

# Source versus Residence Based Taxation with International Mergers and Acquisitions<sup>1</sup>

by

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## **Abstract**

This paper analyses tax competition and tax coordination in a model where capital flows occur in the form of mergers and acquisitions, rather than greenfield investment. In this framework, there is no scope for welfare enhancing coordination of source based corporate income taxes if residence based taxes on capital income are absent. In the presence of residence based taxes on dividends, source based corporate income taxes are too high. The widespread view that tax coordination is less urgent if residence based taxes are available may therefore be misguided.

**JEL Codes:** H54, H25, F23

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# 1 Introduction

One of the most powerful theorems in the literature on international taxation and capital allocation is that residence based taxation is superior to source based taxation. As a consequence, models analyzing optimal tax policy strategies under tax competition usually assume that residence-based taxes are not available. However, most of these models are based on the implicit assumption that investment takes the form of greenfield investment. This neglects that a large part of international capital flows takes the form of mergers and acquisitions (M&A). Since recent contributions claim that taking into account M&A investment does lead to substantial changes in the efficiency properties of taxation, see e.g. Desai & Hines (2004) and Becker & Fuest (2008, forthcoming), it seems worthwhile to restate the above quoted theorem in a model where investment takes the form of M&A.

The purpose of this paper is to develop a simple framework which may serve as an equivalent to the standard framework for tax competition which is based on greenfield investment, i.e. the reallocation of real capital instead of ownership. We consider a world consisting of two countries, where domestic investors may either acquire existing firms at home and abroad or buy bonds in the international credit market. M&A investment is driven by synergies. In this framework, we explore the impact of source and residence based capital income taxes. In the literature on tax competition for greenfield investment, tax competition with source based taxes and in the absence of residence based taxes usually leads to inefficient equilibria, and international tax coordination is required to implement the globally optimal tax policy. If residence based taxes are available, the need for tax coordination may vanish. Our analysis shows that, in the presence of M&A investment, the role of source and residence based taxes is different. In the baseline version of our model, the equilibrium corporate tax levels emerging under tax competition are globally optimal if residence based taxes on dividends are zero. There is no role for welfare enhancing tax coordination. If dividend taxes exist, tax competition yields inefficiently high level of corporate tax rates.

In the literature, the issues of capital mobility and tax competition have been studied intensively. For a recent survey see e.g. Fuest, Huber & Mintz (2005). A broad and still growing empirical literature on the impact of taxes on invest-

ment and capital flows is surveyed by Hines (1999) and Devereux (2007). But as noted above, these contributions usually assume that investment takes the form of greenfield investment. The literature dealing with the impact of taxes on M&A is much smaller. In an early contribution, Devereux (1990) points out that tax distortions to ownership may be important if capital productivity depends on ownership. Gordon & Bovenberg (1996) as well as Fuest & Huber (2004) analyze tax policy strategies in models where firms may be sold to foreign investors. But they do not consider tax competition or tax coordination. Desai & Hines (2004) argue that U.S. taxation of foreign source income is likely to distort ownership patterns and to put U.S. firms at a disadvantage when competing for foreign acquisitions. They propose to exempt foreign source income from domestic taxation. In Becker & Fuest (forthcoming), we analyze this argument and show that exemption is an appropriate policy choice when ownership advantage is a public good within the firm, but is dominated in welfare terms by a cross-border cash-flow tax system. In Becker and Fuest (2008), we analyse tax competition in a model where M&A and greenfield investment are alternative modes of entry and show that the existence of M&A investment intensifies tax competition. However, this analysis does not include residence based taxes. Haufler & Schulte (2007) consider tax incentives in a model where M&A can take place within and across borders. They show that ownership patterns are highly important for the welfare implications of tax policy choices. From an empirical point of view, a number of contributions use the U.S. tax reform in 1986 to explore the tax effects on M&A activity, see e.g. Auerbach & Slemrod (1997).<sup>1</sup> Swenson (1994) explores the idea that effective tax increases in the U.S. may induce investors located in countries with foreign tax credit regimes to take over U.S. firms because the higher U.S. taxes may be credited against home country taxes, and finds robust evidence supporting the hypothesis. In a recent paper, Huizinga & Voget (forthcoming) study the empirical impact of international taxation schemes on M&A activity. Among other things, they find that investors from tax credit countries are less likely to take over foreign firms than investors from countries where foreign profits are exempt from domestic taxation.

The remainder of the paper is set up as follows. In section 2, we present the

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<sup>1</sup>See also Scholes & Wolfson (1990) and Collins, Kemsley & Shackelford (1995). Empirical evidence on non-tax aspects of m&a activity is reported in Andrade, Mitchell & Stafford (2001).

model and the main results. In section 3, we consider some extensions. Section 4 discusses how the results relate to the literature and section 5 concludes.

## 2 The model

We consider a world consisting of two countries, domestic and foreign. Each country is inhabited by a large number of households. For notational convenience, their number per country is normalized to unity. Households live for two periods. The utility of the representative domestic household is given by  $W = U(C_1, C_2) + H(G)$  where  $C_1$  and  $C_2$  are consumption in the first and the second period,  $U(C_1, C_2)$  is private utility and  $H(G)$  is utility from the provision of a public consumption good  $G$  in period 2. For private utility, we assume  $U(C_1, C_2) = u(C_1) + C_2$ , where the subutility function  $u(\cdot)$  is strictly concave, with  $u' > 0$ ,  $u'' < 0$ . This utility function implies that income effects on first period consumption are zero, so that the interest elasticity of savings is strictly positive.<sup>2</sup> Accordingly, the utility function of the foreign representative household is denoted by  $W^* = u^*(C_1^*) + C_2^* + H^*(G^*)$ . The asterisk denotes the foreign country or location. In period 1, the domestic (foreign) household has a given endowment of  $E$  ( $E^*$ ) units of a numeraire good. Households may borrow or lend in the international capital market at the interest rate  $r$ .<sup>3</sup>

In addition, the domestic (foreign) household owns  $m$  ( $m^*$ ) existing and immobile firms operating in the domestic (foreign) country. All domestic (foreign) firms are initially owned by domestic (foreign) households. Without a change in ownership, the after tax profit earned by each domestic firm in period 2 is given by  $\varepsilon(1 - \tau)$ , where  $\tau$  is the domestic corporate income tax. Accordingly, the after tax profit earned by each foreign firm is given by  $\varepsilon^*(1 - \tau^*)$ , where  $\tau^*$  is the foreign corporate income tax.

