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THE IMPACT OF TAX REFORM ON FOREIGN DIRECT INVESTMENT

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The Impact of Tax Reform on Foreign Direct Investment

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Abstract

In an open economy the designers of the tax corporate system have to face the possibility that a too high tax may push capital abroad, through direct investments. This paper analyzes the Swedish tcorporate tax system with respect to the effective marginal corporate tax rate on a standard investment project. The estimation results point toward a small but, positive and significant, response of investment in new capital abroad to the net, after tax, return. The results also indicate that the 1991 tax reform had a very limited effect on foreign direct investment flows.

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1 Introduction

The purpose of this study is to assess the impact of the 1990/91 Swedish tax reform on the incentives for Swedish companies to undertake foreign direct investments. The research approach is to calculate the change in the effective tax rate facing companies operating in Sweden, and compare this with effective tax rates in the major host countries for Swedish direct investment. The sensitivity of real capital flows to changes in the effective tax rate will be estimated and the likely impact of the tax reform, on capital formation and welfare, will be discussed on the basis of this analysis.

In its report (SOU 1989:34) to the parliament, the committee on business tax reform explicitly recognized that a small open economy, like the Swedish one, cannot have a substantially higher rate of taxation on capital than its competitors. It was also its opinion that the sustainable difference between the Swedish and the average foreign tax rate has narrowed in recent times and that the designers of the tax reform had to take this into account. Furthermore, this aspect was considered more important with respect to taxation of capital used by firms, than taxation of income from ownership of claims to this capital.

In the next section I will give a brief review of the impact of capital taxes on the rate of return and illustrate the differences that the degree of openness of economy make to the analysis of the impact of tax changes. I will also discuss the different methods of taxing international source income and the consequences they have for resource allocation between countries. Section 3 contains some empirical evidence as well as the estimation of models of direct investment flows, where particular emphasis is on the impact of tax changes.

My task has not been to make a thorough and detailed investigation of the change in the effective marginal tax rate on corporate investment income due to tax reform. The analysis is simplified in that respect and focuses on how the tax reform changed the Swedish corporate tax climate vis-à-vis some major host countries for foreign direct investment from Sweden.

2 A Theoretical Background to Capital Income Taxation

Taxation of income from capital can be applied at two levels: at the level of capital used in the production of goods and services and at the level of the

owners of this capital. The owners are hereafter called savers and taxes on owners' income will be assumed to influence the supply of savings. Taxes on capital in use influence demand for capital. Thus both the demand and the supply side is potentially distorted by capital income taxation.

The analysis of taxation is usually done by measuring "tax wedges," i.e., the difference between the tax-inclusive and the tax-exclusive price of a good. In the case of capital income taxation the tax wedge is the difference between the rate of return before and after tax. If one relates this wedge to the pre-tax rate of return one gets an "effective tax rate" on the piece of capital analyzed.

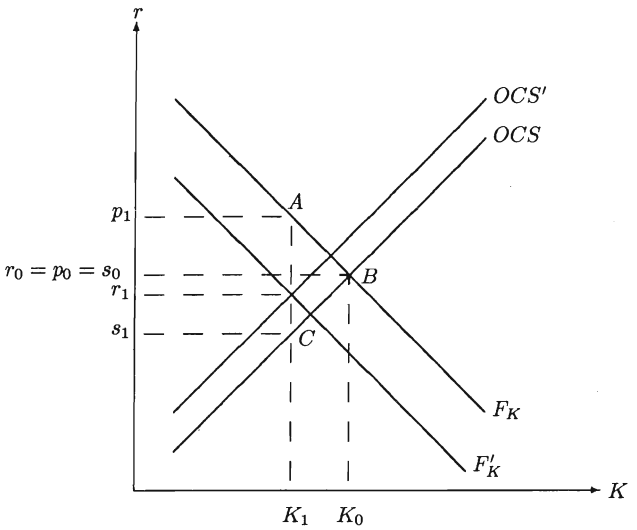
Taxation induces deadweight losses, i.e., losses to consumers and/or producers in excess of the tax revenue collected by the government. In order to assess the effect of tax reform on resource allocation the changes in these deadweight losses, or welfare costs of capital taxation, should be calculated. This analysis is quite different if one assumes a closed economy or an open economy.

2.1 Welfare cost of capital taxation in a closed economy

I start by assuming a closed economy with a homogeneous capital good. The equilibrium stock of this good, called K, is determined by the consumers' preferences for future versus current consumption, the supply of savings, and the technology which determines the marginal physical product of capital. On the supply side savers have to pay personal taxes on their income from capital, I call this tax rate t_p. If a representative saver earns a market interest rate, i, on an asset, his after-tax return is: $s = i \cdot (1 - t_p)$. On the demand side the typical producer pays a tax, τ, on the income that the asset produces. This implies that the post-tax marginal product is: $(1 - \tau) \cdot F_K$, where F_K is the marginal revenue product of capital net of depreciation. If firms are required to earn an internal rate of return after tax equal to the market interest rate the required pre-tax rate of return, will become: $p = \frac{i}{(1-\tau)}$. The total tax wedge applied to income from this capital asset is thus $p - s$, and the effective tax rate is: $\tau^* = \frac{(p-s)}{p}$.

The tax wedges and welfare cost of capital income taxation is illustrated in Figure 1. The curve labelled OCS shows the opportunity cost of savings according to consumers' preferences. Introduction of a personal tax on the return to savings shifts the curve upwards by t_p, (to OCS'). The curve labelled F_K shows the marginal product of capital; a tax shifts this curve down to F_K'. In the initial state, without taxes, the cost of capital and the return to savings

Figure 1: The effect of capital income taxes in a closed economy



is equal to the market interest rate: $r_0 = p_0 = s_0$. With taxes the market interest rate changes to r_1, while the required pre-tax rate of return increases to p_1 and the return to savings drops to s_1. The equilibrium capital stock will fall from K_0 to K_1, and the welfare cost is the area ABC. This welfare cost may also be approximated as $\frac{1}{2} \cdot (p_1 - s_1) \cdot \Delta\, K$. The welfare loss thus depends on the slopes (elasticities) of the supply- and demand curves.

2.2 Capital taxation in an open economy

International capital flows are divided into two categories: *portfolio investments* and *foreign direct investment.* The former concept is associated with short term financial investment done with the purpose of achieving portfolio diversification without an explicit ownership responsibility in the invested company. The latter concept is associated with long-term ownership responsibility. The dividing line is usually set, arbitrarily, to a 10% ownership stake.

