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**THE TAXATION OF INCOME FROM  
CAPITAL IN SWEDEN 1980–91**

by

Jan Södersten

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by

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Preliminary and Incomplete

## I Introduction

Two circumstances have been of primary importance for the structure and development of capital income taxation in Sweden during the last few decades. First is the rapid growth of local and central government revenue raised through taxes and social security contributions. During the post-war period total revenue rose from 25 percent of GDP in 1955 to 50 percent in the beginning of the 1980s. This development was accompanied by ambitious attempts to redistribute incomes through transfer programs and steeply progressive personal income tax schedules.

Second, Sweden is a small open economy where the development of the tradables sector is seen to be of crucial importance to economic welfare. When balance of payments deficits arose in the mid-1960s for the first time during the post-war period, expansion of industrial investment therefore received great emphasis in policy making. There was a liberalization of the rules of fiscal depreciation and the special Swedish scheme of subsidizing investment, that is, the investment funds system, was put to a more frequent use. The external imbalances were much aggregated by the oil crises a decade later and by the concomitant rapid wage increases and the exchange rate policies of the second half of the 1970s. The long-term policy of eliminating the balance of payments deficit remained one of stimulating industrial growth by various and increasingly generous investment incentives to companies.

The international comparisons of capital income taxation reported in King and Fullerton (1984) placed Sweden in a middle position. The overall effective marginal tax rate on capital income from the corporate section was 35.6 percent in 1980, compared to 37.2 percent for the U.S., 48.1 percent for West Germany and only 3.7 percent for the U.K. This may seem a surprising result, when considering that the total tax yield in Sweden, when measured relative to GDP, by far surpasses that of the other three countries. The result must, however, be viewed in the light of the double objective of Swedish tax policy – i.e. of levying high taxes on households for fiscal and redistributive reasons and of providing generous investment incentives to companies. Household taxes on dividends and interest receipts were by far the highest in Sweden. The corporate tax system, on the other hand, did provide a net subsidy to marginal investments, thereby reducing the overall wedge between

pre- and post-tax rates of return to a level comparable to that of the other countries.

In June 1989, three Royal Commissions jointly presented a proposal for a far reaching reform of the Swedish tax system, to be implemented by January 1, 1991. The reform is designed to be revenue neutral and involves very substantial cuts in statutory tax rates and a broadening of the tax base, accomplished by i.a. eliminating or narrowing the extensive range of deductions and loopholes available to both households and companies.

The drastically lowered and flattened bracket rates for the individual income tax will result in a revenue loss of 63 billion SEK – equivalent to 6 percent of GDP. For dividends, interest income and capital gains, a new proportional tax is introduced, replacing the present system of taxing income from capital under the regular individual income tax. Corporations will find their statutory tax rate cut in half, and to maintain an unchanged level of revenue the proposal includes a revocation of the time-honored scheme of stimulating investment, that is the Investment Funds System, and also of the possibility to undervalue stocks of inventories.

Though the details of the proposal may be changed and amended in the course of the parliamentary process to follow, political support is already sufficiently broad to warrant the conclusion that the new tax legislation to be enacted by Parliament during 1990 will constitute the most far-reaching reform of the nation's tax system for at least 40 years.

The U.S. Tax Reform Act of 1986 and its international followers, are the obvious sources of inspiration for the forthcoming tax reform. It also has its roots in the reorientation of the Swedish tax policy debate that took place already in the beginning of the 1980's. More emphasis than before was then placed on efficiency and incentives and less on the goal of an equitable distribution of income. A manifestation of this was the agreement in 1981 between two of the three parties in the non-socialist coalition government and the opposition Social Democratic Party to a reform of the individual income tax. The reform was enacted by Parliament in 1982 to be fully implemented by 1985. It was initially designed to cut marginal income tax rates for the majority of full time wage earners to a maximum of 50 percent, while

simultaneously lowering the value of interest deductions for earners in the higher marginal rate brackets to 50 percent.

The principle of combining cuts in tax rates with a broadening of the tax base introduced through the 1982-85 tax reform received increasing attention in the following debate. Many of the nation's current economic problems, e.g. the extremely low level of household savings and the evolving labor shortage, are seen as intimately related to the existing structure of taxation. It is also claimed that the high statutory tax rates have encouraged tax evasion and tax avoidance and made it necessary to introduce increasingly complicated tax rules. In Sweden, as in other countries, there is a widespread belief that the present tax system diverts savings into "unproductive" investments in various forms, at the expense of financial assets which are used to channel savings into business investment in fixed capital. Residential investment in owner-occupied housing is also considered to be favored by the tax system.

The present structure of the corporation tax has attracted criticism along similar lines. The tax breaks offered companies through various tax allowances, including accelerated depreciation, have to a large extent been contingent on growth in real investment, making stagnant firms pay the full statutory tax on their profits. While this once was believed to be growth promoting, the current debate rather stresses that the high rates of profits retention required to take advantage of accelerated depreciation, actually may hinder or slow down the necessary structural readjustments of industry. According to this line of argument, the direction of corporate tax reform should be one of combining a lower statutory tax rate with a broader tax base.

The purpose of this paper is twofold. First, using the theoretical framework developed in King and Fullerton (1984, henceforth K-F) it measures and compares the incentives to save and invest in the corporate sector of the economy afforded by the tax system in 1980 and 1985 and by new rules proposed for 1991. Second, the K-F methodology is extended to noncorporate business investment and to owner-occupied housing. This enables us in particular to determine the magnitude of the intersectoral distortions on resource allocation imposed by the tax system. The seize and character of these distortions have been one of the key issues in current tax debate and

also in the work of the tax commissions.

The present paper is organized in the following way. Section 2, following this introduction, describes the development of capital income taxation in Sweden between 1980 and 1985. Section 3 gives estimates of effective marginal tax rates for 1985 with a brief comparison with 1980.<sup>1</sup> The treatment of the Investment funds system in these estimates poses special problems which are dealt with in some detail. The expected future development of capital income taxation is discussed in Section 4 and I provide estimates of the effects of the recent proposals for tax reform. I also attempt to determine the extent to which the old and the new tax system discriminates against investments in the corporate sector compared to those in the noncorporate sector.

Evaluating capital income taxation by way of computing effective tax rates is necessarily a difficult and ambiguous exercise. Section 6 puts the estimates of the previous sections in some perspective by pointing to a few of the problems involved.

The King–Fullerton method of estimating effective tax rates captures all taxes that determine the wedge between the pre-tax rate of return on real investment and the post-tax return to the saver. Yet in an open economy taxes may have rather different effects on domestic savings than on domestic investment, and aggregated measures of effective tax rates may therefore hide important information. In Section 5 I attempt to distinguish between taxes on investment and taxes on savings and I provide estimates of the effective marginal tax rate on investment.

The standard King–Fullerton estimates assume that firms minimize their corporate tax payments by taking advantage of all available tax allowances. I discuss in Section 5 the difficulties with this assumption considering that the Swedish corporate tax combines generous tax allowances with provisions that effectively restrict firms in their use of such allowances, and I explore the consequences of departing from it.

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<sup>1</sup> Full details of the 1980 results are given in the Swedish country chapter of K-F. See also Södersten-Lindberg (1983), which in addition to the Swedish country chapter, provides a brief summary of the K-F study.

Section 6, finally, concludes the paper. A brief review of the K-F methodology is given in the Appendix.

## **2 Major Changes in Tax Legislation between 1980 and 1985**

A detailed description of the taxation of income from capital in the corporate sector of Sweden in 1980 is given in Chapter 4 of King and Fullerton and the purpose of this section is to highlight features of the 1985 tax code that are new compared to 1980.

