Income taxes and the probability to become self-employed: The case of Sweden

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Abstract

It is widely recognized that entrepreneurial activity plays an important role in promoting new product innovation, discovering new markets, and replacing inefficient incumbents in a process called "creative destruction", all of which enhance economic growth. Given the importance of entrepreneurship and small business enterprises it is not surprising that policy makers worldwide (and especially in Europe) try to stimulate entrepreneurial activity. One public policy, frequently discussed, is how to design tax policies that stimulate start-ups and entrepreneurship.

Existing knowledge about taxes' effect on entrepreneurial activity and start-ups is relatively limited, however. Existing empirical studies are primarily based on US data and have until recently used aggregated tax measures (e.g., average national tax rates) or hypothetical marginal tax rates and time-series or cross-section data.

This study, however, uses a particular rich longitudinal micro-level dataset based on Swedish tax-return information, which makes it possible to track a cohort of individuals over time periods during which tax rate changes took place, and thereby isolate whether real-life individual decisions about self-employment are affected by changes in the tax rates they actually face. In addition, as the tax structure in Sweden is neutral as opposed to the US that encourages risk taking and tax-driven self-employment, studying the effect of income taxes on the probability to become self-employed based on Swedish data provides information about how taxes on self-employment affect self-employment. Contrary to earlier studies based on US data, I find both average and marginal tax rates to negatively impact the probability to become self-employed.

JEL classification: H24; J24, H26

1. Introduction

It is becoming increasingly recognized that entrepreneurial activity plays a vital role for economic growth and welfare. By promoting new product innovation, discovering new markets, and replacing inefficient incumbents in a process known as "creative destruction" entrepreneurship enhance economic growth and employment. Entrepreneurship is especially valuable in a knowledge economy, as it serves as a mechanism that transforms existing knowledge into commercialized products and economic growth (Audretsch, 2004). Moreover, entrepreneurs and small firm creation will likely become even more important for creating employment opportunities in a global economy, where large firms increasingly choose to outsource and offshore to low-cost countries, and as the technological development process continues.

Given the importance of entrepreneurship, economists have long studied what factors are important for creating and maintaining entrepreneurial activity (e.g., Schumpter, 1934 and Murphy et al., 1991). Despite this, the profession is still far from understanding what drives individuals to become entrepreneurs, even though individual characteristics (such as age, education, and assets) and economic and social environments (such as macro economic environment and institutional setup) have been found to be important (Giannetti & Simonov, 2004).

Interestingly, relatively few studies have considered taxation even though taxes are important both for the return to entrepreneurial activity and individuals' propensity to take risks and therefore likely influence entrepreneurship. As the effects of taxation on entrepreneurial activity is theoretically ambiguous – discouraging it by reducing the net return to successful entrepreneurship but also encouraging risk-taking by allowing loss-offsetting – is it up to empirical analysis to determine the net effect of taxation on entrepreneurial activity. Existing empirical studies (most of them based on US or British data) have until recently used aggregated tax measures (e.g., average national tax rates) or hypothetical marginal tax rates and time-series or cross-section data. Recently, research has transitioned to the use of longitudinal micro-level databases, which enables researchers to track a cohort of individuals over time periods during which tax rate changes took place, and thereby isolate how real-life individual decisions about employment status are affected by changes in the tax rates they actually face. Both the earlier and the more recent studies have been inclined to find a positive correlation between income taxes and entrepreneurship based on US data.

Empirical studies have almost exclusively used self-employment as a proxy for entrepreneurship. Even though there is no single accepted definition of what an entrepreneur is, it is generally thought of as somebody who is innovative, possess a want for their business venture to grow, and operates under uncertainty.[1] As it is hard to measure such activities, it has become standard in the literature to use self-employment as a proxy for entrepreneurial activity. This clearly has its shortcomings, however. For instance, employed individuals can be innovative, operate under risk, and possess a willingness for their business venture to grow and, hence, fit the description of entrepreneurs (the so called intrapreneurs) and many individuals who are self-employed may not fit the description of entrepreneurs (e.g., being innovative and operate under uncertainty) but instead be driven into self-employment for necessity reasons. Using self-employment as a measure of entrepreneurial activity may, hence, both understate and overstate the amount of entrepreneurial activity that takes place.

This paper contributes to the literature by examining how income taxation in Sweden affects the propensity to become self-employed. An important feature of the Swedish tax system is to tax all forms of income neutrally implying that income from self-employment is taxed as income from employment. Potential losses are generally deductible against future gains and can only the first years and up to a fairly low amount be credited against labor income. In the US, on the other hand, the tax system treats gains and losses asymmetrically permitting self-employed to deduct losses against highly taxed labor income while taxing profits at a low corporate tax rate. The US tax structure encourages risk taking and tax-driven self-employment and it is, hence, not surprising that an increase in the income tax encourages self-employment as it makes loss-offsetting more valuable while not affecting net gains as the profits are taxed as corporate income. A study based on a neutral tax system (like the Swedish), hence, analyzes how *taxation of self-employment* affects the propensity to become self-employed. The same study, based on the US tax system does not test how taxation of self-employment affects the propensity to become self-employed but rather how the tax advantage of being self-employed increases with income taxes.

In addition, the data available in Sweden is particularly rich and suitable for a study of how taxes affect the propensity to become self-employed. Specifically, the data used in this paper, Longitudinal Individual Database (LINDA), contain detailed tax-return information for over

[1] An important distinction between an entrepreneur that is self-employed and an employee is that the latter's return is known and always positive, the return to the self-employed entrepreneur consists of the residual that is left when all payments are made and is, hence, unknown and can be negative (Bjuggren et al. (2007)).

300,000 individuals that are followed over a long time period, and include a broad set of socio-economic and demographic variables known to affect self-employment. LINDA, hence, provides the data necessary to estimate statistically how the probability to become self-employed is affected by income taxes while simultaneously controlling for important additional determinants. Specifically, I use random effects probit techniques to identify the effect of tax policy on the likelihood that individuals will become self-employed taking into account such determinants as income, wealth, demographic characteristics as well as taxes. I use the time period between 1985 and 2000 and the tax rate changes that occurred during this period to estimate how average and marginal taxes influence the propensity to become self-employed.

This study finds, contrary to most previous studies based on US data, that income taxes negatively influence the propensity to become self-employed. Differences in tax structure can most likely explain why taxes in Sweden have a negative impact on self-employment while a positive impact in the US. The Swedish tax law provides less generous loss-offsettings, making it more costly to fail in Sweden than in the US and at the same time tax gains at high rates making the net return lower.

The paper is organized as follow. The next section provides a short discussion of some key studies analyzing the effect of taxes on self-employment. Section 3 presents the data. In section 4 the effect taxes have on the likelihood to become self-employed is estimated. Finally, section 5 performs some sensitivity analysis and discusses the results while section 6 concludes the paper.