The domestic entrepreneurial household considers acquisitions of firms in the

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<sup>2</sup>This assumption is not critical but simplifies the exposition.

<sup>3</sup>The seminal contributions by Richman (1963) and Feldstein & Hartman (1979) assume that domestic households only invest in the multinational firm's equity. A portfolio capital market is absent in these models. It is straightforward to show, however, that our results also hold if there is no portfolio capital market in our model. A formal derivation is available from the authors upon request.

domestic and in the foreign country. The representative household in the foreign household does not consider acquisitions. We make this assumption to keep the model as simple as possible.

If an existing domestic (foreign) national firm is acquired by the domestic household, the change of ownership does not imply a relocation of real capital. But the ownership change does have a real economic effect in the form of synergies. This synergy increases the second period cash flow of the domestic (foreign) target firm by  $\Delta$  ( $\Delta^*$ ). We assume that each target firm is characterized by a specific synergy. More precisely, we assume that each potential target firm draws a synergy  $\Delta$  ( $\Delta^*$ ) from a uniform distribution with support  $[\Delta^-, \Delta^+]$  and  $[\Delta^{*-}, \Delta^{*+}]$ , respectively. The distribution functions are denoted by  $\Omega(\Delta)$  and  $\Omega^*(\Delta^*)$  and density functions are constant and normalized to unity to ease notation. This synergy is the driving force for changes in ownership in our model.

An important question which arises in this context is whether the overall number of acquisitions is limited by e.g. managerial capacity. In the base version of our model, we assume that there is no limitation on the overall number of takeovers which may take place. But each takeover does require some entrepreneurial effort. We assume that the domestic household has to supply one unit of entrepreneurial effort  $e$  for each acquisition made by the multinational firm. In section x, we will consider the case where the cost of providing entrepreneurial effort is strictly convex, so that the number of feasible acquisitions is limited.

## 2.1 The market for M&A investment

The market for acquisitions works as follows. In period 1, each domestic (foreign) target firm draws a synergy  $\Delta$  ( $\Delta^*$ ). Then, the domestic household bids for target firms. At this stage, the target firm specific synergy is common knowledge. If the acquisition takes place, the acquirer has to pay the acquisition price ( $P$ ) to the vendor. In period 2, the acquirer receives the cash flow generated by the target firm.

For the tax treatment of acquisitions, we make the following assumptions. The revenue from selling firms is untaxed and investors cannot deduct acquisition costs from the corporate tax base. This may be interpreted as a highly stylised way of

modelling acquisitions in the form of share deals, as opposed to asset deals. We thus abstract from many complexities associated with the tax consequences of mergers and acquisitions. These include e.g. capital gains taxes, the tax depreciation of goodwill, the transfer of reserves, the use of loss carryforwards after ownership changes and other specific tax law provisions of the national tax systems, some of which are surveyed in Huizinga & Voget (forthcoming). We also abstract from tax planning considerations like e.g. the financing of foreign acquisitions with debt issued in high tax jurisdictions to benefit from interest deductions.<sup>4</sup>

The willingness to pay of the domestic household for a target firm  $j$  can be determined as follows. If she acquires the firm, she pays the acquisition price  $P(\Delta_j)$  in period 1. The payment of the acquisition price is financed by a reduction of the household's portfolio investment. The return on portfolio investment is  $(1+r)(1-t)$ , where  $t$  is a residence based tax on income from portfolio investment. In period 2, she receives the after tax cash flow  $(\varepsilon + \Delta)(1 - \tau)(1 - \theta)$ , where  $\theta$  is a residence based tax on dividends. Given this, the highest acquisition price acquirers are willing to pay  $P(\Delta_j)$  is given by

$$(1+r)(1-t)P(\Delta_j) = (\varepsilon + \Delta_j)(1 - \tau)(1 - \theta) \quad (1)$$

Competition among acquirers will imply that the equilibrium price of acquisitions will be given by  $P(\Delta_j)$ . Given this, under which circumstances will domestic vendors sell their firms? If they sell, they may invest the proceeds in the market for portfolio capital or use it for consumption in period 1. Thus a domestic vendor will sell if

$$(1+r)(1-t)P(\Delta_j) \geq \varepsilon(1 - \tau)(1 - \theta) \quad (2)$$

Since  $P(\Delta_j)$  is increasing in  $\Delta_j$ , we may conclude that all domestic target firms with  $\Delta \geq \Delta^c$  will be acquired while firms which offer lower synergies will remain in the hands of their original owners. It follows from (1) and (2) that the cut-off level  $\Delta^c$  is simply given by  $\Delta^c = 0$ .

