Taxing Foreign Profits with International Mergers and Acquisitions

Johannes Becker
Clemens Fuest

Oxford University Centre for Business Taxation
Saïd Business School, Park End Street
Oxford OX1 1HP

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by

Johannes Becker* and Clemens Fuest‡

University of Cologne

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*Cologne Center for Public Economics, University of Cologne, Albertus-Magnus-Platz, D-50923 Cologne, Germany. E-Mail: johannes.becker@uni-koeln.de

‡Cologne Center for Public Economics, University of Cologne, Albertus-Magnus-Platz, D-50923 Cologne, Germany. E-Mail: clemens.fuest@uni-koeln.de

Abstract

A large part of border crossing investment takes the form of international mergers and acquisitions. In this paper, we ask how optimal repatriation tax systems look like in a world where investment involves a change of ownership, rather than a reallocation of real capital. We find that the standard results of international taxation do not carry over to the case of international mergers and acquisitions. The deduction system is no longer optimal from a national perspective and the foreign tax credit system fails to ensure global optimality. The tax exemption system is optimal if ownership advantage is a public good within the multinational firm. But the cross border cash flow tax system dominates the exemption system in terms of optimality properties.

JEL Codes: H25, F23

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1 Introduction

In 1963, Peggy Brewer Richman published her famous work on the *Taxation of Foreign Investment Income*. In this book, she pointed out that full taxation of foreign income after deduction of foreign taxes paid is the optimal tax policy from a national point of view, whereas crediting foreign taxes against domestic taxes leads to global optimality. Richman's book and her article, Musgrave (1969), and the following contributions like Hamada (1966) and Feldstein & Hartman (1979) were highly influential in shaping international taxation agreements like e.g. the OECD convention on double taxation treaties.[1]

Fourty years after Richman (1963), Mihir Desai and Jim Hines (2003) challenge this view and claim that the US government should abandon the tax credit system for the taxation of foreign profits and switch to the exemption system. The authors argue that the tax credit system is appropriate in a world where foreign investment reduces the domestic capital stock. In such a setting, firms decide whether to set up new production facilities at home or abroad (greenfield investment), or even relocate existing plants to the foreign country. Empirically, however, a large part of foreign investment occurs in the form of mergers and acquisitions (m&a). Foreign investment then leads to a change in the ownership of existing production facilities, rather than a relocation of economic activity.[2] In Desai & Hines (2004), the authors argue that the current U.S. taxation of foreign profits creates an undesirable disadvantage for American firms trying to acquire foreign firms and conclude: "*efficiency requires that foreign investment income face no residual tax*

[1] Other standard references are Bond & Samuelson (1989), Bucovetsky & Wilson (1991). Horst (1980), as well as Keen & Piekkola (1997) relax the assumption of a fixed capital stock and consider the effect of taxes on savings. Grubert & Mutti (1995) consider two specific cases of investment, portfolio investment on the one hand and R&D investment on the other hand. However, the standard results derived by Feldstein and Hartman prevail. Janeba (1995), Mintz & Tulkens (1996) and Davies (2003) analyze the desirability and the effects of double taxation agreements. Devereux & Hubbard (2003) derive welfare effects of taxes on foreign source income of multinational enterprises.

[2] As Desai & Hines (2004) put it, "*a very high fraction of such investment takes the form of acquiring existing businesses. Consequently, most FDI represents transfers of control and ownership, and need not involve transfers of net savings. (...) The modern view of FDI as arising from productivity differences among firms, with ownership changes taking the form of FDI, raises the possibility that greater outbound FDI need not be associated with reduced domestic investment.*" (p. 956)

upon repatriation" (p. 938).

From an analytical point of view, the point made by Desai & Hines (2003) has two conceptual dimensions, see table 1. The first dimension is the difference between the allocation of capital (often combined with the notion of greenfield investment, i.e. creating new production facilities) as opposed to the allocation of ownership (i.e. m&a transactions which imply purchasing existing production facilities). The second dimension concerns the nature of the ownership advantage which drives mergers and acquisitions. In the argument made by Desai and Hines, foreign acquisitions do not affect the number of domestic acqusitions; ownership advantage can be thought of as being a public good within the multinational firm. However, ownership advantage could also be a private good within the firm, and thus scarce, which means that an additional foreign acquisition does reduce the number of domestic acquisitions.

	Capital allocation	Ownership allocation
Foreign inv. reduces domestic inv.	Richman (1963)	
Foreign inv. does not reduce domestic inv.		Desai & Hines (2003)

Table 1: Concepts of optimal repatriation taxation.

In this paper we offer a framework which allows analyzing the allocation of ownership when ownership advantage is a either public or a private good within the multinational firm. We analyze the effects of different tax regimes on international investment and derive optimal tax policy strategies both from the national and the global perspective. Our main interest is to find out if the basic results and policy recommendations generated by the standard capital mobility model carry over to a setting with m&a rather than real capital investment. These results include the ability of the foreign tax credit system to implement neutrality of taxes for the location of investment and the national optimality of the deduction system.

Firstly, we find that, if international investment is m&a and ownership is scarce, it is not optimal for an individual country to tax foreign source income according to the full taxation after deduction system. Secondly, in this case, the foreign tax credit system fails to achieve globally optimal capital flows. This happens

because an acquisition implies the transfer of an asset which produces taxable income between two owners which may be taxed differently. If the income of the acquiring firm is taxed more heavily than the income of the seller, acquisitions are distorted. Thirdly, the exemption system leads to overinvestment in the low tax country, as in the Richman (1963) capital allocation model. Fourthly, national and global welfare maximization requires a cross border cash flow tax regime. Finally, if ownership is a public good, the exemption system satisfies national and global optimality, as claimed by Desai & Hines. However, the cross-border cash-flow tax system does so, too.