Portfolio investment can be in foreign bonds as well as stocks. If one assumes that there is no risk this distinction is immaterial and we may assume that all investments are done in bonds. In an international capital market characterized by free and uninhibited flows of capital across borders, as well as no information

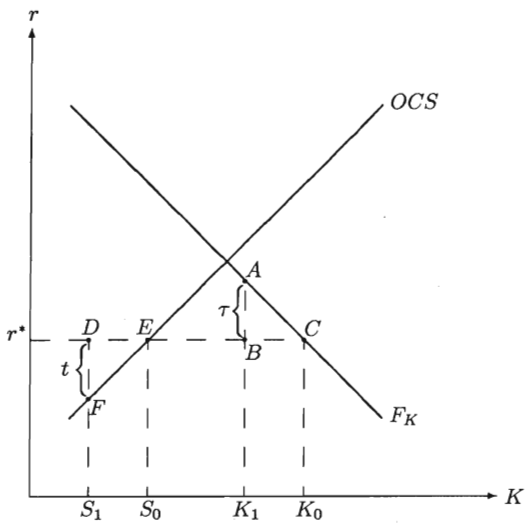
asymmetries, the expected rate of return on the last unit invested should be equalized across national markets. Taxes may interfere with the international capital market equilibrium in different ways, depending on the system used for accounting for so called international double taxation. For example, assume that r is the yield on a typical bond in the home country and r^* is the yield on the foreign market. We assume here that there is no currency risk, i.e., irrevocably fixed exchange rates. Without taxes and barriers to international capital flows, full information, and barring corner solutions, the equilibrium will be such that: $r = r^*$. With taxes only on investment at home the equilibrium will be: $(1-t)r = r^*$. If the foreign country is large compared to the home country, the home tax may have very little effect on the world interest rate. If it has no effect, i.e., r^* is a given constant from the point of view of home country investors, the introduction of the home country tax will have the effect of increasing the pre-tax yield on home country bonds, so that: $r = r^*/(1-t)$.

With free capital mobility domestic saving does not have to be equal to domestic investment; investments can be financed by an inflow of savings from abroad for example. In this case the pre-tax rate of interest is fixed at the world interest level, and is also equal to the firms' cost of capital. An interest tax will have the effect of lowering the post-tax return to domestic savers, thus lowering the quantity of savings, but will not in itself affect the rate of domestic investment. If the country was importing capital to start with, running a current account deficit, the deficit will increase. The effect on economic welfare is that the tax on savings have resulted in a deadweight loss approximately equal to: $\frac{1}{2}t\Delta S$, where t is the tax rate and ΔS is the decrease in the quantity of savings supplied. In Figure 2 the deadweight loss from the tax on savings is equal to the area DEF.

If instead firms' were taxed on the income generated from their investments, by a corporate income tax for example, the pre-tax required rate of return will have to rise so that the post-tax return was equal to the world interest rate. The domestic corporations cost of capital has increased and they will adjust their capital stock downwards. This incurs a deadweight loss of approximately: $\frac{1}{2}t\Delta K$, where ΔK is the reduction in the aggregate capital stock. This corresponds to the area ABC in Figure 2.

Governments do not only tax capital income they also provide subsidies, both in the form of savings incentives and investment incentives. In a closed economy it is, in principle, possible that the government could tax savings

Figure 2: The effect of capital income taxes in an open economy



and provide a subsidy to investments so that the end result is an unchanged capital stock; the pre-tax interest will increase by the amount of the tax. In an open economy, in contrast, an increasing interest rate will cause an incipient capital inflow which will force the interest rate back towards the world level. Corporations will "overinvest" since the cost of capital has been reduced due to the subsidy; the result is again a deadweight loss of the same magnitude as before, $\frac{1}{2}s\Delta K$, where s now is the subsidy rate. The combination of tax on savings and a subsidy at the same rate will in this case result in a total deadweight loss of the amount: $-\frac{1}{2}t(|\Delta S| + |\Delta K|)$.

The conclusion from this discussion is that the impact of tax reform depends a great deal on the degree of openness of the economy to capital flows. The last decade has seen a gradual lowering of barriers to capital flows and increased financial integration, the impact of tax changes on capital income are therefore likely to have a larger impact on real investment, and its localization than in earlier, less integrated, times. Another conclusion is that one may, in an open economy framework, analyze investment and savings incentives separately. I will follow this approach here focusing on the corporate tax rate and investment incentives directed towards companies. Before turning to investment incentives I will discuss the meaning and importance of international taxation methods

2.3 International taxation methods

An international investor may be taxed on the foreign interest income in both the source country (the country where the income accrues) and in his home country. This could happen if both countries tax all income accruing within its own borders, and also tax its own residents on all income they earn, wherever they earn it. The same result would apply if the home country adhered strictly to the *residence principle* of foreign source income taxation, and the source country adhered to the *territorial principle.* In this case the source country taxes all income earned within its borders, irrespective of the residency of the recipient; and the home country taxes only its own residents, but on all their income, wherever earned. If both countries adhered strictly to the same taxation principle, the outcome would be single taxation.

It is unusual that countries adheres strictly to the same, or even to only one principle, so double taxation is in practice the norm. However, bilateral treaties have been signed between most major countries, which specifies which country have the right to tax each kind of income; if both tax the same income it also specifies what method(s) should be used to mitigate the effect of the international double taxation.

There are three basic methods to alleviate international double taxation: *exemption, deduction* and *credit. Exemption* implies that either country, for example the country of residence of the recipient, waives its right to tax the income. This implies, in effect, a territorial principle. *Deduction* means that the recipient can deduct the foreign taxes paid from his home tax base as an expense. The total taxes paid per unit of taxable income is: $t^* + t - t^* \cdot t$; the rate of tax reduction is in this case equal to the product of the two tax rates, $t^* \cdot t$. With the *credit* method the taxpayer calculates his home taxes as usual, without deducting foreign taxes, but only pays the difference between his home taxes and foreign taxes to the home country tax authorities. If the foreign tax rate is higher than the domestic rate, however, no tax refund is usually given. This is because a capital importing country would have an incentive to increase its tax rate at the expense of capital exporting countries. The total taxes paid per unit of taxable income is in this case: $t^*+t-\min(t^*,t)$,The effective marginal tax rate is therefore the larger of the two tax rates. The credit method is thus not a perfect substitute for a pure adherence to the residence principle.

2.3.1 Capital export- and import neutrality

If both countries adheres to the residence method, or if they have signed a double-taxation treaty giving the country of residence of the owner to the income stream the sole right of taxation, the localization of foreign direct investment will not be affected by different tax rates at home and abroad. This has been called *capital export neutrality* and has been seen as a desired goal for international harmonization of tax policy toward companies. From a theoretical viewpoint, the main point is that capital localization decision are taken on a pre-tax basis, guaranteeing an efficient allocation of capital across countries.

On the savings side the residence method does not do so well, however. If interest rates are equalized across countries, savers will not generally receive the same after-tax return on their savings. This mean that the intertemporal marginal rates of substitution are not equated across countries and the allocation of savings will not be efficient. This is accomplished if a pure territorial system is used, however. In this case so called *capital import neutrality* is achieved because, within a particular country, capital imported from various other countries will be taxed at the same rate. However, this means that exporters will evaluate their localization decisions on the basis of post-tax returns, and an equalization of marginal products across countries will not be achieved, and hence not allocative efficiency.

It will appear that unless tax rates are equalized, it will not be possible to achieve an efficient allocation of both savings and capital across countries. For reasons that are unclear the international tax-harmonization efforts, e.g. through the OECD, has concentrated more on achieving efficiency on the productions side, and have therefore recommeded the adoption of the residence method.

2.4 Tax Incentives and Effective Tax Rates on Foreign Direct Investments

When calculating the effect of taxation on resource allocation one should define the actual tax base and the tax rate applied to it. If tax bases differ, but tax rates are the same, the *effective tax rate* on the last dollar of income earned will differ. In this section I will discuss how to derive the concept of effective tax rates, and later apply it to the analysis of international corporate taxation.

2.4.1 Corporate Taxation

Foreign direct investment is usually performed by corporations which receive dividends from its subsidiaries and thereafter pay dividends to its shareholders. I will therefore focus entirely on the corporate income tax.

