Can Tax Competition Boost Demand?

Causes and Consequences of the Global Race to the Bottom in Corporate Tax Rates

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Abstract

Corporate tax rates have been consistently falling around the world for decades now. This paper aims to understand the causes and consequences of this "global race to the bottom". In particular, we wish to test the hypothesis that this race to the bottom is driven by demand-boosting corporate tax competition, where, contrary to traditional Kaleckian theory, lower corporate taxes may positively affect demand through increased investment due to multinational enterprises (MNEs) that seek higher net profits through (re)locating in low-tax jurisdictions. In order to do so, we build a general theory of the effect of average effective corporate tax rates (AECTRs) on MNE location. We use this theory to justify the addition of a tax-sensitive, foreign direct investment channel in the investment function of a canonical Kaleckian model. As a result, we are able to determine the conditions under which a country may be "tax competition-led", where lowering AECTRs increases demand through increased MNE investment and in spite of the negative effect on government expenditure given a balanced budget. While we find it is possible for some countries to be tax competition-led, we also find theoretical and empirical support for the importance of a coordination problem that lessens or nullifies the effect of lowering AECTRs when many countries do so simultaneously. We refer to this problem as the "paradox of tax competition", since, like other fallacies of composition commonly identified in post-Keynesian thought, this is a phenomenon where the benefits of one country acting alone are reduced or eliminated if other countries act the same way at the same time. Based on this model, we develop crude but nonetheless informative estimates that indicate that the race to the bottom has had a negative effect on demand in the vast majority of OECD countries. In this sense, we find that the persistence of policymakers to continue to compete on corporate taxes "irrational". Model-consistent policy recommendations are offered, chief among which are tax coordination or, failing that, technical changes in how individual countries collect corporation tax.

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1. Introduction

Statutory and effective corporate tax rates have been consistently falling around the world for decades now. Concerns of a "global race to the bottom" in corporate tax rates have grown, as has the consensus among empirical studies that tax competition drives a significant part of this downward trajectory. However, theories of tax competition are dominated by models built on the neoclassical theory of capital, which puts the cost of capital at the centre of investment decisions made using marginalist optimisation.[1] Given post-Keynesians' long-standing objections to neoclassical investment theory, many of the formal tax competition models are hard to swallow. Despite this—and the fact that beggar-thy-neighbour and inequality-exacerbating phenomena like tax competition epitomise the natural domain of post-Keynesian thought—post-Keynesian theory still lacks a formal model of the matter.

Perhaps this is because competing on corporate tax rates is dismissed out of hand as ill-advised in a demand-led economy. After all, from a Kaleckian standpoint, it would seem most prudential to be increasing rather than decreasing corporate tax rates. On this matter, to the extent that corporation tax can be considered a capital tax, Kalecki (1937, p.450) concludes its increase "is perhaps the best way to stimulate business and reduce unemployment". Alternatively, if corporation tax represents a tax on capitalist income, Kalecki still stresses its increase also boosts demand.[2] This follows, generally speaking, from the idea that increasing corporation taxes injects into the economy through government expenditure what would otherwise leak in the form of capitalist savings, given a balanced budget. Hence, it is with this logic in mind that Kalecki (1944, p. 57) argues that "income tax financed expenditure—which

[1] See Wilson (1999) for an overview of the tax competition literature.

[2] This is especially true, Kalecki (1944) argues, if investment in fixed capital, due to depreciation or otherwise, is tax deductible, since then expected profitability and thus private investment is unaffected by higher taxes.

has the advantage not only of securing more employment but also of reducing the inequality in the distribution of incomes (after taxation)—should be pushed as far as politically possible".

Does it then follow that the race to the bottom amounts to sustained and widespread economic mismanagement from a post-Keynesian perspective? While it is tempting to conclude as much, we must also consider the seismic changes the world economy has undergone since Kalecki's time. In particular, as is pointed out in OECD (2018), we have seen the exponential growth in size and number of multinational enterprises (MNEs) since the 1970s, whose production and investment is not limited to one country but expands across many and relocates as conditions change. This phenomenon relates to what Palley (2015, p.53) terms "barge economics" since it is "as if factories are placed on barges that float between countries to take advantage of lowest costs – which can be due to under-valued exchange rates, *low taxes, subsidies*, absence of regulation, or abundant cheap exploitable labor" [emphasis added]. Indeed, the growth strategy of countries like the Republic of Ireland suggest a recognition of this "barge economics" logic with the successful use of corporate tax policy to attract real greenfield foreign direct investment (FDI). It is in this sense we might expect lower corporate taxes to boost demand through influencing the *location* decisions of profit-seeking MNEs, and not the *size* of MNE investment through lowering the cost of capital, as in neoclassical capital theory.

The purpose of this paper then is to understand the real economic motive to compete for foreign direct investment (FDI) using tax and related policy variables; introduce this motive into a formal Kaleckian model; and use this model to analyse the causes and consequences of the race to the bottom in corporate tax rates. In doing so, this paper presents a simple but general theory of how the average effective corporate tax rate (AECTR) can attract or repel a part of globalised production. We find reason to believe that AECTRs may attract MNE investment, and that, in especially small economies, this inflow can more than compensate for the demand-

hindering effect of lower tax revenues in a balanced budget Kaleckian model. In this way, we talk of countries being "tax competition-led" when lowering AECTRs increases capacity utilisation and "government expenditure-led" otherwise.

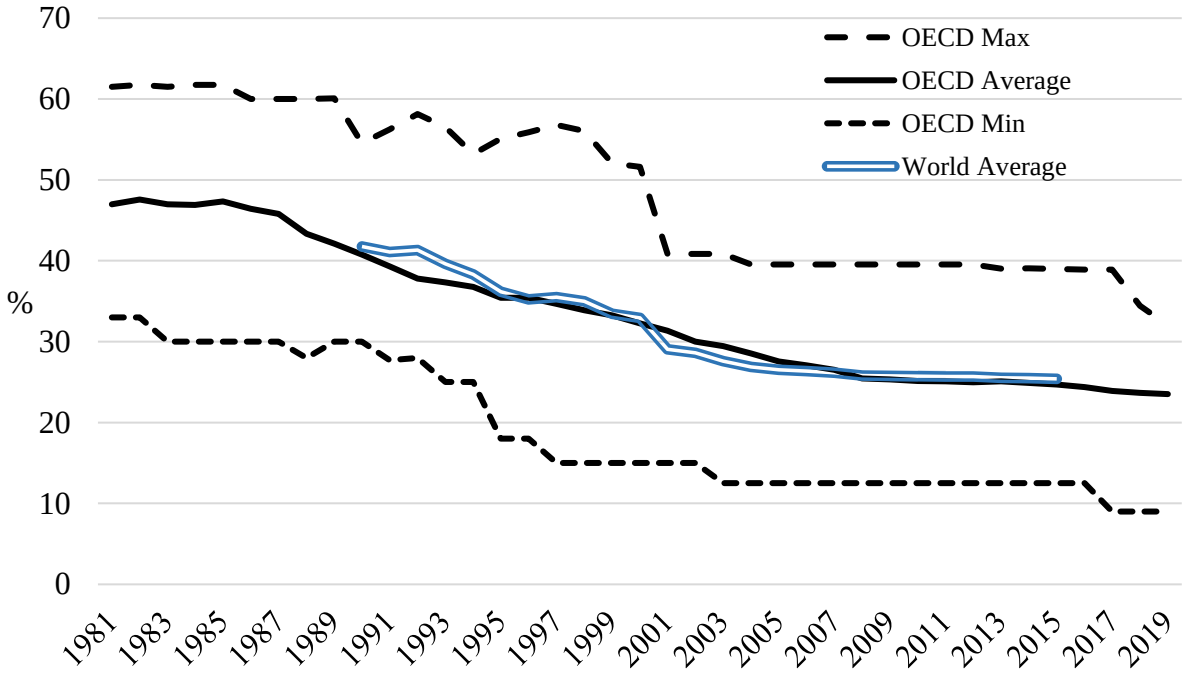
If demonstrating the existence of these two tax regimes is the first theoretical contribution of this paper, then the second is showing the existence of a coordination problem that emerges when countries decide to change AECTRs simultaneously. We refer to this coordination problem as the "paradox of tax competition", because, like other fallacies of composition commonly identified in post-Keynesian thought, this is a phenomenon where the benefits of one country acting alone are reduced or eliminated if other countries act the same way. More specifically, since we suppose MNEs are attracted to countries where the AECTR is *relatively* low, a collective fall in AECTRs may fail to distinguish any one country as being a relatively low-tax jurisdiction. In this case, the potential gains for a tax competition-led country are not realised, and the only entities to gain are MNEs.

Our "Kaleckian tax competition" model predicts that small economies are most likely to engage in tax competition and provides a basis for the rough estimation of a country's tax regime. Additionally, it allows us to consider the extent to which a country must change its AECTR relative to that of the rest of the world to avoid the paradox of tax competition and realise increased demand. On the back of this theory, we can build crude but informative estimates of which OECD countries, if any, have benefitted in recent decades from the race to the bottom. Our results suggest very few economies boosted demand through cutting AECTRs and thereby highlight what we refer to as the irrationality of the race to the bottom. Lastly, in response to this problem, we suggest policy solutions that are consistent with the model, the most effective among which are multilateral tax coordination or, failing that, unilateral adoption of a tax apportionment mechanism.

2. Motivation: The global race to the bottom in corporate tax rates

Figure 2.1 reflects what can be referred to as the global race to the bottom in corporation tax. Graphed are the minimum, average, and maximum values of total statutory corporate income tax rates for the 36 OECD countries between the years of 1981 and 2019 with data from the OECD tax database (2019). After a short period of relative stability in the 1980s, the whole distribution saw a sustained downward shift with the mean halving from 47.0% in 1981 to 23.5% in 2019. Data for 188 countries around the world from the IMF fiscal affairs department (2017) shows the world average largely mirrors developments in the OECD average over the period of data availability, 1990 – 2015.