The structure of the regular corporation income tax is basically unchanged. In 1980 companies paid both local and national income taxes and the total statutory tax rate amounted to approximately 57 percent. Since 1985, however, the local corporation tax is abolished and the national statutory tax rate is set to 52 percent. Some of the tax allowances available in 1980 have ceased or have become less generous. In 1980 firms were offered an extra investment allowance for both the local and national tax assessments. The rate was set to 20 percent for machinery and equipment and to 10 percent for buildings. Regular fiscal depreciation rules were not affected and with a (total) statutory tax rate of 57 percent these allowances were equivalent to investment grants of 11.4 percent and 5.7 percent for machinery and buildings, respectively. No extra investment allowances or grants were available in 1985. The Swedish rules for taxing inventories mean that profits for tax purposes are calculated according to the principle of "first in – first out". As an offset to this, a deduction was allowed in 1980 up to a maximum of 60 percent of the value of purchase of inventories. This deduction was limited to 50 percent in 1985.

Finally, the rules of the investment funds system were modified compared to 1980. The IF-system allows each firm to reduce tax payments by "allocating" up to half of its pre-tax profits to an investment fund – which appears as an entry on the balance sheet. To obtain this tax reduction the firm must deposit a certain fraction of the fund allocation interest free at the Central Bank. This deposit is repaid to the firm when its IF is used for investment. Prior to 1984, the deposit rate was below the statutory corporate tax rate. IF-allocations therefore provided an attractive alternative to paying profits tax



even if the funds were never used again for investment. By the new rules, however, the deposit rate was raised well above the corporate tax rate, to 75 percent compared to the tax rate of 52 percent. Firms that allocate profits to their investment funds therefore have to pay a "fee" of 23 percent, in exchange for expected future benefits when the funds are used.

The new Wage Earners' Funds introduced in Sweden in 1984 have meant a dramatic step towards increased complexity in the taxation of the corporate sector. Firms are required to contribute to the financing of the funds by paying a 20 percent "Profits sharing tax" (PST), which is applied to a base which differs from that of the regular corporation tax in important aspects. The new PST is operated parallel to the corporation tax, which means that Sweden now has a double and extremely complicated system of taxing corporate income.

The PST is determined on a base, which is obtained by reducing taxable income as defined in the regular tax code by corporate tax payments and certain adjustments for inflation. These adjustments allow firms extra deductions for the loss in real value on regular (historic cost) depreciation allowances and for inventory profits corresponding to the rise in the general price level, but they also require the inclusion of inflationary gains on debt. Further adjustments mean that the (now) 50 percent deduction for the value of inventory purchases are disallowed as are the so called Annell-deductions (which are made when new shares are issued). The PST so determined is deductible against the base of the corporation tax for the following year and this provision therefore makes the two parts of the new "total" system of taxing corporate profits interdependent.

The reform of the personal income tax decided on by Parliament in 1982 came into full effect in 1985. The new tax schedule has reduced the average marginal income tax of household investors in debt instruments from an estimated 49.0 percent in 1980 to 44.0 percent in 1985. For equity investors the average marginal tax rate fell from 64.0 percent to 59.0 percent.

Household taxation of investment income has also been affected by concessions to special forms of savings, first introduced at the end of the 1970s. The so called tax savings schemes, which I discussed in the King and

Fullerton study were interrupted by the new Social Democratic government but reintroduced in 1984 under new names and with some changed rules. According to the new rules, households are granted a tax free return on savings channeled into special bank accounts and special funds for shares, with an upper limit in 1985 on monthly savings of 800 SEK for the two schemes combined. These new rules have been ignored for this paper, however, and there are two reasons for this. First, the flow of deposits into the special bank accounts is not a source of finance of corporate investment, since by the new rules the deposits are rechanneled to the Bureau of the Public Debt, for the purpose of financing public sector borrowing. Second, the savings on the special funds for shares were still in 1985 relatively unimportant as a source of finance, contributing to approximately 1.5 percent of the flow of equity funds (gross retained earnings and new share issues) into the corporate sector.

A new turnover tax on shares was introduced in 1984 and the rules in force in 1985 required both seller and buyer of a share to pay a tax of 0.5 percent of the value of the share. All categories of investors are subject to the tax. Assuming that investors expect capital gains to accrue at the nominal rate of 10 percent per annum and assuming a holding period of 10 years, this sales tax is equivalent to an extra tax on realized capital gains of 1.1 percent.

Wealth taxation in Sweden applies to individuals only. The new 1985 schedule levied a zero rate on net wealth (assets less liabilities) below 400,000 SEK, a 1.5 percent rate on wealth between 400,000 and 600,000, 2 percent between 600,000 and 800,000, 2.5 percent between 800,000 and 1,800,000 and 3 percent on wealth exceeding 1,800,000 SEK.

For 1980 I estimated the marginal wealth tax rate on equity to be 1.7 percent, as compared to 0.6 percent on holdings of debt. These numbers were obtained by combining the marginal rates for each class of net wealth with data on the distribution of household wealth among the classes of taxable net wealth. Using the same method, I estimate the new 1985 marginal wealth tax rate to be 2.1 percent on equity holdings and 0.7 percent on debt.

Table 1 Summary of changes in Swedish tax parameters 1980–85

|  | 1980  | 1985  |
|--|-------|-------|
| <u>Tax rates on interest (m)</u>                                 |       |       |
| Households, debt   | 0.49  | 0.44  |
| equity   | 0.64  | 0.59  |
| <u>Personal wealth tax rates (<math>w_p</math>)</u>              |       |       |
| Households, debt   | 0.006 | 0.007 |
| equity   | 0.017 | 0.021 |
| <u>Statutory rate of corporation tax (<math>\tau_s</math>)</u>   | 0.57  | 0.52  |
| <u>Proportion with immediate depreciation (<math>f_2</math>)</u> |       |       |
| Inventories  | 0.6   | 0.5   |
| <u>Investment grant (<math>f_{3g}</math>)</u>                    |       |       |
| Machinery  | 0.114 | 0.0   |
| Buildings  | 0.057 | 0.0   |
| <u>Central Bank IF-deposit rate (b)</u>                          | 0.5   | 0.75  |

### 3 Empirical Results

The King and Fullerton study measures the size of the "wedge" inserted by tax system between the pre-tax rate of return on real investment and the net-of-tax return on savings. The results are expressed in terms of effective tax rates which are defined as

$$t = \frac{p - s}{p}$$

where  $p$  denotes the pre-tax real rate of return on an investment project net of economic depreciation, and  $s$  is the real after tax return received by the savers who supplied the finance for the investment.

The estimation of effective tax rates is based on the conventional cost of capital approach, linking the market interest rate to the pre- and post-tax rates of return,  $p$  and  $s$ . In the following we compute the effective tax rate for a common value of the pre-tax rate of return, namely 10 percent. The results of these calculations, which we denote as "fixed- $p$ " results, depend in general on the particular combination of the type of asset, source of finance, industry and ultimate saver we consider.

This study includes three types of asset: machinery, buildings and inventories; three industry groups: manufacturing, other industry and commerce; three sources of finance: debt, new share issues and retained earnings; three categories of savers: households, tax exempt institutions and insurance companies. This classification, which is motivated by differences in the tax treatment, results in 81 possible combinations of hypothetical investment projects and we compute the marginal effective tax rate for each of these. For obvious reasons the presentation of these results takes the form of broad averages for particular subsets of the 81 combinations. In the tables which appear in this paper, we give the average effective marginal tax rate for each of the three types of assets, each of the three sources of finance etc., and in computing these numbers we use the actual average distributions between type of asset, source of finance etc, as weights. For example, the effective marginal tax rate for machinery given below then expresses how much lower, percentage wise, is the after tax rate of return to savers on a hypothetical investment in a machine which yields a 10 percent pre-tax real rate of return.