Corporate income for tax purposes seldom conforms to the definition of true economic income. The latter concept is equal to current cashflow plus the change in value of assets since the last period. The change in value of, for example machines used in production, is usually negative due to wear and tear and economic obsolescence. Under certain circumstances the periodic decrease in value is equal to the rate of economic depreciation, δ. The true income, and the ideal tax base for an income tax, is under these circumstances: $F(K) - \delta \cdot K$, where $F(K)$ is a value added function and K is the current capital stock. Depreciation deductions for tax purposes are in reality determined as approximations to true economic depreciation and are, in addition, used as investment incentives. The latter implies that the present value of depreciation deductions for tax purposes exceed the present value of the true depreciation deductions.

Let's define the period t depreciation deductions as D_t, the present value of the remaining deductions as of date s is then: $Z_s = \int_s^\infty e^{-r(t-s)} \cdot D_{t-s}\, dt$. Depreciation deductions do not affect the cashflow from an individual investment project; however, with taxation they constitute a source of tax savings such that the after-tax cashflow each period is equal to: $(1-\tau)\cdot F(K_t) + \tau \cdot D_t$. The present value, at time t, of all remaining tax savings is: $\tau \cdot Z_s$. It is assumed here that the corporate tax rate is not expected to change in the future, so it is not indexed by time.

The value of the firm at time t is the present discounted value of all future cashflows; it may expressed as:

$$V_t = \int_t^\infty e^{-is} \left[(1-\tau)F(K_s) - q(\dot{K}_s + \delta \cdot K_s)(1 - \tau \cdot Z_s)\right] dt + A_t \qquad (1)$$

where $\dot{K}_s + \delta \cdot K_s = I_s$ is the investment volume at time s, i is the nominal discount rate and q is the pre-tax marginal cost of one unit of investment good relative to the price of output (assumed constant over time). A_t is the present value of tax incentives on existing assets at time t; it is predetermined and will not influence the marginal incentives for new investment. Tax incentives may be thought of as tax savings due to certain provisions in the tax code, such

as depreciation deductions in excess of true economic depreciation. Deriving the Euler equation and solving for the value of the marginal product at time t, gives:

$$F_K(K_t) = q\left[\frac{(1-\tau \cdot Z_t)(\delta+\rho)}{1-\tau}\right] \tag{2}$$

where $\rho = i - \pi$ is the real discount rate; π is the expected inflation rate. Equation 2 defines the gross marginal product which is equal to the marginal cost of an extra unit of investment good, inclusive of the opportunity cost of funds. This is called the *user cost of capital,* which we will denote by c. If depreciation deductions for tax purposes conforms to economic depreciation, which in turn follow an exponential decline, we can write the per dollar deduction of a piece of equipment of age $(s-t)$, as: $D_{s-t} = \delta \cdot e^{-\delta(s-t)}$. The present value of the remaining deductions are: $\int_t^\infty \delta \cdot e^{-(\delta+\rho)(s-t)} ds = \frac{\delta}{\rho+\delta}$. Defining θ as the effective tax rate, which, given economic depreciation, makes the user cost of capital equal to the gross marginal product, we can write:

$$c = q\left(\frac{(\rho+\delta)\cdot(1-\tau \cdot Z_t)}{1-\tau}\right) = q(\frac{\rho}{1-\theta}+\delta) \tag{3}$$

Solving for the effective marginal tax rate, we get

$$\theta = \frac{\left(\frac{c}{q}-\delta\right)-\rho}{\frac{c}{q}-\delta} \tag{4}$$

From Equations 3 and 4 it is clear that the effective marginal tax is increased by an increase in the statutory corporate tax rate if $Z_t < 1$, given that such an increase does not affect the interest rate. On the other hand an increase in τ can be offset by changes in tax incentives which increases Z_t. The effect of inflation is ambiguous. However, it is generally considered that in most tax systems the combination of interest deductibility at nominal rates and high inflation have had the net effect of favoring debt as a source of finance and lowering the effective tax rate.

3 Empirical Evidence

3.1 Swedish Tax Rules of Foreign Source Income

Sweden has in general followed the residence principle, taxing people and companies residing in Sweden, on their worldwide income. However, a multinational parent company incorporated in Sweden and owning a foreign subsidiary, derive

its income from the subsidiary in the form of dividends. The periodic operating income of the subsidiary, which is incorporated in the host country, is not taxed as it accrues in Sweden, but only in the host country. If the subsidiary is a branch of the parent, localized abroad, it will pay taxes in both countries as it accrues.[1] Furthermore, the internal tax legislation in Sweden provides that intergroup dividends are exempt from tax, for the receiving company, if it owns at least 25 percent of the voting stock of the dividend paying company. Dividends from foreign subsidiaries are generally exempt from income tax under the provisions of most tax treaties. Dividends from non-treaty countries are tax free, provided the foreign company is subject to income tax similar to that imposed on a Swedish company.[2] The only tax the Swedish parent must pay on its subsidiary's dividends is a *withholding tax* which the host country levies on dividends sent abroad. In most cases the latter tax has been reduced by bilateral double taxation treaties and is usually only around five percent. Therefore, ignoring the withholding tax, the effective taxation principle is the territorial, or source, principle. This means that the relevant tax rate to consider is the effective tax rate in the host country (θ^*).

The location decision of investment from countries which use a territorial system of taxing corporate income, i.e., exempt the foreign income from home taxation, would be expected to be influenced by the effective tax rate in various host countries. If this is the case the national governments may be interested in adjusting the effective tax rate, θ^*, to maximize national welfare. This will amount to striking a balance between taxing income earned by foreigners as much as possible (since they are not included in the national welfare function), and not discourage foreign direct investment too much. It may be shown that the optimal tax depends on the elasticity of the supply of foreign capital with respect to the after tax return (see. e.g. Modén 1993). The basic result is that a country which is big enough so that it can affect the pre-tax rate of return, is able to apply a higher tax rate on internationally mobile capital, than a smaller country which cannot affect the international rate of return. Effective tax rates on capital may therefore depend on country specific factors such as total factor productivity, locational advantages, quality of local public goods etc. Countries which are more advantaged in these respects may be able to charge higher taxes, and increase their national welfare, than less advantaged

[1] In some countries, for example Germany, branches of foreign companies are taxed at different tax rates than companies incorporated in the country.

[2] See Price-Waterhouse, 1984-93.

countries. The latter may apply lower tax rates in order to attract foreign capital. Such a strategy may be beneficial if the foreign capital carries with it positive external effects which spill over to the home industry, thereby raising its total factor productivity.

3.2 Effective average tax rates

The traditional measures of the incentive effects of the tax system is to measure effective *marginal* tax rates. However, a reasonable case can be made for also focusing on effective *average* tax rates. The great advantage of average tax rates is that they are observable, in contrast to marginal rates. I will therefore consider both types of tax rates, starting with average rates.