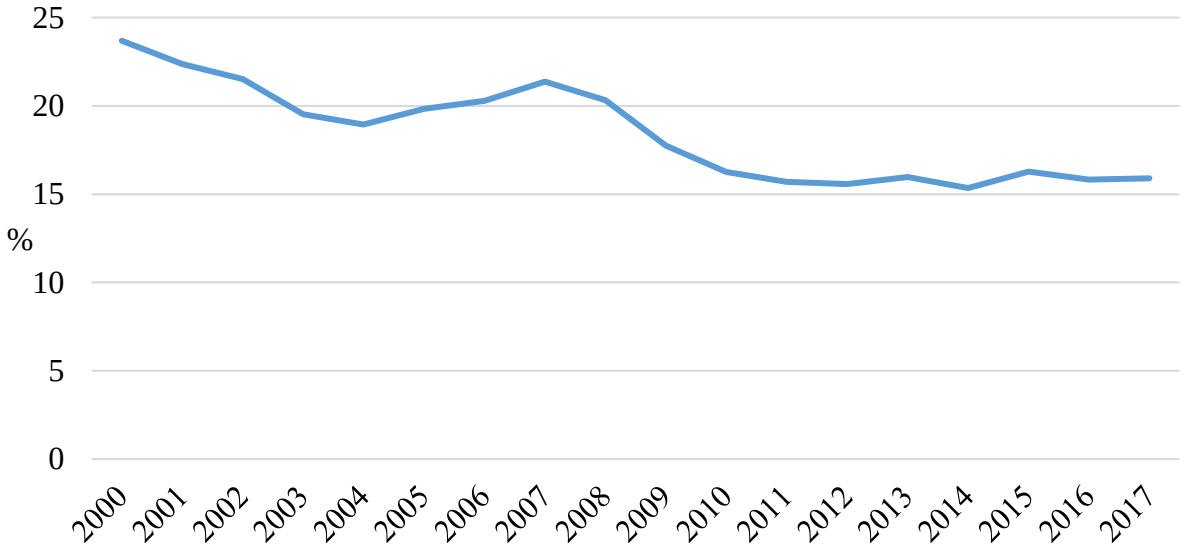
Figure 2.1 *Statutory corporate tax rates in the OECD (1981 - 2019) and around the world (1990 - 2015)*



Effective corporate tax rates have likewise exhibited race to the bottom characteristics in many countries around the world. Figure 2.2 reflects this fact, with data from the European Commission (2019) showing that the mean of the implicit tax rates on corporate income in the

28 countries of the European Union falling over the years of data availability, 2000 – 2017. The data exhibited in figures 2.2 and 2.3 clearly provoke questions about the causes of these downward trends.

Figure 2.2. *Average implicit tax rate on corporate income across the EU28, 2000 - 2017*



One significant driver for which there is evidence is tax competition. For our purposes, we can give the following definition: *Tax competition refers to the uncooperative setting of the relevant tax and fiscal policy variables in order to attract, or avoid losing, FDI inflows*. Since it amounts to the deliberate intention of diverting flows from one region to another, tax competition is a clear beggar-thy-neighbour phenomenon. However, it is also one that has yet to be modelled formally in post-Keynesian economics. Before we try to build our own theory, let us briefly review the evidence for the existence and operation of tax competition.

Empirical relevance for tax competition as a driver of the race to the bottom

In their survey of the empirical literature on the causes of falling corporate tax rates, Devereux and Loretz (2013, p.765) find that "despite significant variation in the approaches there emerges a relatively clear pattern of evidence for tax competition." Overesch and Rincke (2009; 2011), through different econometric approaches, find significant evidence for tax competition among

EU countries in particular. Winner (2005) also finds evidence to suggest the presence of tax competition, and argues that its operation implies a shift of the tax burden from capital to labour. This point, also found in Deprez (2003), stresses the exacerbating repercussions of tax competition for income inequality.

Case studies like that of the Republic of Ireland also bring the relevance of tax competition into focus. In a growth accounting exercise using a demand-oriented, balance-of-payments constrained approach, Garcimartín *et al.* (2008, p.427) find that "tax reductions (particularly with respect to corporation tax) are the primary single factor behind the Irish miracle". Having attracted MNEs to Ireland, the importance of their real activity to the Irish economy can be gleaned by looking at the related statistics. For example, using data for the year 1993, Görg and Ruane (1997, p.21) find that 68% of output, and 45% of employment, and 88% of exports in the manufacturing sector in Ireland were due to foreign-owned MNEs.

Further empirical evidence that supports the relevance of tax competition can be seen in studies investigating the relationship between corporate tax variables and FDI flows. While there is no unilateral consensus, Dellis *et al.* (2017, p.11) conclude that "most studies have to date found … a negative relationship between tax rates and FDI flows". This is supported by OECD (2008, p.2), which states that "studies examining cross-border flows suggest that on average, FDI decreases by 3.7% following a 1 percentage point increase in the tax rate on FDI".

Is it rational to race to the bottom in a demand-led economy?

The empirical evidence suggests that policymakers compete downward on corporate tax rates to remain attractive to mobile capital bases and that doing so may be effective. As mentioned in the introduction however, in a post-Keynesian framework, the usual policy recommendation is to *raise* taxes on capitalist income, which includes corporation taxes. Hence, we are left with the question, once tax competition in taken into account, whether demand is boosted through raising or lowering corporate tax rates. Which channel is dominant, the Kaleckian government

expenditure channel or the tax competition channel, and under what conditions? If the latter channel is dominant in most countries, could the race to the bottom be the result of policymakers rationally engaging in tax competition?

Before our attempts to address these questions, a few clarifications are in order. First, as may already be clear, tax competition is fought not merely with statutory rates, but also with deductions, subsidies, tax holidays, and so on. Hence, in this paper, we will speak most frequently of average effective corporate tax rates (AECTRs) to try to reflect this reality. This is, of course, still a simplification, as effective tax rates may vary at the sectoral and even firm level within an economy, giving rise to many, rather than one, relevant tax rate. We maintain the simplification is worth making for now, though, and withhold a more detailed discussion of the resulting limitation until the end of this article.

Second, it is worth elaborating upon what is meant by *rationally* engaging in tax competition. Since we are in a demand-led framework, by "rational" we mean simply that policymakers lower or raise AECTRs only when demand is boosted by doing so. If demand suffers by lowering or raising ACETRs, we will consider that to be "irrational". We recognise that such "irrationality" may stem from different causes, such as economic policy misguided by unfounded economic theory, regulatory capture, or whatever the case may be. In any case, we will consign ourselves to this broadened notion of rationality, as it is most convenient in our analysis.

Third, since we wish to only concern ourselves with the real effects of FDI in an economy, we limit our discussion in this paper to greenfield FDI. There is some evidence to suggest mergers and acquisitions may also have real effects (see, for example, Ashraf *et al.* 2015), but, for simplicity, we will ignore this kind of FDI. Relatedly, we do not address tax competition for paper profits nor the phenomena of base erosion and profit shifting here. We omit such topics not because they are unimportant, but because the channels through which

they operate and their effects on the economy are quite distinct to those explored here. A full treatment is warranted in a future work.

Lastly, let us be clear from the outset about how lower AECTRs may cause higher demand through higher FDI. We are not alleging that lower capital taxes will increase the total size of MNE investment by lowering the cost of capital, in contrast to the neoclassical capital theory found in Jorgensen (1963). The argument is rather that differences in AECTRs across countries will influence the *location* of MNE production. In order to determine the induced greenfield FDI inflows due to tax competition in a given country, we first need an idea of the extent to which relative AECTRs determine the location of MNE production.

3. How does corporation tax influence the location of MNE production?

Determinants of the location of MNE investment are numerous, varied, and often interdependent. While minimising its tax bill may not be the first priority of every MNE, it is nonetheless likely to be an important secondary goal. Such is the summary of the survey-based evidence offered by Dunning and Lundan (2008). The authors find that "cross-border differences in corporate taxes are rarely a primary motive for MNE activity, but that once a decision is made to engage in FDI or to increase foreign production in a particular country or region, they may play an important role on the siting of activity within that country or region" (ibid., p.614).

A general theory of tax competition

Against this backdrop, suppose an MNE is looking to expand activity and considers where in the world to do so. To build our theory, we make two assumptions, namely that MNEs locate

where net profits are highest and that they are rational to the extent that they can approximately compare the potential net profits from operating in different countries.

To begin, assume all countries have the same AECTR. In this case, the MNE would examine the potential revenue and material, wage, transportation and other costs in *C* countries, and use this information to approximate what its gross profits would be from operating in those *C* countries. Ordering the potential gross profits of the MNE in those *C* countries from lowest, $\Pi^{G}_{MNE,C}$, to highest, $\Pi^{G}_{MNE,1}$, the MNE would be inclined to invest in country 1. Of course, since AECTRs are set equal, the order of potential gross profits is the same as potential net profits (from the lowest $\Pi^{N}_{MNE,C}$ to the highest $\Pi^{N}_{MNE,1}$). There may be a country *j*, where even if it had an AECTR of zero, the MNE would not wish to invest there since its gross profits would be less than its net profits in its first best alternative country ($\Pi^{G}_{MNE,j} < \Pi^{N}_{MNE,1}$). Hence, the investment of the MNE is sensitive to the AECTR in (*j-1*) countries.

Let us now consider the perspective of a policymaker in one of those (*j-1*) countries, country *i*. In order to understand how low the AECTR in country *i*, τ_i, must be to attract the investment of the MNE, we must consider the difference in net profits between locating production in country *i* and the first best alternative of the MNE.