2. Earlier empirical studies

While there is a large body of empirical work trying to determine factors influencing individuals to become self-employed, studies incorporating taxes have until recently been relatively rare. A factor that is well studied and that has consistently been found to positively impact entrepreneurship or self-employment is access to own capital (e.g., Evans & Leighton, 1989, Evans & Jovanovic, 1989, Holtz-Eakin et al., 1994, Johansson, 2000, Nykvist, 2005).

Theoretically, the effect of taxes on self-employment is ambiguous. On the one hand, high taxes reduce the expected return from undertaking risky self-employment projects and the extra effort associated with being self-employed implying a negative correlation between taxes and self-employment. On the other hand, high taxes may stimulate self-employment as high taxes provide incentives to underreport and reclassify taxable income in order to avoid taxation, something that is

done more easily for self-employed than for employees. In addition, high taxes may encourage risk-taking if loss-offsets are granted as the government then shares the risk (Domar & Musgrave, 1944).

As the effect is theoretically ambiguous it is, thus, up to empirical analysis to determine the effect of income taxation on self-employment. Empirical studies on the possible impact of taxes on self-employment have been relatively rare, however. Table 1 summarizes the results from some earlier studies. The work done can roughly be divided into two categories. The first category consists of primarily earlier studies using time-series or cross-sectional data analysis and typically some aggregate tax measures (e.g., average national tax rates) or hypothetical marginal tax rates to study how these affect self-employment *rates*. These studies have almost exclusively found a positive relationship between marginal income taxes and the level of self-employment in primarily the US (e.g., Long, 1982a, 1982b, Moore, 1983, Blau, 1987, Parker, 1996, and Parker & Robson, 2003).[2] A few more recent studies have, however, failed to confirm a positive correlation (e.g., Fairlie & Meyer, 2000 and Parker, 2003) or obtained a negative correlation (Briscoe et al., 2000, Fölster, 2002, and Bruce & Mohsin, 2006). These are rather exceptions, though, and have typically studied a specific industry or a non-US country. Briscoe et al., for example, found that tax advantages for the self-employed in the manufacturing industry positively impacted self-employment in the manufacturing industry in England. Fölster observed a negative correlation between income taxes and self-employment in Swedish counties. Bruce & Mohsin's study is based on US data and indicates a statistically significant negative impact of income taxes on self-employment, but the effect is quantitatively small and sensitive to model assumptions.

A few studies have analyzed how both marginal and average income taxes affect self-employment. Robson (1998), for instance, studied whether income taxes can explain the rapid growth in self-employment during the 1980's in England. He found a positive correlation between average taxes and self-employment but failed to find any correlation between marginal income taxes and self-employment. Robson & Wren (1999) tried to explain why average and marginal income taxes have different effects on self-employment. They argued that high marginal taxes affect self-employment negatively by reducing the return to entrepreneurial effort while high average taxes affect self-employment positively by making tax planning and avoidance more attractive, something they also found empirical support for.

[2] One of the studies (Parker, 1996) is based on British data and one (Parker & Robson, 2003) on OECD data.

The second category consists of more recent studies based on repeated cross-section or longitudinal micro-level data, and have typically estimated the effect of taxes on individuals' probability to *become* self-employed. The latter data enable researchers to track a cohort of individuals over time periods during which tax rate changes took place, and thereby isolate how real-life individual decisions about self-employment are affected by changes in the tax rates they actually face and are better suited for these types of studies. One problem that previous studies have failed to address in an appropriate manner is the endogeneity problem; that is, the problem that income taxes affect the choice to become self-employed but the choice to become self-employed also affects taxes. Panel studies where individuals are followed over time are more successful in addressing these problems (Meyer, 1990). The access to better data has resulted in a large number of new studies, and the results from these tend to confirm earlier results of a positive correlation between marginal income taxes and self-employment (e.g., Schuetze, 2000, Bruce, 2000 & 2002, and Cullen & Gordon, 2002). The positive correlation has, however, been questioned by some. Gentry & Hubbard (2003), for example, obtained no statistically significant correlation between the level of the marginal tax rate and the propensity to become self-employed in the US while Gentry & Hubbard (2004) found a negative relationship. In addition, Moore (2003) observed that both the marginal and average income taxes affect the probability to become self-employed negatively.

More recently, researchers have widened their perspective to not only analyze how the level of marginal and average income taxes affects the propensity to become self-employed but how the tax structure affects the propensity to become self-employed. This is important as it is not only the level of taxation but the progressivity of the tax structure and how self-employment income is taxed relative to other income sources that influence the probability to become self-employed. Gentry & Hubbard (2003 & 2004) have, for instance, studied how the progressivity in the tax code affects individuals' probability to become self-employed. They find that tax progressivity, measured as the difference in the marginal tax rate of succeeding and failing, negatively influence the decision to become self-employed.

Moreover, Cullen & Gordon (2007) have recently developed a model illustrating the importance of the tax structure. More specifically, they model how the tax structure influences risk taking and, hence, self-employment (or entrepreneurship) in three ways. The first mechanism, income-shifting, captures to what extent the tax structure provides incentives to shift income from one form to another, e.g., from highly taxes labor income to low taxed corporate income. How

large this effect is depends on the tax structure. The self-employed in the US have large means to shift income as they ex-post can choose whether they want to be taxed as employees or as corporations. Self-employed with business losses have incentives to be taxed as employees and deduct losses against highly taxed labor income while self-employed with gains have incentives to be taxed as businesses and take advantage of the low corporate income tax rate (currently, the lowest rate is 15 percent). In Sweden, however, the means to lower the tax burden by shifting income is restricted by special tax laws (the so-called 3:12 rules or rules for closely held companies) that are designed to prevent this problem.

The second mechanism, risk subsidizing, measures how the tax structure encourages risk taking. In a proportional tax system taxes are neutral. Risk taking is discouraged in a progressive tax system without means to incorporate, however, as successful entrepreneurship is taxed relatively hard in a progressive tax system. A progressive tax system that allows incorporation (that is, gains can be taxed at corporate tax rates) and losses to be deducted against highly taxed labor income, as is the case in the US, subsidizes risk taking. The US tax structure, hence, encourages risk taking and especially so for high-income individuals that can deduct losses against high-taxed labor income. The last mechanism reflects the government's role as a risk sharer a'la Domar & Musgrave. Again, income taxes encourage risk taking as the government's share of the loss increases with the tax rate.

It is, hence, not surprising that studies based on US data have found a positive relationship between income taxes and self-employment. According to Cullen & Gordon's (2007) model the income tax has an unambiguous positive effect on the probability to become self-employed, as all three mechanisms encourage risk taking.