When comparing average tax rates from income statements one should correct for the interest deductibility. If this is not done the debt-equity proportion will influence the measured tax burden on equity. The effective average tax rate is therefore defined as: the difference between the rate of return on total capital before tax and the rate of return after tax divided by the return before tax. The before tax return is defined as earnings after tax plus taxes and interest payments divided by the total (book) assets. The return after tax equals earnings after corporate tax plus interest payments, minus the imputed corporate tax deduction received for the interest payments, divided by the same base.[3]

Table 1 presents the development of average tax rates for some selected countries. It is striking that the tax rates have been quite close and that they have tended to move together. Germany is an exception since its tax rate has been stable at around 55% throughout the period. It is also noteworthy that the Swedish tax rate has followed the general downward movements during the eighties; the correlation coefficient between (the level of) the average of the other countries tax rates and the Swedish tax rate was 0.771 for the period 1979-1990

The strong tendency for tax rates to adjust, or "follow" each other (or a leader) makes it doubtful whether they can be viewed as exogenous variables. Rational decisionmakers may assume that national governments are going to adjust their effective tax rates in order to keep its domestic capital at home, or to attract foreign capital. Even well announced tax reforms in a major country may not have a big reallocative effect if this endogenous reaction of other countries is taken into account. This in turn make it very difficult to

[3]See Ando & Auerbach 1988.

Table 1: Effective average tax rates in selected countries

Year	USA	UK	France	Germ--any	Nether-lands	Norway	Finland	Sweden
1965	0.417			0.570				
1966	0.427			0.587				
1967	0.423			0.591			0.572	0.424
1968	0.468			0.508			0.571	0.417
1969	0.498			0.481		0.440	0.487	0.439
1970	0.512		0.433	0.472		0.442	0.482	0.456
1971	0.489		0.435	0.493		0.500	0.518	0.436
1972	0.475		0.460	0.509		0.505	0.497	0.434
1973	0.512		0.422	0.549		0.434	0.500	0.415
1974	0.585		0.375	0.563		0.343	0.308	0.457
1975	0.493		0.539	0.557		0.461	0.579	0.466
1976	0.496		0.482	0.514		0.436	0.653	0.446
1977	0.484		0.504	0.555	0.457	0.475	0.601	0.620
1978	0.497		0.545	0.552	0.494	0.532	0.482	0.415
1979	0.515	0.335	0.413	0.559	0.463	0.409	0.358	0.480
1980	0.534	0.506	0.400	0.555	0.508	0.414	0.381	0.496
1981	0.485	0.516	0.420	0.595	0.493	0.614	0.458	0.514
1982	0.465	0.504	0.440	0.606	0.480	0.657	0.508	0.443
1983	0.430	0.521	0.460	0.579	0.430	0.608	0.528	0.470
1984	0.413	0.442	0.390	0.577	0.362	0.576	0.481	0.402
1985	0.393	0.414	0.460	0.567	0.343	0.675	0.501	0.391
1986	0.426	0.291	0.420	0.538	0.364	0.504	0.453	0.330
1987	0.380	0.316	0.427	0.569	0.358	0.479	0.401	0.348
1988	0.374	0.317	0.374	0.558	0.384	0.452	0.406	0.315
1989	0.384	0.316	0.328	0.581	0.316	0.435	0.338	0.328
1990	0.376	0.322	0.335	0.570	0.348	0.487	0.374	0.306
Average:	0.460	0.400	0.406	0.552	0.414	0.495	0.481	0.428
Stand. dev.:	0.054	0.089	0.068	0.035	0.065	0.085	0.085	0.066

Sources: OECD (1982, 87 & 92).

measure the effect of a tax change on foreign direct investment since investors with rational (forward looking) expectations may take the likely reaction into account. International tax competition is just one aspect of the potential endogeneity of tax rates. Changes in tax incentives, and thus in effective tax rates, may depend directly on general economic conditions in each country separately. For example, high unemployment and slow growth induces governments to try supply side policies such as applying tax incentives. If effective tax rates are determined by such political factors future changes may be anticipated and current investment will depend in part on those anticipations.

The calculation of effective average tax rates involves the calculation of rate of return measures. Comparisons of such measures between countries are fraught with difficulties, particularly with respect to the denominator, i.e., the measure of the assets of the companies. The corrections needed requires detailed data from each country, which was not available, the results are therefore presented uncorrected. Table 2 shows the before corporate rate of return, as defined above and Table 3 shows the after tax rate of return.

3.3 Effective marginal tax rates

Effective marginal tax rates are computed as the percentage difference between the internal rate of return before and after tax of a standard investment project, one project for each country. An explanation of the methodology and needed assumptions is provided in the appendix. It is assumed that each country project has the same pre-tax rate of return. One marginal source of funds, debt, is considered and personal taxation is not considered since the dividend withholding tax generally has been quite low (see next section). The results of the computations are given in Table 4.

The calculated marginal tax rates are sensitive to expected inflation, which is assumed to be the actual inflation in each year. Higher inflation reduces the marginal tax rates mainly due to interest deductibility of nominal interest rates. However, inflation raises tax rates since depreciation deductions are not indexed and thus declines in real value. The net result for the standard project and tax systems considered in the simulations is that inflation lower the marginal corporate tax rate. The other main source of variation in marginal tax rates is tax incentives such as accelerated depreciation and tax credits. Taken together these effects sometimes produces negative marginal tax rates.

A noteworthy thing is that while the average marginal tax rate has been

Table 2: Pre-tax rate of return on total capital in the corporate sector in selected countries

Year	USA	UK	France	Germ--any	Nether-lands	Norway	Finland	Sweden	Aver-age
1965	0.095			0.166					
1966	0.096			0.159					
1967	0.088			0.160			0.078	0.062	
1968	0.089			0.132			0.082	0.073	
1969	0.083			0.132		0.062	0.083	0.046	
1970	0.067		0.071	0.125		0.051	0.074	0.043	
1971	0.065		0.066	0.119		0.045	0.066	0.038	
1972	0.067		0.065	0.116		0.046	0.067	0.041	
1973	0.073		0.079	0.116		0.060	0.064	0.045	
1974	0.067		0.106	0.113		0.073	0.108	0.038	
1975	0.066		0.060	0.106		0.056	0.062	0.043	
1976	0.078		0.068	0.113		0.056	0.059	0.045	
1977	0.080		0.060	0.112	0.044	0.049	0.065	0.036	
1978	0.083		0.052	0.109	0.046	0.049	0.081	0.057	
1979	0.085	0.087	0.070	0.110	0.061	0.073	0.104	0.053	0.080
1980	0.081	0.051	0.084	0.111	0.050	0.081	0.103	0.056	0.077
1981	0.095	0.055	0.077	0.104	0.050	0.197	0.095	0.064	0.091
1982	0.074	0.057	0.068	0.101	0.051	0.188	0.082	0.078	0.086
1983	0.074	0.064	0.062	0.096	0.054	0.220	0.077	0.071	0.090
1984	0.093	0.075	0.068	0.096	0.063	0.243	0.076	0.059	0.097
1985	0.087	0.077	0.061	0.098	0.063	0.238	0.073	0.071	0.096
1986	0.079	0.142	0.069	0.099	0.116	0.125	0.067	0.081	0.097
1987	0.087	0.134	0.067	0.106	0.059	0.101	0.069	0.073	0.087
1988	0.097	0.138	0.085	0.108	0.073	0.095	0.062	0.080	0.092
1989	0.100	0.135	0.098	0.109	0.085	0.128	0.080	0.077	0.101
1990	0.074	0.112	0.081	0.114	0.075	0.133	0.063	0.059	0.089

Source: OECD (1982, 87 & 92).

