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Taxes and the choice of organizational form by entrepreneurs in Sweden

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by

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Abstract

This paper estimates the role of both tax and non-tax determinants in the choice in Sweden to be a closely-held corporation vs. a proprietorship, using individual data for 2004 to 2008 on owners of closely-held businesses. While lower-income individuals face relatively neutral incentives, higher income individuals face strong tax incentives to be corporate. The data suggest a relatively strong correlation between these tax incentives and the likelihood that a firm is corporate. Many conventional non-tax determinants are confirmed in the data as well.

Keywords: self-employment, entrepreneurship, taxation of closely-held businesses, business organizational form
JEL-codes: G32, H25, G38

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1   Introduction

The tax treatment of a Swedish firm varies depending on whether it chooses to operate as a non-corporate firm, a closely-held corporate firm, or a widely-held corporate firm. The aim of this study is to investigate to what degree firms change their choice on a form of organization in response to tax incentives.

A variety of non-tax factors affect a firm's choice of form of organization as well, as emphasized by Jensen and Meckling (1976). Corporations by default have limited liability, they have unlimited life, and owners of corporate shares can sell their shares without changing the legal status of the firm. Due to these non-tax factors, large firms are almost always corporate and widely held, regardless of tax incentives.

As a result, this study will focus in particular on a firm's choice between being a non-corporate firm or a closely-held corporation.[4] Non-tax factors may still matter for the choice between these two forms of organization, but past empirical evidence from other countries suggests that taxes can easily matter as well.

Past empirical evidence, though, is largely based on U.S. data. The tax law in the U.S. is dramatically different from that in Sweden. To begin with, tax rates in Sweden are far higher than in the U.S., in itself suggesting the potential for much larger effects on firm behavior. In addition, though, the structure of the tax code in Sweden is very different from that in the U.S.

In the U.S., income from a non-corporate business is taxable in full under both the personal-income tax and the payroll tax, while business losses are fully deductible under the personal-income tax. Profits from a corporation are taxable under the corporate tax, and then dividends and realized capital gains are taxable under the personal (but not the payroll) tax. The corporate tax rate at times has been low relative to the top personal tax rates, while capital gains (and more recently dividends) face much reduced tax rates under the personal tax, generating potentially large tax savings for business owners in top personal tax brackets from operating in corporate form. Potential tax savings from

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[4] See Thoresen and Alstadsæter (2008) for a study in Norway of the decision to establish a widely-held corporation. While the choice to organize the firm as widely or closely held is in principle interesting also in the Swedish case, we lack the data to study this margin and therefore focus on the closely-held firms. In addition, calculations by Sørensen (2008) (see Table 1.2. in Sørensen (2008)) suggest that the main differences in average effective tax rates are between the sole proprietorship and the corporate forms of business, rather than between closely and widely held corporations.

losses incurred by a corporation are very limited however.[5] As a result, firms anticipating tax losses in the immediate future face strong tax incentives to operate in non-corporate form. Gordon and MacKie-Mason (1994), MacKie-Mason and Gordon (1997), and Goolsbee (1998, 2004) provide evidence that these large tax distortions have indeed affected firms' choice of organizational form, though mainly in industries dominated by smaller firms.

The tax treatment of corporate vs. non-corporate firms is dramatically different in Sweden than in the U.S. To begin with, personal and payroll tax rates in Sweden are each roughly twice as high as in the U.S., while the corporate tax rate is lower than in the U.S., in themselves creating much larger tax advantages than in the U.S. to operate in corporate form.

However, the opportunities to convert ordinary taxable income into more lightly taxed dividends and capital gains through incorporation are much more limited in Sweden, due to their use of a dual income tax. Under a dual income tax, capital income from a closely-held corporation is capped at a presumed rate of return (specified in the tax law) times the book value of the individual's assets in the firm, with all remaining income taxed as labor income. As described in more detail in section 2, the specific definitions of presumed capital income are more attractive for corporate than for non-corporate firms. However, the cap remains an important restriction limiting the potential tax savings through incorporation.

Tax losses are also treated very differently in Sweden than in the U.S. There are no immediate tax savings, regardless of organizational form, unlike in the U.S. For a non-corporate firm, capital losses up to SEK 100,000 during the first five years of a firm's existence can be deducted against other wage income. For a corporate firm, capital losses can to a limited extent be used to offset other capital gains, or to an even more limited extent other capital income. The tax law still favors the non-corporate form for firms expecting tax losses, but to a much more limited extent than in the U.S.

Whether tax distortions to the choice of organizational form matter more or less in Sweden than in the U.S. is therefore unclear. The aim of this paper is to provide evidence on the effects of these distortions in Sweden.

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[5] Business losses can be "carried back" three years, to offset past profits, or "carried forward" up to fifteen years to offset future profits. Altshuler and Auerbach (1990) document that in practice corporations with tax losses receive only limited reductions in their tax liabilities.

The available data for a study of tax distortions in Sweden are far better than those available for past studies in the U.S. In the U.S., there is no useful information available about the choices made by individual entrepreneurs. Data sources reporting an individual's income from a business do not report organizational form, while those breaking down income by organizational form do not differentiate between passive investments and income from the individual's own business. The only available data by form of organization report aggregate income and assets each year from the corporate and non-corporate sector. Academic studies are then confined to examining the effects of variation over time in average tax rates, but cannot examine differences in the choices made by individuals depending on their tax bracket.

In Sweden, we have available very detailed register based data at both the individual and the firm level over 2004–2008. The individual level data consists of information from Statistics Sweden on different types of annual incomes, as well as socio-demographic characteristics on all individuals aged 16–64. It also contains an indicator for whether the individual is self-employed in a non-corporate business, or owner of a closely held corporation. The business level data is based on business level tax returns, and contains information on all businesses, except for the financial sector. The combination of these sources of data provides broad information about both business owners and firms.

To our knowledge, there exist no other studies on tax distortions and organizational form using Swedish data. Previous studies on tax incentives and small business have mainly treated the decision to become self-employed (see Hansson 2010, and Fölster 2002) or capital lock in-effects (see Daunfeldt et al 2010).

Why should we care about the size of any effect of taxes on choice of organizational form? When firms change their behavior in response to tax distortions, they end up choosing a form of organization that is less attractive on non-tax grounds. When a firm is just induced to change behavior, the result is normally a loss in tax revenue and an equal loss of efficiency due to non-tax differences between the two organizational forms.

Of course, these existing tax provisions distort many other aspects of behavior. To the degree that tax incentives favor the corporate form, for example, they provide a competitive advantage to firms that can more easily operate in corporate form. Past

evidence, as well as casual observation, suggests that large firms are almost uniformly corporate, whereas new entrants and other small firms are normally non-corporate. Tax provisions favoring the corporate form then put new entrants at a competitive disadvantage, thereby discouraging entrepreneurial activity.

The tax treatment of losses vs. profits also affects the incentive to undertake risky projects. Differences between the tax rates on corporate profits and non-corporate losses can then affect risk taking, again mattering for the extent of entrepreneurial activity. Tax rates also affect investment incentives, and the incentives to hire workers.

Tax distortions to the choice of organizational form per se reflect just one aspect of the economic impact of the differential tax treatment of corporate vs. non-corporate firms. The question focused on in this paper is how important this particular effect of the tax law is.

The organization of the paper is as follows. The next section provides a brief overview of the empirical work undertaken in this paper, suitable for a general reader. Sections 3 and 4 provide more detailed descriptions of the tax distortions and the estimation strategy, respectively, appropriate for specialists. Section 5 discusses the data, and section 6 specifies the regression equation and provides a graphical analysis of key variables. Empirical results are reported in section 7, while section 8 compares these results to the previous literature and discusses their economic implications.

2   Overview of empirical strategy

Past empirical work estimating the effects of taxes on organizational form had to deal with the limitation that only aggregate time series data on choices of organizational form are available. The basic theory, drawn for example from MacKie-Mason and Gordon (1994), compared the after-tax return earned by a firm if it operates in non-corporate or corporate form.

Assume a firm's pretax income is Y if it chooses to be non-corporate, and $Y(1+c)$ if it chooses to be corporate, where c captures any non-tax implications of this choice of organizational form. The value of c varies by firm, with a presumption based on the discussion in Jensen and Meckling (1976) that smaller firms prefer to be non-corporate and larger firms prefer to be corporate. Ignoring taxes, any given firm will be corporate if its $c > 0$. Let the density function for c be denoted by $f(c)$. Ignoring taxes, the fraction

of firms that will be non-corporate equals $\int_{-\yen}^{0} f(c)dc$. Similarly, if the average value of Y for firms with any given value of c equals $Y(c)$, then the forecasted fraction of income received by non-corporate firms would be $\int_{-\yen}^{0} Y(c)f(c)dc/Y*$, where $Y*$ is aggregate firm earnings.

How do taxes affect these forecasts? For simplicity assume that taxable income equals economic income. If the firm chooses to be non-corporate, then this income is taxable under the owners' personal income tax, partly as capital income and partly as earned income. Denote the average personal tax rate of the owners of the firm by *m*.[6] If instead the firm incorporates, then the profits are first subject to corporate tax at rate t.[7] What is left net of corporate taxes can then be used to finance dividend payouts or retained to generate capital gains, which are taxed at realization. Let the average fraction of the after-corporate-tax profits paid in personal taxes be denoted by *e*. Denote the overall tax rate on corporate income by t^*, where $(1-t^*) ^0 (1-t)(1-e)$.

A given firm then prefers to be non-corporate if $Y(1-m) > Y(1+c)(1-t^*)$, or equivalently if

$$(1) \qquad\qquad c < \frac{t^* - m}{1-t^*},$$

assuming $Y > 0$.[8] The higher the owners' personal tax rate, the lower the cut-off value for *c*, and the fewer firms that will choose to operate in non-corporate form.

To proceed from this forecast for an individual firm to a forecast for the whole economy, the easiest approach is to assume that *m* and *c* are independent. The fraction of firms that are non-corporate then depends on the average within the population of

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[6] Note that *m* includes the payroll tax.
[7] The firm has the option to pay out earnings as wages. Wage payments from a corporation face the same tax treatment as income from a non-corporate firm, so we focus on the corporate earnings net of wage payments, which face a different tax treatment.
[8] When $Y < 0$, however, the inequality reverses. Also, while tax losses are deductible under the personal income tax (at least in the U.S.), loss offset under the corporate tax is very limited, implying a much smaller value for t^* when the firm has losses.

potential entrepreneurs of the tax expression on the right-hand side of equation (1).[9] This is the approach used, for example, in the papers by MacKie-Mason and Gordon (1997), and Goolsbee (1998). MacKie-Mason and Gordon (1997) use U.S. aggregate data for 1959–86, while Goolsbee uses aggregate U.S. data from 1900–39. Goolsbee (2004) instead looks across states at differences in the overall corporate share among various parts of the retail sector.