As recent surveys on the impact of taxes on cross-border capital flows, like Devereux (2006) and Hines (1999), show, virtually all studies treat investment flows as if they were greenfield projects.[3] But, capital flows in the form of border crossing m&a are empirically important. In its *World Investment Report*, UNCTAD (2006) reports cross-border m&a at a value of 716 billion dollars worldwide in 2005, compared to 916 billion dollars of total FDI inflows. Foreign acquisitions of U.S. investors had a volume of 147 bn dollars whereas net outflows of FDI were only 12 bn.[4]

In the literature, the tax policy implications of capital flows in the form of m&a have been neglected almost completely. An exception is a contribution by Devereux (1990), who does not refer explicitly to mergers and acquisitions but points out that tax distortions of ownership patterns may be important if capital productivity depends on ownership. The paper introduces the concept of "capital ownership neutrality" as a property of tax systems which avoid distortions in ownership.[5] Moreover, there are the two papers mentioned above, Desai & Hines

[3]Mergers and acquisitions play an important role, though, in the literature on multinational firms and their investment behavior (including both types of investment, greenfield investment and m&a), surveyed by Markusen (2002). Empirical evidence on m&a is reported by Andrade, Mitchell & Stafford (2001) and others.

[4]This discrepancy is explained by the fact that net outflows are calculated by the difference between the US owned capital stocks abroad in two subsequent periods. Stocks can be reduced by depreciation, bankruptcies etc.

Japan reports purchases of 8 bn dollars and net outflows of 46 bn; the European Union has acquisitions abroad of 626 bn dollars and outward FDI of 554 bn. (Source: www.unctad.org/fdistatistics)

[5]Gordon & Bovenberg (1996) consider cross border acquisitions in a model with asymmetric information in order to explain the correlation between savings and investment reported by Feldstein & Horioka (1980). Fuest & Huber (2004) analyze tax policy in a model where firms

(2003, 2004), which do not include a formal model though, and focus on U.S. tax policy.[6] To the best of our knowledge, this is the first paper to analyse the optimality of repatriation tax regimes in the presence of border crossing mergers and acquisitions in a formal model.

How does taxation affect m&a activity? As Auerbach & Slemrod (1997) and Kaplan (1989) suggest, taxes may be of crucial importance for m&a investment. There are some papers discussing the impact of the 1986 U.S. tax reform on acquisitions of US firms by foreign investors. Here, the main idea is that the effective increase in the tax burden caused by the 1986 tax reform induced investors located in countries with foreign tax credit regimes to take over U.S. firms because the higher US taxes were credited against home country taxes (Scholes & Wolfson (1990), Collins, Kemsley & Shackelford (1995)). Swenson (1994) applies the same argument to US inbound foreign direct investment and finds robust evidence supporting the hypothesis. In a recent paper, Huizinga & Voget (2006) study the empirical impact of international taxation schemes on m&a activity. The authors find robust and significant evidence for the deterring impact of double taxation on cross-border acquisitions.

The remainder of the paper is set up as follows. Section 2 presents the model and the results. Section 3 discusses some extensions. In section 4, we discuss some policy implications of our results and conclude.

2 The model

The world consists of two countries, domestic and foreign. Each country is inhabited by a representative household. Households live for two periods. The utility function of the representative domestic household is given by $U(C_1, C_2) = u(C_1) + C_2$, where C_1 and C_2 are consumption in the first and the second period

may be sold to foreign investors, but they focus on the integration of personal and corporate income taxes, and no border crossing acquisitions take place in equilibrium. In Becker & Fuest (2007), we consider tax competition and public goods provision when capital flows take the form of mergers and acquisitions. Haufler & Schulte (2007) explore how tax incentives and ownership patterns interact in a model where mergers and acquisitions can take place within and across borders. Moreover, there are some recent m&a related contributions on the public policy and welfare issues, like in Huck & Konrad (2004) and Haufler & Nielsen (forthcoming).

[6] See also the debate between Grubert (2005) and Desai & Hines (2005).

and $u(.)$ is strictly concave, with $u\prime > 0$, $u\prime\prime < 0$. This utility function implies that income effects on first period consumption are zero. In section 3, we show that allowing for income effects complicates the analysis without adding many new insights. The utility function of the foreign representative household is denoted by $U^*\left(C_1^*, C_2^*\right) = u^* C_1^*) + C_2^*$. 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. We abstract from residence-based taxes on interest income; their role is also discussed in section 3.

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. We refer to these firms as *national* firms, as opposed to *multinational* firms which will be introduced below. The after tax profit earned by each domestic national firm in period 2 is given by $\varepsilon_k(1-\tau)$, where τ is the domestic corporate income tax. Accordingly, the after tax profit earned by each foreign national firm is given by $\varepsilon^*(1-\tau^*)$, where τ^* is the foreign corporate income tax. Throughout the paper, we assume $\tau > \tau^*$. In each period t, the tax revenue collected by the government is paid back to the household sector via lump sum transfers denoted by G_t (G_t^*), $t = 1, 2$.

Next to the national sector, there is a sector of multinational firms. The number of multinationals is normalized to unity. The representative multinational firm has its headquarter in the domestic country and is owned by the domestic representative household.[7] The multinational considers acquisitions of firms in the domestic or the foreign country.[8]

If an existing domestic (foreign) national firm is acquired, the change of ownership is not accompanied by a relocation of real capital. But the ownership change does have a real economic effect. It increases the second period cash flow of the

[7] As we focus exclusively on the optimality properties of different repatriation tax systems, the analysis of inbound acquisitions only complicates the notation without changing the insights generated by the analysis.

[8] We assume that the acquisition targets are only domestic or foreign national firms. We thus abstract from the possibility that a change in firm ownership occurs between multinational firms. Adding this to the model would introduce the possibility that a domestic multinational sells a foreign firm to another domestic multinational. We will discuss the implications of this case in section 3.

domestic (foreign) target firm by Δ (Δ^*). The multinational draws Δ (Δ^*) from uniform distributions over the intervals $[\Delta^-, \Delta^+]$ and $[\Delta^{*-}, \Delta^{*+}]$, respectively. The distribution functions are denoted by $\Omega(\Delta)$ and $\Omega^*(\Delta^*)$. This increase in profitability is the driving force for changes in ownership in our model. It may be interpreted as the result of cost savings due to superior technology or an increase in output value due to access to a brand name or better distribution systems.