Table 3: Post-tax rate of return on total capital in corporate sectors in selected countries

Year	USA	UK	France	Germany	Netherlands	Norway	Finland	Sweden	Average
1965	0.055			0.072					
1966	0.056			0.066					
1967	0.051			0.065			0.033	0.036	
1968	0.047			0.065			0.035	0.042	
1969	0.042			0.069		0.035	0.042	0.026	
1970	0.033		0.041	0.066		0.029	0.038	0.023	
1971	0.033		0.037	0.060		0.023	0.032	0.021	
1972	0.035		0.035	0.057		0.023	0.034	0.023	
1973	0.035		0.045	0.052		0.034	0.032	0.027	
1974	0.028		0.066	0.049		0.048	0.075	0.021	
1975	0.033		0.028	0.047		0.030	0.026	0.023	
1976	0.039		0.035	0.055		0.032	0.021	0.025	
1977	0.042		0.030	0.050	0.024	0.026	0.026	0.014	
1978	0.042		0.023	0.049	0.023	0.023	0.042	0.033	
1979	0.041	0.058	0.041	0.049	0.033	0.043	0.067	0.028	0.045
1980	0.038	0.025	0.046	0.049	0.025	0.047	0.063	0.028	0.040
1981	0.049	0.027	0.038	0.042	0.025	0.076	0.051	0.031	0.042
1982	0.040	0.028	0.030	0.040	0.027	0.065	0.040	0.043	0.039
1983	0.042	0.031	0.032	0.041	0.031	0.086	0.037	0.038	0.042
1984	0.054	0.042	0.039	0.041	0.040	0.103	0.039	0.035	0.049
1985	0.053	0.045	0.032	0.043	0.041	0.077	0.037	0.043	0.046
1986	0.045	0.101	0.040	0.046	0.074	0.062	0.037	0.054	0.057
1987	0.054	0.092	0.051	0.046	0.038	0.053	0.041	0.048	0.053
1988	0.061	0.094	0.066	0.048	0.045	0.052	0.037	0.055	0.057
1989	0.061	0.092	0.069	0.046	0.058	0.072	0.053	0.051	0.063
1990	0.038	0.076	0.057	0.049	0.049	0.083	0.054	0.041	0.056

Source: OECD (1982, 87 & 92).

Table 4: Calculated effective marginal corporate tax rates in selected countries

Year	USA	UK	Canada	France	Germany	Netherlands	Italy	Norway	Finland	Denmark	Sweden
1965	0.405	-0.204	0.196	0.452	0.337	0.328	0.248	0.487	0.148	0.169	0.135
1966	0.516	-0.342	0.191	0.270	0.338	0.340	0.258	0.486	0.141	0.148	0.143
1967	0.517	-0.313	0.193	0.450	0.345	0.261	0.251	0.486	0.238	0.130	0.125
1968	0.577	-0.336	0.169	0.266	0.358	0.249	0.258	0.501	0.353	0.115	0.099
1969	0.460	-0.321	0.209	0.263	0.352	0.321	0.249	0.465	0.202	0.112	0.115
1970	0.411	-0.340	0.121	0.262	0.347	0.303	0.243	0.458	0.188	0.120	0.141
1971	0.395	0.219	0.054	0.364	0.346	0.298	0.227	0.459	0.220	0.121	0.158
1972	0.377	0.193	0.145	0.318	0.350	0.290	0.246	0.461	0.229	0.127	0.157
1973	0.374	0.162	0.190	0.316	0.360	0.332	0.237	0.464	0.303	0.140	0.157
1974	0.374	0.378	0.266	0.311	0.359	0.318	0.175	0.464	0.412	0.163	0.194
1975	0.316	0.565	0.186	0.107	0.360	0.322	0.264	0.462	0.311	0.159	0.268
1976	0.318	0.378	0.184	0.119	0.365	0.320	0.250	0.462	0.290	-0.296	-0.348
1977	0.317	0.358	0.140	0.117	0.365	0.324	0.256	0.460	0.258	-0.059	-0.373
1978	0.316	0.302	0.139	0.119	0.489	0.326	0.271	0.460	0.231	-0.054	-0.388
1979	0.290	0.364	0.196	0.117	0.490	0.328	0.285	0.482	0.154	-0.074	0.180
1980	0.289	0.418	0.186	0.119	0.488	0.326	0.296	0.463	0.247	-0.056	-0.213
1981	0.158	0.309	0.235	0.119	0.490	0.326	0.296	0.370	0.278	0.060	0.198
1982	0.171	0.281	0.234	0.312	0.489	0.326	0.290	0.343	0.232	0.065	0.187
1983	0.187	0.244	0.181	0.312	0.491	0.335	0.186	0.340	0.239	0.087	0.206
1984	0.187	0.255	0.207	0.318	0.495	0.140	0.153	0.352	0.244	0.070	0.154
1985	0.194	0.224	0.233	0.318	0.494	0.139	0.135	0.408	0.195	0.064	0.141
1986	0.196	0.287	0.295	0.295	0.492	0.136	0.132	0.368	0.107	0.084	0.146
1987	0.195	0.227	0.266	0.284	0.495	0.154	0.196	0.360	0.142	0.137	0.123
1988	0.195	0.223	0.267	0.284	0.496	0.361	0.196	0.356	0.159	0.123	0.142
1989	0.200	0.221	0.256	0.284	0.493	0.295	0.194	0.357	0.157	0.131	0.107
1990	0.205	0.221	0.269	0.284	0.454	0.291	0.195	0.357	0.140	0.113	0.116

Sources: Modén (1993) and Price-Waterhouse (89-90).

quite stable over the period, the cross sectional standard deviation of marginal tax rates has declined steadily. For 1965-69 these numbers were 0.235 and 0.212, respectively, and for 1986-1990 they were 0.241 and 0.109. As a comparison, the average tax rate has declined from about 50% to circa 35%, but the standard deviation has not changed. An interpretation of these results is that financial integration, and relaxations of controls on direct investments, has forced a convergence of marginal tax rates. However, convergence of inflation rates may also produce the same result.

The results shown in Table 4 indicate that the tax reform, which started in 1989 with a lowering of the statutory tax rate, lowered the effective marginal tax rate somewhat. But one should keep in mind the relatively simple treatment of many issues in the calculations on which Table 4 is based. Furthermore, the calculated tax rates depends on the currently projected inflation rate. Taking these factors into account one may say that the tax reform probably didn't change the average marginal tax rate (average over different types of assets) all that much. However, it may have had a large effect on relative cost of various sources of finance, and in that way it may have influenced firms' financial policy and the required rate of return before tax may have changed. This is something which I do not consider in this study.

The effect of the tax reform on the marginal effective tax rate has been calculated by Södersten (1989). He uses the King & Fullerton theoretical framework in calculating marginal tax rates on different types of assets and for different types of sources of finance. The calculations show that before tax reform the corporation income tax was quite close to neutral, i.e., a zero tax wedge. The dispersion around the mean for different types of assets and sources of finance was substantial though. The effect of inflation was to lower the overall marginal effective tax rate, although the effect was quite low.[4] Even though Södersten's calculated marginal effective tax rates are lower than the one's I have calculated (the weights used are crucial here) the results are similar in pointing to a small effect on the overall tax rate.

[4] Södersten calculates that the overall marginal effective corporate tax rate increased from -0.7% to +1.4%, at 5% inflation rate. At 10% inflation rates the same numbers were -2.6% and -0.1%, respectively.

Table 5: Withholding tax rates for dividends on portfolio and direct investment made by Swedish companies in various host countries.