The approach used in this study differs for a variety of reasons from that used in these past studies. First, we do have data for individual firms, so we can use equation (1) directly to forecast the probability that any given entrepreneur will choose to operate in non-corporate form. In addition, we have selective information about the nature of the firm, including its industry, and size (assets). Each of these can potentially affect the non-tax benefits/costs of being corporate. In particular, let $c = Zg + \tilde{e}$. We can then forecast the probability that any firm is non-corporate as a function of the tax variable in equation (1) along with the vector Z.

Also, the past studies implicitly assume that firms are always profitable. For a firm with losses, though, the expected coefficient on the tax term changes sign. With individual data, we can take into account the tax treatment of profits vs. losses.

Past studies ignored payroll taxes, a poor choice in hindsight since non-corporate income in the U.S. is subject to payroll taxes while non-wage receipts from a corporation are not subject to payroll taxes. Payroll taxes are sufficiently important in Sweden that we do take them into account.

Having panel data available, an additional set of issues arises. When a firm makes a choice of organizational form, for how long will this choice remain in place? Equation (1) implicitly assumes that the firm can change form each year, and makes its choice based on knowledge of its ex post income. Yet there are likely to be serious costs to a firm of changing its form of organization.

In this paper, we take one step towards relaxing the assumption used in this prior work by assuming that the firm makes its choice for a two year period, knowing (as in

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[9] One approach to measure t and m uses the maximum corporate and personal tax rate. Alternatively, studies use the average corporate tax rate (taxes paid divided by pre-tax profits) and the implicit tax rate embodied in municipal bond interest rates, under the assumption that owners of municipal bonds are representative of potential business owners.

past studies) its ex post income in the initial year but facing uncertainty about its taxable income in the subsequent tax year.[10]

We assume that individuals make this choice of organizational form to maximize the present value of after-tax income over this two year period, implicitly assuming risk neutrality. They would then choose to incorporate if

$$(2) \qquad \sum_{s=t}^{t+1} \left(\frac{1}{1+d} \right)^{s-t} E(1-m_s)Y_s < (1+c) \sum_{s=t}^{t+1} \left(\frac{1}{1+d} \right)^{s-t} E(1-t_s^*)Y_s$$

Here, d is the after-tax interest rate, m_s is the average tax rate in year s (equal to tax payments divided by income if the firm chooses to be non-corporate), while t_s^* equals personal plus corporate tax payments as a fraction of income if the firm instead chooses to be corporate.[11]

Equivalently, the firm will incorporate if

$$(2a) \qquad Zg + \tilde{e} > \frac{t_t^* - m_t + E(1+\tilde{g})(t_{t+1}^* - m_{t+1})/(1+d)}{1 - t_t^* + E(1+\tilde{g})(1-t_{t+1}^*)/(1+d)}$$

Here, $Zg + \tilde{e}$ captures the non-tax benefits from being corporate, $\tilde{g} \equiv \tilde{Y}_{t+1}/Y_t - 1$ measures each possible growth rate in the firm's income between the two years. In the estimation, we forecast the distribution of possible incomes for the firm in year $t + 1$, given income in year t, and then calculate the implications of each possible income for the tax rates faced. Given the resulting tax expression, we can forecast the probability the firm chooses to incorporate, for any assumed distribution function for $\tilde{e}$. We assume that $\tilde{e}$ is distributed normally, and therefore use a probit estimator.

One complication ignored in past studies is tax evasion. One implication of incorporating is that the firm faces tighter auditing regulations, making at least some forms of tax evasion more difficult. To test for a possible role of differential tax

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[10] The choice of modelling a 2-year period, instead of, say 3 or more years, is naturally arbitrary in the sense that we cannot know exactly which time frame a business owner has in mind when making this decision. Still, it is an improvement compared to the previous literature.

[11] In year t, income is known, and each tax rate is set equal to the average tax rate the firm faces if it chooses that organizational form.

evasion, we use estimates, based on Swedish income and expenditure data, provided by Engström and Holmlund (2009). These suggest that households with at least one self-employed member (owners of closely held corporate or non-corporate firms) underreport their total income by around 30%. Underreporting seems to be more prevalent among owners of non-corporate firms, compared to owners of closely held corporations, although this difference is not statistically significant. Based on the estimates in Engström and Holmlund (2009), we will explore an alternative specification in which we assume that owners of closely held and non-corporate firms underreport by 15% and 40% of their business income, respectively.

The above discussion ignores, though, a variety of complications in the Swedish tax law not present in the U.S. We discuss several of these complications in more detail in the next section. In many cases, we take into account the complications and solve for the behavior of the firm that minimizes its tax liabilities for each choice of organizational form. In some other cases, though, we had to ignore particular complications in the estimation.[12]

3   Further information about the tax law

This section supplements the information in section 1, providing more information about the Swedish tax law, our measurement of the resulting tax incentives, and then the estimation method used in the analysis. We begin with a description of the main rules for taxation of entrepreneurial income for non-corporate firms (sole proprietors and unlimited partnerships) compared with those for closely held corporations.[13]

3.1   Tax rules for non-corporate firms

The income of a sole proprietor or a partner in an unlimited partnership to begin with is divided between earned income and unearned income. Earned income is subject to:

   a)   a payroll tax, with a rate equal to 22.9% in 2009 applied to wage costs.[14]

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[12] In particular, we take as given the capital and labor force of the firm when considering its choice of organizational form, even though the tax incentives affecting investment and hiring decisions differ for corporate vs. non-corporate firms. For example, Pirttilä and Selin (2011) find that the introduction of the dual tax system in Finland led to an increase in taxable capital income of the self-employed, and Harju and Kosonen (2012), who also study Finland, find that reducing the tax rate for non-corporate businesses increased the turn-over of firms.

[13] Main sources: Lodin et al. (2009), Sørensen (2008).

[14] The payroll tax for self-employed non-corporate business owners is slightly lower than that for employees (23.9% in 2009). Up to a certain earnings level, SEK 429,500 in 2009, higher payroll tax payments make the individual

b) a municipal income tax, at a rate between 28% and 34% across municipalities.[15]

c) a slightly-progressive central government income tax, at rates of 0%, 20% and 25%.

Taxable income for municipal and central government income taxes is measured net of deductions for: the payroll tax; a basic allowance (varies with income; min SEK 11,000 and max SEK 18,000); and, from 2007 on, an earned income tax credit (which reduces taxable earned income at all income levels).

The total marginal tax rate on earned income for a small business owner is hence roughly 0.51–0.685%, depending on income bracket.[16]

Unearned income for owners of a non-corporate firm is subject to a flat tax rate of 30%.

A key issue then is the division of the income from a non-corporate business between "earned" and "unearned" income. Owners of a non-corporate firm have the right to reclassify as unearned income an amount equal to the capital invested in the firm times a presumed rate of return. This presumed rate of return has been set equal to a long-term government bond rate + 5%. This so called "positive interest allocation"[17] is voluntary and can be made only if the net capital held in the firm at the beginning of the year exceeds SEK 50,000.

If there is a net capital deficit > SEK 50,000 at the beginning of the year, the firm is on the other hand required to report interest income on this deficit. The rule for calculating this interest income is to use an interest rate that is 4 percent lower than that for the "positive interest allocation." This amount is reported and taxed in the firm, and is deductible from capital income.[18]

Sole proprietors and unlimited partnerships also have the option to reinvest income in the firm in so called "expansion funds", which are taxed at the corporate rate rather than as earned income. The aim here is to imitate the tax treatment of retained earnings in a corporation. The yearly investment in the expansion fund cannot exceed the taxable

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eligible for higher social benefits, reducing the effective tax rate. Above this wage level, however, there is no link between payroll taxes and the level of social benefits, so that the individual faces the full statutory rate.

[15] In the empirical work, we set this rate equal to the average rate over the municipalities each year.

[16] These figures ignore the link between payroll tax payments and social benefits.

[17] The Swedish term is *positiv räntefördelning*.

[18] The purpose of this "negative interest allocation" (*negativ räntefördelning)* is to avoid having the firm owner deduct private interest payments from high taxed firm earned income.

business income, and in addition, the accumulated after-tax allocation to the fund cannot exceed net business equity.

When the funds reinvested in an expansion fund are extracted, the funds are at that date taxable as earned income, but with a rebate of past taxes paid on these funds at the corporate rate.

There is a clear tax advantage to withdrawing money from these expansion funds in years when the firm has negative taxable income: past taxes paid at the corporate rate are still refunded but no earned-income tax is owed as long as the firm is still running a deficit even with these extra funds. There is also a gain from deferral of any tax payments above those due at the corporate rate.

A cost of use of expansion funds, though, is that any expansion funds are subtracted from the capital stock used in calculating allowed "unearned" income.

3.2   Tax rules for closely held limited corporations (CHC's)

To set up a closely held corporation, the owner must invest at least SEK 50,000 of his/her own funds in the business.[19] In addition, to be viewed as closely held, there must be at most 4 owners who control more than half of the shares (where owners belonging to the close family count as one owner), and the shares cannot be traded on a regulated exchange.

Corporate income is subject to begin with to a corporate income tax rate of 26.3%.[20]

In addition, dividends and capital gains from closely held corporations were taxed at a 30% rate until 2005 and at a 20% rate since then, to the extent that these capital gains plus prior dividends are less than the amount available for "unearned income", according to special rules for CHCs. Under these rules, unearned income is limited to a presumed rate of return times the acquisition costs of the owner's shares in the firm, where the presumed rate of return equals the long-term government bond interest rate plus 9%.[21]

In addition, firms are allowed to increase their unearned income by a "wage-sum" amount. Under current rules, the extra allowed unearned income equals 25% of the sum

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[19] Before April 1, 2010, this figure was SEK 100,000.
[20] The corporate tax rate was 28% during 1995-2008.
[21] The interest rate premium was initially set at 5%, and increased to 7% in 2004, and to 9% in 2009.

of the wages paid to the owner and to employees, up to a given level, and 50% of these wage payments above this level.[22]

From 2006, firms can opt for a simplified rule instead of the acquisition cost and wage-sum based rules, and simply have a set amount classified as unearned income. This amount was initially set to SEK 64,950, but increased to 120,000 in 2009.

Another set of special tax relief rules[23] for CHCs were in place during 1997–2005. During this period, CHC-owners paid no personal taxes on a share of their dividend income or capital gains on shares. This amount was calculated as 70% of the government long-term bond rate times the acquisition cost of the shares plus a wage-sum based amount. These rules were abolished when new, more generous, wage sum rules for CHCs were introduced in 2006.