In the case of foreign target firms, the acquisition price is given by

$$(1+r)(1-t)P^*(\Delta_j^*) = (\varepsilon^* + \Delta_j^*)(1 - \tau^*)(1 - \theta) \quad (3)$$

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<sup>4</sup>For evidence on international tax planning see Devereux (2007).

and the vendor is willing to sell if

$$(1+r)(1-t^*)P^*(\Delta_j^*) \geq \varepsilon^*(1-\tau^*)(1-\theta^*) \quad (4)$$

This yields the cutoff value

$$\Delta^{c*} = \varepsilon^* \left[ \left( \frac{1-\theta^*}{1-\theta} \right) \left( \frac{1-t}{1-t^*} \right) - 1 \right] \quad (5)$$

which implies  $\Delta^{c*} = \Delta^{c*}(t^*, t, \theta, \theta^*)$ , with

$$\frac{\partial \Delta^{*c}}{\partial t^*} > 0, \frac{\partial \Delta^{*c}}{\partial \theta^*} < 0, \frac{\partial \Delta^{*c}}{\partial t} < 0, \frac{\partial \Delta^{*c}}{\partial \theta} > 0.$$

How can these effects of taxes on border crossing acquisitions be explained? Firstly, the source based corporate income tax  $\tau^*$  does not affect the number of acquisitions. The reason is that this tax is capitalized in the purchase price - it always has to be paid, independent of who owns the firm. For residence based taxes, things are different. An increase in the foreign residence based tax on portfolio income  $t^*$  reduces the number of border crossing acquisitions. This happens because a lower return on portfolio investment increases the value of target firms in the hands of the initial foreign owners. The reason is that these firms offer a return in period 2 which is not subject to the tax on portfolio income. Put differently, an increase in this tax reduces the discount rate of foreign owners. For the same reason, an increase in the domestic residence based tax on portfolio income  $t$  increases border crossing acquisitions. A higher residence based tax on dividend income in the foreign country,  $\theta^*$ , would lead to more acquisitions because the acquirers are not subject to this tax. Accordingly, a higher domestic dividend tax  $\theta$  reduces border crossing acquisitions.

It is interesting to consider equation (5) in the light of neutrality criteria, in particular ownership neutrality. In the absence of taxes, (5) boils down to  $\Delta^{c*} = 0$ . Ownership neutrality would require that this equation holds in the presence of taxes, too. Source based taxes do not disturb ownership neutrality, as has been pointed out in the literature (Devereux, 1990). But interestingly, residence based taxes do not necessarily distort ownership neutrality either. For instance, if each



country taxes dividends and interest income at the same rate, ownership neutrality prevails even if the tax rates differ across countries. The view that taxes on foreign source dividends may violate ownership neutrality is based on the idea that an investor from a country with high taxes will end up with a lower return on the acquisition of a given firm than an investor from a low tax country. But this neglects that the price an investor is willing to pay will also depend on the tax burden on alternative investments. If the tax on interest income is also higher, this may neutralise the higher dividend tax, and no ownership distortions arise. We may state these results as

**Proposition 1** *Ownership neutrality:*

- i) Differences in source-based taxation do not distort ownership allocation.*
- ii) Ownership neutrality is compatible with international differences in residence based capital income tax rates if  $\frac{1-\theta^*}{1-\theta} = \frac{1-t^*}{1-t}$ .*

**Proof.** The proof directly follows from equation (5). ■

## 2.2 The international credit market

How do changes in taxes and acquisitions affect the international credit market? Consider first the budget constraint of the domestic household. In the first period, the household has an exogenous income or endowment  $E$  which may be used for consumption, credit market investment  $S$  or for the financing of acquisitions. Expenditures for financing domestic acquisitions are  $\int_{\Delta^c}^{\Delta^+} P(\Delta)d\Delta$ , but these expenditures flow back to the domestic household in the same period because the domestic household owns these firms in the first place. However, expenditures on acquisitions of foreign target firms, given by

$$\int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*)d\Delta^* = \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{(\bar{c}^* + \Delta_j^*)(1 - \tau^*)(1 - \theta)}{(1 + r)(1 - t)} d\Delta^* \quad (6)$$

do not flow back to the domestic households and therefore have to be financed in addition. The budget constraint in period 1 is thus given by

$$C_1 = E - S - \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*)d\Delta^* \quad (7)$$

In the second period, the household receives income from investment in the international credit market and profit distributions from domestic and international M&A investment. The budget constraint in the second period can be written as

$$C_2 = S(1+r)(1-t) + \left( m - \int_{\Delta^c}^{\Delta^+} d\Delta \right) \varepsilon (1-\tau)(1-\theta) \quad (8)$$

$$+ \int_{\Delta^c}^{\Delta^+} (\varepsilon + \Delta) (1-\tau)(1-\theta) d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) (1-\tau^*)(1-\theta) d\Delta^*$$

Optimal choice of  $S$  implies  $u'(C_1) = (1+r)(1-t)$ . The foreign household has the following budget constraints

$$C_1^* = E^* - S^* + \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \quad (9)$$

$$C_2^* = S^* (1+r)(1-t^*) + \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^* (1-\tau^*)(1-\theta^*) \quad (10)$$

Optimal savings by the foreign household imply  $u^{*'}(C_1^*) = (1+r)(1-t^*)$ . Portfolio capital market equilibrium is given by  $S + S^* = 0$ . The two first order conditions for optimal savings and the credit market equilibrium condition determine the equilibrium values of  $S$ ,  $S^*$  and  $r$ , for given taxes and a given pattern of domestic and foreign acquisitions. How do taxes affect the capital market equilibrium? Consider first the effect of tax changes on the interest rate  $r$ .

**Lemma** The equilibrium interest rate  $r$  is increasing in  $t$  and  $t^*$ . Changes in the number or the prices of foreign acquisitions do not affect the interest rate  $r$ .