This hypothetical investment is then financed by a combination of debt, new share issues and retained earnings which corresponds to the actual average proportions of these sources of finance in 1980.

This section presents the effective marginal tax rates on capital income in the corporate sector in 1985. For purposes of comparison, some calculations of effective tax rates are presented also for 1980.

The results are shown in Table 2. The table shows the average marginal effective tax rate for particular assets, industries, sources of finance and owners or ultimate savers. For example, the 22.9 percent tax rate for machinery means that the average of the post-tax rates of return received by the three categories of owners is 7.71 percent, given the actual distribution of this particular type of asset across the three industry groups, and the way in which savings were actually channeled (i.e. the sources of finance used) into real investment. The table gives also the overall average effective marginal tax rate, where the average is taken across all assets, industries, sources of finance and owners.

At a 5 percent rate of inflation, which I take to be the actual rate of inflation in 1985, the overall effective marginal tax rate is 37.3 percent. This is close to the result for 1980 at the then prevailing rate of inflation, which was almost ten percent. The tax schedule, which is implicit in the complicated tax rules we study here, has changed between 1980 and 1985, however, so that for each rate of inflation, the effective tax rate is now 10 to 15 percentage points higher.

A comparison of the different columns of the table reveals the effects of inflation on effective tax rates. The Swedish tax system is not indexed and the result of this is to raise the overall effective tax rate by more than two thirds, as the rate of inflation increases from zero to 10 percent. Though this is a remarkable result, the sensitivity to inflation is still considerably less than in 1980, at least in relative terms. The main explanation for this is the reduction in household (average) marginal income tax rates described above, from 64 to 59 percent for equity investors and from 49 to 44 percent for

**Table 2**      **Effective marginal tax rates,**  
**Sweden 1985. Standard parameter values**  
**Percent**

|                          | Inflation rate |      |       |
|--------------------------|----------------|------|-------|
|                          | zero           | five | ten   |
| <u>Asset</u>             |                |      |       |
| 1. Machinery             | 18.4           | 22.9 | 29.0  |
| 2. Buildings             | 34.9           | 37.3 | 40.9  |
| 3. Inventories           | 29.4           | 51.2 | 69.5  |
| <u>Industry</u>          |                |      |       |
| 1. Manufacturing         | 26.0           | 33.7 | 41.2  |
| 2. Other industry        | 36.0           | 49.5 | 63.6  |
| 3. Commerce              | 25.2           | 37.1 | 48.0  |
| <u>Source of finance</u> |                |      |       |
| 1. Debt                  | 3.9            | 8.4  | 15.1  |
| 2. New share issues      | 54.1           | 76.5 | 98.4  |
| 3. Retained earnings     | 53.7           | 68.6 | 80.4  |
| <u>Owner</u>             |                |      |       |
| 1. Households            | 56.5           | 73.3 | 88.1  |
| 2. Tax-exempt            | -6.7           | -9.7 | -12.9 |
| 3. Insurance co.         | 13.1           | 29.9 | 53.7  |
| <u>Overall</u>           |                |      |       |
|                          | 27.7           | 37.3 | 46.7  |
| -----                    |                |      |       |
| Overall, 1980            | 12.9           | 25.4 | 37.0  |

investors in debt instruments. Readers looking for a full explanation of the tax increasing effects of inflation are referred to the Swedish country chapter in K-F.

In 1985 as in 1980, there is a wide dispersion in effective tax rates. The variation by source of finance and by owner is particularly striking. The variation in effective tax rate by asset is much reduced compared to 1980 and the main reason for this is the abolition of the special 20 percent investment allowance for investment in machinery.

The results shown in Table 2 do not include the effects of the Profits sharing tax (PST for short), which was introduced in 1984. Separate estimates show,

however, that the new and very complicated tax had a rather limited impact on the effective tax rates. The overall effective tax rate rose by 1.8 percent (see column 2 of Table 3), from 37.3 to 39.1 percent (at 5 percent inflation). The reason for this is that the PST is computed on after tax profits and is also deductible against the corporate tax base for the following year. In the case of new issues and for investment in inventories, there is a more marked tax increase, however. As explained, the PST disallows both regular deductions for inventory undervaluation and the so called Annell deductions for dividends on newly issued shares.

The numbers presented in Table 2 are based on my best estimates of the parameters of the tax system in 1985. As is usually the case, there is a considerable range of uncertainty for some of the parameter values. A major cause this uncertainty is the special Swedish scheme of subsidizing investment, that is, the investment funds system (IF).

Investments "financed" through releases of investment funds receive a substantial subsidy, comparable to that obtained from the use of free depreciation. This has led many researchers to conclude that releases of investment funds will cause a sharp reduction in the cost of capital, providing an inducement to invest.<sup>2</sup> This conventional view of the IF system is usually explained in the following intuitive way: Each firm may "allocate"  $f$  percent of its profits to an investment fund and because the fund allocations are free of tax, only the share  $1 - f$  of profits is taxed at the statutory rate  $\tau_s$ . The fund allocation is instead "taxed" at the rate  $b$ , which is the proportion which must be paid to the Central Bank. The "effective" corporate tax rate, which I denote by  $\tau$ , is therefore a weighted average of the statutory tax rate  $\tau_s$  and the deposit rate  $b$ :

$$\tau = \tau_s(1 - f) + fb \quad (1)$$

When the funds are released by the government, firms withdraw from the Central Bank the amount  $b$  per crown of investment considered to be "financed" through the system. The "net cost of investment" is therefore  $1 - b$ , and the gross cost of capital will then be

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<sup>2</sup> See for example Bergström (1982) and Taylor (1982).

$$\text{MRR} = \left[ \frac{1 - b}{1 - \tau} \right] (\delta + \rho - \pi) \quad (2)$$

where, as in K-F,  $\delta$  is the rate of economic depreciation and  $\rho - \pi$  is the firm's real after-tax discount rate.

A closer look at the IF system makes it clear, however, that this conventional view requires some rather special assumptions. Most importantly, it implicitly assumes that the "representative" firm is able to "finance" all of its current investment from its IF, and that, whenever the funds are released in the future, it expects to be in an "excess funds" position in the sense that it will never exhaust its own fund.

When these strong assumptions are not fulfilled the incentive effect of a fund release is much reduced. In a recent theoretical reexamination of the IF system, Södersten (1989) shows that when the firm is unable to finance all of its current investment through a fund release, the marginal investment must be written off according to the regular rules of fiscal depreciation, rather than through the IF system. He derives, furthermore, a new expression for the "effective" corporate tax rate as

$$\tau = \tau_s(1 - f) + f(b - \beta) \quad (3)$$

where  $\beta$  is the marginal gain to the firm from increasing the size of its investment fund. The investment fund allocation is therefore "taxed" at the rate  $b - \beta$ , which is the Central Bank "deposit rate" less the gain from adding to the IF. Only in the special and extreme case where the firm expects that in the future it will never exhaust its fund can this gain be neglected.

