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TAXES AND MERGERS IN SWEDEN

by

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ABSTRACT

This paper studies the relative importance of tax incentives as merger motives in the Swedish industry during the period 1983—1987. Several econometric models are estimated and statistical tests performed. The tax-hypothesis is contrasted with an alternative hypothesis, suggested by Jensen, which explains mergers as a way for independent managers to increase their personal power. Neither hypothesis get any strong support in this study, the evidence is somewhat stronger in favor of Jensen's theory however.

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1 INTRODUCTION

Mergers and acquisitions have for a long time played important roles in the process of restructuring capitalist economies. Mergers tend to come in waves during which they usually arouse worries about monopolization in the minds of policymakers and theoretical curiosity about their causes among academic economists. The U.S. has probably been the country where the fear for the monopolization effects of mergers has been most pronounced. The different merger-waves of the nineteenth-century triggered several legislative responses which in different ways tried to stop or slow down the attendant concentration process.

The merger-wave of the 1980s has been different in nature compared to earlier ones, and it has also given rise to a host of new questions in corporate finance. One new feature is the greater role for the capital markets in the acquistion process. New financial instruments and new takeover tactics (and defenses) have emerged. On the theoretical front the interest has primarily focused on whether mergers and acquisitions play a complementary function to the competitive mechanism by keeping pressure on independent managers. A firm with too much organizational slack is potentially a takeover target and it is presumably in most managers own interest to keep control over it. The best way to do this is to be efficient, or in other words, maximize the firms market value, just as in the canonical model of firm behavior. Sheer size used to be an insurance against takeovers, but the development in financing technology has made it possible to put almost all publicly quoted firms "in play".

Against the efficieny proponents stand theorists that look upon the merger and acquisition phenomenon as primarily one of "rent-extraction." That is, mergers are essentially zero-sum games in which some groups, or stake-holders in the firm, gain at the expense of other groups. Examples of this is that mergers may upset different type of contracts, e.g. credit-contracts or "implicit contracts", between employees and the management. (See for example Shleifer and Summers, 1988).

It is also possible that some mergers are motivated by tax avoidance consideration. If a combined entity can legally pay less taxes than the firms could do in isolation, their joint market value should rise. In this case none of the stake-holders lose, the merger-gain is a pure transfer from the Treasury to some, or all

stake-holders of the firms.

The tax-motive has not received a lot of attention in the Swedish discussion, but the great increase in merger activity during the 1984-1988 period, has prompted demands for more knowledge about the forces underlying the merger process in general. At the same time, a sweeping tax-reform is under way, which may change the behavior in the capital markets. It is therefore important to assess whether the current tax-system systematically influence the merger activity, in order to predict the consequences of the new proposals.

In this paper we try to test whether the Swedish tax system has influenced the merger activity among Swedish corporations during the eighties. A theoretical background is first presented, in chapter 2. Several mechanisms through which the tax system may influence the valuation of firms and create incentives for mergers, are discussed. Chapter 3 contains an empirical study, where empirical tests are formulated and tested in models of merger behavior.

2 Corporate Income Taxation and Merger Incentives

2.1 Capital Taxation and Firm Valuation

The market value of a firm is, according to the Modigliani-Miller theorem[1] independent of its financial policy, i.e. the sources of funds it uses to finance its investments. Corporate income taxes will, however, change this result, as was pointed out by Modigliani & Miller (1963). In this section we will discuss how this influence of capital income taxes on market valuation arises. [2]

The market-value of equity of a firm equals the present discounted value of all net distribution from the firm to its shareholders:

$$V_t = \sum_{s=t}^{\infty} (1+\rho)^{-(s-t)} Div_s \tag{2.1}$$

where: ρ = the rate of time preference of shareholders.

Div_s = dividends at time s.

[1] Modigliani & Miller, 1958

[2] This section rests on Auerbach 1979.

The total value of the firm on the other hand is the present value of all distributions from the firm, accruing to both shareholders and debtholders, which may be expressed as:

$$W_t = \sum_{s=t}^{\infty}(1+r)^{-(s-t)}x_s \tag{2.2}$$

where r is a weighted average of the cost of debt and equity, the weight being the proportion of debt in the firm's capital structure, and x_s is cash-flow in period s. Introducing a corporate income tax (τ), a tax on interest and dividend income (t_p), and a tax on, accrued, capital gains (c); W_t can be defined in two ways. Firstly, in any period t, W_t can be defined as the sum of the values of its securities net of any tax liability:

$$W_t = (1-c)V_t + (1-t_p)B_t + (1-t_p)x_t - (t_p - c)E_t \tag{2.3}$$

where E_t is new equity issues in period t, and B_t the oustanding stock of debt. Secondly, W_t can be defined as the present discounted value of its future after tax cash-flows:

$$W_t = (1-t_p)\sum_{s=t}^{\infty}(1+r)^{-(s-t)}x_s \tag{2.4}$$

V_t can also be solved, from (2.3), as:

$$V_t = \sum_{s=t}^{\infty}\left(1+\frac{\rho}{1-c}\right)^{-(s-t)}\left[\left(\frac{1-t_p}{1-c}\right)Div_s - \left(\frac{t_p-c}{1-c}\right)E_{s+1}\right] \tag{2.5}$$