A key question is whether these ownership skills are a public good within the firm, so that the firm can make acquisitions in all cases where it has an ownership advantage, or whether the number of acquisitions is limited. A limitation of the number of feasible acquisitions may be due to the fact that e.g. management capacity is limited. The acquisition may also be a discrete investment. Empirically, both types of ownership advantage are likely to exist. In the following, we first consider the case where ownership skills are scarce. In section 2.5, we turn to the case where the number of acquisitons is not limited.

2.1 Investment behavior

The domestic multinational firm maximizes its market value. In the first period, the firm issues shares[9] which are bought by the domestic representative household. These funds are used to finance acquisitions in the domestic and in the foreign country. The multinational firm will carry out all acquisition projects at home (abroad) above a critical level of ownership advantage Δ^c (Δ^{*c}). The overall number of acquisitions is limited to a fixed number N. This implies $\Omega(\Delta^c) + \Omega^*(\Delta^{*c}) = N$, so that $d\Delta^c + d\Delta^{*c} = 0$.

How are the acquisition prices P and P^* determined? We assume that the market for target firms is perfectly competitive and focus on equilibria where the number of acquisitions is smaller than m, i.e. some national firms remain in the hands of their initial owners. Those initial owners who sell their firms receive their reservation income, which is equal to $\frac{\varepsilon(1-\tau)}{(1+r)} \equiv P$ in the case of a domestic target firm and $\frac{\varepsilon^*(1-\tau^*)}{(1+r)} \equiv P^*$ in the case of a foreign target firm.[10] For the tax treatment

[9] Since we abstract from dividend taxes or capital market imperfections, financing via share issues is equivalent to financing via retained earnings.

[10] In the extensions section, we consider the case where the initial owners receive part of the surplus. The key results do not change.

of acquisitions, we assume that 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. Of course, this approach abstracts from many complexities associated with the tax consequences of mergers and acquisitions.

Given that the owners of the multinational firm will have to inject equity to finance acquisitions, the market value of the multinational in the first period is given by

$$\begin{aligned}
&(1+r)\left[V+\int_{\Delta^c}^{\Delta^+} Pd\Delta+\int_{\Delta^{*c}}^{\Delta^{*+}}(P^*+T_1)d\Delta^*\right] \\
=\ &\int_{\Delta^c}^{\Delta^+}(\varepsilon+\Delta)(1-\tau)\,d\Delta+\int_{\Delta^{*c}}^{\Delta^{*+}}\left[(\varepsilon^*+\Delta^*)(1-\tau^*)-T_2\right]d\Delta^* \qquad (1)
\end{aligned}$$

where T_1 and T_2 are taxes on foreign profits paid in periods 1 and 2. This can be rearranged to

$$V=\int_{\Delta^c}^{\Delta^+}\frac{\Delta(1-\tau)}{(1+r)}d\Delta+\int_{\Delta^{*c}}^{\Delta^{*+}}\frac{\Delta^*(1-\tau^*)-T_1(1+r)-T_2}{(1+r)}d\Delta^* \qquad (2)$$

The firm maximizes its market value by choosing Δ^{*c}, taking into account $d\Delta^c=-d\Delta^{*c}$. This yields,

$$\text{PO:}\quad \Delta^{*c}=\frac{\Delta^c(1-\tau)+T_1(1+r)+T_2}{1-\tau^*} \qquad (3)$$

where PO stands for private optimality. In this paper, we focus on four different regimes for taxing foreign profits. These are

1. The exemption system: $T_1=T_2=0$.
2. The full taxation after deduction system: $T_1=0, T_2=\tau(1-\tau^*)(\varepsilon^*+\Delta^*)$.
3. The foreign tax credit system: $T_1=0, T_2=(\tau-\tau^*)(\varepsilon^*+\Delta^*)$
4. The cross border cash flow tax system[11]: $T_1=-\tau P^*, T_2=\tau(\varepsilon^*+\Delta^*)(1-\tau^*)$.

[11]The cross border cash flow tax system can equivalently be implemented by $T_1=0, T_2=\tau\left[(\varepsilon^*+\Delta^*)(1-\tau^*)-(1+r)P^*\right]=\tau\Delta^*(1-\tau^*)$.See e.g. Gordon & MacKie-Mason (1995).

2.2 The household

Consider next the budget constraint of the domestic household. Expenditures for financing domestic acquistions are $\int_{\Delta^c}^{\Delta^+} \frac{\varepsilon(1-\tau)}{(1+r)} d\Delta$, but the cash flow from selling these firms flows back to the domestic household. However, acquisitions of foreign target firms including possible taxes, $\int_{\Delta^{*c}}^{\Delta^{*+}} \left[\frac{\varepsilon^*(1-\tau^*)}{(1+r)} + T_1\right] d\Delta^*$, have to be financed in addition. The budget constraint in period 1 is thus given by

$$C_1 = E - S - \int_{\Delta^{*c}}^{\Delta^{*+}} \left[\frac{\varepsilon^*\left(1-\tau^*\right)}{(1+r)} + T_1\right] d\Delta^* + G_1 \tag{4}$$

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

$$\begin{aligned} C_2 &= S(1+r) + \left(m - \int_{\Delta^c}^{\Delta^+} d\Delta\right) \varepsilon\left(1-\tau\right) \\ &\quad + \int_{\Delta^c}^{\Delta^+} \left(\varepsilon + \Delta\right)\left(1-\tau\right) d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} \left[\left(\varepsilon^* + \Delta^*\right)\left(1-\tau^*\right) - T_2\right] d\Delta^* + G_2 \end{aligned} \tag{5}$$

Optimal choice of S implies $u\prime(C_1) = 1 + r$. The foreign household has the following budget constraints

$$C_1^* = E^* - S^* + \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\varepsilon^*\left(1-\tau^*\right)}{(1+r)} d\Delta^* \tag{6}$$

$$C_2^* = S^*\left(1+r\right) + \left(m^* - \int_{\Delta^{*c}}^{\Delta^{*+}} d\Delta^*\right) \varepsilon^*\left(1-\tau^*\right) + G_2^* \tag{7}$$

Optimal savings by the foreign household imply $u^{*\prime}(C_1^*) = 1+r$. Credit 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.

