

Self-Directed Pensions: Gender, Risk and Portfolio Choices*

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Abstract

Previous literature finds women to be more conservative investors. This paper challenges this by showing that differences are mainly found in the high-end of the risk distribution, controlling for a wide array of background risks. We use a unique data, including all types of workers, on individual pension portfolio choices. We additionally find the economic status of the spouse to clearly affect the portfolio choice. Distinctively, cohabitant women choose the most aggressive strategies. Finally, the study contributes to the literature on portfolio choice by confirming earlier findings on financial sophistication, labor income risk, and pension uncertainty.

Keywords: Portfolio Choice, Risk Preferences, Gender, Marital Status, Income risk

JEL-Codes: D1, D8, H3, J1

* I wish to thank Nabanita Datta Gupta, Lena Granqvist, Åsa Olli Segendorff, Mikael Priks, Ann Charlotte Ståhlberg, Annika Sundén and Eskil Wadensjö, and seminar participants at the Swedish Institute for Financial Research, the Department of Economics, Swedish Institute for Social Research, for valuable comments. I am also grateful to Premiepensionsmyndigheten who provided the data.

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1 Introduction

There is a general notion that women tend to be more risk-averse, but does this apply also when differences in background risk are accounted for? The purpose of this paper is to test empirically whether women's financial risk-taking behavior does differ from that of men, and how far differences in opportunity sets could explain this. In psychological and sociological literature, it has been claimed that women are less prone than men to undertake risky actions and more inclined to perceive risks as higher than men would do. Also, when women are asked about attitudes towards financial risk, they report a lower risk propensity compared to men, (see Barsky, 1997). Economics literature offers some empirical evidence that women are more risk-averse than men in their financial decision-making, in that they have been found to be more conservative investors for savings, (Jianakoplos & Bernasek, 1998), for retirement savings (see e. g. Hinz et al, 1997; Bajtelsmit & VanDerhei, 1997; Sundén & Surette, 1998; but not in Papke, 1998), and for common stock portfolios (Barber & Odean, 2001). As regards Swedish households, Pålsson (1996) and Anderson (2001) also find women to be more risk-averse in putting wealth into risky assets.¹

Asset-allocation decisions can have important implications for the rate of return on retirement assets, and thus on the degree of retirement security that a given stream of individual contributions during working life can provide. For example, an examination of the historical long-term rate of return on equities in the US between 1926 and 1992, shows that the returns on a diversified portfolio of corporate stocks gave a mean of 9.9 percent per year, whereas the figure for a portfolio of long-term bonds was 4.8 percent, and for a portfolio of short-term Treasury Bills 3.8 percent, (see Poterba & Wise, 1998). Hence, the expected value at retirement of an accumulated retirement fund invested in equities is greater than the expected value of one invested in less risky fixed-income assets. One implication of conservative investing, other things being equal, is a lower average return, and thus on average a lower retirement income, than a more ag-

¹ There is also an interesting experimental literature on gender and risk-taking see e.g. Eckel and Grossman, 2005; Powell and Ansic, 1997.

gressive strategy would have yielded. If women are more likely to allocate their portfolio to low-risk investments, their pension accumulations will be smaller and they will have less wealth on retirement. Together with the fact that on average women's labor income and wealth levels are also lower while their longevity is greater, a lower wealth level will have to support a longer retirement period, which may extend the income disparity between retired men and women.

Previous research has been based primarily on US data and on fairly small samples. Research on the portfolio allocation of retirement savings in particular has been based on small samples and has been based on retirement savings plans supplied by a particular employer or from jobs that offer a certain type of retirement savings plan, such as a DC plan. Consequently, results on differences in investment behavior may be driven by self-selection into jobs provided by a certain employer or by the offer of a particular retirement savings plan. In addition, some studies lack vital data on demographics and household characteristics.

In contrast, this paper is based on data from a Swedish national initiative commencing in the year of 2000 that permits individuals to select funds for their personal premium pension.² Approximately 4.4 million had the chance to make such a choice. In order to obtain individual data on economic and demographic variables, the data is matched with the 1999 Swedish Household Survey on Income that includes around 38 000 individuals. Of this group roughly 47 percent were eligible to select funds, and of this group 62 percent did so. The present data has not only access to fund choice and allocations, but also detailed information on individual demographic variables and background risk. Thus it is unique of its kind.

