Income Shifting in Sweden
An empirical evaluation of the 3:12 rules

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Förord

Vid skattereformen 1991 införde Sverige en tudelad inkomstbeskattning där inkomster från kapital beskattas annorlunda än inkomster av arbete och transfereringar. Beskattningsmodellen kombinerar progressiv beskattning av arbets- och transfereringsinkomster med en relativt låg proportionell skatt på kapitalinkomster. Denna modell har flera fördelar, men medför också potentiella problem. Akilleshälen är beskattning av fåmansföretag där ägarna i viss mån kan välja hur inkomsten fördelas mellan egen lön och vinst. Möjligheten för företagarna att klassificera sina inkomster regleras av 3:12-reglerna. Hur dessa regler bäst kan utformas har debatterats sedan skattereformen. År 2006 ökades möjligheten att ta ut en större del av inkomsten som kapitalinkomst. Syftet var bl.a. att skapa bättre förutsättningar för entreprenörskap.

För ESO är de samhällsekonomiska effekterna av reglernas utformning centrala. Det är viktigt att skattesystemet inte missgynnar nystartande av företag för att exploatera nya tjänster och produkter. Men om skattereglerna i stället huvudsakligen leder till skatteplanering är nettoeffekten en samhällsekonomisk kostnad. Dessutom kan det medföra ytterligare kostnader om skattesystemets legitimitet skadas.

I denna rapport till ESO studerar docent Annette Alstadsæter och fil. dr. Martin Jacob hur omfattande omklassificeringen av inkomster från arbete till kapital är genom 3:12-reglerna, och vilken betydelse detta har för skatteinkomsterna. De gör detta genom att i detalj analysera skattedata över tiden och empiriskt belägga effekter som härrör från de förändringar av 3:12-reglerna som gjordes 2006. Utifrån resultaten diskuterar sedan författarna statsfinansiella och samhällsekonomiska effekter.

Författarna konstaterar bl.a. att incitamenten till omklassificering av inkomster i fåmansföretag har ökat avsevärt. Det

finns tydliga indikationer på att denna omklassificering ökat markant till följd av detta och har lett till ett betydande skattebortfall. Analysen visar även på fördelningseffekter. Det är främst personer med höga inkomster som utnyttjar möjligheten till omklassificering.

Rapportarbetet har följts av en referensgrupp med god insikt i dessa frågor. Som vanligt i ESO-sammanhang, svarar författarna själva för de slutsatser som presenteras i rapporten.

Det är min förhoppning att rapporten bidrar till ökade kunskaper de olika effekterna av beskattningen av fåmansföretag och på så sätt kan bidra till ett bättre underlag för eventuella framtida överväganden om reglerna.

Stockholm i maj 2012

Harry Flam
Vice ordförande för ESO

Foreword and acknowledgements

Income shifting is the process of transferring income between income categories and tax brackets in order to reduce total tax payments. Income shifting is legal and a pure relabeling of existing income. The main purpose of this report is to raise awareness of the phenomena of income shifting and the challenges it creates and to provide some empirical evidence on the extent of income shifting in Sweden. The 2006 changes in the taxation of dividends to active owners in closely held corporations (*Fåmansföretag*), the *3:12 rules*, increased both the incentives and opportunities for shifting income from the labor income tax base to the capital income tax base. We identify how taxpayers respond to these changing incentives along several dimensions. Based on these findings, we discuss some consequences of income shifting at the aggregate level and provide a rough estimate of the potential tax revenue lost from income shifting under the 3:12-rules. And finally, we identify some main challenges within the current 3:12 rules that, in our opinion, contribute to increasing participation in income shifting. It is our hope that this report can be a constructive contribution to the Swedish policy debate.

In preparing this study, we have received valuable information and assistance from Magnus Allgulin, Åsa Andersson, Lena Birkelöf, Paul Elger, Charlotte Nömmera, Dan Sölverud, and in particular, Johan Almenberg, Martin Hill, and Martin Kjellqvist. We also received excellent help with data handling from Statistics Sweden.

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None of the aforementioned persons is responsible for any remaining shortcomings or for any of the conclusions drawn.