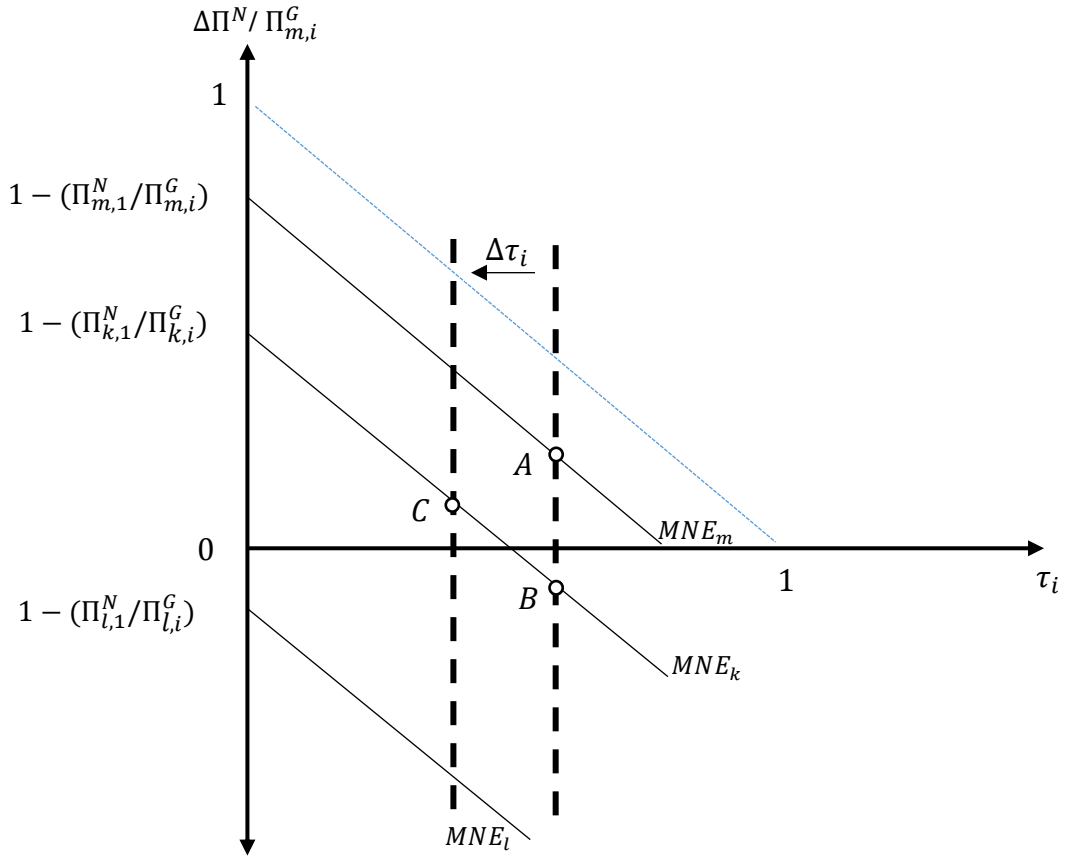
$$\Delta\Pi^{N}_{MNE} = (1-\tau_i)\Pi^{G}_{MNE,i} - (1-\tau_1)\Pi^{G}_{MNE,1} \tag{3.1}$$

To attract the MNE, the policymaker must ensure $\Delta\Pi^{N}_{MNE} > 0$, which implies

$$\tau_i < 1 - (\Pi^{N}_{MNE,1}/\Pi^{G}_{MNE,i}) \tag{3.2}$$

This condition is represented in figure 3.1 for country *i*, now with three different MNEs, denoted *m*, *k*, and *l*, where the relationship between the change in net profits and the tax rate in country *i* is given by equation 3.3. Note that the factors determining Π^{G}_{MNE} do not vary over time in our analysis. We are interested in the effects of AECTRs, and hence everything is held

Figure 3.1 *Attracting MNE investment through lowering the AECTR in country i*



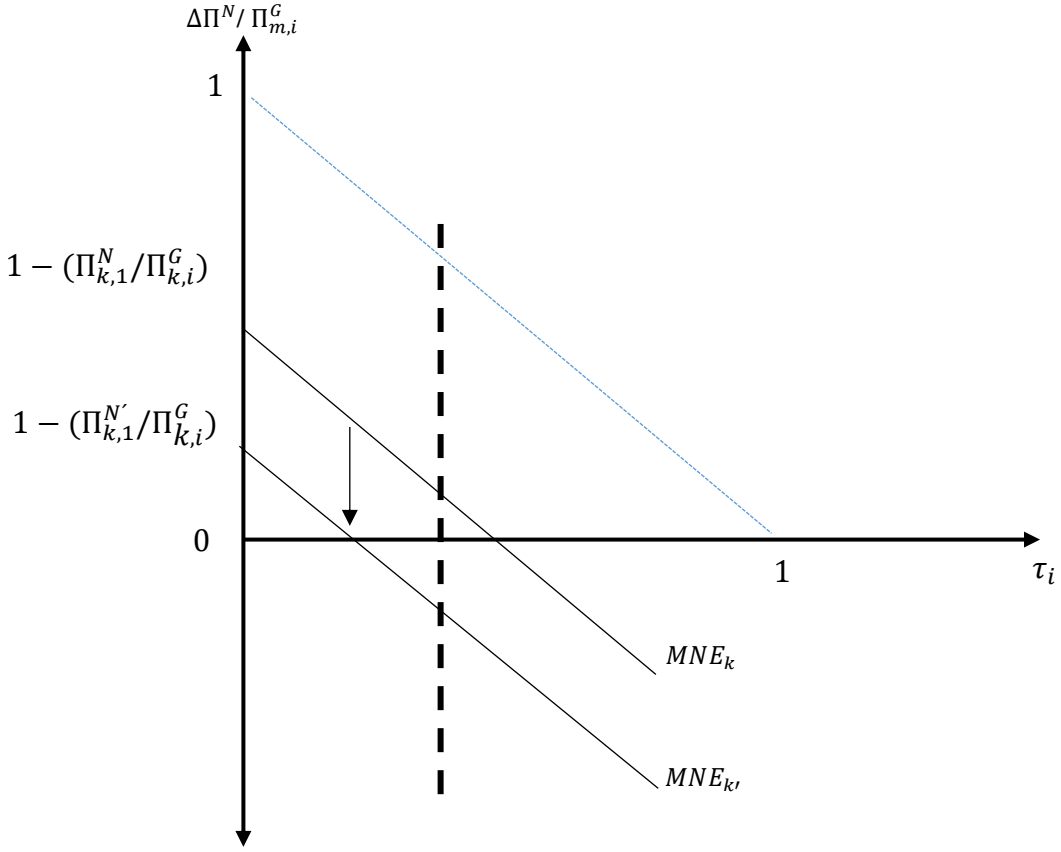
constant apart from τ_i and the AECTR in the first best alternative country, τ_1, (and thus $\Pi^N_{MNE,1}$ may vary if and only if τ_1 varies).

$$\Delta\Pi^N_{MNE}/\Pi^G_{MNE,i} = (1 - \Pi^N_{MNE,1}/\Pi^G_{MNE,i}) - \tau_i \qquad (3.3)$$

At the initial rate of τ_i, net profits of *m* are positive (point A) and thus *m* will be incentivised to invest in country *i*. However, the change in net profits of *k* from moving to country *i* would be negative at this rate (point B), and so τ_i will would have to be reduced to incentivise *k* to invest (point C). Note that *l* cannot be induced to invest for any plausible (i.e. nonnegative) τ_i. Only the investment of MNEs where $\Pi^G_{MNE,i} > \Pi^N_{MNE,1}$ is sensitive to changes in τ_i.

These profit-tax schedules of MNEs will be shifted down if the policymakers in the first best alternative countries also follow this logic, as it will increase potential net profits of MNEs

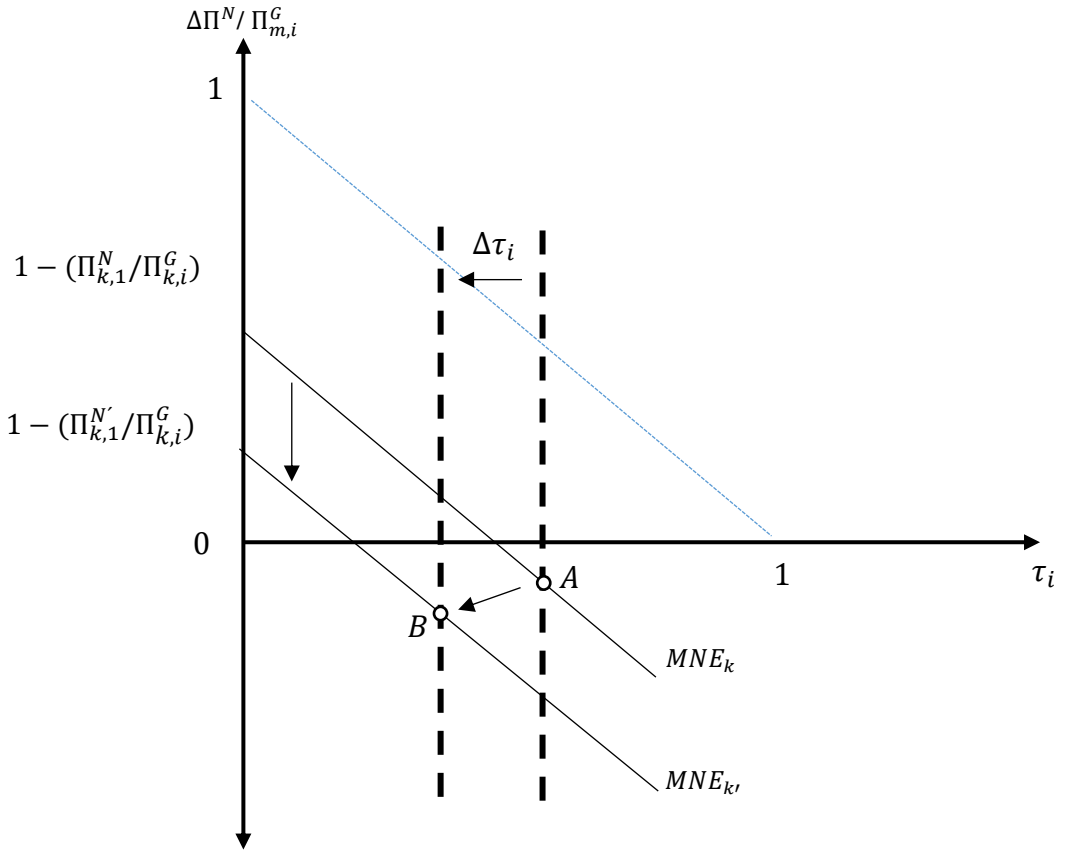
Figure 3.2 *Losing MNE investment due to a fall in AECTRs outside of country i*