The data has additional advantages. First, individuals who would otherwise have chosen not to invest their wealth in either bonds or stocks are now required to make a choice inducing risk, since even the no-choice alternative implies risk in the pension allocation. Second, information regarding the risky choice was readily available in an information guide sent

² Similar data on portfolio choices for the premium pension, but with focus on other issues, have been used in e.g. Cronqvist & Thaler (2004), Engström & Westerberg (2003), Hedeström et al (2004), Palme, Sundén & Söderlind (2005).

to all eligible participants, containing a risk profile for each fund alternative. Moreover, the advantage of this risk measure is that it was explicitly written for each fund, illustrated by colors to suggest a high or low level of risk, and was comprehensively explained. Accordingly, it may be assumed that participants made a reasonably informed choice. Hence, although women may lack experience and adequate information about financial investments, the information guide could have remedied any gender-driven information gap. Third, the definition of the risk content in the portfolio is not defined here as the share of stock, as is common in other papers on this subject, but as the average standard deviation of the fund performance for the three preceding years. Thus the risk measure also takes into account that funds with a lower share of stocks can carry considerable risk. This is an advantage over previous studies, as it should yield a more appropriate measure of risk since, if individuals are risk-averse, they invest according to the risk level, and not necessarily according to which category the asset belongs to.

The results of the present paper reinforce earlier findings about women being more conservative in financial decision-making, but the overall result is based solely on differences in the choice of high-risk assets. This holds good when age, income, wealth, the share of risky assets, education, occupational pension risk, and unemployment risk are controlled for. Hence, we do not find, as earlier studies have done, that women tend to choose mostly safe assets. Rather, they choose portfolios with considerable risk, mainly represented by stock funds. This is a new result, which means that, together with data on total background risk, earlier results on gender differences are being challenged.³

In addition, as Sundén & Surette (1998) have shown, marital status in interaction with gender is important to the investment choice. The inclusion of not only of interaction terms for marital status and gender but

³ One could argue, however, that the premium pension only constitutes a fairly small amount of the total retirement income. Nonetheless, it is estimated that the amount covers approximately 16-38 percent of the total governmental retirement income depending upon investment growth. Hence, with successful investments the share is fairly large over time. This applies especially to those who lack other private savings alternatives or other funds for retirement. Further, this last applies more to women than it does to men.

also for gender and cohabitant status, yields further evidence on the importance of economic background risk, also in terms of the partner's economic status. We find that women who are in a cohabitant relationship are more willing to choose a high-risk portfolio than either single or married women. The effect persists even if an interaction term for cohabitants with children is included. Perhaps this could be explained as a selection effect, such that more risk-averse women choose to be married once they enter a relationship. For men there is a negative marital effect on risky investment, such that married men are less likely to have a high-risk portfolio compared with single or cohabiting men.

The findings here also shed light on the issue of self directed retirement savings plans and to what extent there should be restrictions in the individual discretion in retirement investments.⁴ And it is shown that, if individuals are allowed to choose funds, differences in expected returns to the pension investments may result. A cause of concern in the public pension debate has often been the question of over-conservative investors and the low expected pension return resulting from such an investment strategy. Instead, it is suggested here that the focus could more constructively be on the problem of investors who adopt particularly aggressive investment strategies

Section 2 presents the data. Section 3 presents the empirical model data and Section 4 reports the results. Some concluding comments are offered in Section 5.

2 Data

The premium pension is part of a new public, mandatory, defined-contribution pension system in Sweden.⁵ From the year 2000 individuals

⁴ As pointed out in Poterba (2004), another cause of concern regarding self directed pension plans may be investors choosing a substantial fraction of company stocks, yielding undiversified and highly volatile portfolios, and then facing the risk of retiring with a low pension. An additional cause of concern is the extent of home bias in the investments, see e.g. Palme & Sundén (2005).