Unused capital-taxed income can be saved, with interest, to coming years. This was also true for unused tax relief amounts.

Any additional dividends above the amounts that qualify as unearned income are subject to personal earned income tax, although not to payroll tax.[24] Capital gains above the amounts that qualify as unearned income have been viewed to be half unearned income and half earned income, and taxed accordingly, although they are still not subject to payroll taxes.[25] Capital gains beyond a higher limit[26] were again subject to capital tax.

3.3 Tax treatment of business losses

All firms have the possibility to carry losses forward to future tax years.[27] This can be done as long as the firm exists. (However, no interest is added to preserve the present value of the deduction).

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[22] To be eligible for this "wage sum" allocation to unearned income, the owner's wage payments must be greater than the minimum of SEK 667,500 or (SEK 267,000 + 0.05*wage sum).

[23] *Lättnadsreglerna.*

[24] In the tax calculations, we will assume that dividends never exceed the amounts that qualify as unearned income, but assume that additional income is instead taken out as earned income. This should be optimal in most cases: When paid out as dividends, corporate tax and personal earned income tax is levied, while wages are subject to payroll tax and earned income tax. While the corporate tax is a bit lower than the statutory payroll tax, the effective payroll tax is lower for wage payments up to approximately 7.5 basic amounts, and in addition, wage payments increase the future amounts that are subject to the more favorable tax treatment for unearned income

[25] This rule was in place until 2005, abolished in 2006, but reintroduced in 2008 and 2009, and could be applied retroactively on sales made in 2007. In 2010, it was again abolished. When the rule was not in effect, capital gains were entirely taxed as earned income.

[26] Over a 6-year period, the amount of capital gains that were subject to earned income taxation was limited to 100 income basic amounts (the Swedish term is inkomstbasbelopp).

[27] *Rullning av underskott.* See Chapter 40 of the Swedish Income Tax Law (Inkomstskattelagen (1999:1229))

3.3.1 Realized capital losses

Realized losses on shares in a CHC give rise to the following tax treatment:[28]

    a) Since 2006, two-thirds of the capital loss can be deducted against gains on other listed or unlisted shares that are realized the same year.

    b) Seventy percent of the two-thirds of the capital loss, to the extent not deductible against capital gains, can be deducted against other capital income.

    c) If the remaining net capital income of the individual is negative; the tax payer is entitled to a tax credit equal to 30% of the remaining deficit up to SEK 100,000, and equal to 21% of the remaining deficit above SEK 100,000.[29]

    d) Excess credits, i.e. exceeding income and property tax payments, are lost.

3.3.2 Rules for sole proprietors and unlimited partnerships

In contrast, if a sole proprietor records a business loss during the year he goes out of business, he may deduct seventy percent of the loss against his taxable capital income during that year, and can carry forward any remainder for two years.[30]

An exception is made for newly set up firms, which may deduct business losses up to SEK 100,000 against other earned income during the first five years of the firm. Note, however, that expansion funds expand the degree to which losses can be deducted.

3.4 Possibilities to shift income over time

There are some, but restricted, possibilities to shift the timing of taxable income within the same firm, through so-called periodic funds.[31] Limited companies are allowed to shift up to 25%, and sole proprietorships and unlimited partnerships up to 30%,[32] of the business surplus into these funds. The forwarded funds can be held for a maximum of six years until they are returned as taxable earnings. Since the funded capital can be returned at any point within the 6-year period, the funds can be used to offset tax losses, providing a form of loss carryback.[33]

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[28] See Chapter 48 §20, and Chapter 67 §10 of the Swedish Income Tax Law (Inkomstskattelagen (1999:1229)).
[29] The total credit, though, is limited to the combined taxes paid on earned income and on property.
[30] See Sørensen (2010).
[31] *Periodiseringsfonder.*
[32] Before 2002: these figures were 20% for limited corporations and 25% for sole proprietors and unlimited partnerships.
[33] For CHC's, starting from year 2005, the law attempts to eliminate any gain from deferral through these funds by adding to the withdrawals an accounting rate of return equal to 72% of the ten-year government bond rate. For non-corporate firms, in contrast, there are no attempts to neutralize the gains from deferral.

4   Construction of tax variables and estimation methods

4.1   Construction of tax variables

Several issues must be dealt with carefully when measuring the taxes paid by a corporate or a non-corporate firm with any given level of income.

Consider first non-corporate tax payments. One choice the firm faces is the extent to which some of the income should be classified as "unearned" income. When the individual would face an overall tax rate on earned income below that due on capital income, then it is preferable not to classify income as "unearned".[34] Only those facing a marginal tax rate on earned income above that on unearned income will choose to reclassify. Once earned income payments reach this limit, the owner will instead claim further payouts as "unearned" income, until these payouts reach the allowed limit for "unearned" income. At that point, any further payouts will take the form of earned income. We assume that the individual in fact makes this choice to minimize tax payments.

A second choice faced by a non-corporate firm is the extent to which profits will be transferred into expansion funds. By doing so, the individual pays tax at the corporate rate rather than the personal tax rate on the transferred funds. When the funds are withdrawn, the past corporate taxes are rebated and personal taxes are owned on the withdrawn funds. Withdrawals are more attractive in years when personal tax rates are low. An additional cost of use of expansion funds, though, is that any expansion funds are subtracted from the capital stock used in calculating allowed "unearned" income.[35]

In particular, use of an expansion fund reduces expected tax liabilities whenever

$$(3) \qquad (T'-t) > (r+.05)\frac{T'-c}{d}\left(1 - \frac{1}{(1+d)^n}\right) + \frac{T_f'-t}{(1+d)^n}$$

The left-hand side captures the immediate tax savings from paying taxes at the corporate rate rather than the personal tax rate on the money shifted into an expansion fund. The first term on the right-hand side measures the present value of the extra taxes due while funds remain in the expansion fund due to the drop in allowed "unearned" income, where c is the tax rate on capital income and d is the after-tax discount rate.

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[34] This occurs at low income levels due to the basic allowance and the earned income tax credit,

[35] Another obvious cost of using the expansion funds is that the money cannot be immediately used by the business owner, but is locked in the fund.

Here, we assume that money remains in the expansion fund for n years, The last term measures the extra taxes due in the future when money is taken out of the expansion fund, where $T_f^{'}$ is the tax rate in the future that in expectation will be faced on withdrawals of funds.

Back-of-the-envelope calculations suggest that expansion funds are an attractive option whenever $E(T_f^{'} - c)$ is less than about two-thirds of $T^{'} - c$.[36] In the estimation, we calculate the contributions to expansion funds in period t that minimize expected taxes assuming that they must be withdrawn in period $t+1$.

Similarly, non-corporate firms need to choose how much to shift to periodic funds. Such shifting is worthwhile as long as

$$(4) \qquad T' > \frac{T_f^{'}}{(1+d)^n}.$$

We again assume that the firm chooses contributions to periodic funds to minimize expected taxes, assuming they must be withdrawn in period $t+1$.

A CHC also has a range of choices. For one, among funds it chooses to pay out to the owner, should these payouts take the form of dividends or wages? Wage payments are deductible expenses for the firm, so that the only taxes due are payroll taxes and personal taxes on earned income. Dividends are not deductible expenses for corporate tax purposes, and the payouts are taxed as "unearned" income until the payouts are so large that they are instead reclassified in part as earned income.

Wage payouts dominate dividends as long as:

$$(5) \qquad (1 - t)(1 - T') > (1 - t)(1 - c)$$

When the individual's income is smaller than the basic allowance, $T^{'} = 0$. In addition, at such low incomes, extra payroll tax payments generate extra social benefits, leading to $t \approx 0.16$.[37] At these low income levels, we find that wage payments dominate dividends. In fact, we find that wage payments continue to dominate dividend payment

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[36] In our calculations, we used a pre-tax discount rate of 3%, implying an after-tax discount rate of 2.1% and set $n = 5$.

[37] Du Rietz (2003) suggests that the effective payroll tax should be set slightly lower than the "special payroll tax" on passive entrepreneurial income and on employer's contributions to employees' retirement pensions funds, for income levels below 7.5 basic amounts. Sørensen (2008) on the other hand, argues that the effective payroll tax for the lower income levels is approximately zero. We will follow Du Rietz and set the effective payroll tax equal to 0.16 for income levels below 7.5 basic amounts, but will also test the sensitivity of the results to using the assumption by Sørensen.

for a non-trivial section of the lower end of the income distribution. Once wage payments are high enough that the marginal earned income tax is higher than the capital tax, the individual does better by switching to dividends when making any further payouts, until dividends no longer qualify as "unearned" income. For each observation, we calculate the form of payout that minimizes the individual's expected taxes.

To what extent, though, should funds be paid out? Consider retention of a krona compared with payout of a krona in dividends and then a new investment of a krona in the firm. In both cases, the firm is left with the same amount of funds, and in both cases the same corporate taxes are paid. In the second case, taxes are due now on the payout. With new investment in the firm, however, the basis value for the firm's shares used in calculating "unearned" income increases, expanding the eligible amount of "unearned" income by $(r+.09)$ in all future years that the individual holds these shares. In addition, the increase in the basis value reduces future capital gains taxes when these shares are sold. The present value of these extra taxes due as a result of this payout, assuming that the firm is paying out wages as well as "unearned" income, equals:

$$(6) \qquad T' - \frac{(r+.09)(T'-c)}{d} \left[1 - \frac{1}{(1+d)^n} \right] - \frac{.5(T'-c)}{(1+d)^n}$$

Here, we assume that the capital gains will be realized n years in the future, and that accumulated unearned income will have reached the maximum allowed value so that marginal capital gains will be taxed half as earned income and half as capital income.

Our calculations suggest that the firm breaks even by paying out funds if shares will be held for roughly another seven years, with payouts becoming more attractive the longer the shares will be held.[38] Based on these calculations, we assume in the empirical work that all profits are in fact paid out each year.[39]

Should a CHC place funds in a periodic fund? The rules are the same as for a non-corporate firm except that, from year 2005 on, the taxable amount on withdrawal accrues interest at the long-term bond rate. Rather than expression (11), the net benefits for a CHC from making use of periodic funds are positive if:

$$(7) \qquad T' > \frac{T_f(1+.72r)^n}{(1+d)^n}$$

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[38] Here, we assume that $r = .03$, $d = .021$, $c = .3$, while $T' = .5$.
[39] With this assumption, we can also ignore any deferred capital gains taxes due on retained funds.

