

**PRIVATE PENSION SAVINGS:
GENDER, MARITAL STATUS AND WEALTH
- EVIDENCE FROM SWEDEN IN 2002**

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Abstract

During the last decades, people in Sweden have changed their savings behavior towards long-term savings such as tax-deferred pension accounts. This indicates that the tax-deferrable pension savings will play a larger roll as a source of income for retired people in the future. To improve the understanding of the saving for retirement in general and the policy design for tax-deferred pension saving in particular, it is important to learn more about the people currently saving in the tax deferrable pension accounts. This paper investigates the attributes of the people beginning to save in tax-deferred pension accounts. The emphasis is on gender, marital status, and wealth. The theoretical framework is the life-cycle hypothesis.

The results suggest that women are more likely to pension save and save a greater amount than men. Also, the results indicate that married and single people differ in their savings behaviour. The saving decisions of married people seem to be made at the household level and not on individual level. Further, the public old-age pension wealth has a positive impact on the probability of beginning to pension save and on the size of the pension saved amount for all individuals.

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1. Introduction

In order to make the public old-age pension scheme in Sweden more viable it underwent large reforms in the 1990's, making future pension benefits less generous. As a consequence, private pension savings will play a larger role when individuals plan for their retirement. One important savings form that has become more popular, maybe because of the changed rules for the public pension scheme, is the tax-deferred pension accounts. In 2002, about 40 percent of the people aged 20-64 saved in such accounts whereas a decade earlier it was around 20 percent. The savings form existed already in the beginning of the last century and has undergone considerable changes over time. The changes affect both those who save in the pension accounts and those who consider saving in the accounts. To judge the consequences of further reforms of the rules for saving in the tax-deferred pension accounts it is, therefore, of interest to characterize those who presently use this saving form. It is such a characterization this paper will attempt to do.

This paper focuses on the importance of gender, marital status, and wealth on the savings in the tax-deferred pension accounts by new savers. Wealth is an important source for the well-being of retired people. Despite an extensive literature on saving, the relationship between retirement saving and other household wealth is still little understood, at least empirically. This paper contributes to understanding the complexity of this relationship. Further, there may be potential differences due to gender and marital status that create differences in the retirement saving. Usually women live longer than men and, therefore, they may have a greater need to pension save privately. Also, traditionally married men and women have different roles in both the labor market and the family; men specialize in market production and women in home production. The specialization implies that women receive lower public old-age pension than men do. As a consequence, there is an incentive for women to save privately to compensate for the lower public pension. Finally, the tax-deferred pension is affected by changes in taxation of income, capital, and wealth. By learning more about the people saving in the deferrable pension accounts the analysis of policy changes can be improved.

Almost 95 percent of the people who saved in the tax-deferred pension accounts in 2002 had previously saved in such accounts. For these people, the accumulated savings in tax-deferred pension accounts empirically explains almost all of what determines the likelihood of saving

and the size of the saved amount in the deferrable pension accounts made in that year. To better understand the determinants on the decisions whether to save and the size of the saved amount in the deferrable pension accounts the focus in this study is on the people who have not pension saved prior to 2002. Separate estimates are made for single men, single women, married men and married women to explore any differences in gender and marital status.

The data set used in this study is the 2002 wave of Longitudinal Income Data (LINDA). The wave contains detailed information on individuals, but it is also possible to construct information for households. By linking the wave to other data sources such measures as private assets and public old-age pension wealth are obtained.

The main findings in this paper are the following: The outcome suggests that gender matters for the saving decision. Women are more likely to pension save and they save a greater amount than men. Also, single and married people seem to differ in their saving behaviour. For married people the private pension savings made by the spouse has the greatest explanatory power of the saving decisions and it increases both the probability of saving and the size of the savings. This result indicates that while the decision to save and the size of the saved amount is made at the individual level for single people it is a joint agreement for married people. Further, the public old-age pension wealth increases the probability of saving and the pension saved amount for all people.

The paper is divided into 5 sections and has 5 appendices. Section 2 presents the theoretical framework and previous research. The data are described in section 3. In section 4, the results are presented and discussed. Section 5 summarizes the paper and concludes. In Appendix A the variables used in this study are described. The public old-age pension system in Sweden is briefly described in Appendix B. Appendix C gives a brief overview of the rules for saving in tax-deferred pension accounts. Further, some descriptive statistics are presented in Appendix D. Finally, Appendix E reports some of the estimated results.

2. Earlier Literature and Theoretical Background

There is an extensive theoretical and empirical literature studying the topic of household savings. For surveys, see for example Deaton (1992), Browning and Lusardi (1996), Attanasio (1999), and Bernheim (2002). These surveys show that households save for a large number of reasons. The theory that emphasizes the retirement motive for saving is the life-cycle theory (Modigliani and Brumberg, 1954) and in this study it is considered to be the most appropriate theory in predicting the individual's saving behaviour in tax-deferred pension accounts.

Of course one could question if the purpose of saving in tax-deferred pension accounts is for the retirement since several tax benefits are related to this saving form. The reason for saving in these pension accounts probably varies between people. The main purpose of this saving may be either saving for the retirement or taking advantage of the tax deductions. These motives are of course not mutually exclusive, a person could have both motives when deciding to save in the deferrable accounts. When saving in taxable assets the individual may finance the saved amount by reducing consumption, or/and increasing labor supply. When saving in the deferrable accounts, there are several possibilities to claim the tax advantage without reducing consumption or raising labor supply. The individual may finance the saved amount by redistributing existing taxable assets, or, s/he could raise loans (Agell et al., 1995). Another source of finance could be reallocating current saving that would have been done even in the absence of the accounts. Further, the tax-deferred pension saving was not included in the taxable wealth. People had the possibility of avoiding wealth tax by saving in the pension accounts.¹ There is an additional tax advantage of saving in the deferrable accounts. This advantage depends on the differences in income tax over time and affects the rate of return. If the income tax is greater during the saving period, when the tax is deducted, compared to when the saving is withdrawn, and the tax is paid, the tax differential increases the rate of return. This is likely to happen to high-income earners. This advantage becomes a disadvantage if the opposite occurs. The rate of return decreases. This is likely to happen to low-income earners.² As the descriptive statistics in the following section will show for most

¹ In 2002 the limit for paying wealth tax is SEK 2,000,000 for a married person and SEK 1,500,000 for a single person. However, in 2007 onwards no tax on wealth is imposed.

² After the tax reform in 1990/1991 there are mainly two marginal income tax rates. The tax rates are on average 31% and 51%. The lower rate is set by the local government and affects all citizens. The higher rate is set by the government and affects those with incomes exceeding SEK 290,100 (in 2002). Further, the public pension only

of the individuals saving in the tax-deferred pension accounts the above tax benefits are small if any. For the major part of people saving in the tax-deferrable accounts, therefore, saving for retirement is probably the main motive.

The basic idea in the life-cycle theory is that the individual tends to distribute the lifetime resources to smooth consumption over the life cycle. When the individual is young, the consumption is greater than the income which in turn gives rise to debts. Later in life, when the individual is middle aged, the income is greater than the consumption. During this stage the individual is paying off loans and is saving for the retirement. Finally, when retired, the individual consumes the savings. The theory assumes that the saving behavior changes with income, wealth, age, and family formation. Thus, the saving is only caused by changes over the life-cycle.

Empirical studies applying the life-cycle theory indicate that a variety of factors, but in particular education, information, and economic literacy are important determinants of saving behaviour and especially of saving for retirement (Bernheim and Scholz, 1993). In their survey Browning and Lusardi (1996) present micro facts about household saving in U.S. The facts concern income, wealth, age, household composition, and education. The relationship between income and saving is positive and very strong; the greater income the greater is the saving rate. The rates are higher for wealthy people. Homeowners and people who hold stocks and bonds have higher saving rates. The saving rates are positive at every age group. Looking at saving rates and family composition, the rates are higher for married people with no children and lower for households with children. Lone parents have the lowest rates. Further, the saving rates are higher for higher educated people. It is sometimes argued that education reflects the ability to make rational decision, and that this explains the higher rates. Also, the differences in savings rates may be due to cohort effects. People born at different times may have different attitudes to risk, thrift, and borrowing. An additional factor that may affect the saving rates is gender. In general, the expected life-time is longer for women than for men. This implies that women live longer as retired. Therefore, the women may have a greater need to save for the future retirement than men. Further, women in general usually have lower incomes and earnings profiles that differ from men. An explanation may be that the income

replaces incomes up to 7.5 base amounts, i.e. and up to SEK 272,250 (in 2002). It is, therefore, likely that many of the high-income earners will receive a public old-age pension that is taxed by the local rate only and not by the higher tax rate, i.e. have lower tax when retired compared to when they are in the paid labor force.

profiles are (partly) determined by decisions taken at the household level. Traditionally, men and women take different roles in the labour market and the family; men specialize in market production and women in home production. The specialization causes women to have less market-related human capital than men, and therefore, lower earnings. The public old-age pension and the occupational old-age pension are based on the earnings in the paid labour force. Hence, lower earnings imply lower income as retired. Consequently, women have to save privately to compensate for the lower pensions to a greater extent than men.