Oslo and Vallendar, April 12, 2012

Annette Alstadsæter and Martin Jacob

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Appendix III: Taxes and the choice of organizational form by Swedish business owners

by Karin Edmark and Roger Gordon

AIII.1. Chapter summary

This chapter reports the findings in Edmark and Gordon (2012), who analyze the effect of taxes on Swedish small business owners' choice of the non-corporate[41] or closely held corporate form for their firm[42]. The results suggest that the effective tax rate for closely held corporations (CHCs) has decreased in recent years, particularly after 2006, and that many business owners would be subject to lower taxes if they choose to incorporate. Studying data on business owners in 2004–2008, we also find empirical evidence that this has led to more business owners choosing to incorporate.

The taxation of small businesses is an often discussed topic. In Sweden, the so called 3.12-rules in particular have been debated. The rules cap the amount of income that can be taxed as capital at the proportional 30 percent capital tax rate. The rules, critics have argued, mean that successful business may end up having a large part of their income taxed according to the progressive labor income tax rate, which exceeds 50 percent at high levels of income, instead of being subject to the lower flat capital tax rate. Moreover, it has been argued that this puts CHCs at a disadvantage compared to widely-held corporations and harms risk-taking and innovation in the small business sector.

[41] The most common types of non-corporate firms are sole proprietorships and partnerships. Sole proprietors are most common, and make up 80 percent of all non-corporate firms.
[42] A corporate firm is classified as closely held if no more than four owners own more than half of the shares and the firm is not traded on a regulated exchange.

In response to this critique, the amount of CHC-income that can be classified – and taxed – as capital was increased in 2006.[43] In addition, the capital tax rate on this allowed capital income amount was set at 20 percent instead of the ordinary 30 percent capital tax rate.[44] As a result, CHC-tax rates have decreased dramatically, particularly for firms with high capital and wage sums.

The reforms however did not apply to income from non-corporate firms. While they are also allowed to have a certain amount of income taxed as capital, this amount is considerably lower, and is furthermore subject to the ordinary 30 percent capital tax rate.

As a result, we find that the Swedish small business tax system in general favors CHCs over non-corporate firms. That is, when we calculate how the effective tax rate[45] on business income differs due to the choice to organize as non-corporate or CHC, we find that the average tax would often be lower if the firm were corporate. This is particularly true from year 2006 onwards, when firms with high business incomes and high capital and/or wage sums, can make substantial tax gains from incorporating. The exception is at low levels of income, where average tax rates on labor income are low due to the basic allowance[46] and (from 2007 on) the earned income tax credit. Here, both types of firms can take full advantage of these low tax rates on labor income, yielding very similar outcomes for both types of firms. Firms with losses furthermore face some tax advantages from being non-corporate.

We then test whether the different tax treatment of corporate and non-corporate closely held firms has affected the owners' choice of business organizational form. In order to answer this question, we use regression analysis where we can control for the influence of non-tax factors that also affect the choice to incorporate or not. The analysis is conducted on data on sole proprietorships[47] and closely held firms for the period 2004–2008,

[43] See Chapter 3 in this report for more details on the 2006 reform.
[44] Technically, this is achieved by taxing only 2/3 of income.
[45] This expression for the effective tax rate takes all taxes (including corporate and payroll taxes) into account, and assumes that the business owner makes decisions to classify income as earned or unearned and to make use of for example periodic and expansion funds ("periodiseringsfonder" and "expansionsfonder") in order to minimise total tax payments. See Edmark and Gordon (2012) for more details.
[46] The Swedish term is "Grundavdraget".
[47] Sole proprietorships account for 80 percent of all non-corporate firms (see the Swedish Companies Registration Office, www.bolagsverket.se).

and it contains detailed information both at the level of the firm and at the level of the business owner.

Taking into account a large set of non-tax factors, we find that tax incentives do influence the choice of business organizational form: The size of the estimates suggests that a one percent increase in net-of-tax income if closely held corporate instead of non-corporate, leads to a 0.75 percentage point increase in the likelihood that a firm organizes as closely held corporate. The incentives to incorporate are strongest for firms that face a mild tax advantage (i.e. a 0–3 percent increase in net-of-tax income) from being corporate: For these firms, a one percent increase in net-of-tax income if corporate, is associated with a 3.3 percentage point increase in the likelihood that the firm is closely held corporate.