**Proof.** Totally differentiating  $u' = (1+r)(1-t)$  and  $u^{*'} = (1+r)(1-t^*)$  yields

$$dS = -d \left[ \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \right] - \frac{1}{u''} [dr(1-t) - dt(1+r)] \quad (11)$$

and

$$dS^* = d \left[ \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \right] - \frac{1}{u^{*''}} [dr(1-t^*) - dt^*(1+r)] \quad (12)$$

Using  $dS + dS^* = 0$  and adding up yields

$$dr = \frac{1}{\gamma} \left[ dt \frac{(1+r)}{u''} + dt^* \frac{(1+r)}{u^{*''}} \right] \quad (13)$$

with  $\gamma = \frac{(1-t)}{u''} + \frac{(1-t^*)}{u^{*''}} < 0$ . This implies  $\frac{dr}{dt} > 0$ ,  $\frac{dr}{dt^*} > 0$ ,  $dr/d \left[ \int_{\Delta^*c}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \right] = 0$ . ■

The finding that a change in the expenditure of the domestic household on foreign acquisitions does not affect the interest rate can be explained as follows. Consider an increase in the number of foreign acquisitions. This implies that the revenue from selling firms accruing to the foreign household in the first period increases. The foreign household invests this additional cash flow in the international credit market because, at a given interest rate, it is optimal to hold first period consumption constant. The domestic household, in contrast, needs additional cash to finance the acquisition and therefore reduces credit market investment by the same amount. As a result, the interest rate remains constant. Effectively, the domestic households borrow from the foreign households in order to buy assets previously owned by these households. Lemma 1 also implies that the interest rate would not be affected by changes in the domestic or the foreign corporate income tax rates.

### 3 Tax policy

In this section, we analyse the optimal tax policies in our model. Our main interest is to investigate the role of residence and source based taxes in the case of uncoordinated tax policies and the scope for welfare enhancing tax coordination. In our model, governments levy taxes mainly to finance the provision of public consumption goods. But taxes also affect investment behaviour and, therefore, acquisition prices and the interest rate. Countries may be interested to change these prices in order to increase national income.

Public expenditure of the domestic country is given by

$$G = S(1+r)t + (\tau + \theta(1-\tau)) \left[ m\varepsilon + \int_{\Delta^c}^{\Delta^+} \Delta d\Delta \right] + \theta \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) (1 - \tau^*) d\Delta^*. \quad (14)$$

The first term on the right hand side of (14) is revenue from the residence based tax on interest income, the second term stands for revenue from taxing domestic firms and the third term is revenue raised by the residence based tax on foreign dividends. The public sector budget constraint of the foreign country is given by

$$G^* = S^*(1+r)t^* + \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^* [\tau^* + \theta^*(1-\tau^*)] + \tau^* \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^*. \quad (15)$$

The budget constraint of the foreign government differs from that of the domestic government in two respects. Firstly, there is no revenue from taxing foreign source dividends. Secondly, the corporate tax partly falls on firms owned by residents of the domestic country. However, as will be discussed further below, taxing these firms at source will reduce the prices at which these firms are acquired, so that the tax burden will ultimately be borne by domestic residents.

In the following, we first consider the optimal policies with respect to the source based corporate income tax and then turn to residence based taxes. It is the objective of the analysis to analyse the role of the different taxes under tax competition and to investigate the scope for welfare enhancing tax coordination. Under tax competition, the domestic (foreign) government sets its tax instruments to maximise the welfare of the domestic (foreign) household,  $W = u(C_1) + C_2 + H(G)$  ( $W^* = u^*(C_1^*) + C_2^* + H^*(G^*)$ ), and takes as given the tax policy of the other country. Tax coordination will be discussed further below.

### 3.1 Source based taxes

We start by considering the source based corporate income tax. The first order condition for the optimal domestic corporate tax rate can be written as

$$\frac{\partial W}{\partial \tau} = (H' - 1)(1 - \theta) \left[ m\varepsilon + \int_{\Delta^c}^{\Delta^+} \Delta d\Delta \right] = 0, \quad (16)$$

which implies that the marginal utility of public consumption equals the marginal utility of private consumption ( $H' = 1$ ). The reason is that the domestic tax affects neither savings nor m&a investment. The factors driving the corporate tax policy of the foreign country are slightly more complex. The first order condition is given by

$$\begin{aligned} \frac{\partial W^*}{\partial \tau^*} &= (H^{*'} - 1) \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^*(1 - \theta^*) \\ &+ H^{*'} \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^* - u^{*'} \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{(\varepsilon^* + \Delta^*)(1 - \theta)}{(1 + r)(1 - t)} d\Delta^* = 0 \end{aligned} \quad (17)$$

The first term on the right hand side of (17) represents the redistribution of funds from foreign firms (first term) owned by foreign households to the foreign government. The second term stands for the welfare effect of taxing foreign owned firms. The third term reflects that a higher corporate tax reduces the acquisition prices received by foreign households who sell their firms in period 1. Whether or not  $H^{*'} - 1 > 0$  holds is ambiguous and depends on the structure of residence based taxes, which will be discussed further below.<sup>5</sup>

### 3.2 Residence based taxes

Governments may levy residence based taxes on the two types of investment income in our model: dividends from firm ownership and interest income from credit

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<sup>5</sup>It is straightforward to show that a necessary and sufficient condition for  $H^{*'} - 1 > 0$  to hold is that  $t^* + \theta(1 - t^*) < t$ . For instance, if  $t^* = \theta = 0$  and  $t > 0$ , levying an additional dollar of tax revenue from firms which have been bought by investors in period 2 reduces the acquisition price in period 1 by  $1/(1-t)(1+r)$  dollars, which reduces the household's utility by  $1/(1-t)$ . In this case, the optimal foreign corporate tax level will imply that the marginal utility of public goods provision will exceed the marginal utility of private consumption, i.e.  $H^{*'} - 1 > 0$ .