The maximum value of  $\beta$ , on the other hand, occurs when the firm expects that the current period of fund release will be extended indefinitely and when the amount of money which can be released from its IF, at present and in the future, will not be sufficient to finance all of its investments. Södersten (1989) derives this maximum value of  $\beta$  as

$$\beta = b - \frac{\tau_s a(1 - f)}{a(1 - f) + \rho} \quad (4)$$



where  $a$  is the declining balance rate of regular fiscal depreciation on assets "financed" by the IF. Using (3) and (4), this gives the "effective" corporate tax rate:

$$\tau = \tau_s(1 - f) + f \frac{\tau a}{a + \rho} \quad (5)$$

This expression for the effective tax rate has a clear economic interpretation. A fraction  $1 - f$  of profits will be taxed at the statutory tax rate  $\tau_s$ , while the fraction  $f$  will be allocated to the IF. By the assumption of a permanent release of funds, this extra fund allocation can immediately be used for (intramarginal) investment. The Central Bank deposit rate  $b$  is therefore of no importance. There is, however, an implicit cost to the firm of the allocation and this cost equals the increased tax payments due to the loss of regular depreciation allowances on the subsequent assets, financed by the allocation, i.e.  $\tau a / (a + \rho)$ . When the firm always exhausts its IF and expects the period of fund release to be extended indefinitely, the effect of the IF system is therefore to turn the effective tax rate into a weighted average of the statutory tax rate and the implicit cost of IF-allocations.

This new interpretation of the IF system was first suggested and used for the 1980 estimates of marginal effective tax rates in the Swedish country chapter in K-F. The reinterpretation was motivated by the new IF policy which emerged as part of the government's response to the crisis in the Swedish economy in the second half of the 1970s. The new policy meant repeated renewals of IF releases, which in practice enabled firms during a 10 year period to use their investment funds continuously. During this period of "permanent" releases, less than an average of 20 percent of the investments of the industry groups included in the K-F study were actually financed through the IF system. These observations were the basis for assuming, for 1980, that the "representative" firm had to write off its marginal investments according to the regular rules of fiscal depreciation and that it expected to constantly exhaust its IF.

The "new view" interpretation of the IF system for 1985 would imply a value of  $\beta$  of 0.55 at 5 percent inflation. While the total of IF releases in 1985 still fell short of the amount invested in the three industry groups, it is reasonable to assume that the firms' expectations about the government's future IF

policy now had changed. In 1985 it was generally believed that the period of permanent IF releases was coming to its end. In terms of equation (3) the implication of this is a lower value of  $\beta$ , though there is no empirical foundation for choosing a definite number. However, as long as the amount of money released from the fund system is insufficient to finance current investment, a theoretical argument can be given to the effect that  $\beta$  must exceed 0.45. As our standard assumption for 1985 we have, somewhat arbitrarily set  $\beta$  equal to 0.5. The "effective" corporate tax rate, as defined by equation (3), is then 38.5 percent, compared to the statutory tax rate of 52 percent.

The share of investment actually financed through the IF system rose considerably in 1985, compared to the previous long-term average. It is conceivable that as a result of this, a much larger proportion of firms than before were actually able to finance at least their investments in buildings through the IF system. Table 3 gives marginal effective tax rates for this alternative assumption. As in the standard case, I assume that investment in machinery is written off according to the regular rules of tax depreciation.

When the marginal investment in buildings is written off through the IF-system, the net cost of investment becomes  $1-b+\beta$  (cf. Södersten 1989). This differs from the conventional expression given above, because it takes into account that drawing down the size of the stock of funds is costly to the firm. Only in the extreme case, where the firm expects that it will never exhaust its fund can this cost be neglected (i.e.  $\beta=0$ ).

**Table 3**      **Effective marginal tax rates, Sweden 1985.**  
**Alternative assumptions. Fixed p-case**  
 Percent

|                          | Standard case | Stand.case incl PST | IF-case | No IF-case |
|--------------------------|---------------|---------------------|---------|------------|
| <u>Asset</u>             |               |                     |         |            |
| 1. Machinery             | 22.9          | 22.4                | 18.9    | 15.0       |
| 2. Buildings             | 37.3          | 37.6                | -1.3    | 33.1       |
| 3. Inventories           | 51.2          | 56.5                | 55.1    | 59.0       |
| <u>Source of finance</u> |               |                     |         |            |
| 1. Debt                  | 8.4           | 9.0                 | -14.7   | -5.6       |
| 2. New share issues      | 76.5          | 82.4                | 68.4    | 80.1       |
| 3. Retained earnings     | 68.6          | 71.3                | 66.6    | 81.5       |
| <u>Overall</u>           | 37.3          | 39.1                | 24.2    | 35.9       |

Assumption: Inflation is 5% p.a.

IF-case: Marginal investments in buildings written off through the IF system.

No IF-case: No IF-allocations are made and no IF-release occurs.

Standard case: See Table 2.

PST is Profits Sharing Tax.

The new rules of the IF-system, in effect since 1984, mean that  $b > \tau_s$ . The implication of this is that a "fee" of  $b - \tau_s$  must be paid, per crown of IF-allocation, in exchange for future benefits when the allocation can be used for investment. This future benefit is captured by the parameter  $\beta$  and from equation (3) we find that

$$\beta > b - \tau_s$$

for IF-allocations to be worthwhile to the firm. Since in 1985,  $b=0.75$  and  $\tau_s=0.52$ , the value of  $\beta$  must exceed 0.23. Arbitrarily I have chosen  $\beta=0.35$  for the "IF-case" of Table 3, which is in the middle of the feasible interval 0.23 to 0.55. The "effective" corporate tax rate, as defined by equation (3), is then 0.46.

The IF-case assumptions have a dramatic impact on the estimated effective tax rates. Investment in buildings receive a slight subsidy, compared to a

positive tax of nearly 40 percent in the standard case. There is also a slight reduction in the effective tax rate on machinery. The reason for this is that the range of corporate tax concessions to investment in machinery is sufficiently great to offset the effects of the tax. The required rate of return on a project is a decreasing function of the corporate tax rate, and as explained, the tax rate is 0.46 in the IF-case compared to 0.385 in the standard case. The combined effect of the subsidy to buildings and the increased corporate tax rate is to turn the tax on debt financed investments into a substantial net subsidy.

For comparison, the fourth column of Table 3 gives the effective marginal tax rates without the investment funds system. The corporate tax rate, as defined by equation (3), is then equal to the statutory tax rate, which is 52 percent. Because the tax rate is higher, the value of corporate tax concessions to machinery and buildings is increased. As a result the marginal effective tax rates are reduced compared to the standard case. The combined effect of accelerated depreciation and full interest deductability is furthermore sufficiently great to outweigh the taxation of nominal interest payments received by savers, and as a result of this, debt financed investments receive a net subsidy.

Returning to the standard parameter tax rates, I next attempt to determine the relative contributions of different tax instruments. That is, I decompose the effective tax rates of Table 2, by calculating alternative tax rates that would exist, were it not for personal taxes on dividends, interest receipts, capital gains and wealth. To see how much of the 37.3 percent overall effective tax rate (at 5 percent inflation) is due to personal taxes, Table 4 reports fixed-p results for a simulation with no personal taxes. The overall tax rate falls dramatically from 37.3 percent to minus 0.7 percent. While interrelations destroy the exact additivity of this decomposition, it is clear that the personal tax system completely determines the overall effective tax rate in 1985. On average, therefore, the Swedish corporation income tax is close to a neutral tax in the sense that the wedge between the pre- and post-tax rates of return is small. An important difference between the present system and a neutral corporate tax is, of course the wide dispersion of effective tax rates around the mean. The combination of interest deductability and accelerated depreciation, for example, results in a

substantial net subsidy to projects financed by debt.