from $\Pi^N_{MNE,1}$ to $\Pi^{N'}_{MNE,1}$. This is displayed in figure 3.2 for MNE *k*, where now country *i* will need to further reduce τ_i if it is to recapture *k* after the profit-tax schedule of *k* shifts down after potential net profits in the first best alternative increases ($\Pi^{N'}_{k,1} > \Pi^N_{k,1}$). This process of tax competition will repeat in every period thereafter until tax differentials are so small they no longer influence MNE location. At this point, when AECTRs are zero or close to zero, MNEs will ultimately base location decisions on gross profit differentials instead.

What this simple setup illustrates is that there is good reason to suspect a number of MNEs will locate production in a country that acts alone in lowering its AECTR. However, if all or most countries lower their AECTRs, there will be no or little increase in MNE investment in a given country. Lowering AECTRs, if done *en masse*, acts to move the goalposts, so to speak, that determine if lower AECTRs attract MNE investment. Graphically, this is displayed in figure 3.3, where the policymaker in country *i* cuts τ_i to attract MNE *k*, but the AECTR also

Figure 3.3 *The "paradox of tax competition"*



falls in the first best alternative country of *k*. Here the tax cuts do not increase FDI inflows into country *i* since the move from point A to point B in figure 3.3 does not represent a positive change in net profits for MNE *k*. Tax competition may thus represent a fallacy of composition: What is rational for one country acting alone may be irrational for multiple countries acting simultaneously. This is akin to other "paradoxical" results common to post-Keynesian thinking (*cf*. Lavoie 2014, p. 18).

This "paradox of tax competition", as we will call it, suggests that the FDI gains from tax competition vanish as more countries compete. This alone would seem to imply that the race to the bottom does not reflect rational policymaking, but this would be a premature conclusion. Not joining the race to stay tax competitive means accepting MNE activity will increasingly shift to the other countries that do, as in figure 3.2, which dampens demand. One must also consider countries that became especially competitive quickly—those that actively

lead in the race to the bottom and have done so since an early stage. Do these aggressively tax competitive countries see gains in the form of boosted demand?

To address these issues we must analyse tax competition in the context of a full macroeconomic model, and compare its effects to the changes in government expenditure. We will use the so-called "canonical Kaleckian" (*cf.* Lavoie, 2014) or "neo-Kaleckian" (*cf.* Hein, 2014) model for this purpose. First, though, we must augment its investment function to include this new tax-induced greenfield FDI channel.

The tax-sensitive greenfield FDI channel

We begin by stating our assumptions about MNE investment.[3] We will treat the total size of worldwide MNE investment as an exogenous and autonomous variable with respect to our model, which we will denote by I_m. We suppose a fraction, α_i, of total worldwide MNE investment is sensitive to changes in τ_i, the AECTR of country *i*. Alternatively, α_i can be thought of as the fraction of I_m that would go to country *i* in a given period if $\tau_i = 0$. With reference to what has gone before, α_i is determined by the sum of the investment of those MNEs whose gross profits in country *i* is greater than net profits in their first best alternative location. Hence, $\alpha_i I_m$ is the size of *potential* tax-sensitive greenfield FDI inflows for country *i*. *Actual* tax-induced greenfield FDI inflows into country *i*, $I_{m,i}$, is then given by

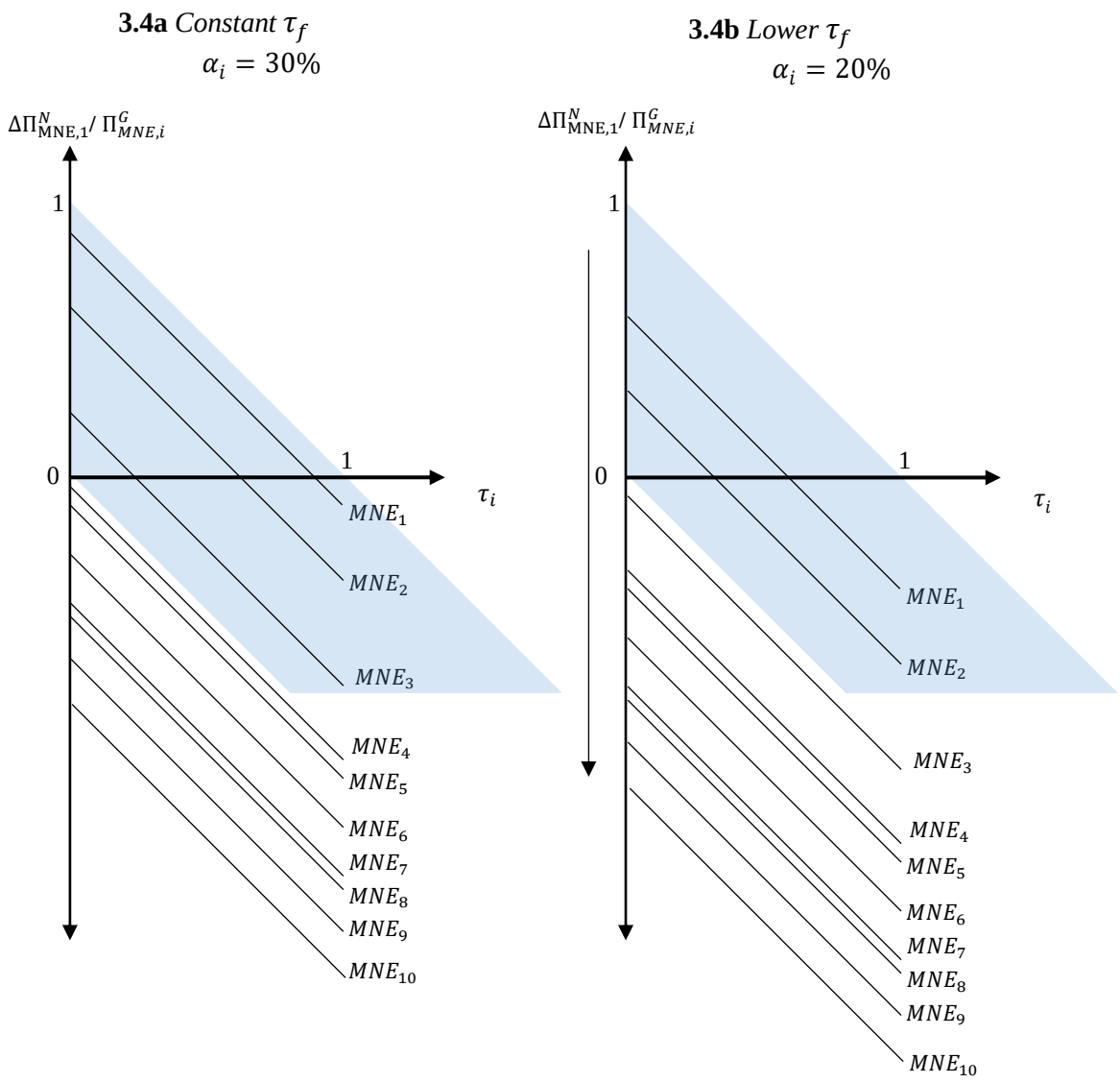
$$I_{m,i} = (1 - \tau_i)\alpha_i I_m \tag{3.4}$$

An important point here, again with reference to the discussion in section three, is that the proportion of tax sensitive greenfield FDI, α_i, is dependent on the AECTRs in the rest of the world. To see this most clearly, consider figure 3.4 where we suppose for the sake of

[3] In this paper, we will take MNE investment and greenfield FDI to be synonymous.

illustration there are ten MNEs in the world. We see in panel 3.4a that three MNEs could increase net profits by moving to country *i* for a low enough τ_i. Assuming, again purely for the sake of illustration, that the size of the investment of each MNE is equal, then it follows that α_i is 30%. Hence, it appears in this period that the policymaker in country *i* could conceivably attract 30% of worldwide greenfield FDI. Now suppose AECTRs in the rest of the world fall in the periods thereafter, reflected in a falling average AECTR in the rest of the world, denoted

Figure 3.4 *Effect of falling AECTRs in the rest of the world, τ_f, on the proportion of worldwide tax sensitive greenfield FDI that country i may attract, α_i*



τ_f. This serves to shift the MNE profit-tax curves downward, as seen in panel 3.4b, such that only two MNEs could now be attracted to country *i* through lower taxes. Thus, in this scenario, α_i falls to 20%.

It is with this logic in mind that we can think of there being a positive relationship between α_i and τ_f. Generally, we expect α_i to be zero when τ_f is zero or very small, since then there is no room to attract I_m with a lower τ_i. Yet the relation between α_i and τ_f is unlikely to be smooth, continuous, and one-to-one for two reasons. First, τ_f may fall without affecting the number of MNEs whose change in net profits from moving to country *i* is still positive for a low enough τ_i. Second, the size of planned investment of each MNE is not equal in reality. For instance, a falling τ_f may first make it impossible for country *i* to attract MNE_m, whose planned investment was a negligible fraction of worldwide investment and hence α_i is hardly affected. As τ_f continues to fall and country *i* cannot attract MNE_k with a lower AECTR either, however, α_i may be strongly affected if the planned investment of MNE_k is relatively large.