market investment. The first order condition for the optimal domestic tax on interest income can be written as

$$\begin{aligned} \frac{\partial W}{\partial t} = & -(1+r) \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \\ & + H' \left[ (1+r)t \frac{\partial S}{\partial t} - \theta(\varepsilon^* + \Delta^{*c})(1-\tau^*) \frac{\partial \Delta^{*c}}{\partial t} \right] + \frac{\partial W}{\partial r} \frac{\partial r}{\partial t} = 0 \end{aligned} \quad (18)$$

where we use  $H' = 1$ , (see equation (16))  $\frac{\partial P^*(\Delta^*)}{\partial t} = \frac{P^*(\Delta^*)}{1-t}$  and  $\frac{\partial \Delta^c}{\partial t} = 0$ . The first term on the r.h.s. is negative and reflects that a higher tax on credit market investment increases the willingness of domestic investors to pay for the acquisition of foreign firms. This redistributes income from the domestic economy to the foreign economy. The second term in parentheses represents the impact of the portfolio adjustments triggered by the tax change on the government budget. The increase in  $t$  will induce households to increase acquisitions and reduce credit market investment (or increase borrowing). Finally, the last term on the r.h.s. captures the effect of an increase in  $t$  on the interest rate. As shown above  $\frac{\partial r}{\partial t} > 0$ , and

$$\frac{\partial W}{\partial r} = S + H'(1+r)t \frac{\partial S}{\partial r} + (1-t) \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \quad (19)$$

where we use  $\frac{\partial P^*(\Delta^*)}{\partial r} = -\frac{P^*(\Delta^*)}{1+r}$ . Whether or not the domestic economy benefits from an increase in the interest rate depends, among other things, on whether it imports or exports capital.

How about the foreign country? The first order condition for the tax on interest income is given by

$$\begin{aligned} \frac{\partial W^*}{\partial t^*} = & (H^{*'} - 1) S^* (1+r) \\ & + H^{*'} \left[ (1+r)t^* \frac{\partial S^*}{\partial t^*} + (\varepsilon^* \theta^* (1-\tau^*) - \tau^* \Delta^{*c}) \frac{\partial \Delta^{*c}}{\partial t^*} \right] \\ & + \frac{\partial W^*}{\partial r} \frac{\partial r}{\partial t^*} = 0 \end{aligned} \quad (20)$$

where we use  $\frac{\partial P^*(\Delta^*)}{\partial t^*} = 0$ . The first term on the r.h.s. of (20) stands for the welfare effect of shifting funds from the private to the public sector. The second

term describes the impact of the portfolio restructuring caused by the tax on the government budget. Fewer firms will be sold to investors from the domestic country. This implies that credit market investment declines, so that revenue from the residence based tax on interest income declines, too.<sup>6</sup> If the marginal acquisitions produce (positive) synergies, i.e.  $\Delta^{*c} > 0$ , the decline in acquisitions reduces corporate tax revenue. But more revenue is raised through the residence based dividend tax. The effect of an increase in interest rates on foreign welfare is given by

$$\frac{\partial W^*}{\partial r} = S^* (1 + (H^{*'} - 1) t^*) + H^{*'}(1 + r)t^* \frac{\partial S^*}{\partial r} - (1 - t^*) \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* \quad (21)$$

Consider next the tax on dividends. The first order condition for the optimal domestic dividend tax can be written as

$$\frac{\partial W}{\partial \theta} = \frac{(1 - t)(1 + r)}{1 - \theta} \int_{\Delta^{*c}}^{\Delta^{*+}} P^*(\Delta^*) d\Delta^* + H' \left[ (1 + r)t \frac{\partial S}{\partial \theta} - \theta (\varepsilon^* + \Delta^{*c}) (1 - \tau^*) \frac{\partial \Delta^{*c}}{\partial \theta} \right] = 0 \quad (22)$$

The first term on the r.h.s. of (22) is positive and reflects that the dividend tax reduces the willingness of domestic investors to pay for foreign firms. This reduces their price. The second term in parentheses reflects the impact of the change in the household's portfolio structure on the government budget constraint. Note that, at least for  $t \geq 0$ , the optimal domestic dividend tax is unambiguously positive. The domestic country wants to tax foreign source dividends because this reduces the acquisition prices domestic are willing to pay for foreign firms. For the foreign country, we get

$$\begin{aligned} \frac{\partial W^*}{\partial \theta^*} &= (H^{*'} - 1) \left[ \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^* (1 - \tau^*) \right] \\ &+ H^{*'} \left[ (1 + r)t^* \frac{\partial S^*}{\partial \theta^*} + (\varepsilon^* \theta^* (1 - \tau^*) - \tau^* \Delta^{*c}) \frac{\partial \Delta^{*c}}{\partial \theta^*} \right] = 0 \quad (23) \end{aligned}$$

The foreign government cannot use its dividend tax to strategically manipu-

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<sup>6</sup>It cannot be excluded that the optimal tax  $t^*$  is negative. In this case, a decline in  $S$  would of course increase tax revenue net of subsidies.

late acquisition prices because acquisition prices are determined by the willingness to pay of domestic investors and therefore do not depend on the foreign dividend tax  $\tau^*$  (see equation (3)). Thus, the optimal foreign dividend tax will depend on the scarcity of public relative to private funds  $(H^{*'} - 1)$  and the impact of the portfolio restructurings caused by a change in this tax on the government budget.

### 3.3 Tax Coordination

Our main interest is to investigate whether the tax policies emerging under tax competition are optimal for the economy as a whole and whether there is scope for welfare enhancing tax coordination. At a more general level, we ask whether the need for tax coordination is related to source or residence based taxation. We first consider the source based corporate income tax. Here, our main result is the following

**Proposition 2** *i) In the absence of residence based taxes on dividends ( $\theta = 0$ ), there is no scope for welfare enhancing coordination of the source based corporate income tax. Tax competition leads to nationally and globally optimal tax levels.*

*ii) If dividend taxes are positive ( $\theta > 0$ ), a coordinated increase in source based corporate income taxes, departing from the equilibrium without coordination, decreases welfare.*

**Proof.** We consider a coordinated marginal change in the domestic and the foreign corporate tax rates, departing from the equilibrium under tax competition. The change in domestic welfare is  $dW = \frac{\partial W}{\partial \tau} d\tau + \frac{\partial W}{\partial \tau^*} d\tau^*$ . Since the equilibrium under tax competition implies  $\frac{\partial W}{\partial \tau} = 0$ , the welfare effect can be expressed as

$$dW = \frac{\partial W}{\partial \tau^*} d\tau^* = -H'\theta \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\tau^* \quad (24)$$

which equals zero for  $\theta = 0$ . Likewise, we can derive the effect on the welfare of the foreign country as  $dW^* = \frac{\partial W^*}{\partial \tau} d\tau = 0$ . ■

The result in proposition 2 may be explained as follows. Given that there is only M&A investment and credit market investment in our model, international capital flows do not involve a relocation of real capital from one country to another.