It is, however, unlikely that these results will carry over to Swedish conditions as the Swedish tax structure is very different from the US. As already mentioned, the Swedish tax structure is less risk encouraging with limited means to shift income and less generous loss deduction rules. It is interesting for several reasons to conduct a study based on Swedish data.[3] First, a study based on the Swedish tax structure is more suitable for estimating how taxes on self-

[3] To my knowledge there are no estimates on how taxes affect self-employment based on Swedish longitudinal individual based data. A study by Fölster (2002) based on aggregate data from Swedish counties finds that the average top income tax rate in the county is negatively correlated with self-employment. Similarly, Backman (2007) found municipal income taxes to negatively influence start-ups in Sweden. Nyström (2007), however, failed to find a significant relationship between municipal taxes and start-ups.

employment affect the propensity to become self-employed as self-employed and employees are treated more uniformly in Sweden.

Second, particularly rich and detailed data are available for Swedish taxpayers that may provide unique insights into the relationship between income tax rates and entrepreneurship. Unlike most previous studies, the data make it possible to track a large number of individual taxpayers over long time periods, and include detailed information about taxes, income, wealth, employment status, education, and many demographic variables making the data especially suitable to study the effect of taxation on self-employment.

3. The Data

To study how taxes influence the occupational choice in Sweden I use data from the **L**ongitudinell **IN**divid**DA**tabas (LINDA), a longitudinal data set that has sampled 3 percent of the population each year since 1968 (SCB, 2003). It consists of a large panel of individuals, and their household members, and is selected to be representative for the whole population. The sampling procedure - where individuals are replaced by a random sample of, for instance, newborns and immigrants - ensures that each cross-section of LINDA is representative for the population in a particular year (Edin and Fredriksson, 2000). The data come from detailed registers such as the income and wealth registers and population census data, and contain highly reliable data on various measures of income, taxes, wealth, employment status as well as demographic information.

In this paper, I follow the standard tradition and, hence, use self-employment as a measure of entrepreneurial activity. It is, however, important to bear in mind that it in many ways is a poor measure for entrepreneurial activity. The self-employment variable equals one if the individual receives at least half of their earned income from their business venture. Business ventures included are sole proprietorships, trading partners, and limited partnerships but not limited liability companies. As 89 percent of all new start-ups in Sweden are sole proprietorship (Cullen & Gordon, 2006) this is a good proxy for start-ups.

I include individuals with valid information on employment status, income, taxes and demographic variables from 1985 to 2000. This data have the advantage of being able to track the *same* individuals over a 16 year time span and thereby eliminate some of the problems with endogeneity, and is rich enough to be able to control for many confounding factors. I restrict the sample to include individuals that are in their working age (20 - 65) each year. They are over

75,000 observations for each year and a total of over 1,100,000 observations for the entire time period, although this number is reduced when education and other control variables are included.

Table 2 shows some sample characteristics for self-employed and employees, respectively. Over the entire time period, 1985 to 2000, 4.3 percent of those in the sample were self-employed according to above definition. This number varied over the years, with a maximum value of 4.48 percent in 1985 and a minimum of 3.86 percent during the economic crisis in 1992. As is apparent from the table, self-employed had a lower average taxable income than the employed (SEK 131,240 compared to SEK 179,624) and paid a slightly lower average and marginal income tax rate (33 compared to 35 percent and 37 compared to 41 percent, respectively). Self-employed have a considerable higher taxable wealth, however. The average taxable wealth of the self-employed is almost 50 percent larger than the average taxable wealth of the employed individuals. One can speculate whether the substantially higher taxable wealth for the self-employed is a consequence of higher returns to self-employment or whether the wealth was initially higher, and maybe even a requirement for becoming self-employed. As already mentioned, a substantial body of literature has found that access to own capital is an important determinant to become self-employed (e.g., Evans & Leighton, 1989, Evans & Jovanovic, 1989, Holtz-Eakin et al., 1994, Lind & Ohlsson, 1996, Blanchfloer & Oswald, 1998, Johansson, 2000, Davidsson & Henrekson, 2002, and Nykvist, 2005). The fact that reported taxable income is lower for self-employed than employees could imply that wealth was not built up from the business venture. There can, however, be a large discrepancy between real income and reported taxable income, especially for self-employed who have larger means to affect their taxable income (Persson, 2005, and Engström & Holmlund, 2006). For instance, Engström & Holmlund estimate that self-employed underestimate as much as 35 percent of their business income. If that is the case the average real income for self-employed is larger than the average real income for employees (given that they have small means to affect their taxable income). The average yearly growth rate in taxable wealth among the self-employed was lower than the average yearly growth rate in taxable wealth among employees, however, suggesting that the self-employed had their wealth initially.

In addition, self-employed tend to be somewhat older than employees (44 compared to 40 years), more likely to be male and married than female and unmarried. Self-employed tend to have a lower level of education than employees, however. That self-employed have a lower level of

education than the employed seems to be the pattern prevailing in Europe, in the US, however the opposite is true (Blanchflower & Shadforth, 2007).

4. Estimating the effect of taxes on the propensity to become self-employed

To determine how taxes affect the propensity to become self-employed I use the variation in tax rates that occurred between 1985 and 2000 to identify the tax effect. During this period several tax rate changes took place. For example, the top marginal tax rate was gradually lowered in the latter part of the 1980's (from 80 percent in 1985 to 72 percent in 1990), then radically decreased to 50 percent by the 1990/91 tax reform, then increased to 55 percent in 1995, in later parts of the 1990's social security contributions have gradually increased providing additional increases in the tax rates. This, together with bracket creeps will likely provide enough variation in average and marginal tax rates to identify tax effects during this period and enable me to study how average and marginal tax rates affect the propensity to become self-employed. The average tax rate is of interest as it determines the net return to being self-employed and is likely to affect the discrete occupational choice. The marginal tax rate, on the other hand, affects the return on the margin and may be harmful to successful entrepreneurship.[4]

To estimate the impact of taxes on the transition into self-employment I follow the standard tradition and estimate the following random effects probit model:

$$E_{i,t+1} = X_{i,t}\beta' + \gamma T_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}, \qquad (2)$$

where $E_{i,t+1}$ is a dummy variable that equals one if individual *i* moves from being an employee at time *t* to becoming self-employed at time *t+1*, and zero if the individual remains an employee or self-employed in both years. The $X_{i,t}$ vector includes a constant term and a set of variables likely to affect the occupational choice, while $T_{i,t}$ represents the individual specific average tax rate at time *t*. The error term includes an individual specific time-invariant random effect (μ_i) to capture unobservable individual heterogeneity, an individual-invariant time effect (τ_t), and an independent and identically distributed component ($\nu_{i,t+1}$) with zero mean and finite variance.