⁵ Since 2000 there are four sources of retirement income in Sweden. First, there is the income pension and the guaranteed pension, which is a pension based on former labor income and for which there is a guaranteed minimum level of SEK 6000 (approximately \$600) per month at retirement. The second source is the premium pension, the source of retirement income under

are allowed to select funds for their individual premium pension accounts that were initiated in 2000 and successively implemented throughout the country. The data has also been merged with the 1999 Swedish Household Survey on Income (HINK), which includes 38 237 individuals of whom 18 124 were eligible⁶ to make a fund selection.⁷ Of the eligible participants 11 102 individuals made a selection and 7122 chose not to select a fund. The latter had their premium pension allocated to the *Premiesparfonden* managed by the *Statliga Sjunde AP-fond* (a governmental agency).⁸ These individuals are excluded from the analysis, since the investment profile of the *Premiesparfonden* was constructed to reflect the profile of an average investor in the national fund selection and was therefore determined after the first fund choices had been made, so non-selectors could not have been certain of the level of risk for their investments.

Individuals who were born in 1954 or later have their total pension determined by the new pension system, and for them 2.5 percent of the wage and other taxable remunerations have been set aside for the premium pension since 1999, while in 1995-98 two percent of income was set aside for the same purpose.

2. 1 The Risk Measure

Prior to the selection each eligible individual received a fairly comprehensive information guide⁹ containing a good many facts about types of funds, fund managers, trading procedures and some advice on fund selection with

study. The third source is a union/collective pension/occupational pension. The fourth source is private pension savings. The first two sources are included in the “national pension system” and from 18.5% of a person’s pensionable income, 16 percentage points (or 84%) is paid into your income pension and 2.5 percentage points (16%) goes to the premium pension..

⁶ To be eligible for fund selection incomes must have exceeded SEK 36 000 in 1995, SEK 36 800 in 1996, SEK 37 000 in 1997 and SEK 37 100 in 1998.

⁷ The conventional practice in using HINK data is to exclude households with declared wealth in unincorporated businesses, farms and commercial real estate since it is complicated to assess the actual value of the assets concerned. The people excluded from the analysis amounts to 1728 individuals who have declared values in unincorporated business, 751 who are farmers and 72 who obtain income from commercial real estate.

⁸ This is a mixed fund and has an imputed risk level of 11.88.

⁹ In addition to the guide, all information was provided on the PPM’s web page, www.ppm.nu.

respect to age and risk. Apart from these fund figures, a risk measure was states such that each fund was indexed according to risk.

The risk measure was defined as variation over time in terms of the average standard deviation for the three preceding years.¹⁰ The index was divided as follows: 0-2 very low risk, 3-7 low risk, 8-17 medium risk, 18-24 high risk and 25- very high risk.

To find the portfolio risk for each individual we use this measure of risk as contained in the information guide. Not all funds had a risk measure however as they did not exist prior to 2000. Therefore, in order to include such funds risk levels have been imputed for each fund by assigning the average value of the risk in the guide for similar types of fund according to:

$$\bar{R}_{klm} = \frac{1}{n} \sum_{j=1}^n R_{jklm}, \quad [1]$$

where j is the individual fund, k is either a stock, mixed, generation or interest fund, l is the particular country or region and m is a specific business sector.¹¹

The total average individual portfolio risk is then derived by using the funds with a risk measure in the guide and the funds with imputed risk values. The measure is derived as

$$\bar{R}_i^p = \sum_{j=1}^n \omega_{ij} R_j + \sum_{k=n+1}^N \omega_{ik} \bar{R}_{klm}, \text{ where } \sum_{j=1}^N \omega_{ij} + \omega_{ik} = 1 \text{ and } 1 \leq n \leq N, \quad [2]$$

where ω_{ij} is individual i 's share invested in n funds with a risk stated in the guide, R_j , and ω_{ik} is the share invested in $n+1$ funds with an imputed risk \bar{R}_{klm} and N is the total number of funds chosen.¹²

2.2 Fund Data

¹⁰ For an earlier version of this paper and a more elaborate and comprehensive discussion of the risk measure and fund selections see Säve-Söderbergh (2003).

¹¹ To give an example, assume the new fund is a European medical stock fund, then following equation [1] this fund is assigned the average value of the risks given in the guide for European stock funds investing in medical companies. Consequently two funds within the same region-industry-sector, and which are both e.g. stock funds, are assigned the same risk value.

¹² Note that the risk measure does not take the covariance between funds into account. There was no such information given in the information guide. The level of risk should therefore be interpreted as the average choice of risk following the risk indicators in the information guide and not as the actual or true level of portfolio risk.