Compared to the findings in the previous, mainly American, literature[48] these are fairly large effects. For example, MacKie-Mason and Gordon (1997) found, using aggregate time-series data for the United States, that a one percentage point increase in the corporate tax rate reduced the share of capital allocated to corporate firms by 0.2 percent. Studies using aggregate data, though, are dominated by large firms, which rarely change organizational form due to taxes, as a result of the large non-tax advantages they face from being corporate. Our study, in contrast, is confined to closely-held firms, where non-tax factors are a less dominant consideration. Our results are approximately half the size of those found in Goolsbee (2004), who found that a one percentage point increase in the corporate tax rate would reduce the share of retail firms that incorporated by 2.5 percent.

Our study is also related to Thoresen and Alstadsæter (2010), who study the choice of Norwegian self-employed individuals to incorporate. They have access to excellent individual and firm level data, and find that the Norwegian tax system has encouraged small business owners to organize as widely held corporations.

The remainder of this appendix is organized as follows: Section 2 gives a short overview of the tax rules for non-corporate firms, and Section 3 shows our calculations of the effective tax rates on business income that apply to non-corporate and closely-held corporate firms, respectively. Section AIII.3 presents and discusses the results of the empirical analysis.

[48] See Gordon and MacKie-Mason (1994), MacKie-Mason and Gordon (1997), and Goolsbee (1998, 2004).

AIII.2. Tax rules for non-corporate firms

This section gives a brief description of the tax rules for the most common type of non-corporate firm, sole proprietorship[49], but similar rules apply to other non-corporate firms such as unlimited partnerships[50]. Since the tax rules for closely held corporations are described in Appendix 1 of this report, we refer to that section for the tax treatment of CHCs. We also refer to Edmark and Gordon (2012) for a more detailed description of the tax schedule for both the non-corporate and the closely held corporate case. The focus is on income from running a business, that is, we abstain from the case where the business owner makes a capital gain from selling the firm.[51]

The main rule is that income of a sole proprietor is classified as labor income, and hence subject to the following tax rates:

1) a payroll tax, with a rate equal to 22.9 percent in 2009, applied to gross earnings, or 29.71 percent on earnings net of payroll taxes.[52]
2) a municipal income tax, at a rate between 28 percent and 34 percent across municipalities.[53]
3) a slightly-progressive central government income tax, at rates of 0 percent, 20 percent and 25 percent.

Taxable income for municipal and central government income taxes is measured net of deductions for: the payroll tax; a basic allowance (varies with income; with a minimum of 11 000 and a maximum of SEK 18 000); and, from 2007 on, an EITC (which reduces taxable labor income at all income levels). The cumulative tax rate on labor income for a small business owner is hence roughly 0.51-0.685 percent, depending on income bracket.[54]

[49] The Swedish term is ”Enskild näringsidkare”.
[50] The Swedish term is ”Handelsbolag”.
[51] For a more detailed description, see Edmark and Gordon (2012).
[52] he payroll tax for self-employed non-corporate business owners is slightly lower than that for employees (23.9 percent in 2009). Up to a certain earnings level, approximately SEK 429 500 in 2009, higher payroll tax payments make the individual 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.
[53] In the empirical work, we set this rate equal to the average rate across municipalities each year.
[54] The marginal tax rates for lower-mid level income intervals are also affected by the fact that the basic allowance varies with income up to approximately SEK 300 000.

Sole proprietors are also allowed to classify a limited amount of income as capital, which is subject to a flat tax rate of 30 percent. This amount is calculated as the capital invested in the firm times a presumed rate of return, which is set equal to the long-term government bond rate + 5 percent. This so called "positive interest allocation"[55] is voluntary and can be made only if the net capital held in the firm at the beginning of the year is above 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 "negative interest allocation".

Sole proprietors are also allowed to allocate some business income to "expansion funds"[56] and "periodic funds"[57]. The periodic funds are a means to postpone taxation, and can be held for a maximum of six years until they are returned as taxable earnings. The expansion funds are taxed at the corporate rate, and aim to imitate the tax treatment of retained earnings in a corporation. When these funds are returned and subject to personal income tax, the corporate rate tax payments are returned.

AIII.3. Tax rates for CHCs and sole proprietors

In order to estimate the effects of the tax system on the choice of organizational form, we first need to calculate the effective tax rates that apply to business owners of corporate and non-corporate closely held firms.

Given the complexity of the tax system, making some simplifying assumptions is inevitable: We calculate the tax rates that apply to business income from running a firm; that is, we do not treat the case where the business owner sells the firm and makes a capital gain. Moreover, we use a two-year model where business income can be funded within the firm during year 1 (in periodisation or expansion funds), but where all business income is taken out and taxed by the end of year 2.[58] Finally, we assume that the business owner classifies income as either earned or unearned (capital income) in a manner that minimises tax payments.