A large literature study if there is any gender differences in investment and risk taking decisions. Some of the US evidence suggests the existence of gender differences in general and retirement investments in particular, see for example Jianakopulos and Bernasek (1998), Sundén and Surette (1998), and Bajtelsmit, Beransek, and Jianakopulos (1999). Jianakopulos and Bernasek (1998), and Sundén and Surette (1998) further suggest that investment decisions are driven more by a combination of gender and marital status than gender in itself. Huberman, Sheena, and Jiang (2007) find that women are more aggressive users of 401(k) plans. They are more likely to participate and contribute greater amounts. Gerrans and Clark-Murphy (2004) study the choice in superannuation based on Australian data and find that the gender effect is not uniform and can be demonstrated as depending on marital status. The evidences from the study of Barber and Odean (2001) indicate that men take greater risks than women in their financial decisions. However, Schubert, Brown, Gysler, and Brachinger (1999) present evidence that does not support greater risk-averse decision for women on the basis of experimental evidence. In her study Papke (2003) find that women do not invest more conservatively than men. Using Swedish data Sävje-Söderberg (2003) comes to a similar conclusion.

Several empirical papers have studied the tax-deferred pension savings in the U.S. during the 1980's (Hubbard [1984], Venti and Wise [1985], O'Neil and Thompson [1988], Collins and Wyckoff [1988], Feenberg and Skinner [1988], Long [1990], Eaton [1995], and Joulfaian and Richardson [2001]). The evidence suggests that higher income, higher marginal tax rate, more wealth, being married, and higher education increase the likelihood of saving and the size of the deferred amount. This literature does not include any analysis of gender differences or differences due to marital status.

3. Data

This study is based on a sub-sample of the 2002 wave of Longitudinal Income Data (LINDA) including people aged 18-64. Theory and previous work suggest that the variables income, marginal income tax, unemployment, age, sex, marital status, having children to raise, and educational level affect the decision to save in tax-deferred pension accounts, as well as the saved amount. The LINDA data set contains information on these variables and the saved amount in tax-deferred pension accounts.³ Detailed information on individual and household wealth is obtained by linking the 2002 wave to wealth data. Unfortunately there are no data on tax-deferred pension wealth. Further, by linking the 2002 wave to LINDA 1991-2001 it is possible to trace whether a person has saved previously in the tax-deferred pension accounts and the size of the amount saved in the pension accounts.⁴ This information is used to defining the data sets of new savers and to calculate the accumulated pension saved amount. The last measure is used later in this section in the part that contains the descriptive statistics. Further, the linking to the LINDA waves 1991 – 2001 gives the information on whether a person has been unemployed during this period is obtained. What the individual thinks s/he will receive from the public old-age pension system may also affect the private pension savings. Therefore, by linking an additional data source to the 2002 wave a measure for public old-age pension is created.⁵ The data source contains records on pension points earned by each individual since 1960 onwards. The pension points are used as a rough measure of the future public old-age pension. For further information about this measure, see Appendices A and B. A rational individual would not only take the expected replacement level of the public old-age pension into account when saving in tax-deferred pension accounts, but also consider the expected payments from the occupational pension. The majority of the employees in Sweden are covered by an occupational pension scheme.⁶ But most of the occupational pension schemes have complex structures. It is difficult for an individual to obtain

³ LINDA is a register based data set and constructed in such way that the sample is both a panel and represents the population each year. A household is defined as a) two adults (who are married/living together as married/registered for partnership) and their eventual children, b) one adult and her/his eventual children. An individual who is younger than 18 years is defined as a child. The data do not include people living in institutions. Neither are any people who have immigrated, emigrated, or died during the year. Further information about the data is found at www.scb.se.

⁴ There is no data on the tax-deferred pension saving registered on individual level before 1991, although it has been possible to make tax deductions for private pension savings at least since the 1930's. In 1980, about 4 percent of the population between the ages 18-64 years saved in tax-deferred pension accounts. Ten years later, in 1990, the corresponding share of saver had increased to about 17 percent (Grip, 2001).

⁵ All data set used are collected from various registers and administered by the Statistics Sweden (SCB). The data sets linked to the wave 2002 are complementary data designed for LINDA.

⁶ It is often said and written that about 90 percent of the employees are covered by an occupational pension scheme, but it is difficult to find any source of verification.

information about what the future replacement level will be. Due to the complexity of the occupational pension schemes there are unfortunately no good data available containing individual records on occupational wealth or savings.

How much an individual can save in a tax-deferrable pension account in a given year depends on his/her income, defined in a certain way. It is this definition of income that is used in this study. This income measure explains the variation in the data better than the pension based income in the public old-age pension system, disposal income, the total income, or the corresponding income measures of the household. Further, three continuous variables for wealth are constructed; financial assets, real property and debts. These variables are preferred when describing the wealth instead of only using net wealth. Two individuals with the same net wealth may differ in their wealth composition. The different wealth composition may reflect different attitudes toward risk, and, thereby, affect the pension saving. More information about what variables used, how they are treated and defined is presented in Appendix A. People born in 1954 or later are covered by the reformed pension scheme only while those born in 1938 – 1953 are covered by transitional rules. To separate these two groups of people a dummy variable is created where the reference group is the cohorts 1938 – 1953.

The LINDA 2002 wave contains 473,647 individuals. The cross-section is a representative sample of the Swedish population that year. The linking to the LINDA panel 1991-2001 excludes those who are not observed every year during the period 1991-2002. Also, the number of observations is reduced by only including people in the age interval 18-64 years and by excluding those with disability pension. People retired by disability pension have a retirement behavior that differs from people in general. To better understand what determines the likelihood of starting to save in the tax-deferrable pension accounts and the size of the saved amount the people who have saved previously in the deferrable pension accounts, i.e. saved some time during the period 1991-2001, are excluded. The focus is on those who decide to start saving in the pension accounts for the first time in 2002. To explore any differences in gender and marital status separate estimates are made for single men, single women, married men and married women. However, the following section give a descriptive comparison between those who saved in the tax-deferred pension account previously, those who pension save for the first time, and those who never save in the accounts.

Descriptive statistics

In 2002, 42 percent of the people aged 18-64 years saved in tax-deferred pension accounts. About 5 percent of them pension saved for the first time. Table 2 contains descriptive statistics for four groups. The first group consist of previous and still active pension savers, i.e. those who saved in the accounts at least once during 1991-2001 and who also saved in 2002, the second consists of previous and inactive pension savers, i.e. those who saved in the accounts at least once during 1991-2001 but did not save in 2002, the third of new pension savers, i.e. those who saved in 2002 but not during 1991-2001, and finally the fourth group, of those who never pension saved during the period 1991-2002.

As shown in Table 2 the major differences between the still active savers and new savers are that the still active savers, on average, pension save greater amounts, have higher income, greater assets, debts and net assets. Also, they are older. This is also true when comparing still active savers and those who never pension save in the accounts. One explanation for the differences in wealth between the still active and new savers may be that the new savers are younger and therefore have saved during a shorter period. When they reach the same age the new savers might have accumulated the same level of wealth as the still active savers. On the other hand, the difference may be explained by still active savers having stronger taste for saving. The higher income level may also be explained by the age difference. When the new savers have reached the same age they may have attained the same income level as the still active savers due to common wage raise. These explanations can be applied to understand the differences between still active savers and those who do not save in the pension accounts. Further, the new pension savers have higher income and debts compared to the people never saving in the pension accounts, but the latter group of people has greater net assets. There may be several explanations for the differences. The higher income among the new savers might reflect higher education level. Higher education level is usually correlated with a later start on the labor market. A later start implies lower old-age pension and, therefore, a greater need to pension save privately. If the people never saving in the accounts joined the labor force earlier, they have had more years to accumulate assets and pay off loans which may explain the greater net assets compared to the new savers. However, the greater net assets among those who never pension save may be explained by stronger preferences for saving. Also, people with low income may prefer relatively liquid assets compared to those with higher income.

Both the still active and the new pension savers, on average, save far less than what they are allowed to deduct. For incomes up to SEK 363,000 the upper limit of the deductible amount was SEK 18,150 per year. Since both the still active savers and the new savers have average incomes below this level they are allowed to save at the upper limit but the average savings are SEK 6,300 and SEK 4,000 only. For further information about the deduction rules, see Appendix C.

Table 2: Descriptive statistics for individuals aged 18-64 years with different experience of saving in the tax-deferred pension accounts previously and for those who never pension save in the accounts, average values in SEK thousands.