Note that $r = 0$ until year 2004, but is positive from 2005 on. Since $d = .7(1-t)r$ due to taxes, from 2005 on use of periodic funds makes sense only if the chance of facing a much lower tax rate in the future is high. We calculate the contribution to periodic funds that minimizes a CHC's expected taxes, assuming the funds must be withdrawn in period $t + 1$.

4.2   Generating measures of tax incentives

To form expectations about Y_{t+1}, we assume that the owner extrapolates using information about earnings, Y_t, and its capital stock, K_t, in the current year. In particular, we make use of the following regression to forecast the distribution of possible profits in the following year:

$$(8) \quad Y_{t+1} = a + b_1 \max(Y_t,0) + b_2 \max(Y_t^2,0) + c_1 \min(Y_t,0) + c_2 \min(Y_t^2,0) + dK_t + u_{t+1}$$

Here, the coefficients b_1 and b_2 capture both mean-reversion and possible on-going growth in the firm among firms with past profits, and similarly for coefficients c_1 and c_2 among firms with past losses. We also include the firm's capital stock, K_t, to help control for variation in expected profits by size of firm.

We estimate these equations on the pooled data for years 2004–2008, and use the resulting estimates to forecast values for years 2005–2009. The sample is restricted to individuals who were self-employed both in period t and t+1.

The distribution of possible outcomes around the forecasted value depends on the distribution of u_{t+1}. We assume that

$$(9)\,|\,u_{t+1}\,| = a + b_1 \max(Y_t,0) + b_2 \max(Y_t^2,0) + c_1 \min(Y_t,0) + c_2 \min(Y_t^2,0) + dK_t + h_{t+1}$$

Here the dependent variable is the absolute value of the residual from equation (1). We also assume a separate relationship between risk and past profits for firms with past profits vs. losses. This relationship is again estimated on the pooled data set using all years of data.

Given the expectation of substantial heterogeneity, we re-estimate equation (8) using generalized least squares, dividing through all variables by the forecasted standard deviation of the error terms.

In order to construct the variables needed to estimate equation (2a), we then use the estimates from equations (8) and (9) to simulate a distribution of possible profits for the

firm in year $t +1$, for any given observed values for profits and the capital stock in year t, drawing from the observed residuals.[40] For each possible outcome, we can calculate tax payments assuming either form of organization, directly enabling us to calculate expected tax payments.[41]

5 Data

The empirical analysis is conducted by linking data for 2004–2008 on individuals' incomes, employment status and socio-demographic characteristics with tax return data on small businesses. This section gives an overview of the data, whereas a more detailed description of the variables can be found in section A2 in the Appendix.

The individual income data come from the tax authority income registers, and are based on tax returns and statements of income. They contain yearly gross amounts of earned income (i.e. wage income and income from non-corporate entrepreneurial activity), and capital income.

The data furthermore contain an indicator of the main income-generating activity of an individual as of November each year, which classifies individuals as employed, non-corporate business owner, or owner of a closely held corporate firm.[42] This measure will be used as the indicator of organizational form of the firm in the empirical analysis. Note that our data sample will thus only include individuals whose main income generating activity is running their own firm. This means that we exclude the many individuals whose main occupation is being an employee, but who run a smaller business on the side.

The business level data is based on business level tax returns,[43] and contains information on all businesses, except for the financial sector, over 2004–2008. The data contains measures of annual business revenues, total wage payments, and aggregate

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[40] Specifically, we draw the 5th, 10th, .., 95th percentile value from the normalized distribution of residuals, multiply by the estimated standard deviation for the residuals coming from equation (9) and then add this to the forecasted value for profits coming from the coefficient estimates in equation (8).

[41] Note that the non-linearity of the tax-function require us to take into account the distribution, and not just the mean, of the predicted profits in t+1 when calculating expected net-of-tax-income.

[42] When constructing this measure of income, Statistics Sweden inflates non-corporate business income by 1.6, in order to account for likely understating of income. Corporate business ownership is identified if the individual files taxes as owner of a closely held corporate business *and* this was the main income generating activity.

[43] For non-corporate firms, these coincide with the personal tax returns, as the income of the business is in this case not separated from the personal income of the owner.

measures of business assets. It also contains a detailed classification of industrial sector, and whether the business is corporate or non-corporate.

A key issue is how we link the individual business owners to their businesses. For owners of sole proprietorships, this is straightforward, as the firm identification code in the business level data coincides with the personal identification code in the individual data. The link between owner and firm can however not be identified from our data for non-corporate partnerships, which means that our empirical analysis will be based only on the non-corporate firms that are sole proprietorships. Sole proprietorships make up more than 80% of the non-corporate firms.[44]

For owners of closely held firms, no such direct link is available, and we need to rely on indirect information to obtain an approximate link between owners and firms. To link individual and business data in this case, we make use of a data set which contains links to all workplaces from which the individual received earned income exceeding SEK 1,000 (USD 110)[45] during the year. These data contain information on the earned income from each workplace, as well as whether the individual is linked to the workplace as a non-corporate business owner or as an employee (where the latter includes corporate business owners who are employed by their own firm). Specifically, we assume that an individual who is classified as CHC-owner according to the indicator described above, owns the business from which he or she received the largest amount of earned income during the year, as long as the business is also classified as a corporate business in the business level data set.[46] [47] Inevitably, this procedure misclassifies the business-link for at least some of the CHC-owners in the data. In order to reduce the potential bias from such mis-classification, we will limit our sample to firms for which we observe only one owner[48], and to individuals who are linked to only one

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[44] See the Swedish Companies Registration Office: www.bolagsverket.se.

[45] The currency conversion throughout the paper is made using the approximate PPP-adjusted conversion rate for 2010, SEK 9 = USD 1, reported by the OECD (http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE4) .

[46] Since the indicator for employment status is based on the status in November each year, we only include workplaces/firms from which the individual received earned income during that month.

[47] 62% of the observations for corporate business owners in our sample were linked to only one workplace, whereas 38% had links to several workplaces. For those with links to several workplaces, we use the following decision rule to link owners to workplaces: a) The workplace data contains an indicator of whether the individual is related to the workplace as an employee or as a sole proprietor: owners of closely held corporations will be classified as employees: after eliminating the links that do not have this classification, 85 percent of the observations for CHC-owners have links to only one workplace. b) For the remaining 15 percent, we keep the workplace that yielded the highest annual income.

[48] We are still likely to misclassify the number of owners of some firms in the data, partly due to the fact that we only observe individuals 20-64 years old in the data, and partly since the classification of CHC-owners only captures those with CHC-ownership as the main income generating activity.

workplace[49]. This means that we exclude all individuals who own several firms, or who combine running their own firm with being an employee.[50] For this sample, there should be few misclassifications. The downside is that we lose a lot of observations: roughly half of the observations are lost due to these restrictions. In a sensitivity analysis we rerun the estimations for the full sample, and it is reassuring that the results are not much affected by the sample restrictions (see Table A 3 in the Appendix). [51] [52]In the empirical analysis, we furthermore exclude firms that are owned by the government sector, as well as firms in the agricultural, forestry and fishing sectors. Only working-age individuals, aged 20–64, are included in the data, and, as previously mentioned, we study only owners of businesses that are either sole proprietorships or closely held corporations.[53]

In order to avoid having a few extreme values drive the estimation results, we also exclude the top and bottom percent of observations of business revenue; and of our measure of tax incentives (see eq. (10) below). We also exclude the top and bottom 0.1 percent of the observations of the variable previous personal income.

After the above modifications, we are left with almost 500,000 observations over the years 2004-2008: about 340,000 observations for sole proprietors and about 150,000 observations for owners of closely held corporations. Summary statistics for the sample of business owners, divided into owners of non-corporate and corporate firms, is given in Table 1. The table first shows our variable of main interest, YTdiff, which measures the percent impact on net-of-tax income, over a 2-year period, if a corporation instead chooses to be a sole proprietorship. The table also gives summary statistics of the firm-

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[49] In particular, we keep only those who are linked to one workplace during the month of November each year, since this month is the basis for the classification of the self-employment indicator, provided by Statistics Sweden, that we use to classify business owners.

[50] Limiting the sample to business owners who are linked to only one firm is furthermore important since the classification of being an owner of a corporate or non-corporate firm is based on the relative incomes from each source. By excluding individuals with several firms we rule out the possibility that an individual changes status from owner of a non-corporate to corporate firm, or the reverse, merely due to changes in the relative size of income from the two firms. This is particularly important since we study the effects of changes to the tax system of the respective types of firms, something that could in itself affect the amounts of income extracted from the respective types of firms.

[51] In the regression including also CHCs with more than one owner, we still exclude the 2.2 percent of the firms where the observed number of owners exceeds four, since a firm is closely held only if up to four owners control more than half the shares. Since the rules that determine whether a corporation is closely held count all close family members as one owner, this probably excludes too many firms. In any case, the number of firms that are excluded is small, and does not change the qualitative results (the result with all firms is available upon request).

[52] Note that firms are in addition regarded as CHCs only if their shares are not traded on a regulated exchange. This we cannot observe in our data.

[53] The reason for focusing on these two forms of ownership is that there is no available link between owners and firms in our data for the other forms of ownership.

level characteristics that are needed for the tax calculations and/or are included in the regression analysis; and of owners' background characteristics.

Table 1. Descriptive statistics regression sample

Variables	Sole Proprietors (SP)			Closely held corporations (CHC)		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Net-of-tax business revenue differential:						
YTdiff	343608	0.01	0.11	152332	0.04	0.08
Firm level characteristics:						
Wage sum employees ($t-1$)	343375	48080	185867	152282	727763	1869718
Wage sum owner ($t-1$)[54]	343608	169930	145958	152332	287801	143054
Capital assets ($t-1$)	343608	138466	536771	152332	882255	1613273
Business revenue (t)	343608	236628	229279	152332	606907	504781
Owner background characteristics:						
Average personal income previous 5 years[55]	343608	159282	140677	152332	298186	172703
Age	343608	48	10	152332	49	9
Dummy male	343608	0.67	0.47	152332	0.82	0.38
Dummy university education	341461	0.44	0.50	151814	0.50	0.50
Dummy married/cohabiting[56]	343608	0.63	0.48	152332	0.71	0.45

Before we move on to the results of the empirical analysis, the following section will present the estimation details and give a descriptive analysis of the tax incentives and choice of organizational form.

6 Estimation

6.1 Specification of the regression equations

In the theoretical model in section 2, we modeled the choice of organizational form as a function of the tax schedule, and derived the condition (see equations (2) and (2a)) for when a business owner would opt to incorporate rather than operate as a non-corporate firm. In order to test this prediction empirically, we make use of business and business owner data on non-corporate and closely held corporate firms over the period 2004–2008.