[55] The Swedish term is "Positiv räntefördelning".
[56] The Swedish term is "Expansionsfonder".
[57] The Swedish term is "Periodiseringsfonder".
[58] More detailed information on how we calculate the effective tax rates can be found in Edmark and Gordon (2012).

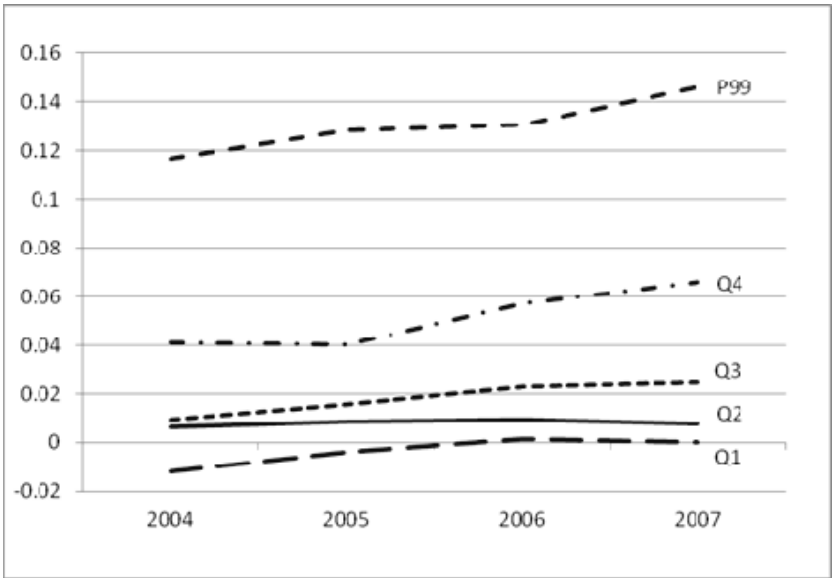
Using this two-year set-up, we calculate the average tax rates, i.e. total tax payments as a share of total business income, under the assumption first, that the firm is closely held corporate, and then, that the firm is non-corporate. That is, we calculate the tax rates that would apply under each alternative.

More specifically, our key tax variable in the regression analysis, denoted *YTdiff*, is defined as the percent drop in two-year after-tax income if the firm chooses to operate under the non-corporate instead of the corporate form (see Edmark and Gordon (2012) for the formal derivation of this expression). In other words, this measure shows how much a firm would gain in net-of-tax income from being a CHC instead of a sole proprietorship.

Figure AIII.1 shows how this variable varies over time, calculated for all business owners in our data and shown separately for owners with business revenue in each quartile (Q1–Q4).[59] In order to illustrate the much larger tax differential for high income firms, it also shows the measure separately for the top percentile of business income (P99).

[59] Note that the taxes depend not only on income but also on capital assets and wage sums. The tax rates are computed using an effective payroll tax of 20 percent for taxable income up to 7.5 basic amounts, following the calculations of Du Rietz (2003) regarding the size of offsetting social benefits over this range of incomes.

Figure AIII.1 The difference in present value 2-period net-of-tax income of being corporate instead of non-corporate, as a share of the net-of-tax income if corporate: *YTdiff*



Note: Q1 denotes the lower 25 percentiles of firms with respect to business income in t; Q2 denotes percentiles 26-50; Q3 percentiles 51-75; and Q4 the upper 25 percent of the income distribution. P99 denotes the top percentile of the business income distribution.

As can be seen in Figure AIII.1, there is a clear tax advantage of being corporate instead of non-corporate at all levels of income except for the lowest income quartile, where there is in fact a small tax advantage of being non-corporate for the first couple of years of the data. The corporate tax advantage increases over time, and is particularly pronounced for firms with more business income. This is likely due to the high income firms also having high capital and wage sums. As noted in Section 1, high capital and wage sums give rise to a much more lenient tax treatment for CHCs, compared to non-corporate firms, from year 2006 on.

Our calculations hence show that firms face a different tax treatment depending on whether they are non-corporate or closely-held corporate, and Figure AIII.1 suggests that this tax differential varies both over time and between levels of business income.