Variable, in 2002	Previous pension savers, still saving in 2002	Previous pension savers, not saving in 2002	New pension savers in 2002	Never pension save
Pension saved amount	7.6 (9.5)	0	4.0 (11)	0
Income	261 (176)	253 (202)	225 (124)	166 (160)
Share having a high marginal income tax, %	25	25	16	11
Private pension assets	52 (65)	34 (52)	0	0
Real property	690 (1 500)	805 (2 600)	340 (600)	358 (1 200)
Financial assets	162 (785)	194 (785)	73 (245)	84 (697)
Debts	296 (490)	364 (1 200)	232 (297)	202 (585)
Net assets	620 (1 900)	635 (2 100)	330 (825)	458 (1 700)
Share paying wealth tax, %	4	6	1	2
Age	47 (9)	48 (9)	36 (12)	37 (15)
No of individuals*	100,787	21,060	5,049	125,773

Source: LINDA 1991-2002.

Note: The numbers in brackets are the standard deviations. The private pension assets contain the accumulated tax-deferred pension saving only. This asset is not included in any of the other assets in the table.

* The total number of individuals is 252,669.

The Tables D1, D2, D3, and D4 in Appendix D contain the corresponding statistics as Table 2 above but separate the information for single men, single women, married men, and married women. These tables show that there is a greater share of married people saving in the pension accounts compared to single people, 54 percent and 31 percent. Also, there is a greater share of women pension saving compared to men, 48 percent and 40 percent. When

comparing previous savers and new savers, the Tables D1 and D2 show that single men and women mainly follow the same patterns as for the total population. This is also true when comparing previous savers and non-savers. But the patterns differ somewhat concerning wealth when comparing new savers and non-savers. The new savers have higher real assets and debts indicating that they are economically more active than those who never pension save in the accounts. The differences in financial wealth and in net wealth are small if any. That the new savers pension save in the accounts may be due to that they have stronger preferences for saving. The main difference between single men and single women is that, when comparing respective group of savers, single men on average have higher income, greater assets, debts and net wealth. Among those who pension saves, men save a greater amount.

Studying married men and women, Tables D3 and D4 show that they mainly follow the same patterns as for the total population. The main differences between married men and married women are as for single men and single women, i.e., the men have higher income, are richer, pension save greater amounts, and have greater accumulated pension savings, compared to women. The main differences between single and married people are that married people on average have higher income, have greater wealth, and when they pension save they save greater amounts.

Considering the information of the spouses, among the new savers a major part has a spouse that saves in the tax-deferred pension accounts as well, 67 percent of the men's spouses and 51 percent of the women's spouse pension saves. The corresponding shares among non-savers are much lower, 32 percent and 17 percent. The decision whether to pension save seems to some extent be a joint household decision.

4. Econometric Results

This section presents results from the Tobit estimates. In a given year some people have positive savings in tax-deferred savings accounts whereas others have zero savings. To capture this pattern of some positive values and some zero observations for the dependent variable a Tobit model is suitable. Let Y be the amount saved in a tax-deferred savings account, x a vector of explanatory variables and ε a random term. Then, according to the Tobit model

$$Y = x\beta + \varepsilon \quad \text{if} \quad x\beta + \varepsilon > 0$$

and

$$Y = 0 \quad \text{if} \quad x\beta + \varepsilon \leq 0.$$

In this study the interest is in three aspects of this model. First, how the explanatory variables affect the probability of saving in a tax-deferred savings account which also is the first estimation step in the Tobit model;

$$i) \quad \Pr(Y > 0) = \Pr(x\beta + \varepsilon > 0),$$

second, the unconditional expected value;

$$ii) \quad E(Y | x),$$

and, finally, the conditional expected value;

$$iii) \quad E(Y | x, Y > 0).$$

The partial derivatives of $\Pr(x\beta + \varepsilon > 0)$ with respect to the x_i are in the following denoted the *marginal* effects on the probability to save. The partial derivatives of $E(Y | x)$ and $E(Y | x, Y > 0)$ with respect to x_i are denoted the *marginal* effects on the unconditional and conditional expected values respectively. To estimate the parameters of the model and the marginal effects the STATA software is used.

Since the dependent variable in the Tobit model is a nonlinear function of the explanatory variables it matters at what values of the explanatory variables the marginal effects are evaluated. Therefore, care must be taken when interpreting the marginal effects. To be able to compare the behaviour between married men, married women, single men, and single women the marginal effects are evaluated at the (unconditional) mean of all individuals included in the estimations. However, the marginal effects of the spouse's variables are evaluated at the (unconditional) mean of all married people included in the estimations. The mean values are presented together with the estimates. A sensitivity test of the marginal effects has been made by evaluating the effects at other values. The size of the marginal effects changed to some extent but not their quality. The results are available upon request.

The results from the estimated models are presented below. The focus is on investigating how gender, marital status, and various parts of the individual's wealth affect the saving decisions in tax-deferred pension accounts. Additional information of interest included in the estimations are the dummy variables (the reference is given in the parentheses) Reformed Old-Age Pension System (a person being covered by transitional rules⁷), Income (income group 300,000), Paying High Marginal Income Tax (paying low marginal income tax), Age (age group 50), Having Children (not having children), the education levels Higher Education and University (low education level), being Unemployed in 2002 (not unemployed in 2002), and being Unemployed some time in 1991-2001 (never unemployed in 1991-2001). When estimating the models for married people information on the spouse's saved amount in the tax-deferred pension account, public old-age pension wealth, private wealth, income, and age is included. Since the spouse's pension saved amount may be explained by the remaining variables of the spouse that are included in the estimations we have controlled for endogeneity. We find that the endogeneity is low, if any.⁸

⁷The transitional rules combine the rules from the former pension system and the new pension system. Those affected by the rules are the people born in 1938 – 1953. The rules imply that the later year you are born the greater part of your pension income you will receive from the new pension system. For example, people born in 1938 receive 16 parts of their pension from the old system and 4 parts from the new system while the corresponding parts for a person born in 1953 are 1 and 19.

⁸ This control is made by computing the residuals from the estimation of marginal effects of a Tobit model that includes the variables of the spouse that corresponds to the variables of the individual that are mentioned above. Thereafter, we have checked if there is any correlation between the obtained residuals and the spouse's pension saved amount.

The Probability of Saving in Tax-Deferred Pension Accounts

The first step in the Tobit model is to estimate the probability of beginning to save in the tax-deferred pension accounts. The marginal effects on this probability are presented in Table 3. As a first look at the impact of gender and marital status estimations on the full sample are made, using dummy variables for gender and marital status (column one). The outcome indicates that gender matters in saving decisions, women are more likely to pension save in the accounts compared to men, while there is no significant difference in marital status.⁹ However, this may be a too crude way to capture gender differences. Therefore the data are divided into the four subgroups married men, married women, single men, and single women. New estimations are made based on these groups. When the spouse's variables are included in the models for married people we find that the most powerful factor explaining why married men and married women pension save is the spouse's pension saved amount. This result indicates that marital status does matter in the saving decision. The relationship is positive implying that the greater amount saved by the spouse the higher is the probability that married men and women begin to pension save privately. Henceforth, only the results for the subgroups are discussed below.

Turning to the effect of public old-age pension wealth we see that for all groups it is significant and the likelihood of saving increases in public pension wealth. The pension wealth has a greater effect for single people as compared to married people. The marginal effect is largest for single women and smallest for married men. A first thought is that the relationship between the probability of saving and the public pension wealth should be negative, i.e. the greater the public old-age pension is the less is the need to pension save privately. However, there may be several explanations for the actual outcome. One explanation may be that the public pension income only replaces incomes up to the limit 7.5 base amounts. To compensate for the income loss above this limit people need to save privately. Therefore, the greater public-old pension the greater probability that a person begin to pension save privately. Most people do make complementary pension savings through their employer by occupational pension savings. Unfortunately, many of the occupational pension schemes have complex structures and therefore it is difficult for an individual to know what

⁹ Using the dummy variables Married Woman, Married Man, Single Woman, and Single Man, instead of the dummies Woman and Married, gives a similar result. Applying different references show that married and single women are more likely to save than men, independent of the men's marital status. Further, there is no significant difference in saving probability between a married woman and a single woman, and not between a married man and a single man.

the income from this saving will be (Sjögren Lindquist and Wadensjö, 2005, and SOU 2004:101). Since most people do not have a complete picture of the future pension income they may underestimate the pension income, and therefore save in tax-deferred pension accounts. Another explanation may be that the measure for the public old-age pension wealth does not regard that the public pension system is reformed. It treats all individuals as if they belong to the former pension system, see Appendix B for further information. A way to control for this is to use the dummy variable New Pension System Only which equals one if the person is covered by the reformed rules only and equals zero if the person is covered by the transitional rules. Additional information about the reformed rules and the transitional rules can be found in Appendix B as well. The estimated results show that for single people and married men there is no difference in saving probability due to the different pension systems. However, married women are more likely to pension save privately if they belong to the reformed pension system as compared to married women covered by the transitional rules.

Concerning private wealth, it does not affect single women in their saving decision. Real property is significant for single men and married people. However, it increases the saving probability for single men but seem to have the opposite effect for married people. Further, married people consider neither public nor private wealth of the spouse in their decision to pension save. Instead, we see that the spouse's pension saved amount in 2002 generates a positive effect, i.e. the greater amount the spouse saves the more likely it is that the married woman and the married man saves. The last result indicate that the decision of beginning to pension save is made jointly at the household level.