The data includes a total of 627 funds from which it was possible to choose. See Table I, of these approximately 68 percent are stock funds, 10 percent mixed funds, 6 percent generation funds and 16 percent interest funds. The range-of-risk index of the stock funds is 13 to 57, 5 to 17 for the mixed funds, 4 to 20 for the generation funds and 0 to 19 for the interest funds.¹³

2.3 Summary Statistics for the Fund Choice

The data includes the first choice of fund allocations (fund allocations could be rebalanced at no cost after the first choice) for the premium pension for those eligible in 2000 and 2001.¹⁴ In Table I the average choices of high-, medium- and low-risk portfolios are shown for men and women. Looking at the portfolio allocation, we find that women have on average approximately 26 percent of their portfolios in high-risk funds while the allocation for men is 31 percent. Likewise, we see that men on average have chosen a higher risk in their portfolios and the difference between men and women is statistically significant. But a division of the funds into high, medium and low-risk funds, as well as type of fund, see Appendix Table I, shows that only the average risk level for the high-risk stock funds has a significant gender difference. Moreover, men and women appear to have chosen a similar degree of diversification in their portfolio.

2.4 Summary Statistics for Control Variables

Table II reports the summary statistics. We can first note that the sample consists of 52 percent women and 48 percent men.

i. Civil Status and Family Background

Previous research has found the interaction of gender and marital status to be important for the portfolio choice, see Sunden & Surette (1998) as the earnings stream of a spouse can act as an insurance against income loss,

¹³ The difference between the average values for funds with a risk in the guide and for funds with both imputed risk values and one in the guide is small. None of the differences are statistically significant using a t-test of unequal variance. Hence the use of the imputed risk values should not give biased results.

¹⁴ Note that in the aggregate for all eligible investors, PPM reports a mere three percent having changed their initial selection.

meaning that married couples may take greater risks as individuals.¹⁵ If we furthermore assume that a couple maximizes its joint utility, then the level of risk exposure should be a compromise between the two risk preferences.¹⁶ If women are more risk averse than men, then married women due to bargaining will invest less conservatively than if single.

Not only married may view the economic status of the partner as a substitute for a risk-free asset, but also cohabitants. Therefore, we further divide the data into individuals defined as married, cohabiting or single (omitted category). This last group also includes the divorced and widowed.

Another family background variable is having children or not. The more children, the larger the economic responsibility, and thereby we may expect a lower risk taken on investments. The percentage of women with children, (defined as biological children of any age), is 76 percent while the equivalent for men is 67 percent.

ii. Labor income and Labor Income Variability

A household with labor income has an implicit holding of a non-tradable asset, human capital that represents a claim to the stream of future labor income. This nontradable asset can crowd out risky asset holdings. If labor income is literally risk-free, then there is strong pressure to crowd out risk-free asset holdings (Bodie, Merton & Samuelson, 1992). Also if labor income is risky but uncorrelated with risky financial assets, then risk-free asset holdings are still crowded out but less powerfully (Viceira, 2001). If labor income is positively correlated with risky financial assets, then risky assets can actually be crowded out.¹⁷ Since increased labor income variabil-

¹⁵ Another implication regarding marriage is that women may not be the household's financial decision-maker. A fundamental problem in measuring gender differences within married couples is that we can only observe the outcomes of the decisions rather than the decision-making process itself. However, in this context, every eligible individual was sent an information guide and a selection package addresses individually and not by household.

¹⁶ In Uccello (2000) however it is found that spouses do not go in for risk-sharing, but often replicate each other's portfolio allocations as regards the amount of stocks held.