For given future values of current cash-flow, the stock of debt and net dividends, decreases in the issue of new equity E_s, at any time $s > t$, will lower V_t, since by assumption, $t_p > c$. A firm which maximize the value of its equity will therefore never issue new shares and pay dividends simultaneously, since the market value

of equity can be increased by decreasing dividends and new share issues by equal amounts. If not prohibited by law this logic can be pushed further letting firms repurchasing their own shares.

As suggested by several authors (e.g. Auerbach 1979), it may be the case that the inferiority of dividends over capital gains as sources of income will be capitalized into the market value of equity. This may be illustrated by the following reasoning: Consider an investment in an additional unit of capital which decreases the cash flow in the current period by the price of a capital good and increases the cash-flow in the future by the marginal product of capital, net of corporate taxes, $f'(1-\tau)$. If the cash-flow last for ever the firms total market value will increase by $[f'(1-\tau)/r]-1$. In equilibrium the firm will invest until the after-tax marginal product of capital equals the cost of capital:

$$f'(1-\tau) = r \tag{2.6}$$

If the firm's production function is homogeneous of degree one, the net cash-flow at the beginning of period t after new investment is:

$$x_t = f'(1-\tau)K_{t-1} - (K_t - K_{t-1}) \tag{2.7}$$

From (2.4), (2.6) and (2.7), the total market value may now be expressed as:

$$\begin{aligned} W_t &= (1-t_p)\sum_{s=t+1}^{\infty}(1+r)^{-(s-t)}[(1+r)K_{s-1} - K_s] \\ &= (1-t_p)K_t \end{aligned} \tag{2.8}$$

Substituting this expression into (2.3) yields:

$$V_t = \left(\frac{1-t_p}{1-c}\right)[K_t - B_t] \tag{2.9}$$

This has the implication that the market value of equity is lower than the reproduction cost of its capital stock, less the market value of its debt. Another implication is that dividends no longer is inferior to capital gains as means of income distribution to the shareholders. The following reasoning further illustrates this point: An all-equity firm reduces its dividends by one unit and invests it in capital goods. Shareholders lose $(1-t_p)$ from the dividend reduction, but they are compensated by an increase in the market value of equity by $(1\text{-}t_p)/(1\text{-c})$. If they sell off shares proportionate to this increase they will have to pay a capital gains tax of, $c(1\text{-}t_p)/(1\text{-c})$, their net income is hence, $(1\text{-}t_p)/(1\text{-c}) - c(1\text{-}t_p)/(1\text{-c}) = (1\text{-}t_p)$, which is equal to the dividend foregone.

(2.9) shows that only in the case where $c = t_p$, will the market value of equity be equal to the difference between the reproduction cost of the firm's stock cost of capital and the stock of outstanding debt. The tax system may, however, influence the valuation of equity even if $c = t_p$. For example, the presence of depreciation allowances in excess of economic depreciation, or so called accelerated depreciation, may create a divergence between value and reproduction cost. The market value of equity can be written:

$$V_t = K_t - (\hat{\delta} - \delta^*)\tau K_t - B_t \tag{2.10}$$

where $\hat{\delta}$ is the maximum allowable depreciation deduction for tax purposes, and δ^* is the rate of economic depreciation. If the difference between $\hat{\delta}$ and δ^* is denoted α, the value of deferred taxes due to accelerated depreciation is, $\alpha\tau K_t$. If other tax incentives exist, in addition to accelerated depreciation, and the sum of all tax deductions is denoted α^* of the reproduction cost of the capital stock, the tax liability can be expressed as: $\alpha^*\tau K_t$.

Corporations may not be able to continuously utilize all of their tax deductions. One reason for this is limited loss offset, which will be discussed in the next section. Another reason is the requirement that dividends cannot exceed current after tax (accounting) profits. This requirement introduces a constraint on the available tax deductions. To see how this constraint works, define $\hat{K}$ to be the accounting value of the capital stock, i.e. the initial capital stock minus accumulated tax deductions.