The lower part of Table 4 reports corresponding results for 1980. Without personal taxes real investment in machinery and buildings would have received a substantial subsidy, as a result of the wide range of tax concessions available to the companies. This striking result explains why Sweden, despite high personal taxes, was placed in a middle position in the King and Fullerton international comparison. It is also clear from the table, that the changes in tax legislation between 1980 and 1985 described in Section 2, brought about a considerable reduction in the rate of subsidy.

**Table 4**      **Effective marginal tax rates 1980 and 1985.**  
**Fixed p-case. Standard parameter values.**  
**Corporate taxes only**  
**Percent**

|                          | Inflation rate |       |       |
|--------------------------|----------------|-------|-------|
|                          | 0 %            | 5 %   | 10 %  |
| <b>1985</b>              |                |       |       |
| <u>Asset</u>             |                |       |       |
| 1. Machinery             | -8.5           | -14.2 | -18.8 |
| 2. Buildings             | 8.6            | -1.5  | -10.7 |
| 3. Inventories           | 0.2            | 13.1  | 21.2  |
| <u>Source of finance</u> |                |       |       |
| 1. Debt                  | -23.7          | -32.1 | -38.7 |
| 2. New share issues      | 7.7            | 12.6  | 15.7  |
| 1. Retained earnings     | 27.3           | 34.5  | 37.8  |
| <u>Overall</u>           | 0.2            | -0.7  | -2.6  |
| <br>                     |                |       |       |
| <b>1980</b>              |                |       |       |
| <u>Asset</u>             |                |       |       |
| 1. Machinery             | -53.4          | -54.4 | -55.1 |
| 2. Buildings             | 0.8            | -9.3  | -18.3 |
| 3. Inventories           | -4.3           | 11.1  | 20.2  |
| <u>Source of finance</u> |                |       |       |
| 1. Debt                  | -47.5          | -52.3 | -56.0 |
| 2. New share issues      | -9.4           | -2.6  | 1.5   |
| 1. Retained earnings     | 14.3           | 22.6  | 26.1  |
| <u>Overall</u>           | -18.5          | -17.0 | -17.6 |

#### 4 A New Tax System

In June 1989, the Business Tax Commission and the Commission on Income Taxation published a package of proposals for reforming the taxation of capital income.<sup>3</sup> The package is intended to come into full effect in 1991.

The new rules for the corporate income tax represent a noteworthy departure from the previous long-standing policy of stimulating business investment in fixed capital through a combination of a high statutory tax rate and generous allowances to investing firms. The statutory tax rate will be reduced to 30 percent. Since the proposal also includes an elimination of the Profits Sharing Tax (PST), this means that by 1991 the "total" statutory rate will be almost cut in half.

To maintain an unchanged level of revenue from the corporation tax, this rate reduction presupposes a substantial base-broadening. The present possibility to defer tax payments by inventory write down up to 50 percent of the FIFO-value will no longer be available. The Investment Funds System will also be discontinued, as will be the special Swedish scheme of mitigating double taxation, the so called Annell-deduction. A new reserv option is introduced, however, enabling the companies to deduct up to 30 percent of the net increase of the book value of equity (including the increase in accumulated retained profits). The effect of this deduction – which takes the form of a tax free allocation to a so called tax equilization fund (Skatteutjämningsreserv, SURV) appearing on the firm's a balance sheet – is equivalent to a partial (30 percent) deduction for the nominal cost of equity. The SURV provision is also intended as a substitute for loss-carry backward, since accumulated SURV allocations may be used as an offset against tax losses.

The corporate tax base is further broadened by the elimination of the so called primary deductions for buildings (K-F,p.) and by the full inclusion of realized nominal capital gains on financial investments and real estate.

The Commission on Income Taxation proposes a flat rate, 30 percent tax on

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<sup>3</sup>At the same time, the Commission of Indirect Taxation proposed a substantial broadening of the base of the VAT.

household dividends, and interest receipts and likewise a 30 percent tax on realized nominal capital gains. Again this is in marked contrast to the present method of taxing capital income according to a progressive rate schedule as part of the individual income tax. A stated purpose of the new capital tax is to reduce the scope for tax avoidance in various forms, and obviously, full nominal taxation of capital gains will considerably reduce the now existing incentive to transform high taxed regular income into low taxed capital gains.<sup>4</sup> Furthermore, the Commission proposes a curb on the incentive to early realization of losses, by limiting deductability to 70 percent.

The reform package also contains new and more uniform tax rules for institutional investors. For the category "insurance companies", which is residually defined in the K–F study to include various tax-paying institutions, dividends, interest receipts and realized nominal capital gains will be taxed at a 30 percent statutory rate. Now existing special rules to exempt part of capital income from tax will be replaced by the new SURV reserv option described above. The result of this is to reduce the tax to an effective rate of 23 percent, which is a slight increase compared to the present rules.

A noteworthy and politically controversial part of the reform proposal is to impose a tax on "tax-exempt institutions"; This category of investors is dominated by various types of pension funds and by the new rules these will be liable to a 20 percent tax on the nominal return (including realized capital gains) to financial investments.

Table 5 shows the effects of the proposed tax reform on the incentives to save and invest. The upper part of the table gives the effective tax rates with no personal taxes, while the lower part reports the combined effects of the proposed new corporate tax rules and the new taxation of owners.

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<sup>4</sup>Of course there is still an incentive to receive income in the form of capital gains since the tax is due only upon realization. The effect of deferral is approximately to make the effective tax rate half that of the statutory rate. Cf. K–F, p. XX



**Table 5**      **Effective marginal tax rates, 1991 tax reform package.**  
**Fixed p-case.**  
**(Percent)**

| Corporate tax only              | 0%    | Inflation rate<br>5% | 10%   |
|---------------------------------|-------|----------------------|-------|
| <u>Asset</u>                    |       |                      |       |
| 1. Machinery                    | -6.2  | -10.9                | -16.2 |
| 2. Buildings                    | 7.2   | 1.7                  | 5.5   |
| 3. Inventories                  | 4.6   | 12.8                 | 21.0  |
| <u>Source of Finance</u>        |       |                      |       |
| 1. Debt                         | -11.5 | -19.0                | -27.5 |
| 2. New share issues             | 16.5  | 23.4                 | 29.6  |
| 3. Retained earnings            | 16.5  | 23.4                 | 29.6  |
| <u>Overall</u>                  | 2.0   | 1.4                  | -0.1  |
| Corporate and personal<br>taxes | 0%    | Inflation rate<br>5% | 10%   |
| <u>Asset</u>                    |       |                      |       |
| 1. Machinery                    | 22.2  | 28.0                 | 33.3  |
| 2. Buildings                    | 33.0  | 38.6                 | 42.8  |
| 3. Inventories                  | 31.2  | 48.0                 | 64.7  |
| <u>Source of Finance</u>        |       |                      |       |
| 1. Debt                         | 18.1  | 24.4                 | 30.0  |
| 2. New share Issues             | 51.2  | 69.5                 | 87.4  |
| 3. Retained earnings            | 40.0  | 52.5                 | 64.5  |
| <u>Owner</u>                    |       |                      |       |
| 1. Households                   | 34.7  | 46.8                 | 58.4  |
| 2. Tax-exempt                   | 22.1  | 28.4                 | 33.9  |
| 3. Insurance co.                | 30.1  | 39.5                 | 48.4  |
| <u>Overall</u>                  | 28.9  | 38.3                 | 47.1  |
| Overall, 1985                   | 27.7  | 37.3                 | 46.7  |

A first and noteworthy result is that the new tax rules will bring about only a minor increase in the overall effective tax rates, compared to their 1985 levels. (For full comparison, see tables 2 and 4 above.) This conclusion holds irrespective of whether we focus on the corporate tax only or on the combined effects of corporate and personal taxes.