[4] The average and marginal tax rates are not reported in LINDA but can easily be calculated for each individual by the information provided in LINDA.

In addition to the variables of interest, the tax rates, I include several individual characteristics that have previously been found to affect the propensity to become self-employed. For instance, as access to own capital has been found to be an important determinant for becoming self-employed I include taxable wealth to control for access to capital. Ideally, total access to wealth would be included. Taxable wealth likely underestimates total wealth as it fails to include all kinds of assets and only include wealth above a certain threshold. Unfortunately, it is hard to measure true wealth and taxable wealth is probably a better measure than many previous studies used for wealth.

Moreover, I include age, age squared, whether the individual is married or not, and the individual's level of education. Age can be seen as a proxy for risk aversion. Old tend to be more risk averse than young individuals but at a decreasing rate. I, hence, expect age to be negatively and age squared to be positively correlated with the propensity to become self-employed. To be married, measured as a dummy equal to one if the individual is married and zero otherwise, can affect the propensity to be self-employed both negatively and positively. Positively if being married makes the individual more risk willing as he/she has a spouse to pool risks with. On the other hand, being married may make the individual less prone to take risks as the risk then not only affects the individual but potentially the family too. Education is represented by a variable between 1 and 7, where a 7 represents a graduate degree and 1 the lowest level of education.[5]

Previous labor income is included. This variable is expected to have a negative impact if it reflects the opportunity cost of becoming self-employed and/or poor employment opportunities. The opposite relation is also feasible if high-income individuals have greater potential to succeed with their business venture and, thus, more prone to become self-employed. Moreover, as pointed out by Robson (1998) the results may be biased if individual income is excluded. To further determine if individuals are pushed into self-employment due to poor employment opportunities, I include a dummy that equals one if the individual received unemployment benefits two years previously and zero otherwise. In addition, the amount of social benefits the individual receives two years previously is included. If individuals are pushed into self-employment I expect these two variables to have a positive impact on the propensity to become self-employed.

[5] More specifically, 1 represents less than 9 years of schooling, 2 represents 9 years of schooling, 3 2 years of high-school and 4 a high-school degree of more than 2 years, 5 represents a collage degree shorter than 3 years while 6 represents a collage degree of at least 3 years, and finally 7 represents a graduate degree.

I also include time and individual specific effects to control for time invariant and individual invariant factors that are hard to measure and quantify. It is, for instance, likely that the rules and bureaucracy involved with starting a business can be a deterrent of becoming self-employed. To measure and quantify these factors are hard, however, but as long as these factors are constant to all individuals the time specific effects, τ_t, will control for these factors. The same goes for the macro-economic environment and the institutional setting. The individual specific effects, μ_i, on the other hand, pick up the characteristics that are specific to the individual and constant over time. An individual's risk propensity is an important factor for the occupational choice and as long as this is constant over time the individual specific effect controls for this effect. The age variable, on the other hand, picks up the change in the risk propensity over the life-cycle.

A potentially serious issue is how to control for the endogeneity arising because an individual's decision to move into self-employment affects her/his tax rates. To control for this endogeneity I use the instrument variable approach suggested by Cummins et al. (1994) and later used by Carroll et al. (2000a, 2000b, 2001) and Bruce (2000, 2002). In this approach, a synthetic tax rate is computed for each time period by applying tax rules from year *t+1* on income from year *t* inflated by inflation and real wage growth. The synthetic tax rate isolates the exogenous change in the tax rate from the behavioural response and represents the change in the tax law eliminating the effect of individuals' behavioural response to tax rate changes. This tax rate is used in the transition regression. I alternatively, use the tax variable lagged two time periods back as an exogenous tax variable.

As I estimate the transition from being an employee in the first period to becoming self-employed in the second period the individuals included in the sample must belong to either of those two categories, and, hence, I have a selected sample. Those who are self-employed in both periods or transitioned out of self-employment are not included in the sample. The individual random effect, that captures unobservable entrepreneurial activity, may be correlated with the transition indicator, the so called initial conditions problem. To control for this bias I follow the method suggested by Orme (1997) and used, for instance, by Bruce (2000). This procedure converts the initial conditions problem to a more tractable sample selection problem. The first stage of this procedure is a probit regression of a dummy variable that equals one if the individual is initially observed as an employee and zero if the individual is initially observed as self-employed. The included regressors in the first stage are individual characteristics observed in the initial year such

as age and age squared, sex, and county of residence. For this procedure to be appropriate individuals who are self-employed in the initial year, 1985, must be omitted from the transition probits, leaving a sample with initially employed individuals who either remain employed, become self-employed or drop out of the labor force. An inverted Mills ratio is calculated and included as a regressor in the random effects transition probit (equation 1).

Results

Table 3 reports the results from the regressions when average and marginal tax rates are employed without controlling for endogeneity. Estimations presented in columns Ia and Ib only control for tax rates and wealth while additional control variables are added in the estimations presented in the following columns.

The average tax rates negatively and statistically significantly impact the probability to become self-employed in all specifications. Consistent with previous studies, access to wealth is positively and statistically significantly correlated with the probability to become self-employed. As expected age is negatively and age squared positively correlated with the propensity to become self-employed. Being married has a positive impact on the probability to become self-employed suggesting that marriage works as a risk-pooling device encouraging individuals to become self-employed. Consistent with other studies (e.g., Blanchflower & Shadforth, 2007), education negatively influence the probability to become self-employed, although this relation is only statistically significant in one specification (IIa). Having been unemployed has a positive impact suggesting that unemployment push individuals into self-employment while receiving social benefits previously has an insignificant effect. Previous labor income has a negative and highly statistically significant impact on the propensity to become self-employed indicting that the opportunity cost of becoming self-employed is high for high-income earners deterring them from becoming self-employed. The inverted Mills ratio is also strongly statistically significant indicating that it is important to control for selection bias. The inclusion of the inverted Mills ratio does not change the impact the average tax rate has on the propensity to become self-employed, however, but reduces the number of observations available substantially. Overall, the effect of the average tax rate on the propensity to become self-employed is robust across the different specifications. The magnitude of the coefficient is, however, rather small.

The last three columns in table 3 report the results for the marginal tax rate. The marginal tax rate has a negative and statistically significant impact on the propensity to become self-employed in all three specifications, and with a fairly stable magnitude. For the other control variables the results are very similar to those for the average tax rate. Age and age squared has a negative but diminishing effect on the propensity to become self-employed and becoming married a positive impact. The negative result previously found for the level of education is now less robust. As before, having previously been unemployed and prior labor income is positively and negatively correlated with the probability of becoming self-employed, respectively. Again, the inverted Mills ratio is highly statistically significant but has no bearing on the impact the marginal tax rate has on the propensity to become self-employed. The magnitude of the coefficients is similar to that of the average tax rate.