For the purposes of analysis, let us abstract from these complications for now by modelling the proportion of worldwide MNE investment that is sensitive to changes in the domestic AECTR, α_i, as a simple positive and proportional function of the average AECTR in the rest of the world, τ_f. This is shown in in equation 3.5, where the constant of proportionality, $\rho_i \in [0,1]$, represents the average change in α_i given a change in τ_f and is determined by country-specific factors that influence the gross profits of MNEs. In this paper, we will treat ρ_i as a constant.

$$\alpha_i = \rho_i * \tau_f \tag{3.5}$$

4. A Kaleckian model with tax competition

Let us briefly consider the effects of higher corporation taxes in a benchmark Kaleckian model with no FDI inflows before we add the tax-sensitive greenfield FDI channel seen in equations 3.4 and 3.5. We will simplify our approach by assuming that the tax on corporate profits is the only tax in the economy, that its incidence falls solely on capitalists, and that the government runs a balanced budget at all times:

$$G = \tau\Pi \tag{4.1}$$

where G is government expenditure and Π represents the total profit level. We assume workers earn wages and capitalists earn profits such that the classes and their income types are mutually exclusive. Furthermore, we will proceed using the classical saving hypothesis that workers do not save, whereas capitalists save a fraction of their income. Hence, using the usual decomposition for the rate of profit, we arrive at our saving rate (σ) function:

$$\sigma = \frac{S}{K} = \frac{s_\pi(1-\tau)\Pi}{K} = s_\pi(1-\tau)\left[\frac{\Pi}{Y}\frac{Y}{Y^P}\frac{Y^P}{K}\right] = s_\pi(1-\tau)h\frac{u}{v} \tag{4.2}$$

where *S* is total saving, *K* is the capital stock, *Y* is output, Y^P is potential output, s_π is the propensity to save out of profits, *h* is the profit share, *u* is the capacity utilisation rate, and *v* is the capital-to-potential-output ratio, assumed to be constant.

The rate of investment (g) is determined by animal spirits (γ_1) and the rate of capacity utilisation:

$$g = \frac{I}{K} = \gamma_1 + \gamma_2 u \tag{4.3}$$

Lastly, and following Hein (2014, p. 290), we shall consider the determinants of the rate of net exports (b) to be the real exchange rate (e^R), domestic capacity utilisation and foreign capacity utilisation (u_f):[4]

$$b = \frac{NX}{K} = \beta_1 e^R - \beta_2 u + \beta_3 u_f \tag{4.4}$$

In the goods market equilibrium, leakages must equal injections, implying that the savings rate must be equal to the rates of investment and net exports:

$$\sigma = g + b \tag{4.5}$$

Before we solve our system, we must highlight the usual assumption of Keynesian stability:

$$\frac{\delta\sigma}{\delta u} > \frac{\delta g}{\delta u} + \frac{\delta b}{\delta u} \tag{4.6}$$

And so, for our particular open-economy model, stability in the goods market thus requires the following:

$$s_\pi(1-\tau)\frac{h}{v} + \beta_2 \; > \; \gamma_2 \tag{4.7}$$

Benchmark model solution

Now we are in position to solve our model by inserting equations 4.1 until 4.4 into 4.5 and solving for the equilibrium capacity utilisation rate (u^*):

$$u^* = \frac{\gamma_1 + \beta_1 e^R + \beta_3 u_f}{s_\pi(1-\tau)\frac{h}{v} - \gamma_2 + \beta_2} \tag{4.8}$$

[4] We also follow the assumption that the Marshall-Lerner condition holds and, as such, the effect of the real exchange rate on the rate of net exports (β_1) is positive.

A few remarks are in order. Unsurprisingly, the paradox of saving (Keynes, 1936) holds in our model. The paradox of costs (Kalecki, 1966; Rowthorn, 1981) may or may not hold depending on the effect of the profit share on the real exchange rate (*cf.* Blecker 1989). However, this is not our focus here. What is of greater interest for our purposes is the effect of an increase in the capital tax rate on equilibrium capacity utilisation, which is clearly positive:

$$\frac{\delta u^*}{\delta \tau} > 0 \tag{4.9}$$

This effect is due to the injection of capitalist income through government spending, which would have otherwise been a leakage in the form of capitalist savings.[5] Hence, this effect is dependent upon assumptions about the fiscal budget, or, more precisely, about what the government does with the changes in tax revenues resulting from changes in the tax rate.

From the standpoint of such a wage-led model, the current worldwide downward trend in corporate tax rates can only be viewed as ill-informed and self-defeating since inequality 4.9 indicates demand, proxied by *u*, is positively affected by higher corporation tax. Now we look to compare these results to a neo-Kaleckian model with tax competition effects.

Adding the tax competition channel

To add the tax competition channel, we simply augment the investment function in 4.3 by the FDI channel specified in equations 3.4 and 3.5, and standardise $I_{m,i}$ by the capital stock in country *i*, as we did before

$$g_i' \;=\; g_i + \frac{I_{m,i}}{K_i} \;=\; \gamma_{1,i} + \gamma_{2,i}u + (1-\tau_i)\rho_i\tau_f g_{m,i} \tag{4.10}$$

where $g_{m,i} = I_m\,/K_i$.

[5] The same effect is derived by Dutt (2013, p.107) in a similar model.

Proceeding now to solve our system for the equilibrium rate of capacity utilisation, and reiterating that our stability condition in 4.6 must apply again for our model to be determinate, we arrive at:

$$u_i^* = \frac{\gamma_{1,i} + \beta_{1,i}e^R + \beta_{3,i}u_f + (1-\tau_i)\rho_i\tau_f g_{m,i}}{s_{\pi,i}(1-\tau_i)\frac{h_i}{v_i} - \gamma_{2,i} + \beta_{2,i}} \tag{4.11}$$

Again, as we did with the benchmark model, let us now take the derivative of capacity utilisation with respect to the domestic AECTR. For convenience, let us denote the numerator of 4.11 by *N* and the denominator by *D* in the interim stages of the derivation.

$$\frac{\delta u_i^*}{\delta \tau_i} = \frac{-\rho_i\tau_f g_{m,i}D + (s_{\pi,i}h_i/v_i)N}{D^2} = \frac{(s_{\pi,i}h_i/v_i)\,N/D - \rho_i\tau_f g_{m,i}}{D}$$

$$= \frac{u_i^*\, s_{\pi,i}h_i/v_i - \rho_i\tau_f g_{m,i}}{s_{\pi,i}(1-\tau_i)\,h_i/v_i - \gamma_{2,i} + \beta_{2,i}} \tag{4.12}$$

We are now in a position to comment on the sign of the effect of the domestic AECTR on domestic equilibrium capacity utilisation. Again, the denominator is none other than our stability condition, which is positive by the usual assumption. Therefore, the sign of $\delta u_i^*/\delta\tau_i$ is determined by the numerator:

$$\frac{\delta u_i^*}{\delta \tau_i} \lesseqgtr 0 \qquad if \qquad u_i^*\, s_{\pi,i}h_i/v_i \lesseqgtr \rho_i\tau_f g_{m,i} \tag{4.13}$$

This is arguably much easier to interpret when reduced and expressed in levels, recalling that $v_i = K_i/Y_i^P$, $g_{m,i} = I_m / K_i$, $h_i = \Pi_i/Y_i$ and $u_i = Y_i/Y_i^P$,

$$\frac{\delta u_i^*}{\delta \tau_i} \lesseqgtr 0 \qquad if \qquad s_{\pi,i}\,\Pi_i \lesseqgtr \rho_i\tau_f I_m \tag{4.14}$$

The conditions set out in 4.14 are significant because, first and foremost, they indicate that policymakers in country *i* can stimulate demand by lowering their AECTR, in stark contrast to

the traditional neo-Kaleckian model where this was not possible. The left-hand side is pre-tax saving, which varies from country to country depending on the size and structure of the economy. It represents the government expenditure channel to demand. As pre-tax saving increases, so does the potential of the effect of a higher tax rate on demand, as it would direct what would be a leakage in the form of savings into an injection in the form of government expenditure. The right-hand side, however, represents the allure of tax competition. As I_m grows, the size of the FDI pie to be fought over grows. As α_i grows through a higher τ_f, the easier it is to take a slice. In this paper we will call a country "tax competition-led" if $s_{\pi,i}\,\Pi_i < \rho_i \tau_f I_m$ and "government expenditure-led" so long as $s_{\pi,i}\,\Pi_i > \rho_i \tau_f I_m$.