2.3 Nationally optimal taxation of foreign profits

How does an increase in foreign acquisitions made by the domestic multinational firm affect the welfare of the domestic household, and which tax policy makes sure that foreign acquisitions maximize domestic welfare? Given that taxes are transferred to private households via lump sum transfers, the budget constraint of the domestic household can be written as

$$C_1 = E - S - \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\varepsilon^* (1-\tau^*)}{(1+r)} d\Delta^* \tag{8}$$

$$C_2 = S(1+r) + m\varepsilon + \int_{\Delta^c}^{\Delta^+} \Delta d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} (\varepsilon^* + \Delta^*)(1-\tau^*) d\Delta^* \tag{9}$$

For the foreign household, first period consumption is given by (6) and second period consumption can be written as

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

The nationally optimal foreign investment is the solution to the following maximization problem:

$$\max_{\Delta^{*c}} U = u(C_1) + C_2$$

subject to $S = -S^*$ and $\Omega(\Delta^c) + \Omega^*(\Delta^{*c}) = N$. Before we derive the optimal foreign investment and the tax policy required to implement this, it is helpful to state the following

Lemma A marginal change in the number of foreign acquisitions does not affect the interest rate r.

Proof. Differentiating $u' = 1 + r$ and $u^{*\prime} = 1 + r$ w.r.t. S, S^*, Δ^{*c} and r yields $\frac{dS}{d\Delta^{*c}} + \frac{\varepsilon^*(1-\tau^*)}{(1+r)} - \frac{1}{u''} dr = 0$ and $\frac{dS^*}{d\Delta^{*c}} - \frac{\varepsilon^*(1-\tau^*)}{(1+r)} - \frac{1}{u^{*\prime\prime}} dr = 0$. With $dS = -dS^*$ these two equations can only hold if $dr = 0$. ■

This can be explained as follows. Consider an increase of foreign acquisitions $d\Delta^{*c} < 0$. This increase 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.

With $dS = \frac{\varepsilon^*(1-\tau^*)}{(1+r)} d\Delta^{*c} = -dS^*$ and $dr = 0$, a marginal change in foreign acquisitions of the domestic multinational firm has the following effect on domestic welfare

$$\frac{dU}{d\Delta^{*c}} = \Delta^c - \Delta^{*c}(1-\tau^*) \tag{11}$$

Equation (11) shows that two effects determine the impact of an increase in foreign acquisitions ($d\Delta^{*c} < 0$) on national welfare.[12] The first term on the right hand side of (11) reflects that more foreign acquisitions reduce domestic acquisitions because we have assumed that ownership skills are a scarce resource ($\frac{d\Delta^c}{d\Delta^{*c}} = -1$). The second term on the right hand side of (11) is the increase in profits generated by the ownership advantage. Note that this is the profit increase after foreign taxes but before possible repatriation taxes levied by the domestic government. Taken together, these two terms are reminiscent of the condition for nationally optimal foreign investment derived by Feldstein and Hartman (1979), who find that the before tax return to domestic investment should equal the return to foreign investment after foreign taxes paid. The difference is that Δ^{*c} is only part of the profit generated by the newly acquired firm. The overall profit is $\varepsilon^* + \Delta^*$. This difference has implications for the optimal repatriation tax system which will be discussed further below. At this point, we may conclude that nationally optimal foreign investment is implied by

$$\text{NO:} \quad \Delta^{*NO} = \frac{\Delta^c}{1-\tau^*} \tag{12}$$

Which tax policy is required to implement a nationally optimal investment behaviour of domestic multinational firms? Comparing (12) to (3) reveals that this requires a foreign cash flow tax system where $T_2 = \tau(\varepsilon^* + \Delta^*)(1-\tau^*)$ and $T_1 = -\tau\frac{\varepsilon^*(1-\tau^*)}{(1+r)}$.[13]

[12] Note that $d\Delta^{*c} > 0$ implies a decrease in foreign investment.

[13] The same result can be achieved by implementing $T_1 = 0$ and $T_2 = \tau[(\varepsilon^* + \Delta^*)(1-\tau^*) - (1+r)P^*] = \tau\Delta^*(1-\tau^*)$.

Full taxation after deduction, which is nationally optimal in the case of greenfield investment, now leads to overtaxation of foreign investment: If $T_1 = 0$ and $T_2 = \tau(1-\tau^*)(\varepsilon^* + \Delta^*)$, (3) yields

$$\Delta^{*c} = \frac{\Delta^c + \tau\varepsilon^*(1-\tau^*)}{1-\tau^*} > \Delta^{*NO} \tag{13}$$

The reason is that, under the deduction system, the repatriation tax gives rise to an extra tax on the acquisition. It changes the tax burden on the "unchanged" part of the income from $\tau^*\varepsilon^*$ under the initial owner to $[\tau^* + \tau(1-\tau^*)]\varepsilon^*$ under the new owner. Imposing this extra burden on foreign acquisitions is not in the interest of national income maximization. In contrast, the foreign cash-flow tax system makes sure that the repatriation tax on profits capitalized in the purchase price is equal to zero.