Country	Portfolio, %	Direct Investment, %	Ownership stake, %
Belgium	15	15	-
France	15*	0	-
Italy	15	10	51
Netherlands	15	0	25
Germany	15	15	-
Denmark	15	5	25
Norway	15	5	25
Finland	15	5	25
Switzerland	5	5	-
United Kingdom	5	5	**
Spain	15	10	50
United States	5	5	-
Canada	15	15	-

Note: * *avoir fiscal* is granted if the recipient is subject to income tax on their payment in Sweden. ** Companies possessing 10% or more of the voting power of the subsidiary are eligible for a half tax credit, subject to 5% withholding tax on the aggregate of the dividend and the half credit. *Source:* Price-Waterhouse (1989).

3.4 Withholding taxes

Most countries impose so called withholding taxes on dividends, interest and royalties paid to foreign shareholders. I will be most interested in the effect of such withholding taxes on dividends paid by a foreign subsidiary to its Swedish parent. The magnitude of the withholding tax rates depends on whether Sweden has a double taxation treaty with the host country or not. If it has not, the rates can be as high as 25%, while the usual rates in treaties are 5-10%. Most countries also make a distinction between portfolio investments and direct investments. It is for example common that dividend distributions to companies with ownership stakes of at least 25% are tax exempt. Table 5 gives a summary of the withholding tax rates for Swedish owners as of 1989, and rules for direct investments, for a selected group of countries.

The Swedish parent companies are usually exempt from Swedish taxation on dividends received from foreign companies, under the provisions of most tax treaties. If not exempt, the international double taxation is reduced by the credit method. Observe that the same income may be taxed four times, twice in the foreign country and twice in Sweden, before it reaches the ultimate shareholders of the parent company.

3.5 Data Issues

Direct investments are registered in the national accounts since they are part of the balance of payments statistics. The purchase of shares in a foreign company by a Swedish investor is considered as an import of capital, or an outflow, in the balance of payments. Similarly, if foreigners buy a 10 percent share in a Swedish company it is a capital export, an inflow. Disinvestments by a Swedish company of its foreign assets, or by a foreign company of its Swedish assets, is registered as an inflow and outflow, respectively. However, if a Swedish controlled foreign subsidiary takes up a loan, on a foreign capital market to finance an investment abroad, this will not influence the Swedish balance of payments flows. The decision to expand the operations of the foreign subsidiary is, nevertheless, taken by the Swedish management. They will have to devote more of their management resources to the foreign subsidiary, since it has expanded in size. This expansion may also have been done at the expense of expansion in Sweden. It may be argued, therefore, that it is not the financial flows but the actual investments in assets which are of interest in the analysis of the impact of taxation. Balance of payments data are easily available, but they should be considered only as proxies to real foreign direct investment data.

For the empirical study I have access both to disaggregated balance of payments, and to survey data for some years.[5] The latter gives bookvalues of assets in subsidiaries of most of the major manufacturing companies. The survey data records the year in which a new subsidiary was "born" which makes it possible to interpolate the foreign direct investment in new subsidiaries as well as investment in existing subsidiaries.[6] Since the survey data covers around 95% of all FDI's by Swedish multinationals and is theoretically more satisfactory than the financial flow data, I use this data set for the empirical study.[7]

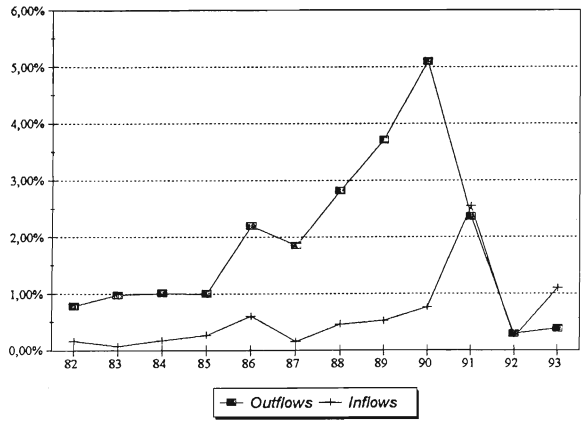
Figure 3 shows the aggregate outflows and inflows of direct investments over the period 1965 to 1993, according to the balance of payments data. Over most of this period Sweden was a net exporter of capital. The magnitude of the flows was quite low until the 1980s, and most significant was the high outflows over the period 1987 to 1990. Since 1991 there appears to have been a changing

[5] The survey years are 1965, 1970, 1974, 1978, 1986 and 1990.

[6] The methods of interpolation is discussed in Modén (1993)

[7] The correlation coefficients of the distribution of foreign direct investment across host countries, for each year, in the two data sets were quite high (in the range of 0.8-0.9) in all years but two. Using balance of payments data may thus not be a too bad practice.

Figure 3: Outward and inward bound direct investments in Sweden, 1965 - 1993, in percent of GDP.



Source: Riksbanken.

pattern of flows, with outflows decreasing significantly and inflows increasing and even surpassing the outflows. Table 6 gives a geographical distribution of the outgoing direct investment over host countries and regions. It is apparent that the EC has been the most important region for Swedish direct investment throughout the period, with a peak in the late 80s. The EFTA countries (primarily Norway and Finland) has received a rather stable and significant share. The development for the US is important since the tax reforms where in 1981 and 1986 are assumed to have had significant effects on inwards direct investment flows; the first reform in a positive and the later in a negative direction.

3.6 Estimation

The starting point is the theoretical notion that changes in various country specific variables, including tax rates, makes each country more or less attractive as a host country for FDI. Such changes will redirect the investment flows between host countries. The aggregate outflow of investment from Sweden is assumed to depend on factors within Sweden, which *push* investment out, as well as factors abroad which *pull* investment out.

Table 6: Geographical distribution of Swedish (net) direct investment abroad, in percent.*

Region/country	1971-75	1976-80	1981-86	1987-90	1991-93
EC**	51.6	42.7	36.8	73.0	64.7
of which					
France	6.3	6.5	6.0	1.6	37.4
Belgium/Luxemburg	3.0	3.8	3.4	2.9	-0.4
Netherlands	6.3	4.3	4.5	16.5	-5.2
Germany	13.7	8.6	4.0	11.7	-15.2
Great Britain	9.2	11.5	9.8	20.7	38.4
EFTA**	12.3	17.1	11.9	12.0	16.6
USA	11.6	21.5	37.4	9.6	10.5
Other	24.5	18.7	13.9	5.4	8.2
Total	100.0	100.0	100.0	100.0	100.0

Note: * Reinvested earnings are excluded.
** The numbers for the EC and EFTA refers to the member countries as of 1994.
Source: Fredriksson, 1994.

In addition to tax variables we should include variables capable of explaining the variation of the total outflow of FDI's from Sweden, as well as, variables which explain the attractiveness of various potential host countries. An explanatory variable measuring the incentive for firms undertaking marginal direct investment should capture the marginal net return on such an investment. One possibility is to use the *average* net return abroad as a proxy for the marginal net return, which can be calculated from available data. However, this reflects the rate of return on old capital already in place, the ideal is a measure that captures the net rate of return on new capital. Feldstein&Jun (1987) construct such a variable and use it, successfully, in estimation of the domestic investment response to changes in the effective tax rate. They call the variable the maximum potential net return, and describe it as the internal rate of return of a project in an economy with taxes and inflation.[8] I will denote this variable ρ. The only source of variation in this variable is, in principle, tax changes, but since the tax system is not inflation neutral, the expected rate of inflation will also be a source of variation.[9] Pre-tax profitability will of course

[8]The estimation of the potential marginal net rate of return on corporate capital for Swedish tax conditions is discussed in the appendix.

