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# ECONOMIC INTEGRATION AND REDISTRIBUTIVE TAXATION: A SIMPLE MODEL WITH AMBIGUOUS RESULTS

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# ECONOMIC INTEGRATION AND REDISTRIBUTIVE TAXATION: A SIMPLE MODEL WITH AMBIGUOUS RESULTS

## Abstract

The rise in foreign direct investment and the increasing activity of multinational firms expose national corporate tax bases to cross-country profit shifting, but also lead to rising profitability of the corporate sector. We incorporate these two effects of economic integration into a simple political economy model where the median voter decides on a redistributive income tax rate. In this setting economic integration may raise or lower the equilibrium tax rate, depending on whether the higher excess burden of the tax or the larger redistributive gains from the perspective of the representative worker are the dominant effect. Our simple model holds several implications for future empirical work on the relationship between globalization and the effective rate of capital taxation.

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Keywords: redistributive taxation, multinational firms, profit shifting.

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# 1 Introduction

One of the most pronounced trends in the world economy over the last decades has been the rise in foreign direct investment and multinational activity. In the United States, for example, foreign profits made up around 5 per cent of all corporate profits earned by U.S. firms until the late 1960s, but this share has meanwhile risen to more than 25 per cent, and is probably even higher (Desai and Hines, 2004). As a consequence of this development national corporate tax bases have become more sensitive to tax changes. A particular tax-saving strategy of multinational firms is to shift profit from high-tax to low-tax countries in which they operate. Empirical evidence is accumulating that firms do indeed use this opportunity through various channels, such as transfer pricing, the allocation of overhead costs, and financial transactions within the multinational firm.<sup>1</sup>

There is, however, a second factor associated with economic integration and the rise of multinational firms. This relates to the empirical evidence showing that multinational firms are on average more productive than local firms (see e.g., Barba Navaretti and Venables, 2004). The difference in productivity (and profitability) has been explained by several factors. At the firm level, profitability may rise due to the ability to utilize differences in international factor prices (Helpman and Krugman, 1985). Productivity growth may also occur at the industry level, however, when firms are heterogeneous and economic integration reallocates market shares from domestic to multinational firms (Melitz, 2003). Recent empirical evidence for the U.S. manufacturing industry shows that economic integration leads to productivity growth both at the firm and at the industry level (Bernard et al., 2006). Similar evidence is obtained for the United Kingdom, where the shift towards the service sector, and in particular towards the highly profitable banking, finance and insurance branches is one of the factors explaining the rise in corporate tax revenues over the last two decades (Devereux et al., 2004).

The traditional literature on international tax competition has usually confined its attention to the increasing mobility of the capital tax base, while taking the distribution of gross-of-tax factor earnings as given. Therefore, the typical result in tax competition models is that increasing capital mobility leads governments to undercut each other's capital income tax rates, resulting in underprovision of public goods as well as relatively higher taxes on immobile factors (see Wilson, 1999 for a survey). Empirical evidence in

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<sup>1</sup>A large number of studies provide evidence for profit shifting by U.S. multinationals; see Hines (1999) for a survey of the early literature. An early case study from Germany is Weichenrieder (1996). More recently, systematic evidence for profit shifting has also been found for European multinationals (Huizinga and Laeven, 2005). For an up-to-date survey of the empirical literature on firm location and profit shifting, see Devereux (2006).

support of this theoretical prediction, however, is mixed. Statutory corporate tax rates have been significantly reduced in most OECD countries since the 1980s, but tax bases have simultaneously been broadened. As a consequence, effective tax rates on profits have fallen by much less than statutory rates, and in several countries they have not fallen at all (see Devereux, Griffith and Klemm, 2002).<sup>2</sup>

Only recently a literature strand has emerged that studies tax competition in models of industry agglomeration where economic integration changes the level of rents earned by imperfectly competitive firms (Kind et al., 2000; Baldwin and Krugman, 2004; Borck and Pflüger, 2006). These models do not allow for multinational firms and cross-country profit-shifting, however, but only consider the location decision of single-jurisdictional firms. This leads to a rather rigid determination of optimal tax policy: the core region always taxes away the excess of profits that firms can earn in its territory, vis-a-vis the other (periphery) country. As the model implies that these agglomeration rents will first rise and then fall as economic integration proceeds, so will optimal corporate tax rates. Moreover, analyzing tax competition in models of the “new economic geography” is a rather complex undertaking and solving the full tax game requires the use of numerical simulation methods, at least in the realistic case of partial firm agglomeration (Borck and Pflüger, 2006).<sup>3</sup>