AIII.4. Empirical analysis

In this section, we test empirically whether the tax differentials, shown in the previous section, have affected business owners' choice of organizational form. In order to do so, we estimate the effect of our measure of tax incentives, *YTdiff* in Figure AIII.1, on the likelihood that a firm is closely-held corporate instead of non-corporate.

The analysis is conducted using data on business owners and firms for the period 2004–2008.[60,61] At the individual level, the data contain information on annual incomes, as well as socio-demographic characteristics, and an indicator for whether the individual is self-employed in a non-corporate business[62] or in a closely-held corporation. At the firm level, the data include tax return information on annual business revenues, total wage payments, and business assets. The data also include detailed information on business sector, and whether the business is corporate or non-corporate. The combination of these sources of data provides a broad base of information about both business owners and firms.[63]

In the estimations, we want to control for all non-tax factors that are likely to affect the decision to incorporate, and that could hence distort our estimates if omitted from the analysis. We therefore include the following variables in the analysis. At the firm level, we first include dummy variables for each decile of the distribution of capital assets, since firms with more capital are likely to gain more from incorporating due to their resulting improved access to risk sharing through outside equity finance. Second, during our sample period, capital assets of SEK 100 000 were required for a firm to be eligible to incorporate, leading us to include a dummy variable if this condition is satisfied. Third,

[60] Since our measure of the net-of-tax income differential is calculated over 2 years, we will be left with *t–1* years of data in the regressions, 2004–2007.
[61] The empirical analysis excludes 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.
[62] Our data is limited to sole proprietorships, which is the most common form of non-corporate business.
[63] A key issue is how we link the individual business owners to their businesses. For owners of non-corporate 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. 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. Detailed information about how this is done is given in Edmark and Gordon (2012).

corporations tend to be more common in some industries than in others; we therefore include dummy variables for each one-digit industry. Fourth, firms that have employees, and thereby face a fixed liability, gain more from having access to equity finance in order to diversify risks; we include a dummy for having employees. We also include the owner's average income during the five previous years (measured in SEK million) as an additional indicator of the expected scale of the business. The sector information is measured in period *t*, while the dummy variables for capital assets and employees are based on lagged values.[64]

It is also possible that personal characteristics, such as gender, age, education and marital status may affect the choice of organizational form, perhaps by serving as proxies for the expected size of the firm. We therefore add dummy variables to some of the specifications for gender, five-year age-groups, marital status, and being a college graduate, all measured in period *t*.

Finally, we include year dummies in some of the specifications, to check if aggregate time trends in the choice of organizational form affect the results.

Table AIII.1 shows descriptive statistics for the variables that are included in our analysis, divided into owners of non-corporate sole proprietorships, and closely-held corporate firms. The table first shows our main variable of interest, YTdiff, which measures the percent impact on net-of-tax income if a corporation were to instead choose to be a sole proprietorship. The table also gives summary statistics for the firm-level characteristics that are needed for the tax calculations, and/or are included in the regression analysis, and owner background characteristics.

[64] However, since we lack information on year 2003, for 2004, the current values are used for all variables. We will therefore test the robustness of the results to excluding year 2004.

Table AIII.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 variables						
YTdiff	209 580	0.97	4.25	159 288	3.08	5.37
Firm level characteristics						
Wage sum employees$_{t-1}$	209 498	29 959	148 968	159 220	564 745	1 567 499
Wage sum owner $_{t-1}$[65]	209 580	175 525	149 216	159 288	307 910	160 568
Capital assets $_{t-1}$	209 580	119 105	552 081	159 288	871 657	1 682 306
Business revenue$_{t-1}$	209 580	245 046	237 477	159 288	625 413	526 790
Owner background characteristics						
Average personal income previous 5 years	209 580	179 447	158 089	159 288	329 966	209 161
Age	209 580	46	11	159 288	48	9
Dummy male	209 580	0.63	0.48	159 288	0.83	0.38
Dummy university education	208 682	0.52	0.50	158 913	0.57	0.50
Dummy married/cohabiting[66]	209 580	0.61	0.49	159 288	0.73	0.44

Using these data, we will estimate the following regression specification: A firm chooses to incorporate if and only if:

$$(1) \qquad \alpha + \beta \cdot YTdiff_{it} + Z_{it}\gamma + X_{it}\delta + \kappa_t\lambda_t + \tilde{\varepsilon}_{it} > 0\,,$$

In equation (1), $YTdiff_{it}$ is our variable of main interest; as explained above it denotes the percent drop in after-tax income if a corporation chooses instead to be non-corporate. Z_{it} contains the business level non-tax factors described above (dummy variables for capital assets; industry sector dummies, and having employees), while X_{it} is a matrix of the personal background dummy variables for gender, five-year age-groups, marital status and being a college graduate. κ_t contains yearly dummy variables, and ε_{it} is a normally distributed regression error term.