Table 4 reports the results when controlling for endogeneity. Two different instruments are used; the synthetic average and marginal tax rates, and the average and marginal tax rate lagged two periods, respectively. In the first column for the two tax rates the inverted Mills ratios are excluded while they are included in latter columns.

The coefficients of both the average and the marginal tax rate are negative and highly statistically significant in all specifications. For the other control variables the results are similar to those in Table 3, wealth is a highly important determinant that positively influence the propensity to become self-employed. As before, age impacts the probability to become self-employed negatively but at a diminishing rate while being married affects the same probability positively. The effect of previous unemployment is positively and statistically significant (at least at the 10 percent significance level) in all specifications. The amount of social benefits received two years previously tend to positively impact the probability to become self-employed although statistically insignificant when including the inverted Mills ratio (and negatively for the marginal tax rate). Previous labor income has a negative impact on the probability of becoming self-employed in all specifications though insignificant in one. The only variables that are not robust across specifications are education and the amount of social benefits received, although these tend to be insignificant. Again, the inverted Mills ratio is highly statistically significant but has no noticeable effect on the results.

5. Alternative specifications and discussion

The above results suggest that both average and marginal taxes matter for the decision to become self-employed, by negatively affecting the probability to become self-employed. This result is in stark contrast to earlier results based on mainly US data. It is, however, not surprising that the results deviate between Sweden and the US as the tax structure in Sweden and in the US differ in several important ways. As already mentioned, income from self-employment is taxed as employment income in Sweden. In the US, on the other hand, self-employed individuals have the possibility to deduct losses against labor income while taxing gains at relatively low corporate tax rates (currently the lowest rate is 15 percent). Increasing the labor income tax rate, while leaving the corporate tax rate unchanged, provides incentives to become self-employed in the US as both the relative gain of being taxed at the lower corporate tax rate and the value of deducting potential losses increase. In Sweden, however, increasing the labor income tax will not make it relatively more attractive to be self-employed as self-employed and employees are taxed uniformly. It should, hence, not come as a surprise that there is a positive correlation between labor income taxation and self-employment in the US and a negative correlation in Sweden.

Even if self-employed and employees are formally taxed uniformly in Sweden, the high income taxes in Sweden may provide incentives for individuals to become self-employed in order to avoid high taxes. As self-employed have greater opportunities than employees to reduce their taxable income both legally and illegally, high taxes may drive individuals to become self-employed for tax reasons. It may be reasonable to expect that individuals that are driven to become self-employed in order to avoid taxes to a larger extent do this part time while keeping their regular employment. For instance, if an individual starts a business alongside her regular employment she can meet potential customers through her employment but perform some services through the firm which provides the individual with greater opportunities to affect the net return to labor. To test this hypothesis, I alternatively investigate how taxes affect individuals that have a positive self-employment income but where this income is less than their income from employment. In the sample, slightly more then 3 percent of the individuals fulfil these conditions.

The results from these regressions are shown in columns Ia and Ib in table 5. In the first column (Ia) the average tax rate is employed while column Ib presents the results when the marginal tax rate is employed. I use the synthetic tax rate as an instrument and omit the inverted Mills ratio.[6] Columns Ia and Ib in table 5 should be compared to columns Ia and Ib in table 4,

[6] Including the inverted Mills ratio does not alter the result but reduce the number of observations substantially.

respectively. Interestingly, the tax rates now positively impact part-time self-employment. An increase in both the average and the marginal tax rate increases the probability to become self-employed part time. This is consistent with the hypothesis that these individuals to a larger extent are driven to become self-employed in order to avoid taxes. As previously, access to wealth is important. Interestingly, age now have a positive but diminishing impact on the probability to become self-employed. In addition, an increase in the level of education positively influences the propensity to become self-employed while amounts of previously received social benefits impact the probability to become self-employed negatively. The results from these estimations, hence, indicate that factors determining individuals to become self-employed part time differ from factors influencing individuals to become self-employed as their primary occupation.

As the propensity to become self-employed may differ between men and women I also estimate regression (1) for men and women separately. The results from these estimations are reported in columns II and III in table 5 for men and women, respectively.

The results do not show any systematic differences between men and women when it comes to the impact of taxes on the probability to become self-employed. For women the coefficient of the average tax rate is, however, less significant than for men and the coefficient of the marginal tax rate is lower for women than men. The other control variables do not influence men and women's propensity to become self-employed differently either. The only difference is that previous earned income impact men's propensity to become self-employed negatively and statistically significant but have an insignificant impact on women's probability to become self-employed.

Another interesting issue is whether more innovative entrepreneurs or start-ups are more sensitive to taxes than less innovative entrepreneurs or start-ups. Gentry & Hubbard (2004) have addressed this issue based on US data, but failed to provide empirical support for it. It is not straightforward how to measure innovative entrepreneurs. Gentry & Hubbard used, among other things, education as a proxy for innovative entrepreneurs and assumed that self-employed with high levels of education were more innovative than self-employed with lower levels of education. To get an indication whether high educated are more sensitive to taxes in their choice of employment status than less educated, I divide my sample into two sub-samples depending on level of education. Those with college degrees or more are assumed to have a high level of education while those with less than a college degree are assumed to be less educated. Determining what drives high-educated individuals to become self-employed is interesting in its own right, regardless if they

are more innovative or not, especially in Sweden were high educated individuals are less likely to be self-employed than low educated. Indeed, the lack of academic entrepreneurship has been pointed out as a contributing factor to why Sweden has been unsuccessful in transforming existing knowledge into commercialized products and economic growth (Braunerhjelm et al., 2003).

The results from these estimations are presented in table 6. As is apparent from the table taxes affect both high- and low-educated individuals' propensity to become self-employed negatively. The magnitudes of the coefficients are somewhat larger for high-educated individuals (especially so for the marginal tax rate), however, even though the magnitudes still are small. There are other noteworthy differences between factors influencing high- and low-educated probability to become self-employed. Age, for instance, seems to have no impact on high-educated individuals' probability to become self-employed while negatively impacting the probability to become self-employed for those will lower levels of education. Likewise, marital status influences high- and low-educated individuals differently. For low educated, being married has a positive impact on the probability to become self-employed, while for high educated marriage has no statistically significant impact. It is also noteworthy that previous earned income has a negative and statistically significant effect on the propensity to become self-employed for high-educated individuals but an insignificant impact on those with lower levels of education.