How about the remaining repatriation tax systems? The exemption of foreign profits leads to overinvestment in the low tax country, as in the case of greenfield investment. Finally, an interesting result can be derived for the tax credit system. With $T_2 = (\tau - \tau^*)(\varepsilon^* + \Delta^*)$ in (3) the multinational's marginal foreign acquisition satisfies

$$\Delta^{*c} = \Delta^c + \left(\frac{\tau - \tau^*}{1-\tau}\right)\varepsilon^* \quad \Leftrightarrow \quad \Delta^{*c} \gtrless \Delta^{*NO} \tag{14}$$

Depending on ε^* investment under the tax credit system is either too high or too low. Concerns that crediting foreign against domestic taxes imposes an undue burden on foreign investment projects therefore have to be qualified.

These results can be summarized as

Proposition 1 *In the case of m&a investment, the cross border cash flow tax system is nationally optimal. Under the full taxation after deduction system, foreign investment is inefficiently low. Under the tax credit system, over- or underinvestment may occur. The exemption system implies that foreign investment is unambiguously too high.*

2.4 Globally optimal taxation of foreign profits

What is the globally optimal system for taxing foreign profits? As a criterion for global optimality, we consider a utilitarian welfare function $W = U + U^*$. Note that the assumed quasi-linearity of utility allows us to abstract from issues of optimal income distribution across countries. The effect of a change in Δ^{*c} on global welfare is

$$\frac{dW}{d\Delta^{*c}} = \frac{dU}{d\Delta^{*c}} + \frac{dU^*}{d\Delta^{*c}} = \Delta^c - \Delta^{*c}\left(1-\tau^*\right) - \Delta^{*c}\tau^* \tag{15}$$

While the effect on domestic welfare is known from equation (11), the global welfare effect now includes the impact on the foreign country, which is represented by the last term on the right hand side of (15). The foreign country benefits from more acquisitions because the ownership advantage leads to a higher tax revenue. The condition for globally optimal investment by the domestic multinational firm thus boils down to

$$\Delta^{*GO} = \Delta^c \tag{16}$$

Not surprisingly, globally optimal acquisitions imply that the gains from ownership changes have to be the same in the two countries, at the margin.

In the case of greenfield investment, the tax credit system implements globally optimal investment. Does this result carry over to the case of m&a investment? With a repatriation tax of $T_2 = (\tau - \tau^*)\left(\varepsilon^* + \Delta_j^*\right)$, (3) leads to

$$\Delta^{*c} = \Delta^c + \left(\frac{\tau - \tau^*}{1-\tau}\right)\varepsilon^* \quad \Leftrightarrow \quad \Delta^{*c} > \Delta^{*GO} \tag{17}$$

It turns out that the tax credit system fails to implement global optimality in the case of m&a investment. Again, the repatriation tax imposes an undesirable burden on foreign acquisitions. Given that $\tau > \tau^*$, the tax credit system implies that the new owner is subject to a tax not faced by the initial owner. As a result, too few foreign acquisitions take place. How can global optimality be achieved? Rearranging (3) shows that the repatriation tax which would implement global optimality is given by

$$T_2 = (\tau - \tau^*)\,\Delta^{*c} \tag{18}$$

which is different from all four regimes introduced above. Essentially, the tax credit system has to be corrected for the inclusion of profits reflected in the purchase price. There is no easy way of implementing this because it would be difficult in practice to distinguish between hypothetical profits under the initial owner and profits generated due to the acquisition.

What are the implications of the remaining regimes for global optimality? The exemption system will lead to overinvestment in the low tax country, as in the case of greenfield investment. The full taxation after deduction system yields to underinvestment in the foreign country:

$$\Delta^{*c} = \frac{\Delta^c}{1-\tau^*} + \frac{\tau}{1-\tau}\varepsilon^* \quad \Leftrightarrow \quad \Delta^{*c} > \Delta^{*GO} \tag{19}$$

Finally, the cross border cash flow tax system, with $T_1 = -\tau\frac{\varepsilon^*(1-\tau^*)}{(1+r)}$ and $T_2 = \tau\left(\varepsilon^* + \Delta^*\right)(1-\tau^*)$, leads to

$$\Delta^{*c} = \frac{\Delta^c}{1-\tau^*} \quad \Leftrightarrow \quad \Delta^{*c} > \Delta^{*GO} \tag{20}$$

i.e. foreign investment is inefficiently low from a global perspective, too. This is not surprising, given the national optimality of this system in the case of m&a investment. We may thus state

Proposition 2 *In the case of m&a investment, none of the four tax regimes under consideration leads to global optimality. The cross border cash flow tax system, the full taxation after deduction system and the tax credit system lead to underinvestment in the foreign country from a global point of view. The exemption system implies overinvestment in the low tax country and underinvestment in the high tax country.*

The results in propositions 1 and 2 differ from the findings in Desai and Hines (2003, 2004), who argue that the exemption system is nationally and globally optimal. Our results show that this does not apply if ownership skills are a scarce resource. In the next section, we consider the case where ownership skills are a public good within the firm, so that there is no limitation on the overall number of feasible acquisitions.

2.5 Ownership advantage as a public good within the multinational firm

So far, we have assumed that ownership skills are a scarce resource, which implies $\frac{d\Delta^c}{d\Delta^{*c}} = -1$, i.e. at the margin, either a domestic or a foreign target firm can be acquired, but not both. How does optimal repatriation taxation look like if ownership advantage is a public good within the firm? Recall the firm value

$$V = \int_{\Delta^c}^{\Delta^+} \frac{\Delta\,(1-\tau)}{(1+r)} d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\Delta^*\,(1-\tau^*) - T_1(1+r) - T_2}{(1+r)} d\Delta^* \qquad (21)$$

and maximize it without the restriction that an increase in the number of foreign acquisitions reduces the number of domestic acquisitions. Privately optimal foreign investment then implies

$$\text{PO:} \quad \Delta^{*c} = \frac{T_1(1+r) + T_2}{1-\tau^*} \qquad (22)$$

Again, we may ask how the benevolent government solves $\max_{\Delta^{*c}} U = u\,(C_1) + C_2$, this time without being restricted in the number of acquisitions. It is straightforward to show that both from the national and the global point of view, welfare maximizing foreign investment requires that all projects which satisfy $\Delta^* \geq 0$ are carried out. Here, the exemption system does ensure national optimality. But, it is not the only system which does so. All repatriation systems which imply zero tax payments for the marginal foreign acquisition, with $\Delta^{*c} = 0$, are nationally optimal. This includes the cross-border cash-flow tax system.