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[54] For sole proprietors, who technically do not receive wage income, this refers to the personal income that is taxed as earned income.

[55] In the regression analysis, this variable will be in units of 1000 000 SEK, since this gives a better scale for the coefficient values.

[56] In the data, we can only observe if a non-married couple is cohabiting if they have common children. Cohabiting individuals without common children will be classified as single.

The tax schedule gives rise to variation in the tax treatment of the two types of firms, both over time and across income groups.[57] We will make use of both of these sources of variation in the regression analysis. Specifically, we pool all years of data, and, based on equation (2), we estimate the choice of organizational form in year t, given income in year t and given the tax incentives faced in years t and $t + 1$.

Before turning to the estimation details, we state again the condition, derived in equation (2) section 2, under which the business will be corporate. Noting that, under the dual tax system, both the corporate and the non-corporate business owner are likely to have a mix of earned and capital income from the firm, we rewrite equation (2) in the following manner: The business will choose to incorporate if

$$(10) \qquad Z\gamma + \tilde{e} + \frac{\sum_{s=t}^{t+1} [E(Y_s - T_s^c) - E(Y_s - T_s^{nc})]/(1+d)^{s-t}}{\sum_{s=t}^{t+1} E(Y_s - T_s^c)/(1+d)^{s-t}} > 0,$$

where $(Y - T^{nc})$ denotes net of-tax income under the non-corporate tax schedule, and $(Y - T^c)$ denotes net-of-tax tax income under the corporate tax schedule.

As equation (10) illustrates, in our model the choice of organizational form is a function of the percent change in after-tax income over the next two years if a corporation chooses instead to operate in non-corporate form. Equation (10) furthermore illustrates that the firm will choose to incorporate as long as any tax benefits from being corporate are not large enough to outweigh the non-tax benefits from being non-corporate.

In order to estimate equation (10) empirically, we should include all relevant non-tax factors that are likely to influence the decision to incorporate. One plausible non-tax factor that affects the choice of organizational form is the capital assets of the firm: firms with more capital gain more from incorporating due to the resulting improved access to outside finance and risk sharing. Second, corporations tend to be more common in some industries than in others, and third, firms that have employees (so face a fixed payroll) gain more from the risk sharing facilitated by corporate status. Based on these considerations, we include dummy variables for each decile of the distribution of

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[57] In particular, the tax treatment depends on business revenue; capital assets (for non-corporate firms); acquisition cost of shares (CHC); and wage costs (CHC).

capital assets, as well as a dummy for whether the business has capital assets worth at least the SEK 100,000 that were required for incorporating during our data period. We also include dummy variables for: one-digit industry[58]; a dummy for having employees (other than the owner), and we include the owner's average income during the five previous years (measured in million SEK), as an additional indicator of both scale of business and access to capital. The sector information is measured in period t, while the dummy variables for capital assets and employees are based on the lagged values.

In some of the regressions we will furthermore add individual background covariates, including dummy variables for gender, 5-year age-groups, marital status and being a college graduate, all measured in period t, in order to further capture differences in access to capital as well as attitudes to risk. We will also estimate equation (10) with and without year dummies, in order to check whether aggregate time trends in the choice of organizational form affect the results.[59]

Finally, we recall that the theoretical model assumes that the business owner makes the choice of organizational form for a 2-year period, which means that in any year half the firms made the decision at the end of the tax year t, knowing year t's income but not the following year's income, while half made the decision the previous year, knowing year $t-1$ income but not year t income. We account for this by letting our tax incentive measure be the average of the two tax incentives, one based on t and $t+1$ and the other based on $t-1$ and t.

The resulting regression specification implies that the firm will choose to be corporate if

(11) $\qquad a + b \times \overline{YTdiff_{it}} + Z_{it}g + Controlfunction_{it}j + X_{it}d + k_t l + \varepsilon_{it} > 0$,

and conversely, and where $\overline{YTdiff_{it}} = \left(\dfrac{YTdiff_{it} + YTdiff_{it-1}}{2} \right)$.

Here, $YTdiff_{it}$ denotes the percent drop in after-tax income if a corporation chooses instead to be non-corporate, i.e. the third variable in equation (10). If business owners react to tax incentives when choosing organizational form, we expect a positive beta-coefficient in equation (11) – all else equal the business owner would choose the

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[58] Some categories were merged due to few observations.
[59] These year effects will pick up the average effect of other changes in the business tax law. One potentially relevant tax rule change is the set of rules denoted "Lex Uggla", that were implemented by the Swedish Tax Agency starting from year 2005. These rules were aimed at preventing tax avoidance of the personal wealth tax through transfer of private wealth to the corporation. Later on, in 2007, the personal wealth tax was however itself abolished.

organizational form that gives the higher net-of-tax income. Note, again, that the regression equation includes the average of this value over the current and last year, in order to take account of the assumption of the theoretical model that the choice of business organizational form is made for a 2-year period. Z_{it} contains the business level non-tax factors described above (dummy variables for capital assets; 1-digit industry; for having employees; and the average income of the owner during the 5 previous years). X_{it} is a matrix of the personal background dummy variables listed above, κ_t contains yearly dummy variables, and ε_{it} is the regression error term.

Although the regression equation (11) includes covariates for a relatively large set of non-tax factors that may be correlated with the choice to incorporate, it ignores the possibility that the variables determining the tax treatment of income from non-corporate and corporate closely-held firms (e.g. the income level, previous wage sums and capital levels) may themselves be correlated with the decision to incorporate. In principle, to control for such correlations we should include flexible control variables for all these variables. However, such controls likely also capture a lot of the variation in tax rates, and would hence lead us to understate the effects of tax incentives. The fact that most of the variation in the outcome variable is between income-levels, as will be shown in Figure 2 in section 6.2 below, suggests that this concern should be taken seriously.

There is hence a trade-off between adding too little, and too much, in terms of covariates that correlate with the tax incentive measure and the outcome variable. Our approach is therefore to first show the results with the basic set of non-tax factors, according to equation (11), and to then, in a robustness section, add a flexible control function for the variables that affect the tax treatment of business income. The detailed specification of this regression equation will be given in section 7.2.1. Before we turn to the regression results, the following section will however give a descriptive analysis of in the data.

6.2   Descriptive analysis

This section gives a graphical description of the tax treatment of corporate and non-corporate small businesses and the resulting choice of business organizational form.

First, Figure 1 graphs the key variable in the regression on business organizational form: the percent drop in 2-year after-tax income if the firm chooses to operate in non-

corporate, instead of corporate, form. The graph shows the average values separately for each quartile of the owner business revenue distribution.

Figure 1. The percent drop in present value of 2-period net-of-tax income if a corporation were instead non-corporate[60]

As can be seen in Figure 1, on average business owners in all three upper income quartiles, especially the top quartile, would face a drop in after-tax income if they choose a non-corporate form for their business. Furthermore, the tax penalty from being non-corporate increases over time for the two upper quartiles, especially for the top quartile. By the end of the period, the average business owner in the top income quartile would lose 9 percent of her 2-period net-of-tax-income if she were to go from corporate to non-corporate form.[61] The average business owner in the lower quartile, however, gains from being non-corporate, especially in the first couple of years.[62]

During the first couple of years of our data period, the 2-year expected tax gains from incorporating, in terms of net of tax income, is around USD 1,100 (SEK 10,000) on average for the firms in our data, but increases to more than double that amount, USD 2,400 (SEK 20,000) by the end of the period. This can be compared to the after-

[60] The tax rates are computed using a payroll tax of 16% for taxable income up to 7.5 basic amounts (see footnote 34 for details).

[61] It can be noted that the tax gains are even higher for the top percentile firms, where the net-of-tax income differential is between 10 and 15 percent during 2004–2008.

[62] The decrease in the tax advantage for non-corporate firms from 2006 on is likely due to the introduction in that year of the set capital amount that could be used by all CHCs, irrespective of capital assets held.

tax cost for certified accounting, something which was mandatory for CHCs but not for sole proprietors during the period that we study, which is estimated to around USD 840–1,100 yearly (SEK 7,600–10,000) for a small corporation.[63][64] The gains from incorporating are in this perspective rather modest for many of the firms in our sample. Nevertheless, for some firms, there are large gains to be made: the 2-year expected tax gains from incorporating in years 2008-9 at the 90th percentile was USD 8700 (SEK 78,000).

In order to get a first indication of whether the tax incentives are correlated with the actual choices of organizational form made by the business owners in our data, Figure 2 graphs the share of business owners that are owners of closely held corporations, for each of the four business revenue quartiles.

Figure 2. Share of owners of closely held corporations
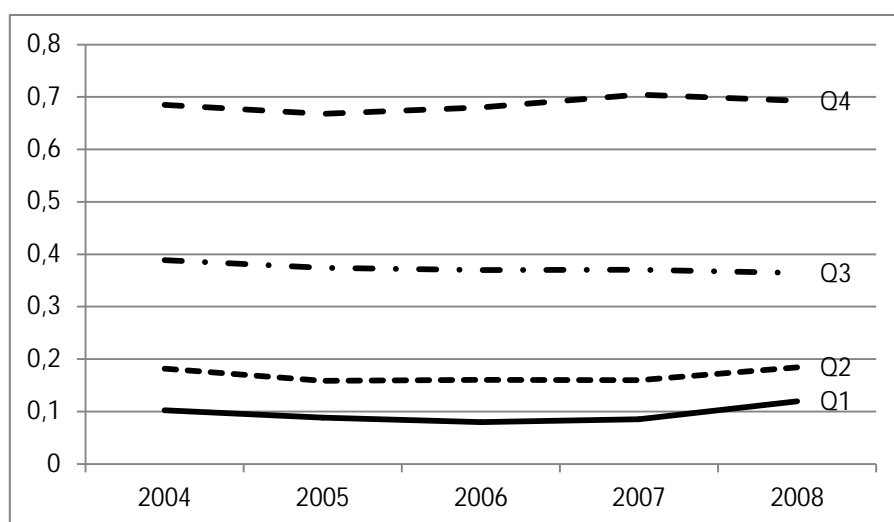
Note: Q1 denotes the lower 25 percentiles of firms w r t business income in t, Q2 denotes percentiles 26-50, Q3 percentiles 51-75, and Q4 the upper 25 percent of the income distribution.

Figure 2 shows that choosing to operate as a closely held corporation is much more common in the higher income quartiles: almost 70 percent of the business owners in the upper business income quartile are owners of a closely held corporation, compared to less than 20 percent in the two lower quartiles.