While the overall effects are small, the reform package does represent a substantial step towards reducing what has been called the "slope of the playing field"<sup>5</sup>. The incentive to use debt rather than equity as a source of finance is much less pronounced under the new tax rules. The main explanation for this is the reduction in statutory tax rates in combination with the new SURV reserve option for equity capital, described above. The proposal also includes an elimination of the special scheme of mitigating double taxation, that is the Annell–deduction. The net effect of this return to a full classical system of company taxation and the capital gains reform (with full taxation of realized gains) is to reinforce somewhat the present discrimination of new share issues as a source of equity funds. The reason for this is that capital gains – and therefore retained earnings as a source of funds – still retain an advantage because they are not taxed until the appreciated assets are sold.

While the tax reform will preserve much of the variation in effective tax rates among assets (one of the stated objectives of the Business Tax Commission was to make inventory investment less attractive), the proposal does take a substantial step towards taxing different investors more equally. The sensitivity to inflation, finally, is still evident. A comparison between the different columns of table 5 shows that as the rate of inflation rises from zero to 10 per cent, the overall effective marginal tax rate will increase by more than three fifths. The tax increasing effect of inflation is the result of several counter-acting factors, and the tax reform package includes both measures that enhance and measures that dampen the sensitivity to inflation.

Reducing the variation in the taxation of the return to savings channeled into real investment in the corporate sector of the economy is obviously only part of the problem of achieving a more "level playing field". Much of the Swedish

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<sup>5</sup>Cf. Summers (1987).

tax policy debate during the 1980's has focused on the possible existence of a gap in effective tax rates between corporate investment and owner-occupied housing.

Owner-occupied housing provides a noteworthy exception to the general principle of taxing only realized income. Home ownership – including summer cottages – in Sweden is taxed on imputed income at a rate of two percent (with higher rates on more expensive houses) on the tax assessed value of the house. This imputed income is included in the income tax base of the owner. The tax assessed values are approximately 75 percent of the market values at the time they are set. The assessments are supposed to be changed at an interval of 5 years, but in practice the intervals have been considerably longer. The tax assessed values in effect in 1989 were set as early as 1980 and as a result of this, they now amount to less than half of the market values. In 1985, this ratio was 0.65.

In addition to the tax on imputed income a new property tax was introduced in 1985, amounting to 0.47 percent of the tax assessed value. Mortgage interest is deductible in computing the personal income tax base, but following the 1982–85 tax reform, the value of interest deductions is limited to a maximum of 50 percent. Real gains on housing are taxed upon realization with an inclusion rate of 100 percent. Since 1981, however, indexation of the acquisition cost is disallowed for the first four years of ownership.

The tax reform proposed for 1991 includes new rules also for the taxation of home ownership. A new non-deductible property tax of 1.5 percent of the tax assessed value is to replace the existing scheme of taxing imputed income. Mortgage interest will still be fully deductible, but since the taxation of home ownership is considered part of the new capital income taxation, the value of interest deductions will be limited to 30 percent. Capital gains on housing will be fully taxed on a nominal basis but the proposal includes an upper limit on the tax actually paid upon realization. This limit is set to 9 percent of the proceeds from the sale a house.

The cost of capital corresponding to owner-occupied housing is

$$p = \rho - \pi + \lambda m + \beta + w_c + z_v(\pi_v - \delta) \quad (6)$$

where, as before,  $\rho$  is the nominal after tax discount rate and  $\pi$  is the rate of inflation. For equity finance, we take  $\rho$  to be the owner's after tax opportunity cost of funds, i.e.  $\rho = i(1 - m)$ , and for debt finance we set  $\rho = i(1 - m_v)$ , where  $m_v$  is the tax rate which determines the value of interest deductions.  $\lambda m$  is the tax on the imputed income of the house,  $\beta$  is the minimum tax (applicable in the case of debt finance) and  $w_c$  is the property tax. The last term of (6) is the capital gains tax, expressed as a fraction  $z_v$  of the accruing change in the nominal value of the house (for details, see Appendix 2). As before, the real after tax return to the saver is

$$s = i(1 - m) - \pi \quad (7)$$

Marginal effective tax rates (defined as  $t = (p - s)/p$ ) for investment in owner-occupied housing are reported in table 6 below for 1985 and 1991. We assume for these estimates that the marginal personal tax rate on mortgage interest receipts ( $m$  in equation (7) above) is the same as the tax on interest income used in computing marginal effective rates for the corporate sector. In other words, we assume that lending to housing investment is done by our three categories of ultimate savers in the same proportions as lending to the corporate sector.

No data is (presently) available for computing the average marginal income tax rate of owner-occupants ( $m$  in equation (6) above) for 1985. We simply use here the same marginal tax rate as for household investors in corporate equity, that is 59 percent. Mortgage payments are deducted at the maximum rate of 50 percent ( $m_v = 0.5$ ) and we assume that owner-occupants expect the future tax assessed values to average 65 percent of the market values (due to the long intervals between reassessments). The effect of this is that the tax on the imputed income ( $\lambda_m$ ) will amount to 0.77 percent of the market value, the minimum tax ( $\beta$ ) to 0.29 percent and the property tax ( $w_c$ ) to 0.35 percent. For the 1991 estimates we set  $m$  and  $m_v$  of equation (6) equal to 30 percent, which is the new proportional individual tax on income from capital. The increased property tax ( $w_c$ ) which is to replace both the present system of taxing imputed income and the minimum tax, is 1.5 percent of the tax assessed value or 1.12 percent of the market value. This assumes, following the recommendations of the Income Tax Commission, that reassessments will be carried out annually to maintain the tax assessed values at a level

corresponding to 75 percent of the market values.

The tax on realized capital gains, finally, is written in equation (6) as a tax of  $z_V(\pi - \delta)$  on the market value of the house. This tax is zero in 1985 and 0.26 percent in 1991, estimated at 5 percent inflation and assuming a holding period of 15 years.<sup>6</sup>

**Table 6**      **Effective marginal tax rates for owner-occupied housing 1985 and 1991. Fixed p-case.**  
Percent

|             | Inflation rate |       |       |
|-------------|----------------|-------|-------|
|             | 0              | 5     | 10    |
| <b>1985</b> |                |       |       |
| Debt        | -48.3          | -72.5 | -96.8 |
| Equity      | 7.0            | 10.7  | 13.6  |
| Average*    | -12.3          | -18.4 | -25.0 |
| <b>1991</b> |                |       |       |
| Debt        | 3.7            | 2.3   | -1.9  |
| Equity      | 11.2           | 13.8  | 13.8  |
| Average*    | 8.6            | 9.8   | 8.3   |

\* Assumes that mortgage debt is 35 percent of the market value of the house.

<sup>6</sup> The base of the capital gains tax in 1985 is the difference between the selling price of the house and the acquisition cost, which is indexed to the CPI after the first 4 years of ownership. Since we assume here that the selling price increases at the rate  $\pi - \delta$ , i.e. at the rate of inflation less the rate of economic depreciation, the effect of this is that the taxable capital gain will decrease as a share of the selling price after the first 4 years of ownership. At 5 percent inflation, a holding period of 14.3 years is sufficient to eliminate altogether the taxable capital gain.

Investment in owner-occupied housing financed by debt received a very substantial subsidy under the 1985 tax law, and the rate of subsidy increased by the rate of inflation. The main explanation for this is that mortgage payments are deducted by owner-occupants at a rate (50 percent) which is considerably higher than the rate at which they are included by holders of mortgage debt (18.4 percent).