The present short paper pursues a different approach to analyze the effects of economic integration on optimal redistributive taxation. We set up a highly stylized model that incorporates, in the simplest possible way, independent effects of economic integration on the profitability of multinational firms and on the ease with which these firms can shift profits to low-tax countries. These twin effects of economic integration are embedded into a simple political economy model with an internationally mobile profit tax base. Our stylized model allows us to derive a reduced-form expression for the optimal redistributive tax rate in the political-economic equilibrium. In this framework globalization increases both the redistributive gains, but also the efficiency costs of taxation from the perspective of the median voter. Hence economic integration has a fundamen-

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<sup>2</sup>Several econometric analyses exist on this subject. These studies provide some evidence of a negative relationship between (different measures of) economic integration and the level of corporate taxation if the latter is measured by statutory or effective average tax rates. This relationship, however, is generally not robust to the precise specification used in the empirical model and it disappears completely when tax revenue is used as the dependent variable. See Rodrik (1997), Bretschger and Hettich (2002), Swank and Steinmo (2002), Slemrod (2004) and Winner (2005).

<sup>3</sup>A different extension of the standard tax competition model is analyzed by Fuest (2005). In his model economic integration increases the mobility of the capital tax base, but also raises the share of foreign firm ownership and thus strengthens the incentive to tax the profits accruing to foreigners. In Fuest’s model, however, this last effect can only dominate the role of increased tax base mobility if governments can also use import tariffs.

tally ambiguous effect on the redistributive tax rate in the political economy equilibrium. Finally, we characterize parameter constellations that lead to an increase or a decrease in the rate of capital taxation.

## 2 The model

We consider a model of two countries which are linked through both goods and capital flows. The home country, on which the analysis is focused, is populated by two types of individuals, capitalists (index  $C$ ) and workers (index  $L$ ). The total population is normalized to unity. There are  $\mu$  workers and  $(1 - \mu)$  capitalists. Workers form the majority of the population so that  $1 > \mu > 0.5$ . There is one aggregate consumption good whose price is normalized to one. It takes one unit of domestic labour to produce one unit of the numeraire good; competitive market conditions then determine that the domestic wage rate is also one. Each worker exogenously supplies one unit of labour and receives a gross wage income of unity. Capitalists instead receive profit income  $\pi$  from a multinational enterprise (MNE). Profits are zero if domestic workers are employed in production. However, positive profits can be earned by the multinational firm when it employs workers from the foreign country, which has a lower wage rate  $W \leq 1$ .<sup>4</sup> In a simple way this captures one of the most important motivations for foreign direct investment, namely to utilize lower factor prices abroad (Helpman and Krugman, 1985).

The home country levies a proportional, comprehensive income tax at rate  $t$  on all wage and profit income. The labour tax base is internationally immobile, whereas the profit tax base is responsive to tax differentials between the home and foreign countries. Hence capitalists face two decisions in our model: they choose (i) how much to produce abroad and (ii) how much profits to shift to the foreign country. Both of these decisions have been extensively discussed in the literature. We incorporate them here in a highly stylized way, in order to keep our argument as simple as possible.

We first turn to the decision on how much output the home-owned firm produces in the foreign country. While the labour input is cheaper, producing abroad adds extra transport costs for the firm. Transport costs are interpreted in a wide sense, including administrative hurdles and information costs. We model these costs as being convex in the volume of foreign production, reflecting, for example, increasing marginal monitoring costs when larger parts of production are outsourced.<sup>5</sup> For simplicity we specify quadratic

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<sup>4</sup>Such differences in unit labour costs could be due, for example, to the existence of trade unions in the home country.