¹⁷ For empirical support for the presence of labor income being perceived as a substitute for a risk-free asset is found (see Cocco et al, 1998; Guiso et al 1996) Related to this is the theoretical literature on long-horizon portfolio choice models, considering background risks such as labor-income risk see Heaton & Lucas, (2000) for an overview.

ity may induce a precautionary motive in financial risk-taking we control for differences in unemployment risk¹⁸ according to different occupations or industries (see Haliassos & Bertaut, 1995, for a similar definition). It is equal to 1 if the individual works in a high-risk occupation and 0 otherwise.¹⁹

There is also empirical support for low-wage workers tending to be more conservative as investors (see Agnew et al, 2000; Bajtelsmit & VanDerhei, 1997; Hinz et al, 1997). In the data we can note women have significantly lower earnings (also including social transfers and private and public pension incomes) which may generate a gender gap in investment strategies.²⁰

iii. Financial Sophistication

Investment in risky assets can also be associated with high transaction costs and information costs. In Haliassos & Bertaut (1995), for example, it is found that the incidence of holding stocks is much greater for educated groups, even when income is controlled for, (see also Hinz et al 1997). To account for any such effect from differences in financial sophistication or information costs, dummy variables for the level of education are included. However it should be noted that the women in the sample have a significantly higher level of education.

Women may though lack vital financial information for two other reasons. First, since historically they have had lower levels of wealth and income, there has been less incentive for them to acquire such information.

¹⁸ The unemployment risk is derived from data on the number of notified workers for each industry divided by the total amount of individuals employed in the industry in the year 2000. High-risk occupations are considered to be those that satisfy the condition that their unemployment risk is not within one standard deviation of the mean. The reverse condition applies for low-risk occupations.

¹⁹ The data on notifications and number of individuals employed in 2000 are gathered from The National Labour Market Board and Statistics Sweden respectively. High-risk industries are found in the manufacturing sector. The only industry that fulfills the criteria of low unemployment risk is the agricultural sector. As all farmers are excluded from the analysis a low-risk occupation dummy is not included. The reference category for the variable “High-Risk Occupation” is then all other industries except those included in the manufacturing sector.

²⁰ Bajtelsmit & Bernasek (1996) suggest further that discrimination in different markets may give rise to and may amplify gender differences in investment profiles.

Second, women may also lack experience, judging by their modest representation in occupations in financial markets or in managerial positions where the remuneration may involve various types of securities. Also, women are more often employed in the public sector, where such remuneration does not occur. We therefore include a second measure of financial education by identifying those who rank as upper-level employees, or who occupy an executive position. We can note that the difference between men and women is especially great if we take into account individuals in executive positions.

iv. Age and Financial Assets

As women on average live longer and thus have a longer investment horizon, we may expect them to tilt their portfolios more towards risky asset holdings.²¹ On the other hand, if the income is annualized at retirement a longer horizon immediately implies less income per year than with a shorter horizon, inducing women to take a lower level of risk in their portfolios. In the data we find that the average age is approximately equivalent for men and women.

The financial wealth is defined as the sum of safe, mixed and risky assets. By following earlier literature (see e.g. Carroll 2000) assets are defined here according to the following: (i) *Safe Assets*: savings deposits, interest rates on savings accounts, premium bonds and the market value of savings in bond funds, interest rate on securities. (ii) *Mixed Assets*: the market value of savings in mixed funds, asset values stated in the income-tax return form as “other valuables” (which are personal inventories such as cars, foreign securities etc). (iii) *Risky Assets*: the market value of stocks (A-listed, OTC-listed and other listings), the market value of savings in stock funds, dividend payments, other securities.²²

²¹ A well-known prediction based on the life-cycle hypothesis of savings in its most stylized form, is that wealth accumulation will display a hump shape over the individuals life cycle. However, there is no clear-cut prediction of the allocation of wealth across different assets. A common counsel from financial advisors is that individuals ought hold less risky assets the older they get, but there has been no agreement about the rationale for this in the literature on theoretical portfolio choice (Poterba & Wise, 1998).

²² The information on asset holdings in HINK is gathered mainly from Swedish government registers on income tax returns, so the quality of the data depends on the accuracy of the values

A dummy variable indicating whether an individual has no financial wealth is also included, to account for any effect from there being no financial wealth or knowledge at all. Further, to assess the impact of risk exposure in the financial portfolio allocation, the share of stocks in the financial assets and the share of mixed assets in financial assets are included in the estimated model.

vi. Pension Savings and Occupational Pension Uncertainty

To account for background risk in pension incomes, we include the incidence of pension savings. The HINK survey only includes the amount of deductible pension savings that were declared in the year 1999. Since only additional pension savings, can be accounted for, and not the total value, a dummy variable capturing the incidence of pension deductibles has been used.