When studying the effect of income not surprisingly we find it is significant and that the likelihood of saving increases in income, but it is not linearly increasing. For single men and women the income is the most important factor explaining why they pension saves privately. Further, married men seem to take the income of the spouse into account in their decision to pension save, the greater income she has the likelier it is that he saves. Married women seem not to consider the spouse's income. This outcome may be explained by the fact that women usually have lower life-time income and earnings profiles that differ from that of men. The earnings profiles are (partly) determined by decisions taken at the household level. The traditional division of labour within the family causes women to have less-market related human capital compared to men, and therefore lower earnings. The public old-age pension system and the pension through the labour market are based on the earnings in the paid labour

forces. Thus, women will have lower income as retired compared to men. This implies that women may need to save privately to compensate for the lost pension income independent of her spouse's and income. Men know that their spouse will receive a pension that is relatively lower than his pension. This implies that when men decide whether to save for their own retirement they may consider the income of the spouse. The greater income she has the greater income from the public old-age pension system she will receive. This increases the possibility for men to save for the own retirement. Thus, this is a further evidence indicating that beginning to pension save is a joint decision for married people.

Considering age we see that for all groups it is significant and the likelihood of beginning to pension save declines with age, but it is not linearly decreasing. There may be several explanations for this outcome. People begin to pension save when they are young. Therefore, the older they get the more likely it is that they already pension save. It could also be that older people may already save in other forms and do not want to change to the deferrable accounts. Or, older people trust the old-age pension system to a greater extent than younger people and, therefore, have less need to save privately for retirement. The results indicate that people who choose this form of pension saving do it because they prefer long-term saving and un-liquid savings contracts.

A common finding in the empirical savings literature is that people with a higher education level are more likely to save as compared to those with lower education level. The results in this study suggest that this is true for single people only. For married people the education level has no significant effect on the saving probability. Furthermore, another common finding in earlier literature is that having children has a positive effect on the savings. This finding is not supported by the results in Table 3.

Table 3: Marginal Effects on the Probability of beginning to Save in the Tax-Deferred Pension Accounts, by Gender and Marital Status. The Results are from estimating Tobit Models, LINDA 2002.

	All	Single Men	Single Women	Married Men	Married Women	Mean Values, Evaluated at
Public Old-Age Pension Wealth	1.06*10^{-6**} (5.25)	5.21*10^{-6**} (4.75)	7.84*10^{-6**} (2.62)	1.04*10^{-6**} (4.75)	2.69*10^{-6**} (3.82)	5 424
Reformed Old-Age Pension System	3.93*10 ⁻³ (1.52)	4.22*10 ⁻³ (0.26)	3.14*10 ⁻² (0.78)	5.36*10 ⁻⁵ (0.24)	1.72*10^{-2*} (2.32)	-
Financial Assets	3.34*10 ⁻¹⁰ (0.73)	1.92*10 ⁻⁹ (0.32)	9.05*10 ⁻⁹ (0.70)	0.25*10 ⁻⁹ (0.76)	4.70*10 ⁻⁹ (1.53)	83 230
Real Property	-2.96*10 ⁻¹¹ (-0.05)	3.88*10^{-9*} (2.16)	14.8*10 ⁻⁹ (1.60)	-1.75*10^{-9*} (-2.34)	-6.55*10^{-9*} (-2.19)	357 239
Debts	4.16*10 ⁻¹⁰ (0.39)	-7.25*10 ⁻⁹ (-1.45)	-26.42*10 ⁻⁹ (-1.33)	-0.15*10 ⁻⁹ (-0.09)	1.60*10 ⁻⁹ (0.25)	202 805
Wealth Tax Payer	2.27*10 ⁻³ (0.91)	-2.82*10 ⁻² (-1.07)	-3.85*10 ⁻² (-0.51)	3.69*10 ⁻⁴ (0.10)	1.61*10 ⁻³ (0.14)	-
Income 100 000	-7.88*10^{-2**} (-50)	-1.96*10^{-1*} (-34)	-3.17*10^{-1*} (-20)	6.43*10^{-3*} (2.99)	-1.78*10^{-2**} (-2.95)	-
Income 200 000	-1.14*10^{-2**} (-9.30)	3.63*10^{-2**} (-7.72)	-4.83*10^{-2**} (-3.98)	-4.56*10^{-3*} (-2.15)	-1.71*10^{-2**} (-4.46)	-
Income 300 000	Reference	Reference	Reference	Reference	Reference	-
Income 400 000	1.72*10 ⁻³ (0.54)	3.11*10^{-2**} (2.68)	6.03*10 ⁻² (1.43)	-1.32*10 ⁻³ (-0.46)	-6.96*10 ⁻³ (-0.50)	-
Income 500 000	2.61*10 ⁻³ (0.62)	4.33*10^{-2**} (2.66)	1.07*10 ⁻¹ (1.75)	-3.19*10 ⁻³ (-0.90)	7.28*10 ⁻³ (0.40)	-
Income 1 000 000	3.61*10 ⁻³ (0.81)	3.98*10^{-2**} (2.13)	1.73*10^{-1*} (2.36)	-2.70*10 ⁻³ (-0.73)	1.89*10 ⁻³ (0.09)	-
High Marginal Income Tax	3.61*10 ⁻³ (0.73)	-2.82*10^{-2*} (-2.27)	-1.21*10 ⁻² (-0.27)	1.57*10 ⁻³ (0.54)	9.02*10 ⁻³ (0.63)	-
Woman	4.54*10^{-3**} (4.58)					-
Married	5.55*10 ⁻⁴ (0.38)					-

Age 30	1.78*10^{-2**} (7.08)	5.90*10^{-2**} (4.11)	1.34*10^{-1**} (4.18)	9.69*10 ⁻³ (1.16)	2.19*10 ⁻² (1.21)	-
Age 35	1.54*10^{-2**} (6.18)	5.10*10^{-2**} (3.81)	1.14*10^{-1**} (3.71)	6.73*10 ⁻³ (1.73)	1.69*10^{-2*} (2.00)	-
Age 40	1.12*10^{-2**} (5.27)	3.06*10^{-2**} (2.36)	8.13*10^{-2**} (2.77)	6.87*10^{-3**} (3.00)	1.74*10^{-2**} (2.82)	-
Age 45	6.91*10^{-3**} (3.48)	1.82*10 ⁻² (1.42)	8.97*10^{-2**} (3.13)	4.10*10^{-3**} (2.25)	6.54*10 ⁻³ (1.22)	-
Age 50	Reference	Reference	Reference	Reference	Reference	-
Age 55	-5.17*10^{-3**} (-2.06)	-1.85*10 ⁻² (-1.20)	-1.79*10 ⁻³ (-0.05)	-8.43*10^{-3**} (-3.92)	4.49*10 ⁻³ (0.61)	-
Age 60	-3.19*10^{-2**} (-10)	-9.77*10^{-2**} (-5.46)	-1.43*10^{-1**} (-3.11)	-3.10^{-3**} (-11)	-2.32^{-2**} (-2.64)	-
Age 64	-3.60*10^{-2**} (-9.45)	-7.07*10^{-2**} (-3.23)	-1.44*10^{-1**} (-2.50)	-3.60^{-2**} (-10)	-5.75^{-2**} (-4.05)	-
Having Children	2.03*10 ⁻⁴ (0.14)	4.42*10 ⁻³ (0.52)	-1.89*10 ⁻² (-1.40)	-8.92*10 ⁻⁴ (-0.51)	3.02*10 ⁻³ (0.61)	-
Higher Education	6.52*10^{-3**} (5.45)	1.97*10^{-2**} (4.20)	5.99*10^{-2**} (4.40)	1.20*10 ⁻³ (0.91)	6.08*10 ⁻⁵ (0.01)	-
University	7.86*10^{-3**} (5.23)	1.61*10^{-2*} (2.50)	1.01*10^{-1**} (6.06)	1.53*10 ⁻³ (0.86)	-9.18*10 ⁻³ (-1.79)	-
Unemployed 2002	4.32*10 ⁻⁴ (0.30)	-2.72*10 ⁻³ (-0.51)	-1.36*10 ⁻³ (-0.10)	7.14*10 ⁻⁴ (0.30)	7.86*10 ⁻³ (1.59)	-
Unemployed 1991-2001	0.02*10 ⁻¹ (1.80)	-4.70*10 ⁻⁴ (-0.12)	2.32*10^{-2*} (2.22)	-0.04*10^{-1**} (-3.03)	3.37*10 ⁻³ (0.94)	-

Spouse's variables

Pension Saved Amount in 2002				9.91*10^{-7**} (12)	3.13*10^{-7**} (22)	1 845
Public Old-Age Pension				10.5*10 ⁻⁷ (0.43)	-3.22*10 ⁻⁷ (-0.66)	229 959
Financial Assets				-1.99*10 ⁻⁹ (-0.71)	-1.02*10 ⁻⁸ (-1.91)	129 298
Real Property				-1.13*10 ⁻⁹ (-1.21)	-2.78*10 ⁻⁹ (-1.63)	129 298

Debts				$3.68*10^{-9}$ (1.77)	$3.62*10^{-9}$ (1.24)	297 037
Income				$1.55*10^{-8**}$ (2.59)	$1.22*10^{-8}$ (1.55)	229 959
Age				$-2.22*10^{-4}$ (-1.43)	$-9.49*10^{-5}$ (-0.25)	49
Number of Observations	130,820	42,499	33,960	28,575	25,786	

Notes: The variables are defined in Appendix A. The values in the parenthesis are the z-values produced by STATA and not the variances. ** The coefficient is significant at 1 percent level. * The coefficient is significant at 5 percent level. The marginal effects for the continuous variables are evaluated at the means of the total sample and the mean values are shown in the last column. The marginal effects on the discrete variables measure the change from 0 to 1.