<sup>5</sup>This is in line with some of the findings in the new theory of the multinational firm (see Marin and Verdier, 2003).

transport costs of the form  $\delta = X^2/(2\alpha)$ , where  $X$  is the volume of foreign production and  $1/\alpha$  is a transport cost parameter. We interpret the inverse of the transport cost parameter,  $\alpha$ , as a measure of economic integration. Increasing economic integration (an increase in  $\alpha$ ) will reduce the transaction costs for foreign direct investment, for example by reducing the communication costs within the MNE. With these specifications the firm's before-tax profits are given by

$$\pi = X(1 - W) - \frac{X^2}{2\alpha} \quad . \quad (1)$$

All profits are taxable in the home country. However, the capitalist is able to shift some of the profits abroad, either through transfer pricing or by using tax-efficient financing structures.<sup>6</sup> Let  $\beta$  be the share of profits that is transferred abroad in this way and denote the foreign tax rate by  $T$ . As in the case of the firm's production decisions it is costly to engage in profit shifting activities and the deadweight costs are convex in the share of profits transferred abroad. Hence, by analogy to the transportation costs incurred when the firm produces abroad, the real resources spent when transferring profits are  $\varepsilon = \beta^2\pi/(2\alpha)$ . The after-tax income of the capitalist,  $y^C$ , is thus

$$y^C = \pi \left[ (1 - \beta)(1 - t) + \beta(1 - T) - \frac{\beta^2}{2\alpha} \right] \quad , \quad (2)$$

where  $\pi$  is given in (1). Hence in our model the firm's output decision ( $X$ ) is separated from the decision on profit shifting.<sup>7</sup>

From (1) the capitalist maximizes profits by choosing

$$X = \alpha (1 - W) \equiv \alpha \Delta W \quad , \quad (3)$$

where we have introduced  $\Delta W$  as a short-hand notation for the exogenous international wage differential. From (3) the level of output produced abroad is a rising function of the unit wage differential and of the degree of economic integration.

Similarly, deriving the optimal level of  $\beta$  from (2) and ruling out that the domestic firm declares more profits in the home country than it earns gives

$$\beta = \max\{\alpha (t - T), 0\} \quad . \quad (4)$$

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<sup>6</sup>Income can be shifted through borrowing and lending between the multinational's affiliates, because the interest paid on this internal loan is taxable in the lending country, but tax-deductible in the borrowing country. See Mintz and Smart (2004) for a detailed modelling of this tax avoidance mechanism.

<sup>7</sup>It should be emphasized that this simplification results from the specification of the transaction cost functions  $\delta$  and  $\varepsilon$ . With more general specifications, the output and profit shifting decisions will interact. This interaction, however, significantly complicates the analysis without yielding qualitatively different results for the main issue under analysis. The separation of output and profit-shifting decisions is a common assumption in the literature; see Gresik (2001) for a survey.

Hence the share of profits shifted abroad depends positively on the differential between the home and the foreign tax rates (if this differential is positive), and again on the integration measure  $\alpha$ .

Finally substituting (3) in (1) yields maximized gross profits

$$\pi^* = \frac{\alpha}{2} (\Delta W)^2 \quad . \quad (5)$$

It follows from (4) and (5) that economic integration (a rise in  $\alpha$ ) will raise the gross profits of the multinational firm, but at the same time increases the share of profits that is shifted abroad.

### 3 Tax equilibrium and economic integration

Tax policy in the home country is determined by the median voter. Given the assumptions on the distribution of the population, this individual is a representative worker who derives utility from the aggregate consumption good and a quasi-private public good. Both the private and the public good enter the workers's utility function linearly.<sup>8</sup> Hence the representative worker's utility function is  $u^L = (1 - t) + \gamma r$ , where  $r$  is total (and per-capita) tax revenue collected. The constant marginal benefit of the public good is  $\gamma < 1$ , implying that the worker suffers a utility loss when one unit of her private consumption is exchanged for one unit of the public good.