Endogenous regime shifts

With regards to the dynamics of the model, it should be pointed out that the profit level, Π_i, is endogenous. For any period in which $\delta u_i^*/\delta\tau_i$ is positive and τ_i is raised or $\delta u_i^*/\delta\tau_i$ is negative and τ_i is lowered, the profit level increases via increased demand and output. As the profit level rises, $s_{\pi,i}\,\Pi_i$ will grow relative to $\rho_i \tau_f I_m$, all else being equal. In the former case, this means $\delta u_i^*/\delta\tau_i$ can only become more strongly positive. In the latter case, $\delta u_i^*/\delta\tau_i$ starts in a negative position and tends towards zero. However, assuming that changes in τ_i (and the resulting effects on Π_i) are discrete, $\delta u_i^*/\delta\tau_i$ can overshoot zero and become positive.[6] Hence, the inherent dynamics of our model played out in logical time suggest that an economy led by a rational policymaker may endogenously shift from a tax competition-led regime ($\delta u_i^*/\delta\tau_i < 0$) into a government expenditure-led one ($\delta u_i^*/\delta\tau_i > 0$), whereas as a government-expenditure-led regime is stable and self-reinforcing. Theoretically, a rational tax competition-led country would cut its AECTR repeatedly until it reaches zero (or some other minimum that

[6] This assumption seems reasonable since, in reality, changes in AECTRs are due to discrete and abrupt changes in the statutory rate and other corporate tax related policies.

is set by socio-political factors), and would have no incentive to increase its rate until its profit level is induced to rise to the point where the country becomes government expenditure-led.[7]

The paradox of tax competition revisited

At this point, we must recall an important feature of tax competition, namely the coordination problem that arises when even a rational policymaker in a tax competition-led country lowers the domestic AECTR against a backdrop of other countries around the world simultaneously doing the same thing. So far, in our analysis of the sign of $\delta u_i^*/\delta\tau_i$, we have ignored this possibility, as we were primarily concerned with the question of whether the FDI channel could dominate the government expenditure channel at all. Given the *potential* benefits to demand of tax competition, where the potentiality is partly based on the degree to which an economy can act alone, let us analyse the *actual* effects of lowering AECTRs when many countries decide to do so *en masse*.

The Kaleckian tax competition model enables such analysis, since the effect of many countries lowering their AECTRs is reflected in a falling τ_f. The total differential, then, of equilibrium capacity utilisation given both a change in the domestic AECTR and the average AECTR in the rest of the world is given by

$$du_i^* = \frac{\delta u_i^*}{\delta\tau_i} d\tau_i + \frac{\delta u_i^*}{\delta\tau_f} d\tau_f \tag{4.15}$$

$\delta u_i^*/\delta\tau_i$ has already been derived in equation 4.12, and $\delta u_i^*/\delta\tau_f$ can easily be shown to be

$$\frac{\delta u_i^*}{\delta\tau_f} = \frac{(1-\tau_i)\rho_i g_{m,i}}{s_{\pi,i}(1-\tau_i)\frac{h_i}{v_i} - \gamma_{2,i} + \beta_{2,i}} \tag{4.16}$$

[7] While the theoretical possibility of an endogenous regime shift in logical time is worth noting, we must also stress that, in historical time, exogenous variables may change such that this becomes a moot point. In particular, the exponential growth of I_m in recent decades with the rise of globalisation may simply dominate the growth in the profit level, especially that of small economies.

Hence, equation 4.15 is the same as

$$du_i^* = \frac{u_i^* s_{\pi,i} h_i/v_i - \rho_i \tau_f g_{m,i}}{s_{\pi,i}(1-\tau_i)\, h_i/v_i - \gamma_{2,i} + \beta_{2,i}} d\tau_i + \frac{(1-\tau_i)\rho_i g_{m,i}}{s_{\pi,i}(1-\tau_i)\, h_i/v_i - \gamma_{2,i} + \beta_{2,i}} d\tau_f \qquad (4.17)$$

Setting $du_i^* = 0$ and, again, reducing and expressing in levels, we find that

$$d\tau_i = \mu_i \; d\tau_f \qquad where \;\; \mu_i = \frac{(1-\tau_i)/\tau_f}{1-(s_{\pi,i}\Pi_i/\rho_i \tau_f I_m)} \qquad (4.18)$$

Equation 4.18 says that the change in τ_i must be a multiple, μ_i, of the change in τ_f for equilibrium capacity utilisation to be unaffected. The factor, μ_i, depends on the size of current τ_i relative to τ_f, and the tax regime of country *i*. If it is tax competition-led ($s_{\pi,i}\Pi_i < \rho_i \tau_f I_m$), then μ_i will be positive, and if it is government expenditure-led ($s_{\pi,i}\Pi_i > \rho_i \tau_f I_m$), μ_i will be negative.

Given a change in τ_f, to what extent should a given country lower or raise its AECTR to boost equilibrium capacity utilisation? It follows that the demand-boosting change in the domestic AECTR that is simultaneous to the change in τ_f is given by inequality 4.18a for a government expenditure-led country and inequality 4.18b for a tax competition-led country.

$$du_i^* > 0 \quad if \quad d\tau_i > \frac{(1-\tau_i)/\tau_f}{1-(s_{\pi,i}\Pi_i/\rho_i \tau_f I_m)} d\tau_f \;\; and \;\; s_{\pi,i}\Pi_i > \rho_i \tau_f I_m \qquad (4.18a)$$

$$du_i^* > 0 \quad if \quad d\tau_i < \frac{(1-\tau_i)/\tau_f}{1-(s_{\pi,i}\Pi_i/\rho_i \tau_f I_m)} d\tau_f \;\; and \;\; s_{\pi,i}\Pi_i < \rho_i \tau_f I_m \qquad (4.18b)$$

The conditions in 4.18a and 4.18b show that to increase equilibrium capacity utilisation it is necessary but not always sufficient for a tax competition-led country simply to lower its AECTR or for a government expenditure-led one to raise its AECTR. What also matters, when one considers the paradox of tax competition, is the *extent* to which a country lowers or raises its AECTR. Hence, policymakers may recognise the tax regime of their country but still be

considered irrational, as we have defined it the term, if they fail to recognise the larger coordination problem and its implications.

5. Implications of the Kaleckian tax competition model

Having built and explained our theoretical model, let us now explore its relation to real-world corporate tax developments.

Multipliers given current low rates of corporate tax around the world

Firstly, note the interesting asymmetry in the fact that, for recent low values of corporate tax rates, tax competition-led countries face multipliers greater than one (in absolute value) whereas government expenditure-led countries face multipliers of less than one in absolute value. To illustrate this point—and with reference to condition 4.18—consider a country that is so "strongly" tax competition-led that $1 - (s_{\pi,i}\Pi_i/\rho_i\tau_f I_m) \approx 1$. Even this strongly tax competition-led country would have to decrease its AECTR by around 3.2 percentage points to compensate for the decreased demand caused by a fall in the rest of the world of 1 percentage point, given $\tau_f = 0.25$ and $\tau_i = 0.2$. Clearly, if τ_f and τ_i fall any lower, or if a country is "weakly" tax competition-led, the multiplier will be even higher. Strongly government expenditure-led countries, on the other hand, may boost u_i^* with increases of domestic AECTRs that are mere fractions of the size of the fall in τ_f, given the current low distribution of AECTRs around the world.

Relatedly, it should also be noted that countries may become "trapped" in the sense that a demand-boosting decrease in the domestic AECTR is simply not implementable. This is especially true for "weakly" tax competition-led economies, where $\rho_i\tau_f I_m$ is only slightly greater than $s_{\pi,i}\Pi_i$, and when τ_i and τ_f are sufficiently close to zero. In this case, the multiplier

may be so large that to implement it would require negative AECTRs. For example, suppose that in a given period $\tau_i = 0.18$, $\tau_f = 0.2$, and $(s_{\pi,i}\Pi_i/\rho_i\tau_f I_m) = 0.8$. The resulting multiplier of 20.5 means that a subsequent fall in τ_f of one percentage point would need to be met with a fall in the domestic rate of 20.5 percentage points, which is an impossibility. If an economy becomes trapped in this sense, it must suffer the negative effects of changes in τ_f on demand without being able to reduce τ_i further to counteract such effects.[8]

Economic size matters

One clear prediction from the Kaleckian tax competition model is that countries with profit levels that are small compared to I_m—typically poorer and/or physically smaller countries—are more likely to be tax competition-led and hence compete more aggressively on AECTRs than larger economies. There is considerable evidence to suggest this prediction holds water.

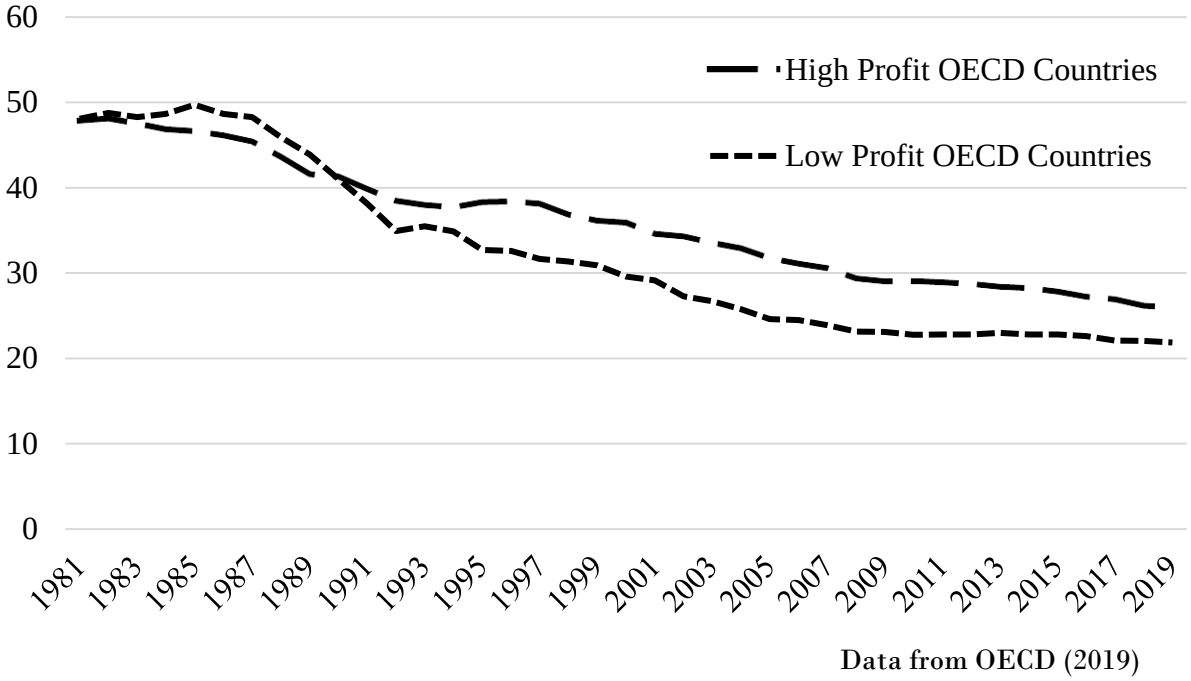
Preliminary evidence can be seen in Figure 5.1. Graphed are the statutory corporate tax rates of the 18 highest profit level OECD countries versus the 18 lowest profit level OECD countries for the years 1981 - 2019.[9] We see that the smaller OECD economies lowered rates more aggressively since the end of the 1980s and have undercut the larger economies by 5.2 percentage points on average since 1990. While this may not be a conclusive test, more rigorous econometric studies such as Winner (2005), Chatelais and Peyrat (2008), and Crabbé and