The Size of the Saved Amount among the Pension Savers

The marginal effects on the size of the saved amount for the pension savers, i.e. the conditional value, are presented in Table 4. The corresponding marginal effects on the unconditional amount are given in Table E1, Appendix E. The main difference between the two types of marginal effects is their sizes. With a few exceptions, the marginal effects in the conditional model are larger. The findings in the Tables 4 and E1 follow the same pattern as for the marginal effects on the probability of beginning to pension save concerning the sign and being significant.

When exploring the impact of gender and marital status on the size of the pension saving a first estimation on the full sample is made, using dummy variables for gender and marital status (column one). The results suggest that women pension save significantly more than men. However, the results do not show any significant differences in the savings due to the marital status. The latter outcome may be due to a too restrictive model. A more flexible way of studying whether gender and marital status affect the size of the pension savings is to divide the data into the subgroups married men, married women, single men, and single women. The next step is to estimate the models based on the data groups. When the models are estimated for married men and married women, including the information on the spouse, a different picture appear. The outcomes shown in the columns 4 and 5 indicate that the pension saved amount made by the spouse is the most important factor explaining the size of the savings. The greater amount the spouse saves the greater amount will the married person save.

Thus, marital status appears to matter for the size of the savings. In the remaining discussion the attention will be on the estimated results based on the subgroups.

Turning to the results for public old-age pension wealth we see that for all groups this wealth is significant and has a positive effect, i.e., the size of the saved amount increases in public pension wealth. The pension wealth has a greater effect for men than for women. The effect is greatest for married men and smallest for single women. The positive relationship between the public wealth and the size of the savings may be explained as in the previous section above when discussing the relationship between old-age pension wealth and saving probability, i.e. the limited replacement rates in the public old-age pension system are too restrictive and therefore the greater the public-old pension wealth is the greater amounts are pension saved privately.

We see that the married women who are affected by the reformed pension system save greater amounts than married women who are covered by the transitional rules. For the remaining groups there is no significant difference in the size of the saving that can be explained by differences due to the different pension rules.

Considering the private wealth, having real property has a significant effect on the size of the savings for single men and married people but not for single women. However, the effect is positive for single men while it is negative for married people. Further, married people seem not to take the spouse's wealth in to account when pension saving privately. However, the greater amount the spouse saves the greater amount the married men and married women save.

Not surprisingly we find that income positively affects the size of the pension saved amount for single and married people. However, for none of these groups does the size of the savings increase linearly in income. This outcome is difficult to understand since people with higher income usually have better economic conditions for saving greater amounts. Also, other empirical studies find that the greater income the greater amounts people usually save. For single people income is the most important variable explaining the size of the pension saved amount.

Another puzzling result is that the saved amount decreases by age, i.e. the older you are when you begin to pension save the smaller amount you save. The finding is significant for all groups. There may be various explanations for this pattern. Older people may trust the public old-age pension system to a greater extent compared to younger people and therefore only need to save small amounts as a supplement. Or, the withdrawal rules may be too restrictive. The minimum period of withdrawal is 5 years. Further, older people may prefer to have more liquid assets as they get closer to the retirement age and they therefore only save small amounts in tax-deferred pension accounts.

A common finding in the empirical literature for saving is that having children has a positive effect on the size of the savings. The results in this study show that having children does not affect the pension savings. Another common finding in the literature is that higher educated people save greater amounts compared to lower educated people. In this study that finding is confirmed for single people only but not for married people.

Table 4: Marginal Effects on the Conditional Expected Saved Amount in the Tax-Deferred Pension Accounts, by Gender and Marital Status. Results from estimating Tobit Models, LINDA 2002.

	All	Single Men	Single Women	Married Men	Married Women	Mean Values, Evaluated at
Public Old-Age Pension Wealth	3.03*10^{-2**} (5.24)	5.92*10^{-2**} (4.75)	4.22** (2.62)	7.57** (4.75)	5.72*10^{-2**} (3.82)	5 424
Reformed Old-Age Pension System	118 (1.59)	48.7 (0.26)	170 (0.78)	39.3 (0.25)	411** (2.61)	
Financial Assets	9.58*10 ⁻⁶ (0.73)	2.18*10 ⁻⁵ (0.32)	4.88*10 ⁻⁵ (0.70)	1.85*10 ⁻⁵ (0.76)	9.99*10 ⁻⁵ (1.53)	83 230
Real Property	-8.48*10 ⁻⁷ (-0.05)	4.41*10^{-5*} (2.16)	7.95*10 ⁻⁵ (1.60)	-1.27*10^{-4*} (-2.34)	-1.39*10^{-4*} (-2.19)	357 239
Debts	1.19*10 ⁻⁵ (0.39)	-8.24*10 ⁻⁵ (-1.45)	-1.43*10 ⁻⁴ (-1.33)	-1.06*10⁻⁵ (-0.09)	3.41*10 ⁻⁵ (0.25)	202 805
Wealth Tax Payer	80.6 (0.76)	-303 (-0.99)	-208 (-0.27)	118 (0.56)	34.5 (0.15)	-
Income 100 000	-1 493** (-33)	-1 716** (-26)	-1 934** (-23)	562** (3.60)	-347** (-2.71)	-
Income 200 000	-296** (-8.39)	-377** (-7.04)	-261** (-3.99)	-302* (-1.96)	-335** (-4.11)	-
Income 300 000	Reference	Reference	Reference	Reference	Reference	-
Income 400 000	50.3 (0.55)	401** (3.03)	327 (1.44)	-92.8 (-0.45)	-143 (-0.48)	-
Income 500 000	77.1 (0.64)	600** (3.24)	592 (1.79)	-216 (-0.84)	162 (0.41)	-
Income 1 000 000	108 (0.84)	540** (2.53)	1 001** (2.53)	-185 (-0.69)	40.6 (0.09)	-
High Marginal Income Tax	90.5 (0.94)	-298* (-2.11)	-65.3 (-0.27)	118 (0.56)	203 (0.67)	-
Woman	137** (4.82)					-
Married	16.0 (0.38)					-

Age 30	672** (9)	946** (5.79)	746** (4.33)	982 (1.61)	545 (1.42)	-
Age 35	552** (7.70)	752** (4.93)	628** (3.81)	594* (2.11)	403** (2.24)	-
Age 40	371** (6.08)	394** (2.67)	444** (2.80)	610** (3.68)	417** (3.17)	-
Age 45	215** (3.78)	221 (1.52)	491** (3.17)	331** (2.51)	144 (1.27)	-
Age 50	Reference	Reference	Reference	Reference	Reference	-
Age 55	-141* (-1.96)	-200 (-1.14)	-9.67 (-0.05)	-521** (-3.35)	98.1 (0.63)	-
Age 60	-724** (-8.62)	-922** (-4.53)	-795** (-3.19)	-1 497** (-7.51)	-443** (-2.37)	-
Age 64	-802** (-7.33)	-691** (-2.78)	-796** (-2.57)	-1 673** (-6.23)	-990** (-3.64)	-
Having Children	5.83 (0.14)	51.0 (0.53)	-102 (-1.40)	-63.4 (-0.50)	66.9 (0.62)	-
Higher Education	202** (5.88)	240** (4.51)	324** (4.43)	89.6 (0.94)	1.29 (0.01)	-
University	246** (5.75)	194** (2.65)	554** (6.17)	115 (0.89)	-186 (-1.71)	-
Unemployed 2002	12.4 (0.30)	-31.7 (-0.51)	-7.34 (-0.10)	52.7 (0.31)	175 (1.66)	-
Unemployed 1991-2001	54.5 (1.83)	-5.34 (-0.12)	125 (2.23)	-275** (-2.79)	73.0 (0.96)	-
<i>Spouse's variables</i>						
Pension Saved Amount in 2002				7.18*10^{-2**} (12)	6.65*10^{-2**} (22)	1 845
Public Old-Age Pension				7.64*10 ⁻³ (0.43)	-6.85*10 ⁻³ (-0.66)	229 959
Financial Assets				-1.45*10 ⁻⁴ (-0.71)	-2.18*10 ⁻⁴ (-1.91)	129 298
Real Property				-8.16*10 ⁻⁷	-5.92*10 ⁻⁵	129 298

				5		
				(-1.21)	(-1.63)	
Debts				$2.67 \cdot 10^{-4}$	$7.69 \cdot 10^{-5}$	297 037
				(1.77)	(1.24)	
Income				$1.12 \cdot 10^{-3}$	$2.60 \cdot 10^{-4}$	229 959
				(2.59)	(1.55)	
Age				-16.1	-2.02	49
				(-1.43)	(-0.25)	
Number of Observations	130,820	42,499	33,960	28,575	25,786	

Notes: The variables are defined in Appendix A. The values in the parenthesis are the z-values produced by STATA and not the variances. ** The coefficient is significant at 1 percent level. * The coefficient is significant at 5 percent level. The marginal effects are evaluated at the means of the total sample and the mean values are shown in the last column.