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[63] The estimate (a before-tax cost of approximately SEK 15,000–20,000) was provided by "The Small Businesses' National Association" (Småföretagarnas Riksförbund). We calculate the after-tax cost assuming that income is first taxed at 28% at the firm-level, and then at 30% at the personal level.
[64] Up until 2011, all corporate firms need to use a certified accountant; from 2011 on, small corporations are exempt from this requirement.

As for changes over time, it is hard to detect any dramatic development in Figure 2: the share of firms that incorporates is relatively stable over time, although one can spot a small upward trend in the upper quartile for the last couple of years of the period.

The graphical analysis indicates a trend towards a more favorable tax treatment of the owners of corporations, especially when business income is high. There is however little indication in the aggregate data that the share of closely held corporations has increased over time, at least not judging from what is visible in Figure 2. However, the figures do not adjust for differences in non-tax incentives. In order to do so, we now turn to the regression analysis.

7   Results

This section presents the results of the empirical analysis, where we analyze tax and non-tax factors that are likely to affect the choice of organizational form by closely-held firms. Based on the theoretical model in section 2, we analyze how the likelihood that a firm is a closely held corporate business, instead of a non-corporate sole proprietorship, is related to the differential tax treatment of the two types of firms.

It shall be made clear that our analysis is not a thorough causal analysis; i.e. we cannot convincingly argue that our estimates capture the causal effects of tax incentives on the decision to incorporate. For example, although we will present specifications that attempt to deal with bias due to omitted variables, we cannot be certain that our strategy eliminates all such bias. In addition, we cannot rule out the presence of reverse causality, that is, that the decision to incorporate in itself affects for example the risk-taking behavior of the business owner, and that this in turn affects the taxation of the business income. While we will attempt to control for omitted variable-bias, we will not deal with the issue of potential bias due to reverse causality. The reader shall interpret the results with these caveats in mind. However, we still believe that the results that will be presented in the following sections are interesting as a first indication of whether tax incentives matter in the Swedish context.

7.1   Regression results

The first step in the estimation is to forecast the mean and variance of income in year t + 1 given income in year t. Results are reported in Table A 1 in the Appendix.

Based on these results, we construct our measure of the tax incentives to incorporate. The result of the regression specification in equation (11) is given in Table 2. The coefficients shown are the average marginal effects, in percentage points, on the probability of being corporate coming from a probit-estimation.[65]

The specification in column (1) includes no covariates; column (2) includes year dummies and average personal income of the owner during the five previous years, $t – 5$ to $t – 1$[66], (measured in SEK 1000,000); one digit industry dummy variables measured in $t − 1$; a dummy variable for whether the business has employees (other than the owner(s)); and a dummy variable for whether the business has at least the SEK 100,000 of capital assets that are required for incorporating. Column (3) further adds the set of personal covariates: dummy variables for gender; being married; having completed a university education; and 5-year age intervals. Finally, column (4) accounts for underreporting of incomes according to the estimates in Engström and Holmlund (2009), that is, we assume that the business income reported for tax purposes by a non-corporate firm is only 60 percent of its true business income, while reported income for a corporate firm is only 85 percent of its true business income.

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[65] The average marginal effects were computed using the STATA command margins.
[66] For some individuals data is not available for all of this period. For these cases, the average is calculated based on the available observations.

Table 2. Regression results equation (11) organizational form[67]

Variables	(1)	(2)	(3)	(4)[a]
$\overline{YTdiff}$	1.460***	0.374***	0.372***	0.251***
	(0.0226)	(0.0135)	(0.0133)	(0.00964)
Average income 5 previous years		0.288***	0.255***	0.327***
		(0.00777)	(0.00767)	(0.00819)
$Employees_{t-1} > 0$		0.221***	0.224***	0.230***
		(0.00174)	(0.00175)	(0.00172)
$Capital_{t-1} > 100k$		0.287***	0.284***	0.284***
		(0.00188)	(0.00186)	(0.00187)
Sector dummies	No	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes
Owner background covariates	No	No	Yes	Yes
Tax evasion	No	No	No	Yes
Log Likelihood	-191551	-115676	-114212	-113852
Observations	326,725	320,061	318,615	318,374

Robust standard errors in parentheses, clustered at the firm level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
[a]The reason for the slightly different number of observations in columns (3) and (4) is that a different number of observations is dropped, due to ties, when the top and bottom percentile of observations w r t business income, and net-of-tax-income, are excluded from the sample. This stems from the assumption in column (4) that actual business income is not equal to reported income, since a share of income is evaded.

The results in Table 2 suggest that tax incentives have a positive and statistically highly significant effect on the choice of organizational form: When we account for business and personal level characteristics, as well as year effects, in columns (2) and (3), a one percent point increase in the net income from operating in corporate rather than non-corporate form leads to a 0.37 percentage point increase in the likelihood that the business owner chooses to be corporate. When we assume underreporting of business income, in column (4), the coefficient of the tax variable decreases a bit, to 0.25.

Table 2 also shows that non-tax factors are strongly correlated with the choice to incorporate: firms with sufficient capital to incorporate or with employees, and owners with higher previous average income, are all much more likely to incorporate. The share of corporations furthermore differs between sectors, and owners of CHCs are more likely to be male; married; in their 40–60s; and more often have college degrees, than their non-corporate counterparts.[68]

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[67] The full set of coefficients is shown in Table A.2 in the Appendix.
[68] These results are available in Table A.2 in the Appendix.

7.2 Alternative specifications

7.2.1 Including a flexible control function

As was discussed in section 6.1, the regression results presented in Table 1 largely ignore the fact that the variables that determine the tax treatment of the business owners may themselves be correlated with the decision to incorporate. This section therefore shows the results when controls are added for all such factors in a very flexible manner. Note, though, that these controls are likely to capture most all of the cross-sectional variation in tax incentives, so that tax incentives are now identified based just on the small time-series variation in the tax law.

In order to define which variables to include as control variables, let us first repeat that the tax incentive for business owner i to choose the corporate form in period t, is written as

$$YTdiff_{it} = \frac{\sum_{s=t}^{t+1} [E(Y_s - T_s^c) - E(Y_s - T_s^{nc})]/(1+d)^{s-t}}{\sum_{s=t}^{t+1} E(Y_s - T_s^c)/(1+d)^{s-t}}. \qquad (12)$$

Note that for period s=t, $YTdiff_{it}$ is determined by the pre-tax income, Y, in period t, as well as the capital assets, K, and the wage sum, WS, in period t-1, since the two latter factors affect the tax treatment of income. For period s=t+1, the tax payments are (as described in section 4.2) instead calculated for the distribution of the predicted income in t+1, where the prediction is based on pre-tax income, and capital assets, in period t.

Taken together, this means that the variables that affect the two-period tax payments, and that should hence be included in the control function, are the following: $Y_t, K_t, K_{t-1}, WS_t, WS_{t-1}$. Furthermore, since the tax incentive variable that is included in regression equation (11) is the average of the 2-period tax incentives over the current and previous period, $\overline{YTdiff_{it}}$, the list of underlying variables to be included in the control function should be extended to include also the previous lags, i.e. it should include the following list of variables: $Y_t, Y_{t-1}, K_t, K_{t-1}, K_{t-2}, WS_t, WS_{t-1} WS_{t-2}$.[69]

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[69] It can be noted that we include the wage payments to employees other than the owner in the control function, but we do not include the wage payments to the business owner, even though these to some extent also affect the tax treatment of business income from the corporate firm.

We will estimate the control function in the form of piece-wise linear functions of all included variables, with breakpoints at each quintile of the distribution.[70]

A practical problem is that many of the variables in the control function are likely to be closely correlated, which means that some will have to be dropped to enable conversion of the likelihood-function. In order to get an indication of whether multicollinearity is a serious concern, Table 3 therefore shows the results when we gradually add to the number of lags in the control function.[71] For comparison, Column (1) also shows the results without including the control function, i.e. the results from column (3), Table 2.

Table 3. Regression results equation (11) organizational form, including control function

Variables	(1)	(2)	(3)	(4)	(5)[a]
$\overline{YTdiff}$	0.372***	0.0927***	0.0507***	0.0510***	0.141***
	(0.0133)	(0.0138)	(0.0151)	(0.0148)	(0.0115)
Average income 5 previous years	0.255***	0.0371***	-0.0141*	-0.0554***	0.234***
	(0.00767)	(0.00693)	(0.00726)	(0.00724)	(0.00955)
$Employees_{t-1} > 0$	0.224***	-0.00746***	-0.0748***	-0.0800***	-0.0815***
	(0.00175)	(0.00245)	(0.00288)	(0.00283)	(0.00280)
$Capital_{t-1} > 100k$	0.284***	0.135***	0.0586***	0.0518***	0.0504***
	(0.00186)	(0.00169)	(0.00617)	(0.00584)	(0.00564)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Owner background covariates	Yes	Yes	Yes	Yes	Yes
Spline business income t	No	Yes	Yes	Yes	Yes
Spline business income t-1	No	No	Yes	Yes	Yes
Spline capital t	No	Yes	Yes	Yes	Yes
Spline capital t-1	No	No	Yes	Yes	Yes
Spline capital t-2	No	No	No	Yes	Yes
Spline wages t	No	Yes	Yes	Yes	Yes
Spline wages t-1	No	No	Yes	Yes	Yes
Spline wages t-2	No	No	No	Yes	Yes
Tax evasion	No	No	No	No	Yes
Log Likelihood	-114212	-95603	-90601	-85337	-82015
Observations	318,615	318,423	318,273	317975	317,740

Robust standard errors in parentheses, clustered at the firm level, *** p < 0.01, ** p < 0.05, * p < 0.1.
[a]The reason for the slightly different number of observations in columns (4) and (5) is that a different number of observations is dropped, due to ties, when the top and bottom percentile of observations w r t business income are excluded from the sample. This stems from the assumption in column (5) that actual business income is not equal to reported income, since a share of income is evaded.

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[70] Using instead breakpoints at the deciles of the distribution gives similar results; these are available upon request.
[71] A small number of the variables are also dropped from the regressions due to multicollinearity.

As can be seen in Table 3, the tax incentive coefficient drops significantly when the extensive set of control variables is added: from the baseline 0.37 that is reproduced in column (1), to 0.05 when all lags of the control variables are included, in column (4). The estimated effect is a bit larger, 0.14, when we account for tax evasion in the same manner as in the previous section. However, we view the results of Table 3 as probably understating the effects of tax incentives. Still they provide a relevant robustness test of the results.

7.2.2 Variation in tax effects across firms

The results so far assume that the impact of taxes is the same regardless of the characteristics of the firm, or the magnitude of the tax differential. In Table 4, we allow for variation in the impact of taxes across types of firms.