[8] While τ_f could theoretically fall so low that country i becomes government expenditure-led (since now $s_{\pi,i}\Pi_i > \rho_i\tau_f I_m$ at the sufficiently low value of τ_f) and thus no longer trapped, it is unclear how rapid or automatic such a "release" would be. Two factors might serve to keep $s_{\pi,i}\Pi_i < \rho_i\tau_f I_m$. First, Π_i will be endogenously lowered in every period that the tax competitive country i is trapped. Second, the size of total worldwide greenfield FDI may continue to grow (exogenously) at its rapid rate. In addition, if a sufficient number of countries become trapped and cease to change AECTRs, then τ_f will cease to fall as quickly too. Yet this depends on assumptions about how "rational" policymakers would act at or near the "bottom" of the race. Rather than make premature conclusions here, we will note the question and leave it as the subject of further work.

[9] Countries' profit levels were ranked by gross operating surplus data from the OECD (2019). Switzerland has been defined as a low profit country because its tax-setting powers are largely devolved to its cantons, meaning that the relevant profit variable should, in fact, be at the canton-level, which is obviously far smaller than that of the nation-level.

Vandenbussche (2009) have all found evidence in various forms that supported the hypothesis that small economies lead in the tax competition race.

Figure 5.1 *Average Statutory Corporate Tax Rate (%): High vs. Low Profit Level OECD Countries, 1981 - 2019*



Data from OECD (2019)

The irrationality of the race to the bottom

While small economies may be more likely to lead the race to the bottom, this does not necessarily imply they do so rationally. Furthermore, questions must be raised concerning why larger economies are also racing to the bottom. Are all the OECD countries really tax competition-led? If so, can they all truly avoid the paradox of tax competition and boost demand through lowering AECTRs?

We can roughly estimate the tax regime of each of the 36 OECD countries in the following way. Using gross operating surplus data for Π_i, data on the average OECD statutory rate for τ_f, and adopting the convention of defining greenfield FDI (I_m) as the residual of total FDI minus merger and acquisition FDI, we can compare the size of $s_{\pi,i}\,\Pi_i$ to that of $\rho_i \tau_f I_m$ in a crude, but nevertheless informative way. Clearly, we still need to give values to $s_{\pi,i}$ and ρ_i.

For simplicity, we will assume all countries under consideration have a marginal propensity to save from profits of 0.8. Since ρ_i is relatively abstract, we will provide various values to see how sensitive our results are to changes in this parameter. We allow ρ_i to equal 1, 0.5 and 0.2 for all countries for every year in the sample.[10] The period of analysis, 1990 – 2017, is determined by the data availability of I_m in particular, with estimates derived from FDI data taken from UNCTAD (2018).[11] Data on Π_i and τ_f is taken from OECD (2019). Since data on gross operating surplus is not available for the first few years of the sample period for typically smaller countries—those more likely to be tax competitive—our sample may suffer a slight selection bias in the first few years.[12] Rerunning the exercise for the sample of countries with full data from 1990, however, shows the same trends as we find below, suggesting that any bias is unimportant for our purposes.

Figure 5.2 shows the percentage of the 36 OECD countries that are tax competition-led ($\rho_i \tau_f I_m > s_{\pi,i} \Pi_i$) in a given year between 1990 and 2017 for different values of ρ_i. In each case, there is a rise in the percentage of countries with an incentive to compete on taxes after the early 1990s. Only for unrealistically high values of ρ_i is there a majority of countries that may have an economic rationale for racing to the bottom. While far from conclusive, figure 5.2 throws into question the rationality of the race to the bottom, or at the very least the rational basis for *large* economies to race to the bottom.

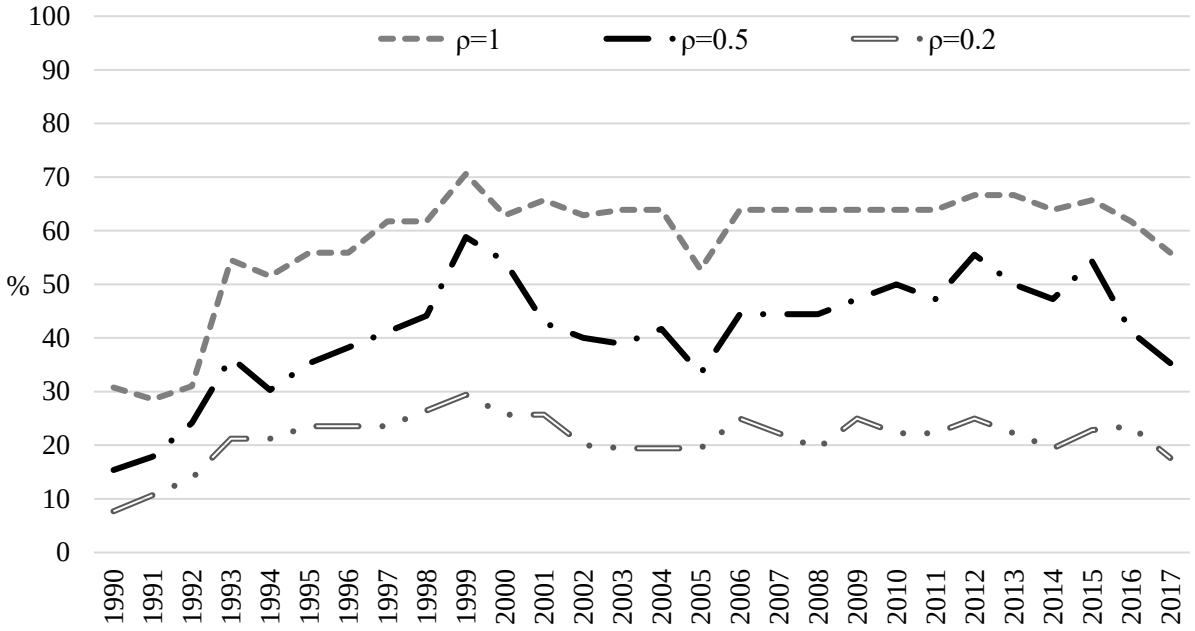
We can take our investigation to its natural conclusion now by considering the coordination problem that we refer to as the paradox of tax competition. Given a fall in τ_f, tax competition-led countries must simultaneously *decrease* AECTRs by a country-specific

[10] There is no reason to suppose ρ_i will be truly equal across countries and across time, but, again, we define it as such because it at least allows for an intuitive grasp of the relative magnitudes of the economic forces.

[11] Such data excludes financial centres in the Caribbean to limit the usual distortions to FDI measures.

[12] First year of data availability is as follows: 1991 - Poland; 1992 – Latvia; 1993 – Czechia, Estonia, Lithuania, and Slovakia; 1995 – Chile, Hungary, and Israel.

Figure 5.2 *Estimated percentage of OECD countries that are tax competition-led for different values of ρ, 1990 - 2017*