5. Summary, discussion, and conclusions

This paper empirically examines which determinants induce people to start saving in tax-deferred pension accounts and the size of their pension saved amount. The variables of main interest are gender, marital status, and wealth. The study is based on Swedish data for 2002. The data are divided into the subgroups married men, married women, single men, and single women. For each group a Tobit model is estimated producing marginal effects on the probability of beginning to pension save as well as marginal effects on the conditional and unconditional expected value of the pension saved amount. Since the dependent variable in the Tobit model is a nonlinear function of the explanatory variables it is important at what values of the explanatory variables the marginal effects are evaluated. To be able to compare the behavior between the groups the marginal effects are evaluated at the (unconditional) mean of all individuals included in the estimations.

The estimates indicate that gender and wealth are important when explaining why people begin to save in the tax-deferred pension accounts and the size of the pension saved amount. Women are more likely to pension save and they save greater amounts as compared to men. The effect of wealth is more complex and varies depending upon the source of wealth. However, the public old-age pension wealth increases the likelihood of saving and the size of the savings. The estimates also indicate that single and married people differ in their savings behavior. When the size of the spouse's pension saved amount made the same year is included in the estimated models for married men and married women the outcome suggest that this information has the greatest impact on explaining the pension savings behavior for married people. The greater amount the spouse saves the higher is the probability that the married person begin to pension save in the accounts and the greater amount s/he saves. This outcome may indicate that the decisions on whether to save in the tax-deferred pension accounts and the size of the savings are made jointly within the marriage.

There may be several reasons why married women are more likely to begin saving in the tax-deferred pension accounts than men and that the saving decision made by married people is taken at household level. One explanation could be that married women usually are active in the labor market during a shorter period of time than married men. This is often because married men and women traditionally take different roles in both the labor market and in the family. Men specialize in market production while women specialize in home production. Since the most important income sources during the retirement, the public old-age pension

and the occupational pension, are strongly dependent upon the time being active in the labor market the specialization implies that women receive lower retirement income than men do. To obtain a retirement income that comport with the final working wage to a greater extent the women need to be economically compensated by their husbands. This compensation can be made by transferring parts of the household income to the wife's tax-deferred pension account.

Further findings in this paper are that income has positive effects on the likelihood of saving and the size of the savings for both single and married people but the marginal effects are not linearly increasing. This result contradicts the common finding in the empirical literature that saving increases in income. Another common finding in the literature is that the higher educated people save more than lower educated people. This outcome is confirmed for single people but not for married people. Also, for all groups having children neither affects the decision to pension save nor the size of the saved amount.

A crucial question is whether it is economically rational for an individual to pension save in tax-deferred pension accounts. The tax rules for the saving form is designed in such a way that the individual under certain circumstances pay less in taxes compared to when saving in other saving forms. Examples of circumstances that generate tax relieves are when the individual is supposed to pay wealth tax and when the income tax rate during the retirement is lower compared to when the tax deductions for the savings were made. If the circumstances are not fulfilled it may be more advantageous to save in other saving forms than tax-deferred pension accounts. Another difficulty is to evaluate whether it is favourable to save in the deferrable pension accounts is that the rules and regulations for this saving form change over time due to political decisions. However, there is one advantage to save in the tax-deferred pension account in the short run compared to other saving forms. For a given saved amount the tax-deduction increases the net income during the saving period.

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Appendix A

In this appendix the definitions of the variables used in the Tobit models are given. The data are from the 1991-2002 waves of Longitudinal Income Data (LINDA) and additional data sources linked to LINDA. These data sources contain pension points and information on the individual's wealth. Concerning the wealth variables the market value of the variable is used when it is available. When it is not available the taxable value is used. More detailed information about the data is given by the Statistics Sweden (SCB).

Dependent variable:

Pension Saved Amount:

The annual amount saved in the tax-deferred pension account is labeled AKUPENS in LINDA. When used for the descriptive statistics it is renamed to Pension Saved Amount. When used as the dependent variable in the estimations it takes the value 1 if the individual has saved in the tax-deferred pension account during 2002, otherwise it takes the value 0.

Independent variables:

Public Old-Age Pension Wealth

This variable contains the number of pension points collected by the individual. The variable indicates the size of the future public old-age pension received by the individual. The greater amount of points the greater public old-age pension. In Appendix B this variable is further discussed.

Reformed Old-Age Pension System

This is a dummy variable that takes the value 1 if a person is covered by the rules for the new system only and takes the value 0 if a person is covered by the transitional rules. Sweden reformed its old-age pension system in the 1990's. The new pension system implies that people born in 1954 or later are covered by the new rules while the people born in 1938-1953 are treated by special transitional rules. Further information about the public old-age pension system is given in Appendix B.

Financial Assets

This variable contains deposits in banks, funds, stocks, and bonds, capital insurance, options, and children's wealth, but also real assets as boats, cars and motor cycles. Tax-deferred pension assets are not included.

Real Property

This variable only includes real property. Other real assets are included in the variable Financial Assets.

Debts

It includes liabilities on property and non-property.

Wealth Tax Payer

This is a dummy variable indicating whether the individual is paying wealth tax. The variable is equal to 1 if the wealth tax is paid, and equals to 0 otherwise. In 2002, wealth tax is imposed on wealth (real wealth + financial wealth – debts) exceeding SEK 2,000,000 for a married person and 1,500,000 for a single individual.

Income

This measure consists of the income upon which the tax deduction for the tax-deferred pension savings is based. The income measure is created by taking the difference between the variables TTJ and TFOAB: $TTJ - TFOAB$. When the income is applied as a dummy variable the groups are defined as follows: Income 100 000 contains the incomes $\leq 100,000$, Income 200,000 contains the $100,000 < \text{incomes} \leq 200,000$, etc., and finally Income 1,000,000 contains the incomes $> 500,000$.

High Marginal Income Tax

This is a dummy variable indicating whether the individual is paying the higher marginal income tax rate which is the central government income. The variable equals 1 if the individual is paying the higher rate, and equals 0 otherwise. There are mainly two marginal income tax rates. The lower rate is on average 30.5 percent. This rate is set by the local government and affects all citizens. The higher rate corresponds to at least 20 percent and is added to the lower rate. The sum of the marginal tax rates corresponds to about 50,5 percent (or more) and affects those with incomes greater than SEK 290,100.

Woman

The variable BKON in LINDA is used when creating the dummy variable WOMAN. The variable WOMAN takes the value 1 if the individual is woman and the value 0 otherwise.

Married

The variable BCIV in LINDA is used when defining the marital status. The dummy variable MARRIED takes the value 1 if the person is married or has entered into a registered partnership, and takes the value 0 if the person is not married or has not re-married after being divorced or being widow/widower.

Age

It is the age of the individual at the 31/12 of the income year that is used and is labeled BALD in LINDA. When applied as a dummy variable the categories used are the following: AGE 30 = 18–30 years of age, AGE 35 = 31-35 years of age, AGE 40 = 41-45 years of age, etc., and finally AGE 64 = 61-64 years of age.

Having children

It is a dummy variable based on the variables BFAMST and BFAMTP. It takes the value 1 if the individual has a child that is 17 years old or younger, living with him/her, otherwise the variable takes the value 0.

Lower Education, Higher Education, University

The dummy variables define the levels of education and are based on the variable BSUNNIV in LINDA. When Lower Education equals 1 it implies an educational level corresponding to at most 10 years in pre-secondary school, otherwise Lower Education equals 0. This level is used as the reference in the estimations. When Higher Education equals 1 the education level corresponds to secondary school and to a post-secondary school shorter than 2 years, Higher Education equals 0 otherwise. When University equals 1 the education level corresponds to post-secondary school lasting 2 years or longer, University equals 0 otherwise.

Unemployed 2002

The variable TARBST in LINDA show the annual amount received from unemployment benefit. This variable equals 1 if the individual has received unemployment benefit during 2002, i.e. if the variable TARBST > 0, otherwise the variable equals 0.

Unemployed 1991-2001

The variable TARBST in LINDA show the annual amount received from unemployment benefit. This variable is equal to 1 if the individual has received unemployment benefit any time during 1991-2001, i.e. if the variable TARBST > 0, otherwise the variable is equal to 0. The variable TARBST has changed over time and in 1991-1992 the sum of the variables DAGARB and KAS corresponded to TARBST.