Assuming an all equity firm, its gross profit is defined as: $\pi = f(K, L) - \omega L$, where ω is the market wage and L employment of labor. The before tax (accounting) profits can now be expressed as:[3]

$$\Pi = \pi(K, L) - \delta^* \hat{K} \tag{2.11}$$

where δ^* is a control variable which lies between zero and the maximum depreciation deduction rate for tax purposes, $(\bar{\delta})$. The constraint on dividends takes the form:

$$0 \leq Div \leq (1 - \tau)\Pi \tag{2.12}$$

δ^* will be constrained by:

$$\delta^* \leq \min \cdot (\bar{\delta}, \tilde{\delta}) \tag{2.13}$$

where $\tilde{\delta} = [f(K, L) - Div/(1 - \tau)]/\hat{K}$. Depreciation deductions in excess of "true" depreciation can be interpreted as tax-debt, which will accumulate in the first stage of a project and be repaid at later stages. Sinn (1987) and Kanniainen (1988) show that it is optimal for a firm to maximize its tax debt at any point in time. Kannianinen also argues that, if the capital market is perfect, the dividend constraint (2.12) is inoperative since the firm can issue, and retire, debt so that the maximum allowances are continuously utilized. If, however, capital market imperfections exist, it may not be possible to adjust credit contracts costlessly. In such a case firms may carry a stock of unclaimed tax allowances. Furthermore, stock prices will be depressed and the market value of debt will be below the reproduction cost of the capital stock minus the value of (ordinary) debt. This effect exists even if c = t_p.

[3] This section rests on Kanniainen 1988.

2.2 Conglomerate mergers and taxes

Mergers which are not motivated by real synergies in production, e.g. branch-crossing or conglomerate mergers, may be explained by financial motives and/or tax motives. Pure financial motives have been discussed by for example Lewellen (1971). He argues that mergers that reduce the variance of the combined cash-flow of the firms, will increase the firm's debt-capacity, and hence the value of the tax shield of corporate debt. This, "firm diversification", can not be replicated by shareholders, and is therefore of value to them. This possibility has been critized by several authors, on both theoretical and empirical grounds, and will not be pursued here. Taxes alone may, however, produce differences in market valuation of the firm, when it is owned by shareholders directly compared to indirectly through another firm. Consider a situation where the market expects that distributions from firms only will be in the form of dividends. Equation (2.9) will in this case express the market value of equity. Assume that there exist two firms, A and B, and that A increases its debt by the amount, $\tilde{B}_B = V_B$, in order to buy B:s shares. The new market value of A is now:

$$\begin{aligned}\tilde{V}_A &= \left(\frac{1-t_p}{1-c}\right)(K_A + K_B - B_A - B_B - \tilde{B}_A) \\ &= V_A + V_B - \left(\frac{1-t_p}{1-c}\right)V_B \\ &= V_A + \left(\frac{t_p - c}{1-c}\right)V_B\end{aligned} \tag{2.14}$$

The market value of B is unchanged, but A:s market value increases. The net gain for A:s shareholders, after capital gains taxes, becomes

$$(\tilde{V}_A - V_A)(1-c) = (t_p - c)V_B \tag{2.15}$$

Since $c < t_p$, the combined market value of the two firms has increased through the substitution of the dividend tax for the capital gains tax. If t_p is 0.6 and c is $0.4 \cdot t_p$=0.24, the value of the tax saving is (0.6-0.24)=0.36 of the market value of the target firm. Purchasing other firm's shares could be thought of as alternatives to ordinary dividends.

An alternative source of tax savings through mergers is transfer of tax benefits between firms. If profits and losses are treated asymmetrically, i.e. no immediate refund is granted when tax-losses occur, the value of the tax shield maybe less than, $\alpha^* \tau K$. Firms with low cash-flow before tax deductions, will not be able to utilize all their available deductions. These, excess or redundant, deductions have a positive market value, and if they can be legally transfered between firms they will be a source of a merger premium. The following discussion will illustrate this point.

With a symmetric income tax system the value of a firm is the present value of future after-tax cash-flows:

$$V_t = \sum_{s=t}^{\infty} [x_s - \tau(x_s - D_s)](1+r)^{-(s-t)} \tag{2.16}$$

where D_s is allowable tax deductions in period s. The first term on the right hand side of (2.16) is the present value of the before tax cash-flows (Y), and the second term, is the present value of future tax payments (T). If two firms, with independent operations, are pooled together, "value additivity" implies that the total value is the sum of the separate values: $\tilde{V} = Y_1 + Y_2 - (T_1 + T_2)$. If gains and losses are treated asymmetrically for tax purposes, the taxes payed each period can be written:

$$T_t = \tau \cdot \max [x_t - D_t, 0] \tag{2.17}$$

where D_t is the tax deductions in period t. The taxes payed by the combined firm in each period now become:

$$\tilde{T} = \tau \cdot \max [x_1 + x_2 - (D_1 + D_2), 0] \tag{2.18}$$

it can be shown that (2.18) is stochastically dominated by the sum of (2.17) for both firms, i.e. that:[4]

[4] see Green & Talmor (1985) for a proof of this claim

$$\tau \cdot \max[x_1 + x_2 - (D_1 + D_2), 0] \leq \tau\{\max[x_1 - D_1, 0] + \max[x_2 - D_2, 0]\} \quad (2.19)$$