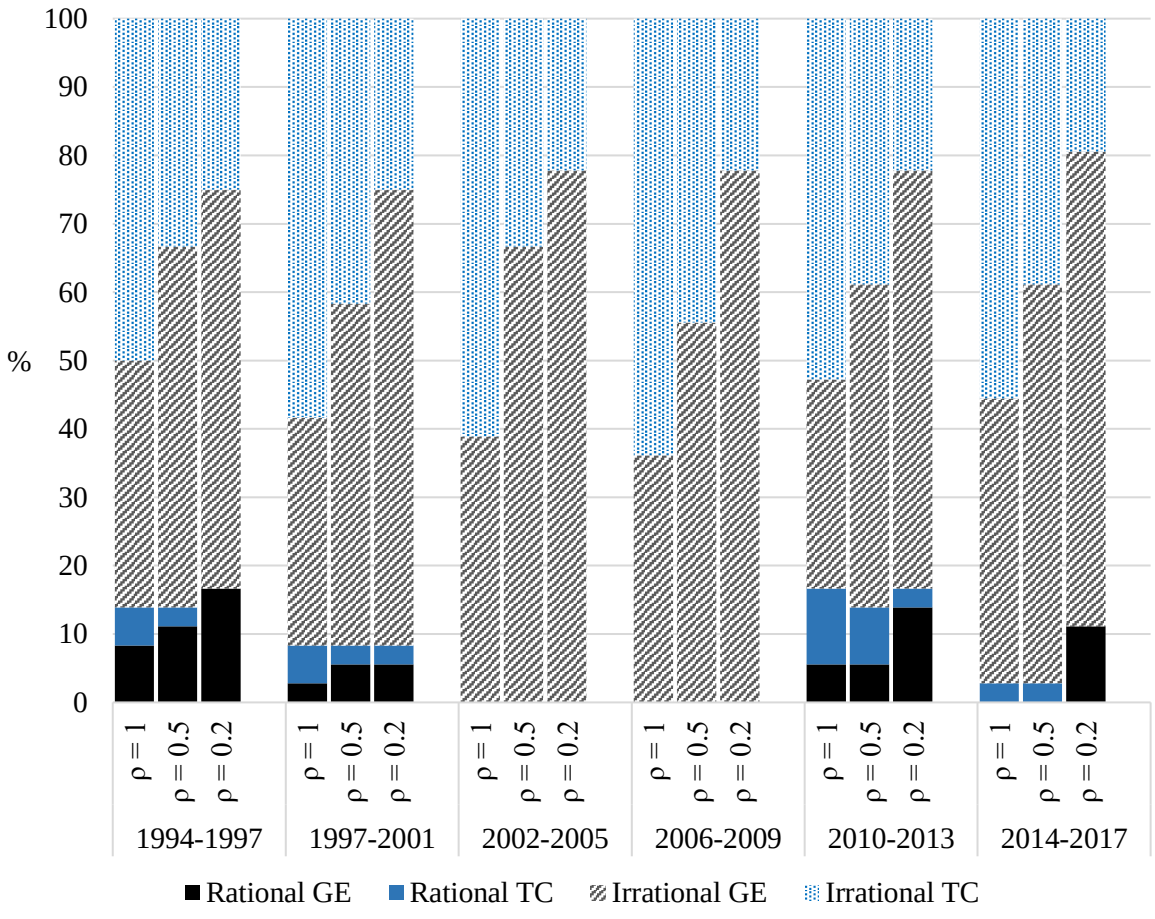


multiple of this fall in order to realise the positive effects on demand. Similarly, government expenditure-led countries must *increase* AECTRs above a country-specific multiple of this fall to compensate for the demand-hindering effects of other countries becoming more tax competitive.

To estimate the empirical relevance of this phenomenon, we use the conditions as derived in inequalities 4.18a and 4.18b. This implies comparing the actual change in the domestic AECTR to the actual change in the AECTR of the rest of the world times the country specific multiplier during the period. If $d\tau_i < \mu_i \, d\tau_f$ for a tax competition-led country, then we shall call it "rationally tax competition-led" and "irrationally tax competition-led" otherwise. If, on the other hand, $d\tau_i > \mu_i \, d\tau_f$ for a government expenditure-led country, it will be termed "rationally government expenditure-led" and "irrationally government expenditure-led" otherwise.

For analytical clarity, we analyse six intervals of four years from 1994 until 2017 for the 36 OECD countries. This is also perhaps more realistic, to the extent that MNE investment decisions are based on tax developments in a period longer than one year. To estimate μ_i, we define changes in the domestic and rest of the world corporate tax rate as the change over these four year intervals and τ_i and τ_f are defined as the average over each interval. Lastly, the tax regime, as determined by $s_{\pi,i}\,\Pi_i/\rho_i\tau_f I_m$, is also given by the average value over the interval. Again, we set $s_{\pi,i} = 0.8$ and give different values for ρ_i to get at least a general understanding of the possible empirical relevance of the tax coordination problem.

Figure 5.3 *Percentage of OECD countries that rationally or irrationally changed corporate tax rates in a given four year period, given the tax regime for different values of ρ*



The results of this exercise, displayed in figure 5.3, suggest that the vast majority of countries failed to boost demand by changing domestic AECTRs over this period. This conclusion is robust to our value of ρ_i and the period in question. The value of ρ_i changes the percentage of tax competition-led countries relative to those that are government expenditure-led, but has seemingly negligible effects on the relative size of those that acted rationally to those that did not. Even allowing for the possibility of tax competition-led demand, our results suggest the race to the bottom is far removed from a "rational" economic basis, as we define it. For the most part, it has effectively dampened demand around the world.

Policy implications

A natural question that arises is how policymakers could be so irrational with regards to the setting of AECTRs. One part of the answer presumably lies in unfounded economic theory or forms of regulatory capture or influence. Another part of the answer may lie in the fact that the process of tax competition described in this paper is one of high if not intractable complexity, giving rise to a form of increased fundamental uncertainty. Estimating the tax regime of a country is difficult enough without then trying to understand how other countries around the world may also simultaneously change corporate tax policies.

In response to the tax competition problem, there are two main policy recommendations worth considering. First, multilateral tax coordination could reflate AECTRs around the world and establish a minimum rate that should not be undercut thereafter. Increasing AECTRs collectively allows for the positive government expenditure effects without suffering the negative tax competition effects, since the rise in τ_f offsets the fall in $(1 - \tau_i)$ seen in the modified investment function seen in equation 4.10. If multilateral action is deemed impossible to achieve, individual countries can at least change the way corporate taxes are collected. For example, Zucman (2019) argues that the consolidated, worldwide profits of MNEs should be taxed based on where sales are made, not where subsidiaries are headquartered or production

is located. Such an apportionment mechanism removes the incentive that gives rise to the race to the bottom problem in the first place while allowing corporate tax rates to rise and inequality to be addressed. To ensure the fairness and effectiveness of such an apportionment mechanism, however, international coordination may still be of great value.

In any case, even if such tax reforms are not implemented and current tax systems remain, our model suggests a number of sufficiently large countries need not accept current received wisdom that AECTRs should be minimised. Large economies in particular, it seems, would do well to realise the benefits of increased corporate taxes. To better contextualise what is meant by "large", we find in our analysis that countries with a profit level equal to or greater than that of Austria (if $\rho_i \leq 0.5$) or the Netherlands (if $\rho_i \leq 1$) are government expenditure-led.[13] Relatedly, claims that the 2017 tax cut in statutory corporate tax from 35% to 21% in the United States—the country with the highest profit level in the world—will increase growth should be viewed with a great deal of scepticism in light of our model.

Limitations

Before we conclude, a few limitations ought to be stressed. Of course, the empirical approach adopted is not rigorous, but nor is it held to be as such. Gross operating surplus and worldwide greenfield FDI estimated by the residual method may be poor proxies for the desired variables. Yet, it is unclear what alternative proxies would be superior. Such an approach at least allows a first approximation of the forces at play.

Additionally, we have simply assumed that changes in statutory rates reflect changes in effective rates, and that there exists one effective rate that is relevant for all MNEs. This is, of course, a large simplification. In particular, cases studies like that of the Republic of Ireland show us that the effective rate for American-owned MNEs based in Ireland are on average far

[13] Estimated using average values over 1990 – 2017 for $s_{\pi,i}\,\Pi_i - \rho_i \tau_f I_m$, assuming again that $s_{\pi,i} = 0.8$.

lower than that of domestic firms and vary significantly (Stewart, 2018). Our analysis here does not take into account the significance of so-called "sweetheart deals", tailored tax arrangements amounting to customised effective tax rates for each MNE, that allowed, in the case of Ireland, what has been dubbed "industrialisation by invitation" (Barry and Ó Fathartaigh, 2015). Hence, the limitations of our approach imply a country like Ireland may still have engaged in "rational" tax competition, regardless of the results found here. However, Ireland is likely to be the exceptional case here since Markle and Shackelford (2009) find that in most cases effective tax rates on domestic firms are similar to those faced by MNEs operating in the same country.

Furthermore, we have not considered the fact that AECTRs may also be lowered to prevent domestic firms from moving activity abroad. This counterfactual scenario is not captured by our empirical approach, since no such data (on domestic activity that would have shifted elsewhere had AECTRs not been lowered) exists. Thus, a greater number of countries than is estimated here could have been competing on taxes "rationally", given current worldwide corporate tax systems.

However, such a kind of tax competition only further emphasises how far from ideal current corporate tax developments are. The only benefit of lowering AECTRs in such a scenario is to keep currently domestic firms where they are, while the cost is felt in reduced tax revenues. In other words, lowering AECTRs in such a scenario becomes a matter of minimising the negative effect on demand rather than boosting demand. Compared to one of the superior alternatives prescribed above, where countries cooperate to tax MNEs on an international basis, the incentive for a domestic firm to internationalise operations is reduced or removed, and policymakers are thereby freer to raise revenues and demand through higher AECTRs.

Lastly, we have ignored the thorny issue of profit shifting in this paper. However, to the extent that profit shifting lessens the influence of relative AECTRs on the location of MNEs, we would expect that including this phenomenon would only serve to show the race to the

bottom is even more irrational than has been suggested here. Tax competition for paper profits, not real capacity-creating investment, is far more likely to be a winner-takes-all phenomenon, with disproportionate gains for the few nations whose AECTRs are zero or thereabouts (*cf.* Tørsløv et al., 2018). In any case, even if countries manage to address the threat of profit shifting, they must still be wary of the problems of tax competition explored here. Solving the problem of tax competition for paper profits does not necessarily solve the problem of tax competition for the real investment of MNEs.

6. Conclusion

The purpose of this paper was to work towards a new theory of tax competition that is compatible with post-Keynesian thinking and use it to understand the causes and consequences of the global race to the bottom. To this end, the paper makes some novel contributions. Perhaps the most important takeaway is that, while it may be possible in theory to boost demand through lower AECTRs in a demand-led economy, it is very difficult to do so in practice due to the coordination problem. Just as Blecker (1989) pointed out that multiple apparently profit-led countries striving for export-led growth via wage restraint is counterproductive, our theory suggests an analogue holds true for tax competition-led countries. This paradox of tax competition together with the failure of government expenditure-led countries to increase their AECTRs has meant that, for the most part, the real winners of the race to the bottom are the MNEs that have seen their tax bills shrink as their influence—implicit or otherwise—over policymakers grew.

Our findings suggest policymakers would do well to rethink corporate tax policy. Excuses for inaction should be regarded with healthy scepticism. Even if tax coordination is

considered politically infeasible—which it need not, given the role and potential of regional blocs—there are still low-hanging fruit that less ambitious countries may pick. Policymakers ought to explore changes in how MNEs are taxed or, simpler still—but for sufficiently large economies only—learn to trust that the effectiveness of tax-financed government expenditure may be greater than the loss attributed to becoming relatively tax uncompetitive.

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