Proposition 3 *If ownership advantage is a public good within the multinational firm, the exemption system and the cross border cash flow tax system both lead to nationally and globally optimal foreign investment.*

We may thus conclude that the exemption system is optimal in the case where ownership skills are a public good within multinational firms. For this case, our results confirm the findings in Desai and Hines (2003). At $\Delta^{*c} = 0$, the exemption system has the same properties as the cross-border cash flow system. But the cross-border cash-flow system has the advantage of being nationally optimal, irrespective

of the nature of ownership skills.[14]

3 Extensions

The analysis in the preceding sections is based on a highly stylised model which uses several restrictive assumptions. In this section, we consider some extensions and variants of the model. These include i) the existence of a residence based tax on interest income, ii), relaxing the assumption that utility is quasilinear in second period consumption, iii) assuming that part of the surplus from the acquisition accrues to the initial owners of target firms through a higher purchase price, iv) the case where domestic and foreign investor firms compete for acquiring a given target firm, and v) the case in which foreign firms are acquired from domestic owners. In all cases except for iv.), we return to the assumption that the overall number of feasible acquisitions is fixed.

3.1 A residence based tax on interest income

Assume that the interest income households earn in the international credit market is subject to a residence based capital income tax denoted by θ (θ^*). Acquisition prices are now given by $P = \frac{\varepsilon(1-\tau)}{(1+r(1-\theta))}$ and $P^* = \frac{\varepsilon^*(1-\tau^*)}{(1+r(1-\theta^*))}$. The market value of the multinational firm is determined by

$$\begin{aligned} & (1+r(1-\theta))\left[V+\int_{\Delta^c}^{\Delta^+} P d\Delta+\int_{\Delta^{*c}}^{\Delta^{*+}}(P^*+T_1)d\Delta^*\right] \\ = & \int_{\Delta^c}^{\Delta^+}(\varepsilon+\Delta)(1-\tau)\,d\Delta+\int_{\Delta^{*c}}^{\Delta^{*+}}\left[(\varepsilon^*+\Delta^*)(1-\tau^*)-T_2\right]d\Delta^* \end{aligned} \tag{23}$$

Firm value maximization yields

$$\text{PO:}\quad \Delta^{*c}=\frac{\Delta^c(1-\tau)+T_1(1+r(1-\theta))+T_2}{1-\tau^*}+\frac{(\theta^*-\theta)r}{1+r(1-\theta^*)}\varepsilon^* \tag{24}$$

Apart from changing the expression for the discount factor $1+r(1-\theta^*)$, the tax

[14] Another difference is that the cash flow tax will collect tax revenue from intramarginal projects.

on interest income may distort acquisitions if the tax rates differ across countries. For instance, if $\theta^* > \theta$, the willingness to pay for an asset which generates a cash flow $\varepsilon^*(1-\tau^*)$ in the second period will be higher in the foreign country than in the domestic country because the after tax return to investment in the credit market is lower abroad. The budget constraints of the domestic household are now given by

$$C_1 = E - S - \int_{\Delta^{*c}}^{\Delta^{*+}} \left[\frac{\varepsilon^*(1-\tau^*)}{1+r(1-\theta^*)} + T_1 \right] d\Delta^* + G_1 \tag{25}$$

and

$$\begin{aligned} C_2 &= S(1+r(1-\theta)) + \left(m - \int_{\Delta^c}^{\Delta^+} d\Delta \right) \varepsilon(1-\tau) \\ &\quad + \int_{\Delta^c}^{\Delta^+} (\varepsilon + \Delta)(1-\tau)\, d\Delta + \int_{\Delta^{*c}}^{\Delta^{*+}} \left[(\varepsilon^* + \Delta^*)(1-\tau^*) - T_2 \right] d\Delta^* + G_2 \end{aligned} \tag{26}$$

Nationally optimal tax policy implies $\frac{dU}{d\Delta^{*c}} = 0$, which is given here by

$$\text{NO:} \quad \Delta^{*NO} = \frac{\Delta^c}{1-\tau^*} + \frac{(\theta^* - \theta)r}{1+r(1-\theta^*)}\varepsilon^* + \frac{r\theta}{1-\tau^*}\frac{dS}{d\Delta^{*c}}$$

How does the cross border cash flow tax system perform now? Using $T_1 = -\tau \frac{\varepsilon^*(1-\tau^*)}{(1+r(1-\theta^*))}$ and $T_2 = \tau(\varepsilon^* + \Delta^*)(1-\tau^*)$ in (24) yields

$$\Delta^{*c} = \frac{\Delta^c}{1-\tau^*} + \frac{(\theta^* - \theta)r}{1+r(1-\theta^*)}\varepsilon^* < \Delta^{*NO} \tag{27}$$

since $\frac{r\theta}{1-\tau^*}\frac{dS}{d\Delta^{*c}} > 0$. The cross border cash flow tax now yields too much foreign investment because the decline in credit market investment which goes along with the increase in foreign acquisitions gives rise to a tax revenue loss. The private sector does not take this into account. Therefore, a higher tax on foreign profits is required. From a global perspective, in contrast, the decline in revenue from the tax on interest income is compensated by the fact that foreign tax revenue increases. If $\theta^* = \theta$, the globally optimal tax system does not depend on the existence of taxes on interest income.