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

[66] 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.

If tax incentives affect business owners' choice of organizational form, we expect a positive β – all else equal, a higher net-of-tax return to being corporate rather than non-corporate increases the incentive for a business owner to incorporate.

Table AIII.2 shows the result of the regression specification in equation (1). The coefficients shown are the average marginal effects in percent from a probit-estimation.[67] We also show in column (5) the results when we assume that business owners evade part of their business income. Based on the estimates of Engström and Holmlund (2009), who estimate the tax evasion for closely held business owners and sole proprietors using expenditure data, we here assume that owners of CHCs evade 15 percent of income, while sole proprietors evade 40 percent of income.

The estimates in Table AIII.2 suggest that a one percent increase in net income from operating in corporate rather than non-corporate form leads, on average, to a 0.75 percentage point increase in the probability that the firm incorporates. The size of the coefficient is robust across specifications in columns (2)–(4), i.e. when gradually more non-tax factors, as well as time dummies, are added to the regression. The coefficient obtained when no non-tax factors are included in the specification, column (1), is more than double in size, which confirms that tax incentives favoring incorporation are positively correlated with non-tax incentives favoring incorporation. This suggests that it is important to control for these non-tax factors in the analysis.

[67] Note that these coefficients measure the average across sample observations of the impact of a one percent change in *YTdiff* on the probability of incorporating. Given the probit specification, the estimated effect of a change in *YTdiff* varies across firms, with larger effects for firms that otherwise are close to indifferent about their choice of organsational form.

Table AIII.2 Regression results[68] Dependent variable: dCHC

VARIABLES	(1)	(2)	(3)	(4)	(5)
Ytdiff	2.366***	0.732***	0.762***	0.750***	0.126***
	(0.029)	(0.020)	(0.021)	(0.021)	(0.006)
Average income 5 years (in SEK m)		0.143***	0.142***	0.115***	0.163***
		(0.007)	(0.007)	(0.007)	(0.007)
$Employees_{t-1} > 0$		0.230***	0.229***	0.229***	0.240***
		(0.002)	(0.002)	(0.002)	(0.002)
$Capital_{t-1} > 100k$		0.0758***	0.0758***	0.0746***	0.0746***
		(0.0044)	(0.0044)	(0.0044)	(0.0044)
Capital asset dummies	No	Yes	Yes	Yes	Yes
Sector dummies	No	Yes	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes	Yes
Owner background covariates	No	No	No	Yes	Yes
Tax evasion	No	No	No	No	Yes
Log likelihood	−243 703	−131 248	−131 138	−129 701	−130 319
Observations	368 868	368 859	368 859	367 589	367 594

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

When we adjust reported business income for tax evasion, according to the estimates in Engström and Holmlund (2009), the coefficient of the tax-variable *YTdiff* decreases dramatically. A likely explanation is that our assumption of tax evasion was too crude, and therefore, rather than improving the tax measure, gave rise to more measurement error and a worse fit of the regression model (as indicated by the lower Log likelihood statistic).

Among the non-tax factors, we find that having employees in particular is strongly correlated with being corporate. Having more capital also leads more firms to incorporate. Owners with higher previous average income, and who are male, married, in their 40s or 50s, and have a college degree, are all much more likely to incorporate.

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 AIII.3, we allow for variation in the

[68] The table shows the marginal effect averaged over the sample observations, obtained using the Stata command margins. The full set of coefficients is available in Edmark and Gordon (2012).

impact of taxes across types of firms.[69] In particular, we allow for differential effects: i) for firms with sufficient capital to have the option of being corporate (column (2)); ii) for firms with employees (in addition to the owner(s)); iii) for firms in the service sector, and iv) for different segments of the net-of-tax income measure *YTdiff*. The latter is done by introducing a piece-wise linear function of *YTdiff*, with changes in the slope at values 0 percent and 3 percent.

[69] More specifically, the estimates were obtained by adding the interaction of *YTdiff* and the categorical variable (along with dummies for the categories) to the model.