Previous results indicate that both the average and the marginal tax rate influence the probability to become self-employed negatively and give the impression of being of the same importance. Bruce (2000), who studies both average and marginal tax rates, found that the marginal tax rate was of greater importance for the decision to become self-employed, however. To determine if the same relation holds in Sweden, I estimate a model that includes both the average and the marginal tax rate. The results from this estimation (presented in table 6) indicate that the average tax rate is of greater importance than the marginal tax rate as the marginal tax rate has an insignificant impact on the propensity to become self-employed when both tax rates are included.

Previously, I argued that a study based on Swedish conditions is more appropriate for analyzing how income taxation of self-employment affects the probability to become self-employed as self-employed and employees are taxed uniformly in Sweden. The study here is based on data from 1985 to 2000. Prior to the 1990/91 tax reform self-employed and employees were not taxed as uniformly as after the reform, as self-employed had extensive deduction possibilities making their effective tax burden lower. As the main purpose of the tax reform was to create a

uniform tax system these deduction possibilities were reduced, resulting in a more uniform tax treatment of self-employed and employees.[7] In a last sensitivity I create a sub-sample including only years after the tax reform. This does not change the results, however. Both the average and the marginal tax have a negative and statistically significant impact on the propensity to become self-employed in the post tax reform sub-sample.

6. Conclusions

This paper studies how taxation affects the propensity to become self-employed. It uses a particularly rich data set of Swedish taxpayers, which provides detailed information about taxes, income, employment status and demographic variables. Previous studies – mainly based on US data - have generally found that taxes positively influence the decision to become self-employed. The intuition behind this result is that the incentives to be self-employed are greater when taxes are high as the self-employed more easily can avoid taxation than employees.

This study casts some doubt on this result, and shows that average and marginal taxes negatively influence the propensity to become self-employed in Sweden. This result could be specific to Sweden, where the tax structure is more neutral and subsidizes risk to a lesser extent than in the US. The result could, however, be due to the use of better data, and, hence, the capacity to better control for a number of confounding factors and endogeneity. It is, however, clear that it is not only the level of taxation but the tax structure that affect individuals' probability to become self-employed.

That Sweden lacks educated self-employed is a problem if self-employed with higher education are more innovative and better equipped to transform existing knowledge to commercialized products and economic growth than self-employed with lower levels of education. A possible reason, and consistent with results from this study, is that high taxes discourage high educated individuals from becoming self-employed. Why leave a relatively safe life as an employee for an uncertain life as a self-employed when the potential net returns are low and the costs if failing are high?

Consistent with earlier studies access to capital (wealth) is an important determinant for becoming self-employed. Taxes that affect the incentives to build up wealth, hence, influence

[7] Part of the tax reform entailed a switch to a dual income tax system taxing labor income at a higher and capital income at a lower tax rate. In order not to create incentives for self-employed to shift labor income to lower taxed capital income special rules, the so called 3:12-rules, were created to minimize this problem.

individuals' self-employment decisions. Other important determinants are age, education and previous employment history.

To make any policy implications it is important to distinguish between factors that influence an individual's decision to become an "entrepreneur" from those attracted to self-employment in order to avoid taxation, however. It is clearly the former that policy makers may want to stimulate, if encouragement of entrepreneurship is desirable. Specific tax relieves for small firms and start-ups may create distortions and stimulate to the latter type of self-employment. General tax reforms that, for instance, reduce the top marginal tax rates will likely have positive impacts on business formations and maybe stimulate high-educated individuals to start businesses as well as tax policies that stimulate individuals to build up wealth. In addition, the loss-offsetting rules must be more generous so that the cost of failing is reduced.

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Table 1. Summery of earlier studies' results

Method	Author	Estimated effect	Tax measurement	Period	Country
Time-series	Long (1982a)	+	Marginal, hypothetical married couple	1963-77	USA
	Blau (1987)	+/-	Marginal, high/low income	1948-82	USA
	Parker (1996)	+/+	Marginal, high/low income	1959-91	UK
	Robson (1998)	0 +	Marginal Average	1968Q3-93Q4	UK
	Robson & Wren (1999)	- +	Marginal Average	1978-92	15 OECD
	Fairlie & Meyer (2000)	0	No regression	1910-90	USA
	Briscoe m fl (2000)	-	Tax law for manuf industry	1970-99	UK
	Bruce & Moshin (2006)	-	Tax on income, corp income. estate, social security contrib.	1950-99	USA
Cross-section	Long (1982a)	+	Marginal	1970	USA
	Long (1982b)	+	Marginal	1970	USA
	Moore (1983)	+	Income and social security contrib.	1978	USA
	Parker (2003)	0	Tax on self-employment	1994	UK
	Parker & Robson (2003)	+ -	Average Social security contrib	1972-96	OECD
	Fölster (2002)	- -	Tax revenues/GDP Top marginal tax rate	1970-89 1976-95	OECD/ Sweden (counties)
Individual panel	Schuetze (2000)	+	Federal/local average	1983-94	Canada/USA
	Bruce (2000)	+ -	Expected marginal and average	1970-92	USA
	Bruce (2002)	- exit	Expected marginal and average	1970-91	USA
	Cullen & Gordon (2002)	+	Aggregated average	1964-93	USA
	Gentry & Hubbard (2003)	0 -	Marginal Progressivity in marginal tax rates	1979-93	USA
	Gentry & Hubbard (2004)	- -	Marginal Progressivity	1978-93	USA
	Moore (2003)	-	Marginal and average	1983-2001	USA

Table 2. Some sample characteristics for self-employed and employees, respectively.

	Self-employed	Employees
Share	4.28 %	95.72 %
Average taxable income	131,240	179,624
Average tax rate	33 %	35 %
Marginal tax	37 %	41%
Average taxable wealth	131,031	68,721
Average age	44.2	39.9
Average sex[1]	1.29	1.49
Marital status[2]	0.65	0.52
Average education level[3]	2.85	3.53

[1] Sex equals one if the individual is a man and 2 if it is a woman.
[2] Marital status equals one if the individual is married and zero otherwise.
[3] Education takes a value between 1 and 7, where 1 is the lowest level and 7 the highest (graduate).
Source: LINDA

Table 3. Probit estimation of the probability of becoming self-employed using panel data from 1985 to 2000.