(2.17) implies that value additivity no longer holds. In present value terms we have that:

$$\tilde{V} \geq Y_1 + Y_2 - (T_1 + T_2) \quad (2.20)$$

where $\tilde{V}$ is the value of the combined firm. One can look at these results from two perspectives. First, under certainty, D_t may be interpreted as the stock of tax deductions connected with existing assets. If these deductions only can be claimed in a particular year, some of them will be redundant if they exceed current operating earnings. Second, under uncertainty, (2.17) may be interpreted as an ex ante relationship. The ex ante viewpoint has been stressed by for example Green & Talmor (1985), Cooper & Franks (1983) and Majd & Myers (1987). Due to the tax asymmetry, the government's tax claim is equivalent to a portfolio of call options, one on each year's operating cash flow. The point of doing this comparison is that one can use the theory of option pricing to value the tax claim. The value of a call option increases with the variance of the underlying asset. Hence, since the value of the firm is the present value of the operating cash flows minus the value of the tax option, actions which reduces the variance of the operating cash flow will increase the value of the firm, ex ante. Note that this is different from the first viewpoint which stresses the incentives to use deductions which are known with certainty to be redundant with the current operating cash flow, an ex post consideration.

Most countries have methods to ameliorate the asymmetric treatment of gains and losses. One such method is the right to carry back a taxloss to offset taxable profits from earlier years, a refund for taxes paid on these profits is granted in the current period. If carry-back is not allowed, or if the current period loss exceed profits from earlier periods[5], tax losses can be carried forward to offset profits, if any, in future period.

[5] In the U.S. losses can be carried back for a maximum of three years, in Great Britain two years etc. In Sweden carry-back is not allowed but carry-forward is allowed for ten years.

3 EMPIRICAL STUDIES

Empirical studies of mergers and acquisitions usually come in two varieties. Most common are "event studies" where the shareprice reaction around the time of the announcement of a merger is analyzed. Less common are studies that look directly at tax attributes, such as the stock of loss carryforwards, redundant deductions, etc., of both firms and which try to estimate how such attributes affect the probability of a merger. In this study we try both approaches. The emphasis is, however, on the second method. The reason for this is that mergers between stockmarket firms have, until 1988, been relatively rare, giving us few observation to work with.

3.1 Data and Sample

The sample consists of mergers between Swedish manufacturing firms performed from 1983 to 1987. The original sample was drawn from SPK's [5] register of mergers. All mergers where the target had at least 200 employees the year before the merger, and where the ratio of the target's to the acquiror's (book) assets was at least 0.01, were included. The size of this sample was originally 185 mergers. Due to data deficiencies this sample was ultimately reduced to 126. Table 3.1 contains a crosstabulation of targets and acquirors with respect to their status as public or private. [6]

		Targets					
	List:	AI	AII	OTC	Other	Private	Sum:
Acquirors	AI	17	1	2	2	28	50
	AII	2	1	2		14	19
	OTC				1	5	6
	Other						
	Private	3			1	47	51
	Sum:	22	2	4	4	94	126

Table 3.1 Mergers between firms quoted on different stock-market lists.

In model 1, described in more detailed below, we include observations on these

[5] Statens Pris- och Konkurrensnämnd

[6] AI,AII and OTC refer to different stock-market lists, with different requirements of ownership dispersion.

firms for each of the five years. In some years a particular firm engages in one or more mergers. We wish to investigate whether the values of certain tax related variables affect the probability of engaging in mergers. The sample is not purely random, since it is drawn from a population of merging firms. The reason for using this procedure was practical, it was very difficult and costly to construct a control group of the same size and character. In model 1 we therefore have to interpret the results as pertaining to the sample alone and be very careful in drawing inferences to the whole population. It can nevertheless be of interest to estimate whether tax considerations have influenced the merger decision within this, relatively large, group.

The dataset consists of financial data collected from annual reports. From this source one can get information about book-values of assets and liabilities, investments in physical and financial assets, cash-flow from aggregate firm activity, etc. Tax information is, unfortunately, limited from this source, but it is the only one available (since tax returns are confidential). One major deficieny is the absence of information about the stocks of tax-loss carry-forwards which very rarely is provided in the annual reports.

3.2 Econometric Models and Testable Hypotheses

Firms may accumulate excess funds and use these funds to acquire other firms for tax reasons, as discussed above. However, there exist other possible explanations for this behavior. Jensen (1986), for example, has suggested a different explanation in the agency theory vein, which he calls "the free-cashflow theory". According to this theory, managers of firms with cash-flows from existing activities in excess of what is required for consolidation and expansion in their main line of business, will not distribute these funds but rather invest them on low return, size-incresing, acquisitions. It is primarily firms with high profits from existing activities, but low expansion possibilities in similar activities, which undertake such acquisitions. The main point is that the motivation behind such acquisitions are contrary to shareholders interests, and is pursued by independent managers who seek to maximize their own self-interest. If this motivation is the principal force behind (conglomerate) mergers, the acquirors should primarily be large firms in oligopolistic industries.