More important, we include the future uncertainty in occupational pension payment flows. Two groups of employees (upper-level and public sector employees) receive pension payments predetermined at a certain level, consisting for example of a fixed percentage of the final wage, while two groups (municipal employees, private blue-collar workers) have contribution-based payment levels, thus depending on the premiums paid by the employees over their working lives. Hence the latter groups have future pension incomes that are more uncertain. In order to identify such background risk we include dummy variables identifying those with uncertain pension incomes.

vii. Time Effects and Regional Initiation

The national fund selection was first introduced in northern Sweden in September 2000, followed by middle Sweden and finally southern Sweden by the end of October. In order to account for any possible time effects,

declared. For listed shares the quality is likely to be good, since the tax authorities obtain information direct from the bank and brokers. Similarly, the data quality on year-end deposits is good, since Swedish banks report deposits and interests direct to the tax authorities. However, personal inventories are likely to suffer from both underreporting and unreliable valuation, since only a few such items are subject to taxation.

dummies are included. Further, since the national fund selection was surrounded by a lot of publicity in the media and advertizing by fund managers, any information effect could be expected to have been strongest in the first initiation stage, i.e. in northern Sweden. These dummies may thus also capture whether there is any difference in risk-taking due to a greater volume of financial information.

There were also some individuals who did not become eligible until 2001, and who thus had pension rights for 1999 and 2000 only. These individuals are significantly younger than the average, with an average age of 25 rather than 41 for the full sample. In order to account for any particular year or cohort effect a dummy variable is included.

3 Empirical Model

We estimate the choice of portfolio risk for the premium pension as linearly dependent on various characteristics and assets of the individual. Thus the basic estimated empirical model is:

$$\begin{aligned} \bar{R}_i = & \alpha + \beta_1 FEMALE + \beta_2 MARRIED + \beta_3 COHABITANT + \beta_4 AGE + \\ & \beta_5 CHILDREN + \beta_6 WEALTH + \beta_7 LABORINCOME + \beta_8 INCOMERISK + \\ & \beta_9 PENSIONSAVINGS + \beta_{10} PENSIONRISK + \beta_{11} REFORMTIME + \varepsilon_i \end{aligned} \quad [4]$$

$$\text{where } \bar{R}_i = \sum_{j=1}^N \omega_{ij} R_j \text{ and } \sum_{j=1}^N \omega_{ij} = 1, \quad 1 \leq N \leq 5,$$

where ω_{ij} is individual i 's share invested in fund j , R_j is the risk level for fund j and N is the number of funds chosen. The \bar{R}_i is thus the weighted average of the risk levels chosen by the individual for the number of funds chosen. The error term ε_i is assumed to be iid.

We also model the choice of risk as a multinomial logit model. This is done in order to elicit differences in investment strategies in the different ends of the risk distribution. The choice of risk is then divided into a choice of having a low-risk, medium-risk and a high-risk portfolio according to:

$$\begin{aligned} RI = 1 & \text{ if } \bar{R}_i < 13 \\ RI = 2 & \text{ if } 13 \leq \bar{R}_i \leq 22 \end{aligned} \quad [3]$$

$$RI = 3 \text{ if } \bar{R}_i > 22,$$

where RI is the *Risk Index*. The cut-off value of *Risk Index* thus assures that no stock funds are within the low-risk funds and that only stock funds are within the high-risk funds, see Table I.²³

4 Results

The results from the OLS regressions on the *average risk* are reported in Table III. First, there is evidence suggesting that women invest more conservatively than single men. There is no evidence, however, that married women differ from single women in their investing behavior.²⁴ Married men, on the other hand, invest more conservatively than single men. Even so, they invest less conservatively than women, either married or single.

These results on marital status are similar to results found for women in Papke (1998), where no evidence was found of gender differences in investments in stocks for either single or married women. Similarly, Sundén & Surette (1998) found that single women and married men are less likely than single men to invest primarily in stocks.²⁵

Apart from marital effects, a fascinating effect is found when it comes to women being in a cohabiting relationship. These women actually choose a higher level of average risk in their portfolios compared with either single or married women.²⁶ An important difference between being married and cohabiting is that only cohabitees with children can claim a

²³ The results are presented in relative risk ratios which involves a transformation of the β 's in the multinomial logit model, where the relative risk ratio is e^β . Relative risk ratios above 1 are interpreted as a higher relative risk ratio, compared to the comparison group; similarly a relative risk ratio below one should be interpreted as a lower relative risk ratio, relative to the comparison group.