[9]In the estimates of the potential marginal net return I use a one-step ahead ARIMA(1,1,1)

also vary in reality, but is assumed to be constant when constructing ρ.

Pre-tax profitability *is* considered in a variant to this variable, called $\tilde{\rho}$; where the wiggle symbolizes variable profitability. I use the actual average pre-tax profitability as a proxy for the unobservable marginal pre-tax profitability. Net investment is zero when the internal rate of return is equal to cost of funds, (or cost of capital if we measure the gross marginal cash flow, i.e., including economic depreciation), but should be expected to be positive when the difference between these two concepts is positive. I therefore also include a measure of the cost of funds. This is often considered to be a weighted average of the cost of equity and the cost of debt, with weights equal to the proportions of equity and debt in the firms' capital structure. Since it is difficult to get a reliable measure of the cost of equity, e.g., an earnings-price ratio, I simply use the prime interest rate on corporate bonds as the cost of funds, in effect assuming that debt is the marginal source of funds.

The decision to invest abroad or at home may be substitutes if there exists some fixed factor, such as management, which limits the extent of the whole multinational firm. In this case it may be the difference between the marginal return after tax at home and abroad which is important. I therefore calculate a ρ^*- and a $\tilde{\rho}^*$-variable, which is a weighted average of marginal net returns abroad,[10] and include the differences: $\rho^* - \rho$ and $\tilde{\rho}^* - \tilde{\rho}$, as explanatory variables. Foreign direct investment outflows are expected to be positively related to these variables.

The cost of funds (r) may not directly influence the localization of direct investment if capital markets are integrated. If capital markets are segmented, however, a lower cost of funds abroad may attract domestic capital if domestic firms cannot, for some reason, borrow abroad for domestic investments. The differential in cost of funds, $r^* - r$, may therefore also influence direct investment outflows. Several studies indicate that capital markets were segmented up to the first part of the 1980s, and have become more integrated thereafter. Following the arguments in Modén & Oxelheim (1994), I include a dummy variable which is one for the years 1986-1990, and zero for the preceding years.

The net return variables reflects the current state of profitability as well as tax incentives. However, firms base their investment decisions on their expecta-

forecast of the rate of inflation in Sweden.

[10]Due to computational difficulties and data availability problems I only calculate these variables for the U.S. and West-Germany, and give them equal weights. Since these countries have been dominant host countries for Swedish FDI:s this may not be a restrictive assumption.

tions of future profitability. I use an $AR(2)$ forecast of the aggregate industrial production ($WINDP$) of twelve included OECD member countries, as an approximation to the expectation of future activity and investment demand. The investment decisions taken at time t is assumed to be based on the forecasted industrial production at $t+1$. In addition to these variables I also include a multilateral real exchange rate ($WREXCH$). If this exchange rate index goes up, the Swedish currency has depreciated in real terms, i.e., the terms-of-trade has deteriorated. This means that more Swedish goods has to be exchanged for one unit of foreign goods. Hence, a real depreciation is assumed to have increased the real price Swedish companies have to pay for foreign assets, relative to home assets. A substitution in favor of Swedish assets is therefore assumed to take place, and the foreign direct investment outflow is assumed to decrease.

3.6.1 Results

The results of the estimation by OLS is given in Table 7. The first equation may be seen as a benchmark since it only includes the difference in marginal net returns and a dummy variable for 1986 to 90. This equation is capable of explaining 37% of the total variation and both coefficients have the expected signs and are significant. In Equation (2) I add the cost of funds abroad, r^*. This will be the relevant cost of funds if capital markets are integrated. The coefficient of this variable does not have the right sign though, and is insignificant. The next step is to add the real exchange rate, as in equation (3). The coefficients change considerably for both the net return variable and the cost of funds. In Equation (4) I include the real exchange rate, but exclude the cost of funds. The real exchange rate enters with the expected sign, but is insignificant. The adjusted R^2 does not improve compared to the benchmark equation.

If capital markets are not integrated, differences in cost of funds in Sweden and abroad may influence the real investment decisions. Assuming that the observation period is characterized by segmented capital markets, I include the difference in cost of funds, $r^* - r$, as an explanatory variable. The result is given in Equation (5). The coefficient of the cost of funds variable is negative as expected, albeit not significant. The other coefficients also have the right signs and are significant, except for the real exchange rate variable. I finally add the real exchange rate to the last model and get Equation (6). In this case the coefficients of the cost of funds and the real exchange rate do not change

considerably, as they did when moving from (2) to (3). The signs are correct and the cost of funds variable now becomes significant (at the ten percent level).

To take into account the likely fact that the net return variable does not pick up the effects of expectations of future profitability, the variable $WINDP$ was included. However, the coefficient of this variable was very small and insignificant. I also included the Swedish average tax rate as an explanatory variable. It had the right sign, but was insignificant. Furthermore, the explanatory power of the models which included these variables decreased. I do not show the results of these models.

To sum up, it seems that the both the marginal net rate of return differential, as well as, the cost of funds differential, are capable of explaining the aggregate foreign direct investment outflow from Sweden. Equations (3) and (6) has the highest coefficients of determination. They differ with respect of the relevant cost of capital channel. Since the nominal exchange rate is influenced by the nominal interest rate differentials, one may expect a high correlation between these variables, and one may argue that they should be included separately, as in Equations (4) and (5). However, the coefficient of the difference of net returns is relatively stable across these four equations, ranging from 0.44 to 0.62. The conclusion from this study then is that a one percentage point increase in the effective marginal Swedish corporate tax rate would, *ceteris paribus*, lead to an extra outflow of direct investment of about a half percentage point, in terms of the ratio between the volume of investment expenditure abroad and value added at home. This is a fairly high elasticity, which indicates a relatively large deadweight loss from raising the corporate tax rate.

3.7 Foreign studies

Most empirical studies on the effect of taxation has studied FDI into the United States. The most common approach has been to use aggregate financial flow data and relate them to after-tax rates of return or effective tax rates on different types of capital income. It has also been common to distinguish FDI by parent company transfers, or "new" investment, from investment financed through retained earnings by existing subsidiaries. The reason for doing this division is that theory predicts quite different responses to changes in effective host country tax rates for these types of investments. Another division is between investments from countries using a residence-tax credit system and

Table 7: Estimates of Swedish Foreign Direct Investment Equations

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.010	0.008	0.371**	0.078	-0.006	0.095
	(1.03)	(0.75)	(2.71)	(0.43)	(−0.97)	(1.24)
$(\tilde{\rho^*} - \tilde{p})$	0.354**	0.329*	0.536**	0.440**	0.470**	0.623**
	(2.05)	(1.74)	(2.95)	(2.20)	(2.62)	(2.95)
DUM8690	0.071**	0.067**	0.090**	0.083**	0.065**	0.082**
	(3.86)	(3.08)	(4.32)	(3.56)	(3.58)	(3.73)
r^*		0.176	2.117**			
		(0.37)	(2.52)			
WREXCH			-0.391**	-0.070		-0.106
			(−2.66)	(−0.85)		(−1.33)
$(r^* - r)$					-0.511	-0.608*
					(−1.63)	(−1.93)
$\bar{R}^2$	0.37	0.34	0.51	0.36	0.42	0.44
Durbin-Watson	1.94	1.98	1.91	1.83	2.12	2.03
F-value	7.45**	4.80**	6.74**	5.16**	6.28**	5.38**

Note: Dependent variable is investment expenditure abroad by Swedish multinationals, in fixed 1980 SEK, divided by value added in Sweden by large (more than 1.000 employees) companies. The sample period is 1967-1990. All explanatory variables are one-period lagged. t-values are shown in parentheses. * means significance at the ten percent level, and ** significance at the five percent level. The names of the explanatory variables are explained in the text.

territorial-exemption systems, respectively. The former should be insensitive to US tax rates if their income is taxable at home, as it accrues, and at a higher rate than the US rate.