By the new rules proposed for 1991, this net subsidy to debt financed investments will largely disappear. The reason for this marked change is that the difference between the rate at which interest payments is deducted and the rate at which interest receipts is taxed is reduced from 32.6 percentage points in 1985 to merely 5.9 percentage points in 1991.

For investments financed by owners' equity the effects of the new tax rules are much less dramatic. At low rates of inflation there is a slight increase in the rate of tax, which gradually disappears as the rate of inflation rises.

The average marginal effective tax rates given in table 6, finally, are weighted averages of the tax rates for debt and equity. We use as weights the average proportions of debt and equity (0.35 and 0.65, respectively) for the entire stock of owner-occupied housing.

## **5 Problems of Measurement and Interpretation**

The effective tax rate as measured in the King-Fullerton study and in this paper, captures the combined effects of personal and corporate taxes. It shows the percentage reduction in the after tax return to savings compared to the pre-tax return on real investment. In a closed economy, where capital is completely immobile, the effective tax rate so defined, provides a useful summary index of how the tax system affects the incentives to save and invest. But when capital is mobile, breaking the link between domestic savings and investment, a tax on personal savings is no longer necessarily equivalent to a tax on corporate earnings. For example, a reduction in personal taxes could stimulate domestic savings, but the increased savings need not be invested domestically.

In a small open economy the incentive to invest afforded by the tax system may be measured by computing the wedge between the required pre-tax rate of return on investment and the exogenously given market interest rate. The corporate tax is obviously part of this wedge. But also personal taxes matter, when real investment is financed by retained earnings (provided that capital gains receive a preferential tax treatment).

This is most easily seen from equation (9c) in the Appendix, which shows the firm's after tax discount rate: The higher the marginal personal tax rate on interest income, the lower is the discount rate for retained earnings, and, therefore, the pre-tax required rate of return on real investment.

This mechanism is emphasized by Sinn (1987) in a study of the 1986 US tax reform. Sinn argues forcefully that domestic investment is likely to be discouraged both by the corporate tax increases and by the cuts in personal taxes. The personal income tax reductions favor domestic and foreign financial investments in debt instruments by households over holdings of domestic shares (where the returns are partially taxed under increased capital gains taxes). To counteract this, firms must raise their pre-tax rate of return requirements on real investments financed by retained profits.

The tax rules in force in Sweden in 1985 implies that the effective marginal tax rate on investment (that is, the wedge between the pre-tax rate of return on investment and the market interest rate, in percent of the pre-tax return) was –22.8 percent. This should be compared to the total overall effective marginal tax rate, as defined in previous sections (e.g. measuring the percentage reduction in the post-tax return on savings compared to the pre-tax return on investment), which was 37.3 percent at 5 percent inflation. The striking conclusion is therefore that the tax on capital income from the corporate sector effectively is a combination of a substantial net subsidy to investment and a high tax on savings!

Needless to say, these numbers must be interpreted with care. To determine the importance of personal taxes on the incentive to invest in an open economy is a difficult problem, which strictly speaking cannot be resolved without a convincing general equilibrium model. In particular, the negative relationship proposed here between the marginal personal tax rate and the

size of the "investment tax wedge", requires the assumption that domestic shares cannot be traded internationally. If such trade is possible, the reduced demand for domestic shares from domestic savers, as a result of a cut in personal taxes on interest income, may very well be offset by an increased foreign demand. The final outcome of this might be a change in the ownership of the domestic capital stock with little effect on real investment and with the corporate tax as the principle determinant of the incentive to invest.

To evaluate the relative contributions of different tax instruments to the total overall effective marginal tax rate, I calculated in Section 3 the effective tax rates that would exist were it not for personal taxes. The corporation tax was found to be close to a neutral tax in the sense that the wedge between the pre- and post-tax rates of return is small. At 5 percent inflation the effective marginal corporate tax rate was  $-0.7$  percent. The rate of subsidy was slightly higher for higher rates of inflation.

The two alternative estimates for the effective tax on investment given here,  $-22.8$  percent and  $-0.7$  percent, obviously leave a great deal of uncertainty about the precise nature of the incentive to invest. That the taxation of capital income originating in the corporate sector is not detrimental to investment, seems clear however. At the margin the tax system rather extends a net subsidy to investment, though the exact size of this subsidy remains uncertain.

An important and implicit assumption behind the estimates of effective marginal tax rates reported in previous sections is that all available corporate tax allowances are claimed by the firm and that they reduce corporate tax payments, or (if pre-tax profits are too low) give rise to tax refunds, in proportion to the corporate tax rate. An immediate objection here is of course that actual tax systems do not treat gains and losses symmetrically. The Swedish corporate tax, for example, provides only for loss carry-forward, which means that firms lose interest on losses claimed against profits for later years. This asymmetrical treatment of positive and negative tax bases may reduce the value of tax allowances below that assumed for our estimates of effective tax rates.<sup>7</sup>

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<sup>7</sup> See Auerbach (1986) for an analysis of the effects of corporate tax asymmetries.



A potentially more important problem, however, is that even firms which pay corporate tax to a large extent have unused tax allowances. Data available from a recent study carried out by the Business Tax Commission and covering all manufacturing firms with more than 50 employees indicate that unused tax allowances on average 1979–85 amounted to no less than 66 percent of all available allowances (regular depreciation allowances and allocations to inventory reserves and investment funds). Actual payments of corporate tax averaged 16 percent of pre-tax (true) profits for the same period. This high figure on unused allowances is conceivably affected by the inclusion of firms which already had exhausted their tax payments and therefore could be expected to abstain from claiming further allowances. No attempt to eliminate tax exhausted firms is made, however. For the subset of firms with above average rates of return on equity capital – which is less likely to include tax exhausted firms – the average corporate tax burden was 19 percent, while 40 percent of available tax allowances were still unused. An increase in the use of allowances by 16 percentage points (from 60 to 76 percent of maximum allowances) would have been sufficient to eliminate all corporate tax payments for this group of firms.

The important question is therefore, why do companies pay corporation tax? A possible explanation for the coexistence of positive tax payments and unused tax allowances is provided by the close and legally determined connection in Sweden between book profits and tax accounting profits. Allocations to inventory reserves and investment funds, for example, reduce both the base of the corporate tax and the book profits. Because of the legal requirement that dividends must be paid out of current or accumulated book profits the result of this is that companies which pay dividends may be constrained in their use of tax allowances.

The implications of a dividend constraint of the type suggested here have recently been studied by Kanninen (1986), Ylä-Liedenpohja (1983) and Södersten (1989). A common conclusion emerging from these studies is that when the firm is constrained in its use of tax allowances, the effective marginal corporate tax rate is zero. The intuitive interpretation of this is simple: When tax allowances on already existing assets have not been fully used, an additional investment project will not affect total tax payments. For comparison we recall that the overall effective marginal corporate tax rate,

estimated on the assumption that all allowances are claimed by the firms, was –0.7 percent in 1985 (see Table 4, p. 20 above). On the average, therefore, the alternative assumption that firms always have unused tax allowances does not make a great difference. For the important question of whether or not the corporate tax distorts the firm's choice of assets and sources of finance it is crucial, however. The extent to which tax allowances are used by the firms and the exact reasons for not using them seems to be a subject worthy of a further study.

## 6 A Summing Up

This paper has focused on the changes in capital income taxation 1980–91. It covers investments in real assets in the corporate sector of the economy and investments in owner–occupied housing.