Moreover, the domestic household are not limited in the number of acquisitions. As a consequence, the marginal synergy is zero, tax payments under the original owner and the acquirer are equal and corporate tax rate changes have not impact on M&A investment. , but this does not reduce M&A investment in the domestic country, so that domestic tax revenue from domestic economic activity is unaffected. The capital flows which are triggered by the corporate tax change will only affect domestic welfare if there are domestic residence based taxes on either interest income from the international credit market or residence based taxes on dividends.

If  $\theta > 0$ , corporate taxes are too high under tax competition, i.e. a tax rate cut gives rise to positive fiscal externalities. This happens because a cut in the foreign corporate tax rate increase the dividends after foreign taxes. As a result, domestic tax revenue increases.

It is interesting to contrast the fiscal externalities arising in our model to the fiscal externalities arising in models of tax competition with greenfield investment. In the case of greenfield investment, the increase of the corporate tax rate in one country increases capital demand in that country. Savings available for the creation of new production facilities become scarcer, so that the interest rate increases. As a result of this, greenfield investment in other jurisdictions declines, and savings from these jurisdictions flow to the jurisdiction which has reduced its tax rate. If these jurisdictions levy a source based tax on the marginal greenfield investment but no residence based tax on savings, they lose tax revenue. Therefore tax rate cuts give rise to negative fiscal externalities. However, if they also levy a residence based tax on savings, the increase of the interest rate caused by the tax cut in the other jurisdiction raises revenue from the residence based tax on savings. This mitigates the negative fiscal externality of corporate tax rate cuts. In so far, residence based taxes on capital income tend to reduce the need for tax coordination.

In the case of M&A investment, a corporate tax rate cut in the foreign country leads to more acquisitions in the foreign country, but this does not reduce domestic M&A investment. It does reduce credit market investment of domestic households, though, because the additional acquisitions have to be financed. Thus, the interest income of domestic households declines.

### 3.4 Extension: Limited number of acquisitions

A crucial assumption for the above analysis is that the number of m&a transactions is not limited. As a consequence, investors acquire target firms until the resulting after-tax surplus is zero. In the following, we will assume that the number of acquisitions is constrained to certain number  $N$ . Possible reasons could be that management capacities are scarce, there are boundaries to firm size etc. In any way, it captures the idea that the marginal acquisitions yields a positive surplus. At the margin, investors make a discrete investment choice between the domestic and the foreign location, see Devereux & Griffith (2003).

The above model is modified by adding the additional assumption of

$$\int_{\Delta^c}^{\Delta^+} d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* = N \quad (25)$$

from which follows  $d\Delta^c = -d\Delta^{*c}$ . Investment is profit-maximizing if

$$\Delta^{*c} = \Delta^c \left( \frac{1-\tau}{1-\tau^*} \right) + \varepsilon^* \left[ \frac{(1-t)(1-\theta^*)}{(1-t^*)(1-\theta)} - 1 \right]$$

from which follows  $\frac{d\Delta^c}{d\tau} = \frac{\Delta^c}{2-\tau-\tau^*} = -\frac{d\Delta^{*c}}{d\tau}$  and  $\frac{d\Delta^c}{d\tau^*} = -\left(\frac{1-\tau}{1-\tau^*}\right) \frac{\Delta^c}{2-\tau-\tau^*} = -\frac{d\Delta^{*c}}{d\tau^*}$ . Optimal corporate tax policy of the domestic country is given by

$$\begin{aligned} \frac{\partial W}{\partial \tau} = 0 &= (H' - 1)(1 - \theta) \left[ m\varepsilon + \int_{\Delta^c}^{\Delta^+} \Delta d\Delta \right] + H'(1 + r)t \frac{\partial S}{\partial \tau} \\ &- H' \left[ \theta(\varepsilon^* + \Delta^{*c})(1 - \tau^*) \frac{\partial \Delta^{*c}}{\partial \tau} + (\tau + \theta(1 - \tau))\Delta^c \frac{\partial \Delta^c}{\partial \tau} \right] \end{aligned} \quad (26)$$

The foreign country sets its corporate tax rate according to

$$\begin{aligned} \frac{\partial W^*}{\partial \tau^*} &= (H^{*'} - 1) \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^*(1 - \theta^*) + H^{*'} \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^* \\ &+ H^{*'}(1 + r)t^* \frac{\partial S^*}{\partial \tau^*} - \frac{1-t^*}{1-t} \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta_j^*) (1 - \theta) d\Delta^* + \frac{\partial W^*}{\partial \Delta^{*c}} \frac{\partial \Delta^{*c}}{\partial \tau^*} \end{aligned} \quad (27)$$

with

$$\begin{aligned} \frac{\partial W^*}{\partial \Delta^{*c}} &= \varepsilon^* (1 - \tau^*) \left[ \frac{1 - \theta^*}{1 - \theta} - \frac{1 - t^*}{1 - t} \right] - \Delta_j^{*c} \left( \frac{1 - t^*}{1 - t} \right) (1 - \tau^*) (1 - \theta) \\ &\quad + H' ((1 - \tau^*) \varepsilon^* \theta^* - \tau^* \Delta^{*c}) \end{aligned} \quad (28)$$