In particular, we re-estimate regression equation (11), but allow for differential effects: i) for firms with sufficient capital to have the option to be corporate; ii) for firms with employees; iii) for firms in the service sector, and iv) for different segments of the net-of-tax income measure, $\overline{YTdiff}$. The latter is done by introducing a piece-wise linear function of $\overline{YTdiff}$, with changes in the slope at values 1% and 4%[72]. Note that the estimations in Table 4 were performed without the control function that was used in Table 3. Results including the control function are shown in Table A 3 in the Appendix.

Table 4 shows the average marginal effects, in percentage points, of $\overline{YTdiff}$ for the respective categories, that is, column (2) shows the marginal effects for the firms without and with sufficient capital to be corporate, column (3) shows the same for firms without and with employees, etc. For reference, Column (1) reproduces the baseline result from column (4) in Table 2.

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[72] The interval 1-4% contains roughly half of all observations, with the remaining observations approximately equally split above and below this interval.

Table 4. Regression results equation (11) heterogeneous effects

Variables	Baseline	Capital	Employees	/Non/ Service sector	Spline *YTdiff*
	(1)	(2)	(3)	(4)	(5)
$\overline{YTdiff}$	0.372***				
	(0.0133)				
$\overline{YTdiff}$: $Capital_{t-1} \leq 100k$		0.0122*			
		(0.00637)			
$\overline{YTdiff}$: $Capital_{t-1} > 100k$		0.878***			
		(0.0277)			
$\overline{YTdiff}$: $Employees_{t-1} = 0$			0.262***		
			(0.0135)		
$\overline{YTdiff}$: $Employees_{t-1} > 0$			0.672***		
			(0.0315)		
$\overline{YTdiff}$: Non Service Sector				0.500***	
				(0.0279)	
$\overline{YTdiff}$: Service Sector				0.329***	
				(0.0147)	
$\overline{YTdiff}$: $\overline{YTdiff}$ <1%					0.129***
					(0.0213)
$\overline{YTdiff}$: $\overline{YTdiff}$ 1-4%					1.407***
					(0.0980)
$\overline{YTdiff}$: $\overline{YTdiff}$ >4%					0.163***
					(0.0267)
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Owner background covariates	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-114212	-113838	-114169	-114191	-113879
Observations	318,615	318,615	318,615	318,615	318,615

Robust standard errors in parentheses, clustered at the firm level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The results suggest that the effect of taxes is a lot larger for firms with sufficient capital to be corporate (column (2)), a bit larger for firms with employees (column (3)), and a bit larger for the non-service sector (column (4)). A potential explanation for the latter could be that taxes are more easily avoided by firms in the service sector, and that the formal tax differential is of less importance for the decisions made by these firms.

The tax effect, is furthermore estimated to be larger when $\overline{YTdiff}$ is between 1 and 4 percent (column (5)). Here, we find that increasing the income if corporate by one

percent relative to the income if non-corporate raises the probability of incorporating by 1.4 percentage points, compared to estimates of roughly a tenth this size below and above this interval. Presumably, a larger share of the firms outside this interval are infra-marginal, almost entirely corporate (when $\overline{YTdiff}$ is high) or non-corporate (when $\overline{YTdiff}$ is low or negative), and do not respond to marginal tax changes.

7.2.3 Additional robustness tests

We have also run a set of alternative robustness tests: First, we used an alternative assumption for the effective payroll tax, and, second, we included business owners with links to more than one workplace, introducing the risk that CHC-owners are linked to the wrong workplace. Third, we included also CHCs with more than one owner. Fourth, we omitted year 2004 from the estimation, since for 2004 we do not have access to information on lagged variables that are needed for the tax calculations, and instead use current values for that year. All these specifications were run using the specification of Table 2, i.e. excluding the control function for the direct effect of the variables that determine the tax rates. The tax coefficients from these alternative specifications, which are given in Table A 4 in the Appendix, range from 0.4–0.7.

8   Discussion and conclusion

The objective of this paper has been to examine the impact of tax incentives on the choice of organizational form in Sweden, using detailed data on the choices of organizational form for firms during the time period 2004–2009. During this time period, there were many changes in the tax law, and firm owners potentially experienced dramatic changes in the financial position of their firm, potentially affecting the relative attractiveness on tax grounds of one form of organization over the other.

When we calculate the tax incentives facing small business owners over this period, ignoring differential rates of tax evasion by organizational form, we find that, for the business owners in the higher end of the business income distribution, the tax system favors organizing as a CHC rather than a sole proprietorship, and more so during the last years of our data period. For lower income levels the differences in tax rates due to organizational form are much smaller, and change less over time. These findings are similar to those of Sørensen (2008), who studies the 2007 tax rules. He finds that the

average effective tax rates are roughly similar for CHCs and sole proprietors when pre-tax business profits are SEK 500,000, but that the average effective tax rates are higher for sole proprietors when pre-tax business profits are SEK 1,000,000 or higher.[73]

The results of the regression analysis show a fairly large and highly statistically significant impact of tax incentives on the choice of organizational form. In particular, if we consider the specification without controls for the direct effects of variables that determine tax payments, a one percent increase in net income if corporate is estimated to lead to 1.4 percentage points more firms being corporate among firms not already facing a decisive tax distortion,[74] and a 0.37% increase among all firms. If the corporate rate were reduced by one percentage point, for example, this would increase the net-of-tax income if the firm is corporate by $1/(1-t)\% » 1.4\%$ [75], leading to a 1.96% increase in the fraction that incorporate among firms facing relatively neutral incentives, and a 0.52% increase across all firms in our sample.[76] These numbers are however drastically reduced, to 0.26% and 0.07%, if we instead consider the results from the specification which includes flexible controls for firm income, capital and wage sums. This specification is likely to understate the effect, but still provides a relevant robustness test of the results.

How do these results compare with the previous literature? As discussed in section 1, most previous studies examine US data. Gordon and MacKie-Mason (1997) estimate tax distortions to the choice of incorporation, using aggregate US data, by industry, for 1959-1986. Their results suggest that cutting the non-corporate tax rate by 10 percentage points would cause a trivial 0.2 percent of total assets to shift out of the corporate sector. Goolsbee (1998) estimates effects of the same order of magnitude when he uses similar US data but from an earlier period: 1900–1937.

Goolsbee (2004) instead uses US cross-state data for year 1992, and estimates the effect of the state corporate tax on the share of business activity that is corporate. He estimated that an increase in the corporate tax rate by one percentage point reduced the

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[73] See Table 1.2 in Sørensen (2008).

[74] When firms already face at least a 3% gain in net-income from being corporate, further tax advantages to being corporate no longer matter as much. Similarly, if firms face a tax advantage from being non-corporate, further advantages to being non-corporate matter much less.

[75] We approximate here the percent tax savings from incorporating by $2(\tau - m)/(2(1-\tau))$. The derivative of this expression with respect to τ equals $(1-m)/(1-\tau)^2$. We assume that m approximately equals τ, as we find in the data, so that this expression simplifies to $1/(1-\tau)$.

[76] Remember however that a number of sample restrictions are made, see section 5, so this number shall not be generalized to the full population of business owners.

corporate share of firms by about 2.5%. In contrast, we forecast that this one percentage point increase in the corporate tax rate would reduce the overall fraction of firms that incorporate by 0.5%. This is about a quarter the size of estimate in Goolsbee (2004), but still substantially larger than previous studies. In both cases, these stronger results are likely due to a focus on smaller firms. Goolsbee's estimates, though, capture firm sorting across states as well as changes in organizational form, so do not entirely correspond to our estimates.

To conclude, our calculations show that for a large share of business owners, the Swedish statutory tax provisions favor the corporate over the non-corporate form, and this tax distortion is fairly strongly correlated with the propensity to incorporate. It shall be pointed out however that the estimates are obtained using a subsample of the population of business owners, and can hence not be generalized to the full population. Second, the range of the coefficients obtained from various robustness tests is broad: from 0.05–0.7, which suggests that the results shall be interpreted with caution. Third, we cannot rule out that the estimates suffer from bias due to omitted variables or reverse causality; in particular, while we attempt to control for omitted variable-bias, we cannot control for reverse causality.

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Appendix

A1 Tax calculation
This section describes how we calculate the tax payments for the business owner.

Allocation of income
We take business income (including wage income of the owner) as given, and allocate the revenues to be taxed between earned and unearned, as well to periodic funds and (for sole proprietors) expansion funds, in the following manner, that approximately minimizes tax payments:

If the business makes a profit:
- Allocate business income as earned income until the marginal tax rate on earned income exceeds the tax rate on unearned income.
- Allocate remaining business income as unearned (positive interest allocation[77] for sole proprietors, and tax relief amount and normal dividend amount[78] for closely held corporations) up to the maximum allowed amount.
- In period 1: Allocate remaining business income to periodic fund and, if sole proprietor, expansion fund, if the conditions in equations (8), (9) and (12) are satisfied. (Note that for closely held firms, we assume that no profits are retained, as discussed in relation to equation (11).) If periodic/expansion funds are used, allocate the maximum allowed amount to the funds.[79]
- In period 2: Assume that all business income is taken out, i.e. assume zero allocation to periodic and expansion funds, and return any existing funds to taxation.
- Classify the remaining business income as earned income.

If the business makes a loss:
- If the business makes a loss, we calculate the immediate tax savings for sole proprietors due to the deduction against other earned income, for losses up to SEK 100,000. This rule only applies during the 5 first years of the firm, but since we lack information on the age of firms, we apply it to all sole proprietorships.

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[77] *Positiv räntefördelning*.
[78] *Lättnadsutrymme* and *normalt utdelningsutrymme*.
[79] That is, either zero or the maximum amount is allocated to the funds. This is done to simplify the tax calculations. Judging from summary statistics for closely held corporations, generously made available by Håkan Sehlin, this is a reasonable assumption.

- We disregard expected tax savings in the future due to forwarding of losses.

- Since we have limited information on realized profits and losses, we disregard the tax rules for realized profits/losses.

- For firms in forestry/agriculture, or with business real estate, there are special tax rules that lower effective tax rates. While we exclude all firms whose main activity is forestry or agriculture from the analysis, we cannot observe whether the included business owners, whose main business activity is elsewhere, also have some forest/agriculture activity. We also cannot observe whether the firm owns real estate.

Tax calculations

Given the above allocation over different types of incomes and funds, we calculate the tax payments in the following manner:

Earned income:
Earned income is subject to payroll tax, personal municipal and central government earned income tax, and a general social fee,[80] which since 2006 is fully compensated through a tax reduction. There is a general allowance of between SEK 11,000-18,000, and, since 2007, there is an earned income tax credit.

