of these mechanisms can give rise to observed strategic interaction. However, we believe that we can eliminate yardstick competition as a possible explanation, simply due to the fact that corporate taxes are not a salient political issue for voters: in the UK, as in other OECD countries, hardly any voters know what the domestic rate of corporate tax is, much less how it compares to the rate in (say) Germany or the US. Indeed, most economists would be hard-pressed to provide this information from memory.

On the other hand, common intellectual trends cannot be ruled out. For example, the 1986 US tax reforms are sometimes credited with introducing a wave of similar tax reforms in OECD countries (although they were preceded by a similar reform in the UK in 1984). Broadly, this type of reform was a move to a broader tax base and a lower tax rate. The US implemented this type of reform in corporate and personal taxes; many OECD countries had implemented a similar reform in corporation tax within a few years.

So, our approach is a two-fold one. Part of our statistical work tests for the existence of strategic interaction between corporate tax rates, and part looks for other supporting evidence that this interaction is due to tax competition, not common intellectual trends.

Specifically, in Devereux, Lockwood and Redoano (2002), we show that there is considerable evidence that individual countries react to others when they set statutory or effective average tax rates. Specifically, a regression of either of these tax rates in any one country – say the UK - against an average of tax rates in other countries and a range of control variables indicates that a cut in the average tax rate in other countries leads to a cut in the first country. Moreover, we show that this effect is likely if the country in question has a relatively high tax rate i.e. above average in the sample.

For example, the tax rate in the UK is below the unweighted average of other taxes. On our estimates, then, a one percentage point fall in the average tax rate in other countries would induce the UK to reduce its rate by nearly 0.3 percentage points. But for a country above the unweighted average, a one percentage point fall in the average would induce it to reduce its rate by about 0.67 percentage points. These magnitudes are larger in the long run - around double - as taxes are highly persistent. Implicit in

this approach is that all other tax rates are equally important for our country under consideration. We experimented with weighting the other taxes according to the other countries' distance from the UK, or the country's economic importance, as measured by GDP, or the extent of bilateral FDI flows between them. As the table below shows, the results are not very sensitive to the different possible weightings.

Percentage Point Change in the Statutory Tax Due to 1 Percentage Point Cut in All Other Countries' Statutory Tax

	Averages			
	Unweighted	Distance Weighted	GDP weighted	FDI weighted
Short run, country below average	0.297	0.143	0.196	0.147
Short run, country above average	0.672	0.495	0.595	0.477
Long run, country below average	0.591	0.301	0.536	0.350
Long run, country above average	1.137	1.042	1.630	1.136

Results for the effective average tax rate give similar results.

What about the supporting evidence that this interaction is due to tax competition, not common intellectual trends? One piece of evidence is that a theoretical model of tax competition, developed in the paper, predicts that high-tax countries will react more to a tax cut of a given size than low-tax countries - precisely what we find in the empirical work. More importantly perhaps, we find corroborating evidence when we look at how the behavior of US multi-national enterprises (MNEs) changes in response to corporate taxes in other countries. We study the determinants of the capital stock in other OECD countries owned by affiliates of US MNEs (those in which the US parent has at least a 10% share). This capital stock depends on the profitability from locating in that country, as we might expect, and on country characteristics such as size and openness. Moreover, it depends significantly (in a negative way) on statutory and effective average tax rates in the country of location, as the Table below indicates.

Estimated Percentage Increase in Capital Stock of US Affiliates Resulting from 10 Percentage Point Corporate Tax Cut

Tax Rate	Short Run	Long Run
Statutory	5.15	42.21
Effective Average	6.76	65.68
Effective Marginal*	2.17	18.70

* Effect of this tax rate is statistically insignificant

Why is this corroborating evidence in favor of tax competition? Because if governments understand that their corporate tax bases depend on their rates of statutory (or effective average) tax relative to their neighbors, they will compete over these dimensions of the corporate tax system. So, we take our empirical results on location of the capital stock as supporting the tax competition interpretation of our results on strategic interaction.

However, we also plan to do additional empirical work to discriminate between the two hypotheses. One way to do this would be to look for evidence of strategic interaction in other important taxes, such as the top statutory rate of personal income tax, across countries, where the tax base is much less mobile. If we do find evidence of strategic interaction, in spite of the immobility of the tax base, then this is some evidence of a common intellectual trend. Another would be to ask whether tax competition is more intense between countries where inward and outward investment flows are less constrained⁴

We close by describing an extension of our work on strategic interaction (Devereux, Lockwood, and Redoano (2003)). This paper introduces several quantitative measures of exchange controls on the capital account to our econometric work on strategic interaction.

The motivation is a small but growing literature, mostly in political science, which empirically investigates whether relaxation of exchange controls, especially on the capital account, lowers either corporate tax revenues or rates (Basinger and Hallerberg, 1998, 2001; Garrett, 1998; Quinn, 1997; Rodrik, 1997; Swank and Steinmo, 2002). The findings here are very mixed: capital controls may have no significant effect on corporate tax rates or revenues, or lower them - consistently with the conventional wisdom - or indeed raise them (Quinn, 1997; Rodrik, 1997).

In our view, the main weakness of this literature is that it does not allow for strategic interaction in tax setting between countries - each country is assumed to set its own corporate taxes in isolation from all others. Therefore, this literature does not address a crucial part of the "race to the bottom" story: that "globalization" - here in the form of weaker exchange controls - leads to more intense competition between countries.

In this paper, we allow exchange controls to affect the intensity of strategic interaction between countries in setting taxes, as well as the levels of tax they choose. We find some evidence that the level of a country's tax rate, other things equal, is lowered by a unilateral liberalization of exchange controls (as in the political science literature), and that strategic interaction in tax-setting between countries is increased by liberalization. These effects are stronger if the country is a high-tax one, and if the tax is the statutory or effective average one. There is also evidence that countries' own tax rates are reduced by liberalization of exchange controls in *other* countries.

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⁴ A simple way of quantifying this would be to use quantitative measures of the strength of exchange restrictions on the capital account of the balance of payments e.g. Quinn(1997).

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