What are the externalities of corporate taxation in this setting? Consider first a small increase in the foreign tax rate and its effect on domestic welfare:

$$\begin{aligned} \frac{\partial W}{\partial \tau^*} &= H'(1 + r)t \frac{\partial S}{\partial \tau^*} - H'\theta \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^* \\ &\quad - H' \left[ \theta (\varepsilon^* + \Delta^{*c}) (1 - \tau^*) \frac{\partial \Delta^{*c}}{\partial \tau^*} + (\tau + \theta (1 - \tau)) \Delta^c \frac{\partial \Delta^c}{\partial \tau^*} \right] \end{aligned} \quad (29)$$

Now, consider the effect of a small increase of  $\tau$  on foreign welfare:

$$\frac{\partial W^*}{\partial \tau} = \frac{\partial W^*}{\partial \Delta^{*c}} \frac{\partial \Delta^{*c}}{\partial \tau} \quad (30)$$

Since the externalities are different for both countries, the question arises whether a coordinated increase of  $\tau$  and  $\tau^*$  increases welfare or reduces it. Due to the asymmetry of countries, we consider the following experiment. Let both countries increase their corporate tax rate such that the allocation of ownership remains unaffected, i.e.  $d\tau = \left( \frac{1 - \tau}{1 - \tau^*} \right) d\tau^*$ , which implies that  $\Delta^c$ ,  $\Delta^{*c}$ ,  $S$  and  $S^*$  remain constant. World welfare  $W + W^*$  changes in response to this tax reform as follows:

$$\begin{aligned} &\frac{d(W + W^*)}{d\tau^*} \\ &= (H' - 1)(1 - \theta) \left[ m\varepsilon + \int_{\Delta^c}^{\Delta^+} \Delta d\Delta \right] \frac{1 - \tau}{1 - \tau^*} + (H^{*'} - 1) \left( m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^* \right) \varepsilon^* (1 - \theta^*) \\ &\quad + (H^{*'} - 1)(1 - \theta) \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^* \\ &\quad - \left[ \frac{t - t^*}{1 - t} (1 - \theta) + (H' - H^{*'}) \theta \right] \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*) d\Delta^* \end{aligned} \quad (31)$$

which is positive as long as asymmetries, expressed in  $t - t^*$  and  $H' - H^{*'}$  do

not become too severe.

### 3.5 Extension: Capital gains taxes and tax depreciation of goodwill

So far, we have assumed that the proceeds from selling the firm are exempt from tax and that the acquirer cannot write off the purchase price. Assume now that there is a capital gains tax denoted by  $c$ , and assume further that the acquirer gets a corporate tax deduction  $\delta$  of the purchase price in period 1.<sup>7</sup> In this case, the maximum acquisition price for foreign acquisition would be given by

$$(1+r)(1-t)P^*(\Delta_j^*)(1-\delta\tau^*) = (\varepsilon^* + \Delta_j^*)(1-\tau^*)(1-\theta) \quad (32)$$

The vendor would be indifferent between selling and not selling if

$$(1+r)(1-t^*)P^*(\Delta_j^*)(1-c^*) \geq \varepsilon^*(1-\tau^*)(1-\theta^*) \quad (33)$$

This yields the cutoff value

$$\Delta^{c^*} = \varepsilon^* \left[ \frac{(1-\theta^*)(1-t)(1-\delta\tau^*)}{(1-\theta)(1-t^*)(1-c^*)} - 1 \right] \quad (34)$$

If the capital gains tax is equal to the corporate income tax rate and the purchase price is fully deductible, i.e.  $(1-\delta\tau^*)/(1-c^*) = 1$ , the results derived in the preceding section would be preserved. If there are asymmetries, i.e. if  $(1-\delta\tau^*)/(1-c^*) \neq 1$ , acquisitions are distorted. But it is straightforward to show that our results concerning the need for corporate tax coordination also hold in this case.

## 4 Discussion of the Results

How are the results derived in the two preceding sections related to the literature on tax competition and tax coordination? Firstly, it is interesting to contrast

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<sup>7</sup>All other assumptions are as in the base version of the model.

our results to those of models with greenfield investment. In standard models of tax competition with greenfield investment, an increase in source based capital income taxes induces a capital flow to other jurisdictions. If these jurisdictions tax the marginal greenfield investment, they benefit from this capital inflow, i.e. a positive fiscal externality arises. Things are different if residence and source based taxes coexist. In most models of greenfield investment with residence based capital income taxes, the welfare gains from a coordination of source based taxes are small or even disappear, see Bucovetsky and Wilson (1991). On the base version of our model, quite the opposite is true. In the absence of residence based taxes, there is no need for corporate tax coordination, but as soon as residence based taxes exist, a case for tax coordination can be made.

It is also interesting to discuss our results in the light of the view developed in Desai and Hines (2004) who argue that M&A investment abroad does not reduce the domestic capital stock. Since the largest part of foreign investment is actually M&A investment, a tax policy which assumes that more foreign investment of domestic firms necessarily reduces domestic investment is misguided. As a consequence, governments should exempt foreign income from tax because an additional tax upon repatriation distorts ownership decision and leads to efficiency losses. Our analysis confirms that taking into account M&A investment changes the implications for tax policy substantially. However, we also show that differences in residence-based do not need to distort ownership decisions.

Our results are also related to the literature on the capitalization of taxes in land prices (see Mieszkowski, 1972, or Hamilton, 1976). This applies in particular to section 3.1., where we consider the case of full deductibility of effort costs. In this case, source based taxes are neutral for the number of acquisitions because any tax change will be fully capitalized in acquisition prices. This happens because target firms are immobile by assumption and therefore cannot escape taxation by relocating abroad. Of course, the comparison with the literature on land prices also points to a limitation of our analysis: we do not discuss the initial investment decisions that created the target firms.

## 5 Conclusions

This paper develops a framework designed to analyse the role of source and residence based taxes for tax competition and tax coordination in a world where investment takes the form of M&A investment, rather than greenfield investment. In the base version of our model, domestic entrepreneurs acquire domestic and foreign firms to exploit synergies. An acquisition does not imply a change in the stock of a firm's real capital, just a change in ownership. The governments levy source based taxes on corporate profits and residence based taxes on dividends and interest income. Source based taxes do not affect M&A investment. One reason is that M&A investment does not absorb savings, in contrast to greenfield investment. Another equally important reason is that the number of potential acquisitions is unlimited.