3.2 No quasilinearity of the utility function

In this section, we relax the assumption that the marginal utility of second period income is constant. Instead, assume the general utility function $U = U(C_1, C_2)$. This implies that the effect of a marginal change in acquisitions on the capital market and, hence, the interest rate is different, due to an income effect which arises.The first order conditions for optimal savings now take the more general form $U_{C_1} = (1+r) U_{C_2}$ and $U^*_{C_1^*} = (1+r) U^*_{C_2^*}$, where subscripts denote partial derivatives. In the case of quasilinear preferences, the foreign household reacts to a change in border crossing acquisitions by investing the additional revenue from selling firms in the credit market because the optimal level of first period consumption does not change. This is true although second period consumption of the foreign household will change by $\tau^* \Delta^{*c} d\Delta^{*c}$. If an additional firm is acquired and the ownership advantage is positive, tax revenue increases. This gives rise to an income effect. If utility is not quasilinear in second period consumption, this income effect may also affect first period consumption and, hence, savings. For instance, if first period consumption is a normal good, the foreign household will invest less than the additional revenue from selling firms in the credit market, so that the interest rate will have to adjust to restore equilibrium in the credit market. This affects the nationally optimal repatriation tax policy in our model.

Recall the budget constraints in (4) and (5). Now, solve for $\max_{\Delta^{*c}} U = U(C_1, C_2)$:

$$\begin{aligned} \frac{dU}{d\Delta^{*c}} &= U_{C_1}\left(-\frac{dS}{d\Delta^{*c}} + \frac{\varepsilon^*(1-\tau^*)}{(1+r)} - \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\varepsilon^*(1-\tau^*)}{(1+r)^2} d\Delta^* \frac{dr}{d\Delta^{*c}}\right) \\ &\quad + U_{C_2}\left((1+r)\frac{dS}{d\Delta^{*c}} + S\frac{dr}{d\Delta^{*c}} + \Delta^c - (\varepsilon^* + \Delta^*)(1-\tau^*)\right) \end{aligned} \tag{28}$$

Using $\frac{U_{C_1}}{U_{C_2}} = 1 + r$ and setting $\frac{dU}{d\Delta^{*c}} = 0$ this expression boils down to

$$\Delta^{*c} = \frac{\Delta^c + NCE\frac{dr}{d\Delta^{*c}}}{1-\tau^*} \tag{29}$$

where NCE stands for domestic net capital exports, which are given by

$$NCE = S - \int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\varepsilon\,(1-\tau)}{(1+r)} d\Delta^*\,(1-\tau^*) \tag{30}$$

Not surprisingly, the impact on the interest rate may change the welfare effect of a change in foreign acquisitions, depending on whether the country is a net capital exporter or importer. It is an open question, though, whether the choice of the tax regime, which is typically a long term decision, will be influenced by terms of trade considerations. It is likely that other instruments like tax rates are more appropriate to address this issue.

3.3 Initial owners participate in the surplus

So far, we have assumed that the initial owners of existing firms do not receive more than their reservation profit when they sell their firms. But in real world transactions, it is likely that they do receive part of the surplus.[15]

Consider firstly the case of m&a when the multinational firm has to decide between acquiring either the foreign or the domestic target firm. The surplus generated by a domestic (foreign) acquisition, evaluated at second period prices, is given by $\Delta\,(1-\tau)$ or $\Delta^*\,(1-\tau^*) - T_1(1+r) - T_2$, respectively. Assume that the initial owners receive a share $0 \leq \beta \leq 1$ (or $0 \leq \beta^* \leq 1$) of this surplus, so that the acquisition prices are $\frac{(1-\tau)\varepsilon+\beta\Delta(1-\tau)}{1+r}$ and $\frac{\varepsilon^*(1-\tau^*)+\beta^*(\Delta^*(1-\tau^*)-T_1(1+r)-T_2)}{1+r}$, respectively.[16] Thus, the market value is given by

$$V = (1-\beta)\int_{\Delta^c}^{\Delta^+} \frac{\Delta\,(1-\tau)}{(1+r)} d\Delta + (1-\beta^*)\int_{\Delta^{*c}}^{\Delta^{*+}} \frac{\Delta^*\,(1-\tau^*) - T_1(1+r) - T_2}{(1+r)} d\Delta^* \tag{31}$$

Again, the firm maximizes its market value by choosing Δ^{*c}, taking into account

[15] This may be due e.g. to the fact that there is some room for bargaining, for reasons not included in our model.

[16] Here, we assume that the investor firm has to decide first whether to acquire the domestic or the foreign firm before negotiating, so that the reservation profit in the bargaining game is equal to zero. A more complicated setup would be one where bargaining with domestic and foreign initial owners takes place simultaneously.

$d\Delta^c = -d\Delta^{*c}$. This yields,

$$\text{PO:} \quad \Delta^{*c} = \frac{\Delta^c (1-\tau) + T_1(1+r) + T_2}{1-\tau^*} + \left(\frac{\beta^* - \beta}{1-\beta^*}\right) \frac{\Delta^c (1-\tau)}{(1-\tau^*)} \tag{32}$$

The first term on the r.h.s. is the same as in equation (3). The second term is equal to zero, if the share in the surplus accruing to the initial owners is equal at home and abroad ($\beta^* = \beta$).