The aggregate shareprice reaction (the combined effect on both firms) ought to be negative, if not counterbalanced by a positve tax effect. In this study we test the free-cashflow theory by constructing a variable called CASHFLOW (defined as profits after financial items plus depreciation allowances, divided by total, book, assets), and a variable called ΔINVEST (defined as the change in investments in physical assets, in real terms, divided by total, book, assets). If CASHFLOW is positively related to probability of an acquisition, and ΔINVEST is negatively related, the free-cashflow theory is supported.

The tax hypothesis predicts that acquisitions and dividends are negatively related, since acquisitions are alternative means of distributing cash to the market. We use a variable called DIVRAT to test this hypothesis. A more satisfactory variable would be the change in dividends, but this variable was hard to construct for a significant subset of the sample, and it is only used in models of mergers between stock-market firms, and is then called ΔDIVRAT.

Utilization of tax-loss carry-forwards may give a partial explanation of merger premia. Information about the stock of these deductions are hard to ascertain. It is possible to approximate additions to this stock from the profit and loss statements, but it is impossible to know how they are used up. Different assumption can be made of course, but the resulting estimate will likely be fraught with very big measurement errors. As a second-best approach we included a dummy-variable (D2) which is one if the target had reported a loss the year before the merger. This approach is admittedly very crude and all models are estimated both with and without this variable. A more satisfactory treatment of tax-loss carry-forwards has to await better data on this variable.

Redundant deductions in general may be a motive for mergers if they can be transferred between firms after an acquisition. A variable, called REDUNDAN, which measures the difference between the maximally allowable deductions each year and actually used deductions the same year was constructed, in order to measure the degree of redundancy of deductions.

Private firms are not constrained by the need to report profits in order to pay dividends. To check whether there exist differences between public and private firms, a dummy variable (D1) (1 for private and 0 public) was included. For publicly

traded companies stock-market data can be used. We use such data to construct a measure of "Tobin's-q" (Q), which is expected to be negatively related to the probability of acquisitions. We also use the stock-market data to construct a variable of the degree of leverage (D/E), the ratio of book value of debt to the market value of equity. The hypothesis is that a merger could be a expedient way to increase the leverage of the firm, and thus the rate of tax deductions. A high value of (D/E) would in such a case be positively correlated with mergers.

3.2.2 Models of Acquirors—Models 1 & 2

Most econometric studies of mergers analyzes the qualitative choice of engaging in a merger or not. The basic idea is that there exists a latent, non-obeservable, variable (y^*) which depends on a vector of explanatory variables $\mathbf{x}$:

$$y_i^* = \mathbf{x}_i\beta + \epsilon_i \tag{3.1}$$

y^* is a continuous variable which expresses the subjective value of an action for individual i, given the value of $\mathbf{x}_i$. When y^* reaches a critical value, $\bar{y}$, an action is observed. Action—non-action is coded as a binary variable y:

$$\begin{aligned} y_i &= \mathbf{x}_i\beta + \epsilon_i \\ y_i &= 1 \text{ if } y^* \geq \bar{y} \\ &= 0 \text{ otherwise.} \end{aligned} \tag{3.2}$$

If ϵ_i is assumed to be normally distributed this model can be estimated by the PROBIT-method where a normal-distribution function is fitted to the scatter of observations. The resulting coefficient estimates could be interpreted as the percentage change in the probability of a merger due to a small increase in the value of the explanatory variables.

The first model of acquirors, model 1, contains the following variables:

$$\begin{aligned} y_i = \alpha_1 + \beta_{11}D1 + \beta_{12}D2 + \beta_{13}CASHFLOW_i + \beta_{14}\Delta INVEST_i + \\ \beta_{15}DIVRAT_i + \beta_{16}REDUNDAN_i + \epsilon_i \end{aligned} \tag{3.3}$$

The second model of acquiring firms uses a different sample than model 1. Only public acquirors are included and comparisons are made with a control group consisting of public companies which had not been engaged in a merger during the year under investigation. The control sample is matched with respect to industry classification (main line of business), with the merger sample. It was not possible to match the sample with respect to the size of the acquiror since the number of big firms which had not been engaged in mergers were too few. The model is estimated separately for the years 1984 to 1987. The drawback with this model is that the number of observations are few, giving us few degrees of freedom to work with. The variables included in model 2 are:

$$\begin{aligned} y_i = \alpha_2 + \beta_{21} D/E_i + \beta_{22} \Delta DIVRAT_i + \beta_{23} \Delta INVEST_i + \beta_{24} Q_i + \\ \beta_{25} DIVRAT_i + \beta_{26} CASHFLOW_i + \beta_{27} REDUNDAN_i + \epsilon_i \end{aligned} \tag{3.4}$$