The proportional income tax falls on wage income and on the share of profit income that the capitalist reports in the home country. Using the optimal tax avoidance decision (4), total and per capita tax revenues are  $r = t \{ \mu + (1 - \mu) \pi^* [1 - \alpha (t - T)] \}$ . Hence the utility of the representative worker in the home country is

$$u^L = (1 - t) + \gamma t \{ \mu + (1 - \mu) \pi^* [1 - \alpha (t - T)] \} \quad . \quad (6)$$

The equilibrium policy maximizes  $u^L$  with respect to the proportional income tax  $t$ . This yields the home country's best response function

$$t(T) = \frac{\gamma [\mu + (1 - \mu) \pi^* (1 + \alpha T)] - 1}{2\alpha \gamma (1 - \mu) \pi^*} \quad . \quad (7)$$

It is directly inferred from (7) that this function is upward-sloping.

Tax policy in the foreign country is modelled in the simplest possible way. We assume that the foreign country maximizes tax revenues from the profits of the multinational

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<sup>8</sup>A well-defined optimal tax rate is obtained in our model, despite the linearity of the objective function in both arguments, because the excess burden of taxation is strictly convex in the tax rate.

firm, which are given by  $R = T\beta\pi^* = T\alpha(t - T)\pi^*$ . The foreign country's best response function is then

$$T = \frac{t}{2} \quad , \quad (8)$$

which implies that the foreign country has the lower tax rate in the non-cooperative tax equilibrium.

Substituting (8) in (7) then determines the home country's income tax rate in the non-cooperative tax equilibrium

$$t^* = \frac{2\{\gamma[\mu + (1 - \mu)\pi^*] - 1\}}{3\alpha\gamma(1 - \mu)\pi^*} \quad , \quad (9)$$

where  $\pi^*$  is given in (5). The equilibrium tax rate is rising in the preference parameter for public goods ( $\gamma$ ). It is positive, if the value of additional units of the public good that is financed by the tax contributions of the capitalist,  $\gamma(1 - \mu)\pi^*$ , exceeds the utility loss for the worker from being taxed herself ( $\gamma\mu - 1 < 0$ ). This is assumed in what follows. It can then be directly inferred from (9) that the home country's Nash equilibrium tax rate will rise, if the equilibrium level of gross profits ( $\pi^*$ ) is increased.

The core issue underlying our analysis is whether economic integration, as described by an increase in the parameter  $\alpha$ , leads to an increase or a reduction in the home country's equilibrium tax rate. From (8) this will also induce a foreign tax change of the same sign. From the reduced-form expression for  $t^*$  in (9) and using (5), it is straightforward to derive

$$\frac{dt^*}{d\alpha} = \underbrace{-\frac{\gamma[\mu + (1 - \mu)\pi^*] - 1}{3\alpha^2\gamma(1 - \mu)\pi}}_{(-)} + \underbrace{\frac{2(1 - \gamma\mu)(d\pi^*/d\alpha)}{3\alpha\gamma(1 - \mu)\pi^2}}_{(+)} \quad (10)$$

There are two counteracting effects in equation (10). The first term is unambiguously negative, if the equilibrium tax rate (9) is positive. This effect captures the increased efficiency costs of redistributive taxation when economic integration makes the domestic profit tax base more mobile internationally and increases profit-shifting to the low-tax country. The second effect is positive, however, as  $1 - \gamma\mu > 0$  and  $d\pi^*/d\alpha > 0$  is implied by (5). This effect describes the additional redistributive gains from the income tax when economic integration raises the profits of the multinational firm. Depending on which of the two effects dominates, economic integration may thus either raise or lower the redistributive tax rate chosen by the median voter.<sup>9</sup>

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<sup>9</sup>Note the difference between our results and those derived in political economy models of strategic delegation (Persson and Tabellini, 1992; Gottschalk and Peters, 2003). In these models the working majority is able to mitigate the downward pressure on capital tax rates by delegating decisions to

To link the two counteracting effects in (10) to observable country characteristics we use the gross profit expression (5) and substitute the home and the foreign countries' equilibrium taxes from (8) and (9). The effects of economic integration can then alternatively be expressed as

$$\frac{dt^*}{d\alpha} = \frac{-(T^* - 2t^*)}{2\alpha} + \frac{(1 - \mu\gamma)(\Delta W)^2}{3\alpha\gamma(1 - \mu)\pi^2}. \quad (11)$$

Hence the increased sensitivity of the tax base will be the dominant effect of economic integration, if the international tax differential is large and thus the motive for international profit shifting is strong. In contrast, if the international wage differential is large, then economic integration will lead to a substantial increase in the profits of multinational firms. From the perspective of the median voter, the redistributive gains from an income tax increase may then exceed the additional efficiency losses. Our results are summarized in the following proposition.