Among the earliest results are Hartman's (1984). He found evidence that the ratio of FDI to GNP increased with the after-tax return and decreased as the relative tax on foreign owned investment income increased. Another study, yielding basically the same results, is Boskin & Gale (1987). However, Newlon (1987) reestimated the models used in the previously mentioned studies and failed to find any significant effects for FDI financed by transfers. One may concluded that these studies using aggregated financial flow data, did not reach any clear evidence concerning the role of taxation as a determinant of FDI inflow into the United States.

Slemrod (1990) disaggregated the data over various source countries and included other nontax variables apart from the aftertax rate of return, e.g., the unemployment rate and the real exchange rate. Among his findings was that although the marginal effective US tax rate had a negative and significant effect on transfer financed FDI into the US, this was not robust to source countries' unemployment rates. He also found a negative relationship between the real effective dollar exchange rate and inbound FDI. However, he could not find any differences between countries using residence and territorial taxation, as theory predicts.

The evidence from the studies mentioned is mixed, but slightly biased towards a negative impact of host country marginal tax rates on inbound FDI. However, in a series of recent paper Feldstein claims that the apparently high international capital mobility is partly an illusion. And since national capital markets are in reality highly segmented, one should expect a very limited role for differences in corporate taxes in multinational firms' location decisions. Another implication is that domestic savings incentives could be quite powerful in affecting domestic investment, which is contrary to the prediction from the high capital mobility model. Feldstein's conclusions rests on his own work, originating with a study together with Horioka (1980), on the relationship between domestic savings and investment. They found, over long time periods, a tight relationship implying that a dollar of extra savings will result in almost one dollar of domestic investment.

There have been various responses to the Feldstein & Horioka findings, trying to explain away the results with various econometric problems with the

original analysis. A recent such response is Taylor (1994). He claims that the high savings-investment correlation may be due to omitted variables which are common determinants of both savings and investment. His own results point toward a quite high degree of integration between high-income economies.

4 Concluding Comments

The aim of this study was to assess the impact of the tax reform on Swedish outbound foreign direct investment. To make such an assessment I studied how the aggregate direct investment outflow have developed over time and its possible response to differences in after-tax returns in Sweden and abroad. The results indicate that investment outflows do respond to changes in marginal effective tax rates. To the extent that the tax reform lowered the marginal effective tax rate on investment in Sweden, and that such a change is seen as permanent, one would expect, *ceteris paribus,* lower FDI outflows, and higher domestic investment, as companies adjust to the new tax environment.

The last conclusion rests on the implicit assumption that domestic and foreign direct investments are substitutes. This seems to be the case on the level of individual firms (see Svensson 1993), but may at the same time not be true on the aggregate national level. If, for example, most foreign direct investment are financed in the host countries by debt and/or equity, more domestic savings is available for domestic investment projects. Feldstein (1994) finds that one dollar of US FDI outflow leads to a much smaller reduction in US domestic investment, between 40 and 20 cents. If this is true, increased FDI will have a limited crowding out effect on domestic investment, and domestic saving will have an important effect on domestic capital formation.

An FDI project, financed abroad by debt or equity and which yields a return in excess of the interest rate, will unambiguously increase the national income of the parent company's home country if there is no crowding out effect on the financial side or other external effects. Among non-financial external effects one can mention spill-overs from R&D activity which may move abroad as a multinational expands its operations abroad at the expense of its home activity. On the other hand, there may primarily be activities requiring little human capital that are moved abroad, leaving a concentration of R&D in the home country. Available evidence from Sweden (see Fors & Svensson (1994)) points towards complementarity between R&D and the degree of multinationality;

i.e., R&D is increased both domestically and abroad as a company expands outside its home country.

What, then, is the conclusion about the impact of the tax reform on foreign direct investment by Swedish firms? Since this study has focused on changes in net return differentials as the channel which may redirect foreign investment flows, the answer will depend on what happens to (or is expected to happen to) other countries' tax rates, as well as, expected pre-tax rates of return. Since my calculations, as well as others, point towards a small change in the effective marginal corporate tax rate, one would not expect a large effect on the FDI outflows. Furthermore, since 1990 there have not been any major tax reform moves in the most important host countries which would significantly alter the relative tax situation. However, after 1990 there has in fact been what seems a significant structural break in both outwards and inwards FDI flows. Other developments, coinciding in time with the tax reform, such as relaxed rules on foreign ownership of Swedish firms, as well as the deep economic downturn, are likely to have played a larger role in explaining these developments than changes in the corporate tax rate.

Appendix: A Model Pre-Tax Reform Investment Project

The hypothetical project used to compute after-tax returns is a mixture of investment in machinery and buildings, with 50% in each category. The project is assumed to be financed by 2/3 loans and 1/3 equity. Interest is deductible at nominal rates, while dividends are not. The projects cashflow is assumed to decline in real terms by 4.5% per year, and the depreciation rates for machinery and buildings are set to 7.5% and 2.5%, respectively. The lifetime of the project is assumed to be 15 year, after which machines have no salvage value and buildings are sold at their replacement values. The loan is not amortized but paid back in full at the end of the project with accumulated funds.

For each country and year I try to incorporate as many realistic features of the tax system as possible.[11] This includes such features as accelerated depreciation, tax credits and the investment fund system. An important issue is how to treat reported tax losses. The tax base will usually be negative during the first year(s), due to the generous depreciation deductions. And since no immediate tax refund is given firms will accumulate operating losses which can be carried forward to future years when they can be offset against operating profits. This assumption tries to take into account the possibilities firms have in most tax systems to average out the tax payment over time by saving redundant tax deductions from one year to a later year when it may be used. Firms are assumed to use their surplus tax deductions as soon as they can.

The initial cashflow is calibrated so that the real pre-tax internal rate of return is 10%. Deductibility of interest at nominal rates implies that debt finance is favored and comprises a subsidy to the project. In the absence of financial distress costs, 100% debt finance would be optimal. We do not consider such cost here, but assume that firms, for some reason, shy away from full debt finance an opts for a marginal D/E-ratio of 2. The effect of interest deductibility is calculated by the "Adjusted Present Value" method (APV). By this method one presumes that the project is financed by equity and its present value is calculated using the equity-owners discount rate. The effect of debt finance is then added by calculating the present value of the loan. Due to interest deductibility, this is generally positive. The NPV of the loan is added to the NPV of the (equity-only) project. When calculating the internal rate of return we subtract the "loan subsidy" form the initial cost of the project. The

[11] The tax data are from various sources which are listed in Modén (1993).

equity-owners discount rate is taken to be the nominal interest rate plus a 3% riskpremium.

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