Spouse's variables:

Public Old-Age Pension Wealth

This variable contains the number of pension points collected by the spouse. The variable indicates the size of the future public old-age pension received by the individual. The greater amount of points the greater public old-age pension. In Appendix B this variable is further discussed.

Pension Saved Amount in 2002

The actual saved amount in the tax-deferred pension accounts in 2002. The saving is made by the spouse and is labeled AKUPENS in LINDA.

Financial Assets

This variable contains the financial assets owned by the spouse and consists of deposits in banks, funds, stocks, bonds, capital insurance, options, children's wealth and real assets as boats, cars, and motor cycles. Tax-deferred pension assets are not included.

Real Property

This variable contains the real property owned by the spouse.

Debts

This variable contains the liabilities on property and non-property belonging to the spouse

Income

The same income measure as used above but for the spouse.

Age

The variable is labeled BALD in LINDA and is the age of the spouse at the 31/12 of the income year. It is the same age measure as described above but it is only applied as a continuous variable.

Appendix B

In this Appendix the public old-age pension system in Sweden is briefly described. Also, the variables Public Old-Age Pension and Reformed Old-Age Pension System used in the estimations are discussed.

Sweden reformed its public pension system during the 1990's. The new pension system is based on life-time earnings consisting of two components: the notional defined-contribution (NDC) plan financed on a pay-as-you-go (PAYG) basis and the Premium Pension plan which is funded individual accounts. The total mandatory contribution rate is 18.5 per cent of pension based income: 16 per cent is credited to the NDC, and 2.5 per cent to the Premium Pension.¹⁰ A base broadening was also part of the reform in the sense that more types of income are part of the pension based income.

The pre-reformed public pension system provided a flat benefit (FP, introduced in 1913) to ensure income security in old age, and a supplementary benefit (ATP, introduced in 1960) to provide earnings-related benefits. The ATP benefit was based on the worker's 15 years of highest earnings; it also required 30 years of covered earnings for a full benefit, and it replaced 60 per cent of the pension based income.¹¹

People born in 1937 or earlier are covered by the pre-reform system and those who are born in 1954 or later are covered by the reformed system only. People born in 1938 – 1953 are covered by both systems through transitional rules. These rules are designed to phase out the pre-reformed pension system and gradually introduce the new pension system. The transitional rules are such that that the replacement rate for an individual is divided into twentieth parts. A person born in 1938 will receive 16 parts of their pension from the pre-reformed system and 4 parts from the new pension system. The corresponding parts for a person born in 1953 are 1 and 19. Thus, the later year a person is born the greater part of the pension income s/he will receive from the new system.

¹⁰ The ceiling of the pension based income is 7.5 price base amounts which is approximately 1 ½ times the average wage. In 2002 this amount corresponded to SEK 284,250. This year the price base amount equalled to SEK 37,900. Earnings above the ceiling are not replaced in the public pension system.

¹¹ The ceiling of the pension based income was 7.5 price base amounts which approximately corresponded to 1 ½ times the average wage. Earnings above this limit were not replaced by the public pension system.

When calculating the ATP, the pension based income was transformed into points. A person could earn at most 6.5 pension points per year.¹² Although a new pension system is in use the pension point was still calculated in 2002. The accumulated sum of these pension points represents the value of the public old-age pension wealth in this study. One drawback of this measure is that it takes neither the flat benefit (FP) nor any old-age support into account. The flat benefit is equal for everybody and therefore the exclusion will not affect the sign and the significance of the empirical results. The measure treats the individuals included in this study as all covered by the pre-reformed pension system only and does not take into account that people born in 1938-1953 are covered by the transitional rules and those born in 1954 or later are covered by the reformed system only. It is not possible to make any meaningful calculations of the old-age pension wealth for those covered by the transitional rules. This is because we need to know the final number of working years and that is not known until the individuals have retired. If they work less than 30 years the pension wealth is reduced. To handle the drawback that all people are treated as if they belong to the same pension system a dummy variable is used labelled “Reformed Old-Age Pension System“. It takes the value = 1 if the person belong to the reformed pension system only, i.e., is born in 1954 or later, and the value = 0 if the person is covered by the transitional rules, i.e. is born in 1938-1953.

¹² The pension based income (PBI) corresponds to at most 7.5 price base amounts. The formula for calculating the pension points earn during a year is: $((PBI - 1 \text{ price base amount}) / 1 \text{ price base amount})$.

Appendix C

A brief overview of the rules for saving in tax-deferred pension accounts is given in this Appendix.

A person saving in tax-deferred pension account locks in the saved amount and its return until the age of 55 years. Thereafter the person is allowed to withdraw the savings. The minimum period of withdrawal is 5 years. The withdrawn amount is not allowed to decrease over time. The pension saving is treated as a postponed income, no tax is imposed on the saved amount before its withdrawal. A relatively low tax on the return is paid during the saving period. When withdrawn an income tax is paid on both the saved amount and the return.

The size of the deductible amount varies with the size of the income, the type of income, and whether the individual is covered by any occupational pension plan. Among those people covered by an occupational pension plan and having income from being employed the upper deduction limit is a half price base amount, i.e., SEK 18,150 in 2002, as long as the income does not exceed 10 price base amounts, i.e., SEK 363,000 in 2002. For higher incomes the deduction limit is 5 percent of the income but at most 1 price base amount, i.e. SEK 36,300 in 2002. For people having income from being employed but are not covered by any occupational pension plan the upper deduction limit is 35 percent of the income. This limit is restricted as well to not exceed 10.5 price base amounts, i.e., SEK 381,150 in 2002. If an individual has income from active business activity only, the deduction rules are as for people having income from employment but are not covered by any occupational pension plan. The same rules are valid for a person having income from both employment and active business activity.

Appendix D

Table D1: Descriptive statistics for single men in the ages 18-64 years with different experience of saving in the tax-deferred pension accounts and for those who never pension save in the accounts, average values in SEK thousands.

Variable, in 2002	Previous pension savers, still saving in 2002	Previous pension savers, not saving in 2002	New pension savers in 2002	Never pension save
Pension saved amount	6.6 (9.4)	0	3.1 (6.8)	0
Income	257 (153)	238 (202)	218 (109)	126 (125)
Share having a high marginal income tax, %	25	24	14	6
Private pension assets	37 (57)	28 (49)	0	0
Real property	524 (1 100)	679 (4 700)	219 (552)	185 (1 200)
Financial assets	172 (448)	212 (816)	64 (176)	67 (321)
Debts	260 (478)	363 (2 300)	168 (272)	141 (669)
Net assets	436 (1 200)	528 (2 700)	116 (531)	111 (1 000)
Share paying wealth tax, %	2	4	0.5	0.5
Age	39 (11)	43 (11)	29 (9)	29 (12)
No of individuals*	12,806	3,089	1,693	40,806

Source: LINDA 1991-2002.

Note: The numbers in brackets are the standard deviation. The accumulated tax-deferred pension saving is not included in any other assets.

* The total number of individuals is 58,394.

Table D2: Descriptive statistics for single women in the ages 18-64 years with different experience of saving in the tax-deferred pension accounts previously and for those who never pension save in the accounts, average values in SEK thousands.

Variable, in 2002	Previous pension savers, still saving in 2002	Previous pension savers, not saving in 2002	New pension savers in 2002	Never pension save
Pension saved amount	5.3 (6.6)	0	2.4 (4.3)	0
Income	230 (116)	202 (114)	185 (93)	109 (100)
Share having a high marginal income tax, %	15	11	7	3
Private pension assets	33 (47)	22 (35)	0	0
Real property	468 (1 000)	473 (1 700)	198 (455)	132 (604)
Financial assets	126 (360)	119 (459)	55 (129)	54 (306)
Debts	250 (397)	262 (541)	203 (291)	135 (280)
Net assets	343 (1 000)	330 (1 500)	49 (420)	51 (666)
Share paying wealth tax, %	2	2	0.5	0.5
Age	42 (11)	44 (11)	30 (10)	29 (12)
No of individuals*	15,050	3,407	1,372	32,588

Source: LINDA 1991-2002.

Note: The numbers in brackets are the standard deviation. The accumulated tax-deferred pension saving is not included in any other assets.

* The total number of individuals is 52,417.

Table D3: Descriptive statistics for married men in the ages 18-64 years with different experience of saving in the tax-deferred pension accounts previously and for those who never pension save in the accounts, average values in SEK thousands.