	Ia	IIa	IIIa	Ib	IIb	IIIb
Average tax rate	-0.042	-0.046	-0.073			
	(0.0010)***	(0.001)***	(0.006)***			
Marginal tax rate				-0.029	-0.027	-0.032
				(0.0007)***	(0.0010)***	(0.0017)***
Wealth	$6.08\ 10^{-6}$	$5.88\ 10^{-6}$	$1.12\ 10^{-5}$	$6.29\ 10^{-6}$	$5.78\ 10^{-6}$	$1.24\ 10^{-5}$
	$(6.84\ 10^{-7})$***	$(6.95\ 10^{-7})$***	$(3.18\ 10^{-6})$***	$(6.73\ 10^{-7})$***	$(6.87\ 10^{-7})$***	$(2.86\ 10^{-6})$***
Age		-0.026	-0.05		-0.02	-0.04
		(0.006)***	(0.012)***		(0.007)***	(0.011)***
Age squared		$3.12\ 10^{-4}$	$4.41\ 10^{-4}$		$2.35\ 10^{-4}$	$3.52\ 10^{-4}$
		$(6.60\ 10^{-5})$***	$(1.40\ 10^{-4})$***		$(6.54\ 10^{-5})$***	$(1.37\ 10^{-4})$***
Married		0.05	0.05		0.05	0.06
		(0.015)***	(0.026)**		(0.015)***	(0.025)***
Education		-0.019	-0.001		-0.005	0.007
		(0.005)***	(0.009)		(0.005)	(0.008)
Unemployed two years previously			0.21			0.21
			(0.124)*			(0.12)**
Amount of social benefits received two years previously			$4.48\ 10^{-5}$			$-4.25\ 10^{-5}$
			$(4.93\ 10^{-5})$			$(4.95\ 10^{-5})$
Earned income previous year			$-6.74\ 10^{-5}$			$-8.21\ 10^{-5}$
			$(2.23\ 10^{-5})$***			$(2.12\ 10^{-5})$***
Inverted Mills Ratio			-7.22			-7.54
			(0.714)***			(0.675)***
Constant	-1.73	-0.91	8.08	-1.99	-1.69	6.72
	(0.045)***	(0.122)***	(0.825)***	(0.035)***	(0.117)***	(0.736)***
N	1,035,454	729,941	257,420	1,040,573	732,180	259,472
McFadden's R-squared	0.031	0.032	0.022	0.030	0.019	0.037
Wald ch2	2260.11	1737.54	296.98	1820.32	851.87	567.35
Pro > chi2	0.000	0.000	0.000	0.000	0.000	0.000

Numbers shown in parenthesis are robust standard errors.
Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Also include year dummies.

Table 4. IV probit estimation of the probability of becoming self-employed using panel data from 1985 to 2000.

	Ia Synt tax	IIa Synt tax	IIIa Laggad tax	Ib Synt tax	IIb Synt tax	IIIb Laggad tax
Average tax rate	-0.022 (0.0026)***	-0.017 (0.0053)***	-0.036 (0.0029)***			
Marginal tax rate				-0.0076 (0.0011)***	-0.011 (0.0023)***	-0.030 (0.0048)***
Wealth	$5.44\ 10^{-6}$ $(9.94\ 10^{-7})$***	$7.91\ 10^{-6}$ $(2.42\ 10^{-6})$***	$1.10\ 10^{-5}$ $(3.32\ 10^{-6})$***	$6.42\ 10^{-6}$ $(1.24\ 10^{-6})$***	$8.25\ 10^{-6}$ $(2.06\ 10^{-6})$***	$1.07\ 10^{-5}$ $(2.67\ 10^{-6})$***
Age	-0.026 (0.0047)***	-0.046 (0.010)***	-0.049 (0.012)***	-0.023 (0.005)***	-0.39 (0.010)***	-0.04 (0.011)***
Age squared	$3.23\ 10^{-4}$ $(5.54\ 10^{-5})$***	$4.23\ 10^{-4}$ $(1.26\ 10^{-4})$***	$4.44\ 10^{-4}$ $(1.44\ 10^{-4})$***	$2.28\ 10^{-4}$ $(5.43\ 10^{-5})$***	$3.36\ 10^{-4}$ $(1.22\ 10^{-4})$***	$3.07\ 10^{-4}$ $(1.39\ 10^{-4})$**
Married	0.027 (0.0123)**	0.028 (0.020)	0.035 (0.023)***	0.03 (0.012)***	0.04 (0.020)*	0.05 (0.022)**
Education	-0.0066 (0.0041)	-0.014 (0.007)**	-0.006 (0.008)	-0.006 (0.004)	-0.008 (0.007)	0.008 (0.008)
Unemployed two years previously	0.103 (0.020)***	0.45 (0.099)***	0.16 (0.11)***	0.09 (0.020)***	0.227 (0.095)***	0.18 (0.104)*
Amount of social benefits received two years previously	$1.33\ 10^{-6}$ $(2.95\ 10^{-7})$***	$6.22\ 10^{-3}$ (0.021)	$5.85\ 10^{-5}$ $(4.73\ 10^{-5})$	$1.24\ 10^{-6}$ $(2.95\ 10^{-7})$***	$-5.49\ 10^{-5}$ $(4.62\ 10^{-5})$	$-4.40\ 10^{-5}$ $(5.07\ 10^{-5})$
Earned income previous year	$-1.05\ 10^{-5}$ $(6.42\ 10^{-6})$*	$-4.66\ 10^{-5}$ $(2.46\ 10^{-5})$*	$-1.18\ 10^{-4}$ $(4.66\ 10^{-5})$***	$-2.18\ 10^{-5}$ $(1.22\ 10^{-5})$*	$-5.87\ 10^{-5}$ $(2.55\ 10^{-5})$**	$-5.93\ 10^{-5}$ $(4.31\ 10^{-5})$
Inverted Mills Ratio		-4.26 (0.566)***	-5.48 (0.638)***		-4.99 (0.530)***	-6.58 (0.597)***
Constant	-1.29 (0.118)***	3.34 (0.640)***	5.29 (0.867)***	-1.80 (0.097)***	3.83 (0.585)***	5.89 (0.597)***
N	855,575	301,743	255,881	860,140	305,083	259,472
Wald chi2	385.28	147.68	176.19	423.07	209.68	282.88
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Numbers shown in parenthesis are robust standard errors.
Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Also include year dummies.

Table 5. IV probit estimation of the probability of becoming self-employed using panel data from 1985 to 2000 for self-employed part-time and for men and women (using the synthetic tax rates as instruments)