   Payment of the payroll tax increases the social insurance benefits up to a level of approximately 7.5 basic amounts (approximately USD 33,500 in 2007). We follow DuRietz (2003) (and as a test of robustness, Sørensen (2008)) and take account of this by reducing the payroll tax to 0.2 (0) percent for amounts below this level.

Capital income:
Capital income is taxed according to the special rules that limit the amount of capital income from small businesses (see details in sections 2.1 and 2.2).

Corporate tax:
Corporate tax is levied on corporate capital income, as well as on expansion funds.

A2 Data details

Owner's pre-tax business income is defined as: business revenue minus costs, divided by the number of owners (i.e. we assume that all own an equal share), and for CHC-

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[80] Allmänna egenavgifter.

owners we also add the pre-tax wage that was paid out to the owner. (As a measure of business revenue, we use the variable "Resultat före bokslutsdispositioner och skatt" from the data base Företagens ekonomi, Statistics Sweden.)

In order to calculate tax payments, for corporate firms we need information on the wage sums to employees and to the owner the previous year, and the acquisition value of the owner's shares. For sole proprietors, we need information on the business capital assets by the end of the last year.

We use the following information to construct measures of these variables:

Net business assets are defined as the variable "Eget kapital" in the data base Företagens ekonomi, Statistics Sweden.) The variable is equal to total assets minus total debt, and minus appropriations (avsättningar) and untaxed reserves (obeskattade reserver).

As a measure of the business wage sum for all employees except the owner/s/, we use information on total wages paid out to employees (minus wage payments to the owner/s/), from the data base Företagens ekonomi, Statistics Sweden.

The owner's wage payments from the business come from individual level data from the Table Anst, Statistics Sweden, which contains information on annual earned income from all workplaces from where the individual received income of at least SEK 1000 during the year. Information on the sector, or industry, of the firm is also collected from Table Anst, Statistics Sweden, and info on government ownership is based on the variable agkat2 in Table Ftgast, Statistics Sweden

Our data lacks information on the acquisition value of the owner's shares. Instead we use business capital assets as of last year as a proxy for this. For the regressions where we include firms with several owners, we simply split this amount equally among owner, since we cannot observe the exact ownership shares.

For all years, except for 2004, the capital assets and wage based variables that are used for the tax calculations are the lagged values. Since we lack complete information for year 2003, the values for 2004 are the current values.

The tax rules for sole proprietors stipulate that business losses up to SEK 100 000 are deductible from other earned income during the first five years of the firm. Since we cannot observe the age of the firm, we apply this rule to all sole proprietorships. Information on other earned income is collected from the inviduals earned income from

workplaces/employment other than the own firm (i.e. the sum of the variable "lonfink" from table "Anst" from Statistics Sweden, over all workplaces with an organization number different from that of the own firm). For year t+1, we forecast other earned income based on the regression coefficients obtained from regressing other earned income on its lagged value, as well as age dummies based on five-year age intervals. These regressions are run separately for men and women.

The variable for Average income during 5 previous years is measured as the average income during period t-5 to t-1. In case of missing observations, the measure is based on the existing observations during the period. For the baseline sample, 98.7% of the observations are based on income information for the full 5-year period, and the remaining 1.3% on a subset of the years.

A3 Additional results

Table A 1. Regression results equation (8) and equation (9)

Variables	Dependent variable: Y_{t+1}, in million SEK	Dependent variable: $\lvert \hat{u}_{t+1} \rvert$
$\max(Y_t,0)$	0.979***	0.248***
	(0.00237)	(0.00171)
$\max(Y_t^2,0)$	-1.19e-07***	1.04e-10
	(1.21e-09)	(8.70e-10)
$\min(Y_t,0)$	-0.320***	-1.492***
	(0.0565)	(0.0408)
$\min(Y_t^2,0)$	1.02e-06***	-2.67e-06***
	(3.47e-07)	(2.50e-07)
K_t	0.0242***	0.0242***
	(0.000364)	(0.000263)
Constant	41,171***	51,421***
	(703.3)	(506.9)
Observations	466,524	466,524
R-squared	0.569	0.240

Robust standard errors in parentheses, clustered at the firm level, *** p < 0.01, ** p < 0.05, * p < 0.1

Table A 2. Regression results Baseline specification, full set of coefficients

Variables	(1)	(2)	(3)	(4)
$\overline{YTdiff}$	1.460***	0.374***	0.372***	0.251***
	(0.0226)	(0.0135)	(0.0133)	(0.00964)
Average income 5 previous years		0.288***	0.255***	0.327***
		(0.00777)	(0.00767)	(0.00819)
Employees $t-1 > 0$		0.221***	0.224***	0.230***
		(0.00174)	(0.00175)	(0.00172)
Capital $t-1 > 100k$		0.287***	0.284***	0.284***
		(0.00188)	(0.00186)	(0.00187)
Sector dummy 1		-0.0518***	-0.0474***	-0.0465***
		(0.00402)	(0.00403)	(0.00401)
Sector dummy 2		-0.0195***	-0.0157***	-0.0162***
		(0.00367)	(0.00366)	(0.00364)
Sector dummy 3		0.0552***	0.0455***	0.0480***
		(0.00399)	(0.00410)	(0.00408)
Sector dummy 4		-0.0253***	-0.0335***	-0.0289***
		(0.00547)	(0.00574)	(0.00570)
Sector dummy 5		-0.0373	-0.0655	-0.0310
		(0.111)	(0.114)	(0.114)
Sector dummy 6		-0.0358***	-0.0341***	-0.0365***
		(0.00721)	(0.00725)	(0.00718)
Sector dummy 7		-0.155***	-0.138***	-0.140***
		(0.00676)	(0.00703)	(0.00704)
College graduate			0.0415***	0.0409***
			(0.00233)	(0.00233)
Male			0.0295***	0.0314***
			(0.00278)	(0.00278)
Married			0.0163***	0.0177***
			(0.00219)	(0.00219)
Age 25–29			-0.00638	-0.00700
			(0.0173)	(0.0171)
Age 30–34			0.0199	0.0186
			(0.0171)	(0.0168)
Age 35–39			0.0429**	0.0417**
			(0.0169)	(0.0166)
Age 40–44			0.0599***	0.0577***
			(0.0169)	(0.0166)
Age 45–49			0.0691***	0.0660***
			(0.0169)	(0.0166)
Age 50–54			0.0730***	0.0690***
			(0.0169)	(0.0166)
Age 55–59			0.0755***	0.0706***
			(0.0168)	(0.0166)

Variables	(1)	(2)	(3)	(4)
Age 60–64			0.0662***	0.0598***
			(0.0169)	(0.0166)
Year 2005	0.0337***	0.0346***	0.0533***	0.0380***
	(0.00115)	(0.00116)	(0.00111)	(0.00119)
Year 2006	0.0206***	0.0202***	0.0391***	0.0251***
	(0.00111)	(0.00112)	(0.00109)	(0.00114)
Year 2007	0.0160***	0.0156***	0.00394***	0.0191***
	(0.000821)	(0.000822)	(0.000710)	(0.000832)
Tax evasion	No	No	No	Yes
Log Likelihood	-191551	-115676	-114212	-113852
Observations	326,725	320,061	318,615	318,374

Robust standard errors in parentheses, clustered at the firm level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A 3. Regression results equation (11) heterogeneous effects, including control function

Variables	Baseline	Capital	Employees	/Non/ Service sector	Spline *YTdiff*
	(1)	(2)	(3)	(4)	(5)
$\overline{YTdiff}$	0.0510***				
	(0.0148)				
$\overline{YTdiff}$: $Capital_{t-1} \leq$ 100k		-0.0852***			
		(0.00869)			
$\overline{YTdiff}$: $Capital_{t-1} >$ 100k		0.260***			
		(0.0265)			
$\overline{YTdiff}$: $Employees_{t-1} = 0$			0.0689***		
			(0.0147)		
$\overline{YTdiff}$: $Employees_{t-1} > 0$			0.00193		
			(0.0303)		
$\overline{YTdiff}$: Non Service Sector				0.0665**	
				(0.0265)	
$\overline{YTdiff}$: Service Sector				0.0459***	
				(0.0162)	
$\overline{YTdiff}$: $\overline{YTdiff}$ <1%					-0.0257
					(0.0232)
$\overline{YTdiff}$: $\overline{YTdiff}$ 1-4%					0.187**
					(0.0918)
$\overline{YTdiff}$: $\overline{YTdiff}$ >4%					0.0258
					(0.0353)
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Owner background covariates	Yes	Yes	Yes	Yes	Yes
Spline business income t	Yes	Yes	Yes	Yes	Yes
Spline business income t-1	Yes	Yes	Yes	Yes	Yes
Spline capital t	Yes	Yes	Yes	Yes	Yes
Spline capital t-1	Yes	Yes	Yes	Yes	Yes
Spline capital t-2	Yes	Yes	Yes	Yes	Yes
Spline wages t	Yes	Yes	Yes	Yes	Yes
Spline wages t-1	Yes	Yes	Yes	Yes	Yes
Spline wages t-2	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-85337	-85177	-85328	-85337	-85270
Observations	317,975	317,975	317,975	317,975	317,975

Robust standard errors in parentheses, clustered at the firm level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A 4. Regression results equation (11), robustness tests

Variables	Baseline	Alternative effective payroll tax[81]	Include CHCs with >1 workplace	Include CHCs with >1 workplace and >1 owner	Years 2006–2008
	(1)	(2)	(3)	(4)	(5)
$\overline{YTdiff}$	0.372***	0.725***	0.596***	0.552***	0.394***
	(0.0133)	(0.0311)	(0.0146)	(0.0133)	(0.0154)
Average income 5 years	0.255***	0.257***	0.235***	0.327***	0.250***
	(0.00767)	(0.00782)	(0.00630)	(0.00705)	(0.00810)
$Employees_{t-1}>0$	0.224***	0.222***	0.218***	0.284***	0.227***
	(0.00175)	(0.00176)	(0.00157)	(0.00144)	(0.00185)
$Capital_{t-1}>100k$	0.284***	0.289***	0.292***	0.245***	0.282***
	(0.00186)	(0.00188)	(0.00148)	(0.00154)	(0.00204)
Sector dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Owner background covariates	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-114212	-114226	-189057	-272326	-85805
Observations	318,615	318,692	484,365	654,077	237464

Robust standard errors in parentheses, clustered at the firm level, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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[81] This specification set the effective payroll tax equal to zero for earned income below 7.5 basic amounts, see footnote 34. The reason for the slightly different number of observations, compared to column (1) is that a different number of observations is dropped, due to ties, when the top and bottom percentile of observations w r t net-of-tax-income, are excluded from the sample.

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