3.4 Domestic and foreign investor firms competing for acquisitions

So far, we abstracted from the possibility that investor firms from different countries compete for the same target firm. Therefore assume that there is a second investor firm in the foreign country. The domestic and the foreign firm bid for a target firm located in the foreign country. Ownership advantage is assumed to be a public good within the firm.[17] In order to acquire the firm, the price the domestic firm offers has to be at least as high as the price offered by the foreign firm. The change in profits which occurs if the foreign investor acquires the target firm is denoted by Δ^{*f}. The target firm will be acquired by the domestic investor if

$$(\Delta^* + \varepsilon^*)(1-\tau^*) - T_1(1+r) - T_2 > (\Delta^{*f} + \varepsilon^*)(1-\tau^*) \equiv P^{*f-\max} \tag{33}$$

where $P^{*f-\max}$ is the maximum purchase price the foreign firm is willing to pay. This can be reduced to

$$\Delta^* - \Delta^{*f} > \frac{T_1(1+r) + T_2}{1-\tau^*} \tag{34}$$

It is immediately clear that any positive tax on foreign profits of a marginal project would imply too few foreign acquisitions of domestic investors from a global perspective. But is this also true from a national point of view? Nationally optimal investment implies that domestic firms should carry out the acquisition in all cases

[17] This allows to abstract from alternative investment opportunities. Including them would add notation but leads to the same results.

where

$$(\Delta^* + \varepsilon^*)(1 - \tau^*) - P^* \geq 0 \tag{35}$$

where P^* is the acquisition price. Using $P^* = P^{*f-\max} = (\Delta^{*f} + \varepsilon^*)(1 - \tau^*)$, this can be reduced to

$$\Delta_j^* - \Delta^{*f} \geq 0 \tag{36}$$

It turns out that nationally and globally optimal investment requires $T_1(1 + r) + T_2 = 0$, which may be implemented either by using the exemption system or the cross border cash flow system. This confirms the intuition in Desai and Hines (2003, 2004) who argue that US firms may be at a systematic disadvantage when competing for foreign acquisitions, and that this is against the national interest.

3.5 Acquisitions of foreign firms from domestic owners

So far, we have considered acquisitions of foreign firms which are initially held by foreign owners. In this extension, we assume that the acquired firm is initially held by another domestic owner. The main difference is that the purchase price P^* is adjusted since repatriation taxes on the initial owner have to be taken into account. With $P^* = \varepsilon^*(1 - \tau^*) - (1 + r) T_1(\varepsilon^*) - T_2(\varepsilon^*)$, equation (3) becomes

$$\text{PO:} \quad \Delta^{*c} = \frac{\Delta^c(1 - \tau) + (1 + r) T_1(\Delta^{*c}) + T_2(\Delta^{*c})}{1 - \tau^*} \tag{37}$$

Interestingly, it is straight-forward to show that the full taxation after deduction system is optimal from a national point of view, and that the tax credit system is optimal from a global perspective. For m&a transactions between domestic owners, the standard results are still valid. The case where domestic multinational firms trade foreign firms among themselves may be of secondary importance empirically. But it becomes clear that the optimality properties of repatriation taxes depend critically on the tax status of the buyer and the seller, not just the type of investment.

4 Discussion and concluding remarks

In the preceding sections, we have analyzed the effects of taxes on international capital flows when investment is m&a instead of real capital relocation. It has been shown that the tax effects may be quite different from the effects emerging in the standard capital mobility model. Table 2 briefly summarizes the results.

Nationally optimal tax policy

	Capital allocation	Ownership allocation
Foreign inv. reduces domestic inv.	Full taxation after deduction	Cross border cash flow
Foreign inv. does not reduce domestic inv.	-	Exemption or Cross border cash flow

Globally optimal tax policy

	Capital allocation	Ownership allocation
Foreign inv. reduces domestic inv.	Tax credit system	-
Foreign inv. does not reduce domestic inv.	-	Exemption or Cross border cash flow

Table 2: Optimal repatriation tax systems.

What are the policy implications of the analysis? Firstly, the traditional focus on the tax credit system in double taxation agreements and international tax coordination proposals, e.g. within the EU, may be misguided. It is based on the assumption that the geographical location of investment matters for its productivity whereas corporate ownership structures do not. In the real world, however, corporate ownership structures are crucial for the exploitation of synergies, for access to technological and administrative know-how and for the solution of corporate governance problems. In an increasingly knowledge based economy with declining communication and transport costs, these factors are likely to gain importance relative to the geographical location of production facilities. If this is correct, tax distortions of ownership structures deserve more attention.

Secondly, our results are relevant for the current tax policy debate in the U.S., the U.K. and other countries considering reforms of their repatriation tax systems.[18] Our findings confirm the view expressed by Desai and Hines (2003, 2004) that the tax credit system may not be optimal in cases where foreign investment takes the form of mergers and acquisitions. But, we also show that the exemption system is only optimal if ownership advantage is a public good within the firm.

[18] The U.K. government has recently published a document suggesting that the U.K. should switch to the exemption system at least for large multinational corporations, see H.M. Treasury (2007).

Interestingly, the current tax policy debate in some countries, e.g. Germany, points into the opposite direction. The fact that foreign profits are exempt from domestic taxes is often criticized because the exemption system is seen as creating incentives for German firms to invest abroad, where taxes are lower, rather than at home. A switch to a tax credit system is seen as beneficial for domestic economic activity. The results derived in this paper point to neglected potential costs associated with such a move. Currently, Germany is the country of residence of many headquarters of multinational firms. Higher taxes on foreign profits of domestic firms would create incentives to sell foreign subsidiaries to multinational firms residing in other countries[19] although this is not in the national interest.

Thirdly, our results differ to what Desai and Hines (2003, 2004) suggest in two important aspects. In the case where investors decide whether to acquire a firm at home or abroad, the tax credit system does not necessarily imply that there are too few acquisitions from a national point of view; there may be too many as well. Moreover, the exemption system leads to overinvestment abroad. In this case, the cross border cash flow system is optimal from a national point of view.[20]

A fourth implication of our results is that the optimality properties of taxes on foreign profits, both from a national and a global point of view, crucially depend on the type of investment. Many real world investment projects will include elements of both, real capital investment and acquisition. National optimality or neutrality of the tax system for all types of capital flows therefore seems hard to achieve.

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[19] Another option would be to move headquarters, a possibility not included in the analysis of this paper.

[20] Of course, the OECD double taxation convention does allow an exemption system whereas the possibility of introducing a cross border cash flow tax is not included. Therefore, the latter is no doubt more difficult to implement in practice.

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