**Proposition 1** *Economic integration tends to increase (decrease) the redistributive income tax rate, if (i) the equilibrium tax differential between the home and the foreign country is small (large); and (ii) the wage differential between the domestic and the foreign country is large (small).*

## 4 Conclusion

This paper has started from two well-known effects that are associated with the rise in foreign direct investment and multinational firm activity. In contrast to nationally operating firms, MNEs have the opportunity to shift profits to low-tax countries, but they are also more profitable and thus raise the aggregate profitability in the corporate sector. Incorporating these facts into a simple political economy model we have shown that economic integration (a rise in the market share of multinational firms) increases the efficiency cost of capital taxation, but it also increases the redistributive benefits of the tax from the perspective of the median voter. As a consequence the relationship between the degree of economic integration and the redistributive income tax rate chosen by the representative worker is fundamentally ambiguous. This ambiguity is also the main justification for the modelling approach that we have followed. If a simple model like the one used here does not lead to a clear-cut relationship between economic integration and the level of redistributive taxation, then neither will a more complex one.

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politicians that prefer a larger degree of redistribution than the median voter herself. Nevertheless, the only direct effect of economic integration is increased tax base mobility. As a consequence economic integration leads, in equilibrium, to an unambiguous decline in the level of redistributive taxation.

Our finding may provide an explanation for the contrast between the clear theoretical prediction of falling tax rates that are derived in much of the literature on capital tax competition, and the rather mixed evidence found in empirical studies. In fact, existing studies may even overstate the negative relationship between globalization and the rate of capital taxation, because they typically focus only on taxes at the company level. If taxes at the shareholder level are also taken into account, this downward trend becomes even less clear in many countries. For example the German corporate tax reform of 2000 significantly reduced the federal corporate tax rate from 42 to 25 percent, but simultaneously ended the full crediting of the corporation tax against the personal income tax of German shareholders. Another case in point is Norway, which reduced the statutory corporate tax rate from 50.5 percent to 28 percent in 1992. The Norwegian tax reform of 2004 maintained this tax rate for undistributed company profits, but ended the zero taxation of dividends and subjected all dividend income exceeding a computed risk-free return on the investment to double taxation. The mandate that the Norwegian tax committee had was explicitly to narrow down the tax differential between capital taxes and wage taxes that had formed after the tax reform of 1992, and which had caused rising tensions in society from a redistributive point of view.<sup>10</sup>

In sum, despite large reductions in statutory corporate tax rates, the combined effects of the reforms in Germany and Norway implied that the effective tax burden on individual capital income - incorporating both the corporation tax and the individual income tax - fell only slightly, if at all. To fully account for these developments, a more detailed model would have to be set up, where the government disposes of separate tax instruments at the company level and at the level of shareholders. However, our simple model is able to explain the small net effect on the overall effective capital tax rate as the result of two counteracting forces caused by economic integration.

Our analysis holds several testable implications for future work on the empirical relationship between economic integration and the effective rate of capital taxation. First, it implies that corporate tax revenue (as a percentage of GDP) is not a suitable measure for the effective tax rate, as this measure includes the effects of rising firm profitability. This conforms with the empirical results of Slemrod (2004) and earlier studies discussed in Bretschger and Hettich (2002) and Swank and Steinmo (2002), who do not find any negative, and in some cases they even find a positive relationship between economic integration and corporate tax revenue. Second, from the discussion above, a broader measure for the effective rate of capital taxation would be desirable that includes

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<sup>10</sup>A detailed explanation for the mandate and the reform can be found at <http://odin.dep.no/fin/english/topics/p4500279/reform/006071-230126/dok-bn.html>

taxes levied at the shareholder level. Such a measure would be able to capture offsetting tax changes at the company level and at the level of individual shareholders. Finally, to isolate the effect that economic integration has on the international mobility of the capital tax base, the level of pre-tax profitability of firms needs to be controlled for. Only then would we expect to find a robustly negative effect of economic integration on the effective rate of capital taxation.

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