Under these assumptions, we find that the implications of source and residence based taxes for tax competition and tax coordination are as follows. If governments can only levy source based taxes, the tax levels they choose under tax competition are also efficient for the economy as a whole, which implies that there is no room for welfare enhancing tax coordination of these source based taxes. The reason is that a change in the source based tax in one country does not affect M&A investment in other countries, i.e. no fiscal externalities arise. In contrast, if there are residence based taxes, competition in source based taxes gives rise to negative fiscal externalities which imply inefficiently high tax rates in equilibrium.

These results contrast with findings for the case of greenfield investment, where source based taxes are usually seen as the major source of fiscal externalities whereas the ability to levy residence based taxes makes the demand for tax coordination less pressing or even implies that no coordination of source based taxes is necessary any more (Bucovetsky and Wilson (1991)).

A result which is more in line with findings for greenfield investment emerges, however, when we relax the assumption of an infinitely elastic supply of entrepreneurial effort related to M&A investment. In the presence of convex effort costs, more acquisitions abroad would inevitably imply a decline in domestic acquisitions. In this case, tax competition for investment is actually tax competition for entrepreneurship. The implications for tax policy are similar to the case of

greenfield investment - higher source based taxes will give rise to positive fiscal externalities and inefficiently low tax levels are likely to prevail under tax competition. In terms of policy implications, our results imply that the prevailing view, according to which tax competition leads to inefficiently low levels of source based taxes, has to be qualified. More attention may have to be devoted to the interaction between source and residence based taxes and the impact of taxes on M&A investment.

## References

- [1] Andrade, G., Mitchell, M. & Stafford, E. (2001). New Evidence and Perspectives on Mergers, *Journal of Economic Perspectives* 15(2), 103–120.
- [2] Auerbach, A. J. & Slemrod, J. (1997). The Economic Effects of the Tax Reform Act of 1986, *Journal of Economic Literature* 35(June): 589–632.
- [3] Becker, J. & Fuest, C. (2008). Tax Competition - Greenfield Investment versus Mergers and Acquisitions, CESifo Working Paper No. 2247.
- [4] Becker, J. & Fuest, C. (forthcoming). Taxing Foreign Profits with International Mergers and Acquisitions, *International Economic Review*.
- [5] Bucovetsky, S. & Wilson, J. (1991). Tax Competition with Two Tax Instruments, *Regional Science and Urban Economics* 21(3): 333–350.
- [6] Collins, J., Kemsley, D. & Shackelford, D. (1995). Tax Reform and Foreign Acquisitions: A Microanalysis, *National Tax Journal* 48(1): 1–21.
- [7] Desai, M. A. & Hines, J. R. (2004). Old Rules and New Realities: Corporate Tax Policy in a Global Setting, *National Tax Journal* 57(4): 937–60.
- [8] Devereux, M. P. (1990). Capital Export Neutrality, Capital Import Neutrality, Capital Ownership Neutrality and All That, Unpublished Working Paper.
- [9] Devereux, M. P. (2007). The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence, Oxford University Centre for Business Taxation Working Paper Series No. 07/2.

- [10] Devereux, M. P. & Griffith, R. (2003). Evaluating Tax Policy for Location Decisions, *International Tax and Public Finance* 10(2): 107-126.
- [11] Feldstein, M. & Hartman, D. (1979). The Optimal Taxation of Foreign Source Investment Income, *Quarterly Journal of Economics* 93(4): 613-629.
- [12] Fuest, C. & Huber, B. (2004). Why Do Countries Combine the Exemption System for the Taxation of Foreign Profits with Domestic Double Taxation Relief?, *Journal of International Economics* 62(1): 219-231.
- [13] Fuest, C., Huber, B. & Mintz, J. (2005). Capital Mobility and Tax Competition: A Survey, *Foundations and Trends in Microeconomics* 1(1): 1-62.
- [14] Gordon, R. H. & Bovenberg, A. L. (1996). Why is Capital So Immobile Internationally? Possible Explanations and Implications for Capital Income Taxation, *American Economic Review* 86(5): 1057-1075.
- [15] Haufler, A. & Nielsen, S. B. (forthcoming). Merger Policy to Promote Global Players? A Simple Model, *Oxford Economic Papers*.
- [16] Haufler, A. & Schulte, C. (2007). Merger Policy and Tax Competition, Working Paper.
- [17] Hines, J. R. (1999). Lessons from Behavioral Responses to International Taxation, *National Tax Journal* 52(2): 305-322.
- [18] Huck, S. & Konrad, K. A. (2004). Merger Profitability and Trade Policy, *Scandinavian Journal of Economics* 106(1): 107-122.
- [19] Huizinga, H. & Voget, J. (forthcoming). International Taxation and the Direction and Volume of Cross-Border M&As, *Journal of Finance*.
- [20] Markusen, J. R. (2002). *Multinational Firms and the Theory of International Trade*, Massachusetts Institute of Technology, Cambridge, USA.
- [21] Musgrave, P. B. (1969). *United States Taxation of Foreign Investment Income: Issues and Arguments*, Cambridge (MA), International Tax Program, Harvard Law School.



- [22] Richman, P. B. (1963). *Taxation of Foreign Investment Income - An Economic Analysis*, The Johns Hopkins Press, Baltimore.
- [23] Scholes, M. S. & Wolfson, M. A. (1990). The Effects of Changes in Tax Laws on Corporate Reorganization Activity, *Journal of Business* 63(1): S141–164.
- [24] Swenson, D. L. (1994). The Impact of U.S. Tax Reform on Foreign Direct Investment in the United States, *Journal of Public Economics* 54(2): 243–266.