The average overall effective tax rate on capital income from the corporate sector was 37.3 percent in 1985, at the then prevailing rate of inflation and for standard parameter assumptions. This is close to the tax rate for 1980. The explanation for this approximate constancy is the reduced rate of inflation. At given inflation rates, the 1985 tax schedule implies an effective tax rate which is 10 to 15 percentage points higher than in 1980. This increase is brought about mainly through a marked reduction in the rate of subsidy extended to companies through the corporate tax system.

A striking result of the estimate for 1985 is the wide dispersion in effective tax rates. There is a systematic variation in tax rates depending on type of asset, source of finance and category of saver. Investment in machinery is favored compared to other assets, and debt finance compared to other ways of channeling savings into real investment. Direct ownership by households is much discriminated against, compared to institutional ownership.

In the spring of 1990, the Swedish Parliament is likely to enact the most far–reaching reform of the nation's tax system for at least 40 years. A note–worthy result of this study is that the new tax system will not improve the incentive to invest in real capital in the corporate sector. At 5 percent inflation, the overall effective marginal tax rate will be one percentage point

higher than in 1985. However, the reform package does take a substantial step towards achieving a more level playing field. For example, the incentive to use debt rather than equity as a source of finance is much reduced under the new tax rules and much of the present discrimination in favor of institutional ownership is eliminated. An additional important effect of the tax reform is to cut in half the gap in effective tax rates between corporate investment and owner-occupied housing. This is accomplished mainly by eliminating the net subsidy to debt financed investments in housing.

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## Appendix

### Measuring Marginal Effective Tax Rates

The King and Fullerton (1984) study measures the size of the "wedge" inserted by tax system between the pre-tax rate of return on real investment and the net-of-tax return on savings. The results are expressed in terms of effective tax rates which are defined as

$$t = \frac{p - s}{p} \quad (1)$$

where  $p$  denotes the pre-tax real rate of return on an investment project net of economic depreciation, and  $s$  is the real after tax return received by the savers who supplied the finance for the investment.

The estimation of effective tax rates is based on the conventional cost of capital approach, linking the market interest rate to the pre- and post-tax rates of return,  $p$  and  $s$ . Given a well functioning capital market and abstracting from all considerations of risk, the savers' opportunity cost of funds may be taken to be determined by the market interest rate. Assuming that nominal interest receipts are taxed as income, the post tax real rate of return to the savers is then given by

$$s = (r + \Pi)(1 - m) - \Pi - w_p \quad (2)$$

where  $r$  is the real market interest rate,  $\Pi$  is the rate of inflation,  $m$  is the marginal personal tax rate on interest income, and  $w_p$  is the marginal personal tax rate on wealth.

The minimum pre-tax rate of return,  $p_{\min}$ , which must be earned on an investment project in order to give the saver the required market yield,  $r$ , is termed the project's (net) cost of capital. It depends on both the real interest rate and the specifics of the tax code:

$$p_{\min} = p(r, T) \quad (3)$$

where the vector  $T$  captures all relevant provisions of the tax code relating to

depreciation, investment allowances, statutory tax rates, interest deductability, etc.

For the purpose of illustration, assume that a corporate firm undertakes an investment project whose acquisition cost is 1 SEK. The firm's taxable income from this project is defined by the following three rules:

- (i) A proportion  $f_1$  of the acquisition cost qualifies for regular depreciation allowances. The deduction for depreciation reduces future tax payments and the present discounted value of these tax reductions is  $f_1 A_d$ , per crown of investment. The precise definition of  $A_d$  depends on the particular method of depreciation which applies. In the case of declining balance depreciation, taken at the rate  $a$ ,  $A_d$  is given by

$$A_d = \int_0^{\infty} \tau a e^{-au - \rho u} du \quad (4)$$

where  $\tau$  is the corporate tax rate,  $u$  is the time and  $\rho$  is the firm's after tax nominal discount rate.

- (ii) A proportion  $f_2$  of the acquisition cost may immediately be deducted ("expensing"). This reduces corporate tax payments by the amount  $\tau f_2$  per crown of investment.
- (iii) An investment subsidy in the form of a cash grant is payed by the government at the rate  $g$  on the proportion  $f_3$  of the acquisition cost. The cash grant per crown of investment is therefore  $f_3 g$ .

Considering the three rules (i)-(iii) the net cost to the firm of acquiring an asset of unit value is

$$C = 1 - A \quad (5)$$

where

$$A = f_1 A_d + f_2 \tau + f_3 g \quad (6)$$

Assume furthermore that the investment yields a gross rate of return which is MRR. The asset depreciates at the rate  $\delta$  and the rate of inflation is  $\pi$ . The gross profit net of tax at time  $u$  is then  $(1-\tau)\text{MRR}e^{-\delta u+\pi u}$ . The present value of all future gross profits from the project is therefore given by

$$V = \int_0^{\infty} (1-\tau)\text{MRR}e^{-u(\delta+\rho-\pi)} du \quad (7)$$

The project is worth undertaking if

$$V \geq 1 - A \quad (8)$$

which means that the present discounted value of after tax gross profits must equal or exceed the net cost of investment.

Using (8) we may solve for the minimum gross rate of return,  $\text{MRR}_{\min}$ , which makes the investment worthwhile:

$$\text{MRR}_{\min} = \left[ \frac{1-A}{1-\tau} \right] (\delta+\rho-\pi) \quad (9)$$

The minimum net rate of return or the net cost of capital is then

$$p_{\min} = \text{MRR}_{\min} - \delta \quad (10)$$

The final step is to relate the firm's after tax discount rate  $\rho$  to the market interest rate. In general,  $\rho$  depends on the source of finance. For debt finance, since nominal interest is taxable and interest payments are deductible, we have

$$\rho = (r+\pi) \left[ \frac{1-m}{1-m_d} \right] \quad (9a)$$

In the case where the marginal investment is financed by equity capital,  $\rho$  is determined by the personal tax system. When the marginal source of equity funds is new share issues, the discount rate may be represented as

$$\rho = (r + \pi) \left[ \frac{1 - m}{1 - m_d} \right] \quad (9b)$$

where  $m_d$  is the marginal personal tax rate on dividends. In the case of retained earnings we have instead that

$$\rho = (r + \pi) \left[ \frac{1 - m}{1 - z} \right] \quad (9c)$$

where  $z$  is the effective accruals tax rate on capital gains.

By using equations (2)-(9) we may estimate the wedge between the pre-tax rate of return  $p$  and the after tax return on savings,  $s$ , and the effective marginal tax rate, as defined by equation (1). In the following we compute the effective tax rate for a common value of the pre-tax rate of return, namely 10 percent. The results of these calculations, which we denote as "fixed- $p$  results, depend in general on the particular combination of the type of asset, source of finance, industry and ultimate saver we consider.

This study includes three types of asset: machinery, buildings and inventories; three industry groups: manufacturing, other industry and commerce; three sources of finance: debt, new share issues and retained earnings; three categories of savers: households, tax exempt institutions and insurance companies. This classification, which is motivated by differences in the tax treatment, results in 81 possible combinations of hypothetical investment projects and we compute the marginal effective tax rate for each of these. For obvious reasons the presentation of these results takes the form of broad averages for particular subsets of the 81 combinations. In the tables which appear in this paper, we give the average effective marginal tax rate for each of the three types of assets, each of the three sources of finance etc., and in computing these numbers we use the actual average distributions between type of asset, source of finance etc., as weights. For example, the effective marginal tax rate for machinery given below then expresses how much lower, percentagewise, is the after tax rate of return to savers on a hypothetical investment in a machine which yields a 10 percent pre-tax real rate of return. This hypothetical investment is then financed by a combination of debt, new share issues and retained earnings which corresponds to the actual average proportions of these sources of finance in 1980.