Variable, in 2002	Previous pension savers, still saving in 2002	Previous pension savers, not saving in 2002	New pension savers in 2002	Never pension save
Pension saved amount	9.8 (12)	0	7 (17)	0
Income	327 (327)	318 (258)	294 (170)	274 (237)
Share having a high marginal income tax, %	44	41	35	29
Private pension assets	70 (82)	42 (62)	0	0
Real property	925 (2 300)	1 000 (2 600)	601 (786)	730 (1 700)
Financial assets	210 (1 300)	244 (1 000)	113 (420)	139 (1 300)
Debts	362 (661)	445 (1 000)	329 (335)	332 (793)
Net assets	773 (2 700)	846 (2 500)	385 (1 000)	538 (2 000)
Share paying wealth tax, %	6	7	2	3
Age	50 (7)	50 (7)	46 (7)	50 (8)
<i>Spouse</i>				
Pension savers	81%	42%	67%	32%
Pension saved amount	5.8 (7.9)	3.0 (6.4)	3.5 (6)	1.8 (4.5)
Income	216 (110)	207 (119)	208 (118)	191 (96)
Private pension assets	43 (51)	33 (49)	12 (25)	12 (28)
Real property	661 (990)	710 (1 300)	516 (555)	519 (923)

Financial assets	138 (525)	135 (389)	69 (204)	82 (278)
Debts	280 (339)	316 (465)	301 (288)	256 (399)
Net assets	519 (1 100)	529 (1 300)	283 (569)	345 (866)
Age	48 (7)	48 (8)	44 (7)	48 (8)
No of individuals [*]	32,269	8,107	1,031	27,545

Source: LINDA 1991-2002.

Note: The numbers in brackets are the standard deviation. The accumulated tax-deferred pension saving is not included in any other assets.

* The total number of individuals is 68,952.

Table D4: Descriptive statistics for married women in the ages 18-64 with different experience of saving in the tax-deferred pension accounts previously and for those who never pension save in the accounts, average values in SEK thousands.

Variable, in 2002	Previous pension savers, still saving in 2002	Previous pension savers, not saving in 2002	New pension savers in 2002	Never pension save
Pension saved amount	7.1 (7.8)	0	5 (12)	0
Income	222 (111)	205 (120)	207 (93)	183 (97)
Share having a high marginal income tax, %	12	12	10	7
Private pension assets	50 (53)	35 (47)	0	0
Real property	637 (900)	737 (1 400)	476 (525)	526 (1 100)
Financial assets	135 (382)	163 (439)	74 (214)	89 (380)
Debts	273 (339)	317 (509)	280 (570)	245 (407)
Net assets	499 (1 000)	583 (1 400)	270 (570)	370 (1 100)
Share paying wealth tax, %	6	8	2	4%
Age	48 (7.5)	49 (8)	44 (7)	48 (8)
<i>Spouse</i>				
Pension savers	65%	26%	51%	17%
Pension saved amount	6.2 (10)	3.1 (10)	4.2 (14)	1.8 (6.1)
Income	313 (228)	303 (258)	288 (191)	271 (253)
Private pension assets	51 (76)	44 (73)	13 (44)	16 (48)
Real property	891 (2 100)	1 000 (2 900)	642 (1 300)	808 (2 700)

Financial assets	195 (764)	277 (2 000)	103 (378)	186 (2 000)
Debts	349 (701)	420 (1 100)	345 (659)	341 (1 200)
Net assets	737 (2 100)	871 (3 500)	400 (1 100)	652 (3 200)
Age	51 (8)	51 (9)	47 (8)	51 (9)
No of individuals*	40,662	6,457	953	24,834

Source: LINDA 1991-2002.

Note: The numbers in brackets are the standard deviation. The accumulated tax-deferred pension saving is not included in any other assets.

* The total number of individuals is 72 906.

Appendix E

Table E1: The Marginal Effects on the Unconditional Expected Value of the Size of the Saved Amount in the Tax-Deferred Pension Accounts, by Gender and Marital Status. Results from Estimating Tobit Models in STATA, LINDA 2002.

	All	Single Men	Single Women	Married Men	Married Women	Mean Values, Evaluated at
Public Old-Age Pension Wealth	7.22*10^{-3**} (5.24)	2.87** (4.75)	4.56** (2.62)	1.05*10^{-2**} (4.75)	2.02*10^{-2**} (3.82)	5 424
Reformed Old-Age Pension System	26.6 (1.50)	23.1 (0.26)	178 (0.79)	5.38 (0.24)	125* (2.23)	-
Financial Assets	2.28*10 ⁻⁶ (0.73)	0.01*10 ⁻³ (0.33)	5.28*10 ⁻⁵ (0.70)	2.57*10 ⁻⁶ (0.76)	3.53*10 ⁻⁵ (1.53)	83 230
Real Property	-2.07*10 ⁻⁷ (-0.05)	2.13*10^{-5*} (2.16)	8.62*10 ⁻⁵ (1.60)	-1.77*10^{-5*} (-2.34)	-4.93*10^{-5*} (-2.19)	357 239
Debts	2.84*10 ⁻⁰⁶ (0.39)	-3.99*10 ⁻⁵ (-1.45)	-15.4*10 ⁻⁵ (-1.33)	-1.47*10 ⁻⁶ (-0.09)	1.20*10 ⁻⁵ (0.25)	202 805
Wealth Tax Payer	18.5 (0.73)	-165 (-1.12)	-232 (-0.53)	3.71 (0.10)	12.0 (0.14)	-
Income 100 000	-634** (-58)	-1 380** (-43)	-2 524** (-27)	62.6** (2.88)	-138** (-3.05)	-
Income 200 000	-80.6** -10	-211** (-8.14)	-295** (-4.16)	-47.0* (-2.19)	-133** (-4.61)	-
Income 300 000	Reference	Reference	Reference	Reference	Reference	-
Income 400 000	11.7 (0.53)	162* (2.54)	333 (1.36)	-13.4 (-0.47)	-53.1 (-0.51)	-
Income 500 0000	17.7 (0.63)	220* (2.46)	568 (1.58)	-32.7 (-0.91)	53.9 (0.39)	-
Income 1 000 000	24.4 (0.62)	204* (1.98)	856* (2.00)	-27.5 (-0.74)	14.1 (0.09)	-
High Marginal Income Tax	20.7 (0.90)	-162* (-2.37)	-71.5 (-0.27)	15.7 (0.54)	66.6 (0.62)	-
Woman	30.6** (4.52)					-
Married	3.79					-

	(0.38)					
Age 30	114** (6.65)	289** (3.67)	688** (3.68)	92.2 (1.09)	157 (1.15)	-
Age 35	100** (5.86)	255** (3.46)	596** (3.34)	65.3 (1.67)	123 (1.93)	-
Age 40	73.8** (5.08)	160** (2.24)	440** (2.57)	66.6** (2.89)	126** (2.71)	-
Age 45	46.2** (3.41)	97.2 (1.38)	482** (2.87)	40.5* (2.20)	48.5 (1.21)	-
Age 50	Reference	Reference	Reference	Reference	Reference	-
Age 55	-35.8** (-2.09)	-105 (-1.23)	-10.5 (-0.05)	-87.9** (-4.06)	33.5 (0.60)	-
Age 60	-235** (-12)	-614** (-6.23)	-957** (-3.55)	-348** (-13)	-182** (-2.76)	-
Age 64	-268** (-10)	-430** (-3.57)	959** (-2.86)	-410** (-11)	-478** (-4.98)	-
Having Children	1.38 (0.14)	24.2 (0.52)	-112 (-1.42)	-9.03 (-0.51)	23.1 (0.60)	-
Higher Education	43.6** (5.34)	105** (4.07)	330** (4.16)	12.0 (0.90)	4.57*10 ⁻¹ (0.01)	-
University	52.4** (5.11)	86.4* (2.44)	536** (5.51)	15.3 (0.85)	-70.3 (-1.82)	-
Unemployed 2002	2.95 (0.30)	-15.0 (-0.51)	-7.97 (-0.10)	7.18 (0.30)	58.1 (1.56)	-
Unemployed 1991-2001	12.7 (1.79)	-2.59 (-0.12)	133* (2.18)	-42.3** (-3.09)	25.1 (0.93)	-
<i>Spouse's variables</i>						
Pension Saved Amount in 2002				9.99*10^{-3**} (12)	2.35*10^{-2**} (22)	1 845
Public Old-Age Pension				1.05*10 ⁻² (0.43)	-2.42*10 ⁻³ (-0.66)	229 959
Financial Assets				-2.01*10 ⁻⁵ (-0.71)	-7.70*10 ⁻⁵ (-1.91)	129 298

Real Property				$-1.13 \cdot 10^{-5}$	$-2.09 \cdot 10^{-5}$	129 298
				(-1.21)	(-1.63)	
Debts				$3.70 \cdot 10^{-5}$	$2.72 \cdot 10^{-5}$	297 037
				(1.77)	(1.24)	
Income				$1.56 \cdot 10^{-4}$*	$9.18 \cdot 10^{-5}$	229 959
				(2.59)	(1.55)	
Age				-2.24	$-7.14 \cdot 10^{-1}$	49
				(-1.43)	(-0.25)	
Number of Observations	130,820	42,499	33,960	28,575	25,786	

Notes: The variables are defined in Appendix A. The values in the parenthesis are the z-values produced by STATA and not the variances. *** The coefficient is significant at 1 percent level. ** The coefficient is significant at 5 percent level. * The coefficient is significant at 10 percent level. The marginal effects are evaluated at the means of the total sample.