	Self-employed part-time	Self-employed part-time	Men	Women	Men	Women
	Ia	Ib	IIa	IIIa	IIb	IIIb
Average tax rate	0.008		-0.028	-0.029		
	(0.002)***		(0.003)***	(0.005)*		
Marginal tax rate		0.0014			-0.016	-0.006
		(0.0006)**			(0.001)***	(0.003)**
Wealth	$6.82\ 10^{-6}$	$6.62\ 10^{-6}$	$6.85\ 10^{-6}$	$1.02\ 10^{-5}$	$7.19\ 10^{-6}$	$1.08\ 10^{-5}$
	$(8.97\ 10^{-7})$***	$(8.79\ 10^{-7})$***	$(1.05\ 10^{-6})$***	$(2.01\ 10^{-6})$***	$(1.03\ 10^{-6})$***	$(2.19\ 10^{-6})$***
Age	0.025	0.025	-0.019	-0.033	-0.011	-0.030
	(0.0034)***	(0.0034)***	(0.058)***	(0.008)***	(0.0057)**	(0.079)***
Age squared	$-2.53\ 10^{-4}$	$-2.60\ 10^{-4}$	$2.57\ 10^{-4}$	$3.83\ 10^{-4}$	$1.77\ 10^{-4}$	$3.50\ 10^{-4}$
	$(4.08\ 10^{-5})$***	$(4.06\ 10^{-5})$***	$(6.88\ 10^{-5})$***	$(9.52\ 10^{-5})$***	$(6.75\ 10^{-4})$***	$(9.35\ 10^{-5})$***
Married	0.083	0.086	0.034	0.065	0.046	0.073
	(0.0092)***	(0.091)***	(0.016)**	(0.021)***	(0.016)***	(0.021)***
Education	0.032	0.033	0.001	0.008	0.013	0.009
	(0.003)***	(0.003)***	(0.005)	(0.007)	(0.005)***	(0.007)
Unemployed two years previously	0.081	0.084	0.128	0.064	0.081	0.054
	(0.017)***	(0.017)***	(0.027)***	(0.032)**	(0.026)***	(0.032)*
Social benefits two years previously	-0.067	-0.070	$1.21\ 10^{-6}$	$1.53\ 10^{-6}$	$9.79\ 10^{-7}$	$1.48\ 10^{-6}$
	(0.009)***	(0.009)***	$(3.81\ 10^{-7})$***	$(4.69\ 10^{-7})$***	$(3.81\ 10^{-7})$***	$(4.69\ 10^{-7})$***
Earned income previous year	$-1.23\ 10^{-5}$	$-5.59\ 10^{-6}$	$-3.46\ 10^{-5}$	$-3.13\ 10^{-6}$	$-4.30\ 10^{-5}$	$-2.00\ 10^{-5}$
	$(5.31\ 10^{-6})$**	$(3.60\ 10^{-6})$	$(1.46\ 10^{-5})$**	$(2.10\ 10^{-5})$	$(1.50\ 10^{-5})$***	$(3.20\ 10^{-5})$
Constant	-3.21	-3.02	-1.17	-1.10	-1.59	-1.94
	(0.085)***	(0.071)***	(0.139)***	(0.246)***	(0.120)**	(0.180)***
N	859,981	864,978	430,753	424,822	433,055	427,085
Wald chi2	2243.15	2310.79	433.36	156.47	613.17	137.25
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Numbers shown in parenthesis are robust standard errors.
Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Also include year dummies.

Table 6. Sensitivity analysis IV probit estimation of the probability of becoming self-employed using panel data from 1985 to 2000 for those with any business income and for men vs women (using the synthetic tax rates as instruments)

	High-education	Low-education	High-education	Low-education	Marginal and average taxes	After 1991	After 1991
Average tax rate	-0.014 (0.004)***	-0.028 (0.035)***			-0.021 (0.004)***	-0.022 (0.028)***	
Marginal tax rate			-0.007 (0.001)***	-0.081 (0.0014)***	-0.0003 (0.0014)		-0.006 (0.0012)***
Wealth	$4.71\ 10^{-6}$ $(1.04\ 10^{-6})$***	$7.17\ 10^{-6}$ $(1.76\ 10^{-6})$***	$5.24\ 10^{-6}$ $(1.22\ 10^{-6})$***	$7.76\ 10^{-6}$ $(1.88\ 10^{-6})$***	$5.44\ 10^{-6}$ $(1.09\ 10^{-6})$***	$5.37\ 10^{-6}$ $(1.01\ 10^{-6})$***	$6.57\ 10^{-6}$ $(1.34\ 10^{-6})$***
Age	-0.015 (0.010)	-0.027 (0.005)***	-0.013 (0.010)	-0.021 (0.005)***	-0.03 (0.005)***	-0.027 (0.005)***	-0.024 (0.005)***
Age squared	$2.63\ 10^{-4}$ $(1.14\ 10^{-5})$**	$3.13\ 10^{-4}$ $(6.38\ 10^{-4})$***	$2.46\ 10^{-4}$ $(1.12\ 10^{-4})$**	$2.50\ 10^{-4}$ $(6.21\ 10^{-5})$***	$3.33\ 10^{-4}$ $(5.53\ 10^{-5})$***	$3.33\ 10^{-4}$ $(6.22\ 10^{-4})$***	$3.00\ 10^{-4}$ (0.013)***
Married	-0.033 (0.024)	0.049 (0.014)***	-0.038 (0.024)	0.049 (0.014)***	0.026 (0.012)**	0.032 (0.013)**	0.033 (0.013)***
Education	-0.005 (0.022)	0.009 (0.008)	-0.015 (0.043)	0.010 (0.008)	-0.006 (0.004)	-0.004 (0.004)	-0.005 (0.004)
Unemployed two years previously	0.202 (0.040)***	0.080 (0.023)***	0.194 (0.041)***	0.070 (0.022)***	0.119 (0.019)***	0.100 (0.020)***	0.092 (0.020)***
Social benefits two years previously	$2.37.23\ 10^{-6}$ $(5.71\ 10^{-7})$***	$1.02\ 10^{-6}$ $(3.44\ 10^{-7})$***	$2.23\ 10^{-6}$ $(5.75\ 10^{-7})$***	$1.39\ 10^{-6}$ $(3.00\ 10^{-7})$***	$1.54\ 10^{-6}$ $(2.64\ 10^{-7})$***	$1.38\ 10^{-6}$ $(2.95\ 10^{-7})$***	$1.30\ 10^{-6}$ $(2.94\ 10^{-7})$***
Earned income previous year	$-1.20\ 10^{-5}$ $(6.19\ 10^{-6})$*	$-8.66\ 10^{-6}$ $(1.42\ 10^{-5})$	$-1.70\ 10^{-5}$ $(8.38\ 10^{-6})$**	$-2.38\ 10^{-5}$ $(2.11\ 10^{-5})$	$-9.93\ 10^{-6}$ $(7.09\ 10^{-6})$	$-1.01\ 10^{-5}$ $(6.59\ 10^{-6})$	$-2.40\ 10^{-5}$ $(1.41\ 10^{-5})$*
Constant	-1.93 (0.250)***	-1.13 (0.143)***	-2.18 (0.22)***	-1.83 (0.109)***	6.99 (0.829)***	-1.36 (0.133)***	-1.88 (0.108)***
N	246,708	608,837	248,043	612,067	854,765	688,987	691,189
Wald chi2	211.03	243.31	229.35	213.84	362.33	302,44	321,02
Prob>chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Numbers shown in parenthesis are robust standard errors.
Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level
Also include year dummies.