3.2.3 Target Firms—Model 3

In order to analyze the probability of being acquired we use only public firms and construct a control sample of firms which had not been subjects of a merger proposal or takeover-bid within 12 months after each year. The model is estimated for the years 1985 and 1986. The PROBIT-model is used; y_i is 1 if firm i was subject to a takeover bid, and 0 otherwise:

$$\begin{aligned} y_i \quad = \quad & \alpha_3 + \beta_{31} RHO_i + \beta_{32} SIZE_i + \beta_{33} URES_i + \beta_{34} E/P_i + \\ & \beta_{35} REDUNDAN_i + \epsilon_i \end{aligned} \tag{3.5}$$

RHO is a measure of the target's rate of growth, which is included to control for growth oriented mergers. SIZE controls for different abilities to protect against a takeover bid which is correlated with absolute size. URES is included to test whether a high proportion of untaxed reserves in the firms capital structure make it a more palatable takeover target. E/P is a measure of the stockmarkets expectations of the firms future profitability. REDUNDAN measures, as before, the extent to which available deductions could be used the year before the merger.

3.2.4 Results

The estimation results are summarized in table 3.2, below:

Table 3.2

PROBIT estimates of acquiring firms, 1983-87. t-statistics appear in parenthesis below coefficients; significance is determined using a two-tailed t-test. Entries marked # are significant at the 10%-level, those marked * at the 5%-level. $\mathcal{L}$ stands for the Log-likelihood function, χ^2 expresses the value of the chi-square statistic, with α being its level of significance.

Model 1:

N=460	α_1	β_{11}	β_{12}	β_{13}	β_{14}	β_{15}	β_{16}
	$-0.2171^{\#}$ (−1.664)	−0.1609 (−1.093)	−1.6230 (−0.928)	-1.6676^{*} (−1.994)	1.1526^{*} (2.354)	−4.8542 (−0.998)	−0.1999 (−0.634)

$\mathcal{L}$ = -211.96; χ^2 = 18.503 (α = 0.05)

Model 2:

År	α_2	β_{21}	β_{22}	β_{23}	β_{24}	β_{25}	β_{26}	β_{27}
1984:	−0.5591 (−0.879)	0.0578 (0.498)	−0.5827 (−0.532)	−0.0039 (−0.879)	0.0019 (0.272)	−5.4664 (−0.283)	−0.3956 (−0.065)	−2.3396 (−0.541)
1987:	-2.1076^{*} (−2.966)	0.4852^{*} (2.324)	0.6303 (1.479)	0.0146 (0.316)	−0.0888 (−0.169)	$-14.823^{\#}$ (−1.696)	−0.3486 (−0.071)	2.2435^{*} (2.421)

$\mathcal{L}_{84}$ = -19.213; $\chi^2{}_{84}$ = 8.7376 (α = 0.2720)

$\mathcal{L}_{87}$ = -15.707; $\chi^2{}_{87}$ = 20.778 (α = 0.004)

Model 3: (unweighted)

År	α_3	β_{31}	β_{32}	β_{33}	β_{34}	β_{35}
1985:	8.2428 (1.713)	5.3650 (1.065)	-0.6748^{*} (−2.139)	11.241^{*} (2.193)	-8.7642^{*} (−2.027)	−12.412 (1.477)
1986:	−3.365 (−1.048)	4.9750 (1.502)	0.0045 (0.021)	7.0066^{*} (2.296)	3.0407 (1.109)	0.9658 (0.272)

$\mathcal{L}_{85}$ = -8.354; χ^2_{85} = 18.085 (α = 0.028)

$\mathcal{L}_{86}$ = -11.450; χ^2_{86} = 13.089 (α = 0.0226)

Model 3, (weighted)

År	α_3	β_{31}	β_{32}	β_{33}	β_{34}	β_{35}
1985:	4.191	4.820	−0.459	8.715	−6.066	−11.016
	(0.260)	(0.380)	(−0.340)	(0.570)	(−0.410)	(0.280)
1986:	−3.827	3.967	−0.034	6.187	3.072	1.242
	(−0.160)	(0.186)	(−0.004)	(0.300)	(0.330)	(0.023)

$\mathcal{L}_{86}$ = -12.602; χ^2_{86} = 10.789 (α = 0.056)

The estimates in model 1 does not indicate any significant difference between public and private companies. Jensen's "Free-Cashflow theory" does not receive any support in this model; CASHFLOW has the wrong sign and is also significant at the 5%-level. ΔINVEST is positive and significant, which indicates that acquisitions and investments in new physical capital are complementary activities instead of substitutes, as the "Free-Cashflow theory" predicts. The hypothesis that acquisitions are made in order to distribute funds in a low taxed way, as alternatives to ordinary dividends, does not receive any support either. The coefficient of DIVRAT has the right sign, but is insignificant. Relatively redundant deductions does not seem to motivate mergers, nor does the presence of tax-loss carry-forwards. Model 1 was also estimated without the dummy-variable for loss carry-forwards, but this did not change the qualitative results.

Model 2 was estimated for each year (1984-1987), but only the results for 1984 and 1987 are reported in table 3.2. The results are quite different for these years, and the results for the intermediate years lie somewhere between the results for 1984 and 1987. One can observe that CASHFLOW is negative (but insignificant) in this model too. DIVRAT is also negative and is significant at the 10%-level. Both ΔINVEST and ΔDIVRAT are shifting signs between years and are insignificant for all years. These results does not lend support for neither the tax- nor the "Free-Cashflow theory". D/E is positive and significant for 1987 which, for that year, indicates that high leverage the year before the merger increases the probability of a merger. [7] The market valuation relative to the reproduction cost of the capital

[7] Auerbach & Reishus (1987) point out that the leverage variable should be analyzed in a longer perspective . They find that an increase in leverage is usually not sustained

stock does not seem to be important in explaining mergers in these samples. The redundancy of deduction is positively related (and significant) to mergers in 1987, while its not important in 1984. Both samples are of small sizes and this makes the standard-errors large and the models have low explanatory ability.

Model 3 is estimated in two variants; one unweighted and one weighted, the distinction will be discussed below. The unweighted models have a very good prediction- and explanatory ability. This would mean that such a model is very valuable since it could be used as a tool for choosing stocks to invest in, which with a high probability will be targets for takeover bids (with high expected bid-premia) within the near future. Since the stockmarket does not seem to be very adept in identifying takeover targets, one ought to be very careful in drawing too hasty conclusions from these models despite their good fits. Palepu (1986) points out that the sampling process bias the estimates in such a way that the models predictive ability is exaggerated. The sampling process is not random because the target firms are overrepresented. This sampling-technique is known as "choice-based sampling" and is used when the phenomenon under scrutiny is occurring rarely in the population. If a random sample is drawn from the whole population this sample must usually be quite large in order to ensure that enough observations on the phenomenon under study are included. This may be very expensive, and in such a situation one can choose to consciously oversample these observations. If the true proportion of these observations in the population is known, one can correct the coefficient-estimates by weighting them with the correct proportions as weights. The standard errors also have to be corrected, which requires the computation of a weighted variance-covariance matrix.

The weights used in model 3 are computed using the sample-inclusion criteria discussed above, which gave quite low weights. The sample proportions of mergers were around 0.5 (by construction), while the population weights were around 0.07. The effect of the correction of the estimates and standard-errors was that no estimates remained significant, which of course made the model quite uninformative. The predictive ability, as measured by the proportion of correctly predicted

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the years after the merger. If a debt-financed merger is value increasing, the increase in the value of equity is often large enough such that the D/E-ratio often is kept constant or declines after the merger.

observations[8], also deteriorated drastically (unfortunately).

3.2.5 Analysis of Merger Pairs

The models presented above have analyzed acquirors and targets separately. A merger consists of two parts, which have to fit together, much like a (successful) marriage. This is especially important when one analyzes redundant deductions and other transferable tax credits. If both companies have such redundant deductions, a merger cannot increase the utilization of those deductions. If one company is able to use some of the other's, redundant, deductions, the situation becomes different. The estimation results indicate that this variable is not important in the merger decision. This may, however, be a result of the "match" of merger-pairs.

One method, which takes account of such "pair-specific" variables, has been used by Auerbach & Reishus (1988). They compare a sample of merger-pairs with a stratified sample of "pseudo-mergers." This control-group consists of firms in the same size-class, and industry group, as the actual merger-pairs, but are randomly matched. If these merger-pairs show the same potential tax advantages as the actual mergers, one can draw the conclusion that those, pair specific, tax incentives does not have a determinate influence on the merger decision.

This method was not possible to use, with the current sample, due to its small size and the small number of large firms which have not been engaged in mergers or acquisitions. However, given that this data problem can be solved, this method seems to be a superior method for the purpose of this study.

3.3 "Event"-studies

In order to calculate the effect on shareholders wealth of a merger one performs so called "event"-studies. These are studies of price-changes of the firms' shares at the time of a merger announcement. To get a correct measure of the pricechanges due to the merger, one must correct for the general development of the stockmarket during the relevant time period. This is done by computing a so called control

[8] The fitted observations can be classified in two groups, those between 0 and 0.5 and those between 0.5 and 1. The former are coded as 0 the latter as 1, these values are the prediction of the models and they can be compared to the actual, binary variables, in order to assess the predictive ability of the model

return for each firm, during a period which is uninfluenced of merger rumours. The control return is compared with the actual return around the time of the merger announcement, the difference is called "abnormal" return. The cumulative abnormal return is a measure of the gain (or loss) the shareholders incur due to the merger. The abnormal return for company j during period t can be written as:

$$ar_{jt} = r_{jt} - c_{jt} \tag{3.6}$$

The abnormal returns for each company are aggregated over firms:

$$AR_t = \frac{1}{N}\sum_{j=1}^{N} ar_{jt} \tag{3.7}$$

where N is the number of firms. AR_t is then cumulated over time:

$$CAR_t = \sum_{i=t_0}^{t} AR_i \tag{3.8}$$

where t_0 is the first date of observation.

The next step is to find an adequate model to compute the control return, c_{jt}. The different issues involved in choosing a correct model in this regard are discussed by among others Franks et al. (1988), they use three different models but conclude that the differences among these are minor. We use the so called "market model" in the studies reported below:

$$c_{jt} = \alpha_t + \beta_j(r_t^m - r_t^0) \tag{3.9}$$

where: r_t^0 is the return on a one month T-Bill,

r_t^m is the return on a marketindex,

β_j is the stock j's covariance with the marketindex divided with the variance of the marketindex.

Given estimates on α_t and β_j, one can get an estimate of the control return, $\hat{c}_{jt}$, by inserting into equation (8).

The number of tender offers studied were 25 over the period april 1983 - january 1988, 17 different acquirors were involved, all offers were successful in attaining at least 90% of the votes of the respective target.

The targets' abnormal return between day -1 to +1 was on average 16.3%, the cumulative abnormal return, CAR, from t=-16 to t=+1 was 18.5%. CAR_{+16} was on average 19.4%, while $CAR_{-1} = 2\%$. This indicates that the "information-leakage" before t=0 was relatively limited.

The acquirors got on average an abnormal return of 4% at t=+1, which is not significantly different from zero (at the 5%-level). CAR is negative up to t=+10 and not significant for any t.

3.3.1 Medium of Exchange

In order to check whether the use of different media of exchange is governed by tax considerations, the observations were divided into three groups. The classification was: 1) pure cash offers; 2) cash and stock; 3) combinations of cash, ordinary and straight debt, stock-options etc. These groups contained 6, 10 and 9 offers, respectively. To test whether the abnormal returns for the targets differed among these groups, the following least-square regression equation was estimated:

$$AR_{+1} = \beta_1 D_1 + \beta_2 D_2 + \beta_3 D + \epsilon \tag{3.10}$$

where: $D_1 = 1$ if group 1, 0 otherwise;

$D_2 = 1$ if group 2, 0 otherwise;

$D_3 = 1$ if group 3, 0 otherwise;

The result of this estimation was (t-values and significance levels in parenthesis):

$$\begin{array}{lccc} AR_{+1} = & 0.121 D_1 & +0.183 D_2 & +0.17 D_3 \\ & (1.7950) & (3.3290) & (3.2480) \\ & (0.0864) & (0.0030) & (0.0037) \end{array} \tag{3.11}$$

These estimates indicates that cash-offers are connected with significantly lower abnormal returns than other types of offers. One has to keep in mind though, the small number of firms in this study, especially since the same firm is involved in several cash-offers. However, comparing these results with similar studies for the

U.S. and the U.K., e.g. Franks et al. (1988), one can note that cash-offers are connected with above average abnormal returns in those countries. This difference, if sustained by a larger study, is probably due to the difference in capital-gains tax treatments. In the U.S. and the U.K., taxation is usually deferred in a stock–for–stock offer, until the new stock is sold. Not so in Sweden where a capital gains tax has to be paid at the time the consideration has been received. The lower abnormal returns in cash-offers may be given an explanation along the lines of Jensen's "Free-cash flow" theory, where distributing cash is viewed by the stock market as a negative signal. The tax effect must in this case been considered minor.

4 CONCLUDING COMMENTS

The purpose of this study has been to analyze whether tax incentives have been important factors in mergers between Swedish industrial firms. The evidence presented in favor of the tax hypothesis have been quite weak and often not consistent between years and models. This is a feature that this study shares with similar studies from the U.S., and the U.K.

The reason for this failure to prove the tax hypothesis of mergers, may be that there exist other, more cost-effective, means of reaping the tax gains discussed here. Gilson, Scholes & Wolfson (1988), for example, argue that, in the case of tax-loss carryovers, the gains from the sale of these may be anticipated and will not show up by the time of an acquisition. They also point out that the social desirability of certain tax incentives cannot be determined apart from the desirability of the underlying activity that the tax system may encourage. Tax motivated acquisitions may promote allocative efficiency by loosening constraints on tax constrained firms, it may on the other hand be an impediment to growth by allowing large, and inefficient firms, to devour smaller and more dynamic ones. Which way the balance goes is by now uncertain.

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