²⁴ Note that widows/widowers and divorced persons are included in the single group. Hence, to the extent that this sub-group continues an investment strategy begun by their late or ex-wives/husbands, the results will be biased against finding any gender differences.

²⁵ Sundén & Surette (1998) find that, although the interaction of marital status and gender is statistically significant, a joint test of all three gender marital coefficients indicates that married women do not behave significantly differently from other groups as regards the probability of primarily choosing 'mostly stocks'.

²⁶ One may expect women in a cohabiting relationship to be younger than married women. Women who are in a cohabiting relationship are on average younger (approximately 35 rather than 40) but note that 40 percent of the cohabitant women are above 40.

survivor's cover for the premium pension. However, if we control for this by using an interaction term for being male or female cohabitant and having children, the positive effect for female cohabitants prevail, see Appendix Table II, model I.²⁷ Moreover, a cohabitant agreement between two individuals allows a greater amount of assets to be excluded from equal division in the event of a separation, compared to the case of married couples (see "Lag (1987:232) om sambors gemensamma hem", Rixlex). There is thus a contractual difference which may reflect the difference between married and cohabiting women. However, as the contracts between cohabitants include fewer assets to be regarded as commonly owned, one might expect to find cohabiting women to be different from married women in this respect, but similar to single women. However, the data does not support this.²⁸ One explanation of the cohabitant effect for women could be that, if women are in a relationship at all the more risk-averse of them will tend to marry, which would mean a selection of more risk-prone women into the cohabiting group. On the other hand, couples are cohabitants prior to the wedding, so the cohabitant status could be only a temporary phase before marriage. If this were to hold, then individuals in cohabiting and married couples could be expected to make similar asset-allocation decisions, especially if the cohabiting couple were to have children. But as stated above this is not the case.

The regression results in Table III confirm several previous findings on portfolio choice. Age is related to financial risk-taking by a statistically significant concave pattern. The results are compatible with earlier findings on risk preferences and age (see e.g. Jianakoplos & Bernasek, 1998) but as the data is a cross-section the results cannot be interpreted as a life-cycle pattern of investment, since that would require data on the same individual over time rather than different individuals at one point in time.

²⁷ The survivor benefit pays a lifelong annuity to the surviving spouse if the death occurs after retirement and a five year fixed payment if death occurs before retirement.

²⁸ However, the difference could come from cohabiting women, knowing that in the event of a separation, they will be able to retain more of their initial assets compared to women in married relationships. This is somehow suggesting that women with high-valued assets, or even human capital, choose to remain in a cohabitant relationship in order not to divide the assets in the event of a separation.

There is evidence of a clear relation between education and risk-taking. Individuals with a college education have a higher level of risk in their portfolio compared to individuals with no college education. Moreover, those lacking a high school diploma, or with a maximum of 9-years schooling, choose on average a lower average risk level in their portfolios. This lends support to earlier findings that less-informed actors are less likely to invest in risky assets, compared to others with a higher level of financial sophistication.

An examination of annual income shows that the estimated coefficient indicates a positive effect on risk-taking, thus indicating in turn that individuals are willing to bear more risk as their income grows. Financial wealth also has a significant and positive impact on the average level of risk chosen in the portfolio. As this is an additional measure of financial sophistication, we again confirm the conclusion that more sophisticated investors entertain a higher average level of portfolio risk. The dummy variable for having no financial wealth has no significant effect, statistically, on risk-taking.²⁹

As discussed above, a low labor income risk may be a substitute for risk-free assets. Working in a high-unemployment risk industry does have a negative impact on the average level of risk accepted in the portfolio but it is not significant. Further, the relative size of risky assets as against safe ones is an important determinant of the amount of risk accepted. The positive relationship suggests that, rather than diversifying the risk in the pension savings against other background risks, individuals expose them-

²⁹ The ownership of real estate could additionally be important for the portfolio choice. However, the data on real estate in HINK is not easy to assess. The tax-assessed values of different kinds of real estate are transformed into market values with the help of regional purchase price indices and for individual co-operative apartments values are imputed from the tax-assessed value of the whole apartment building. Since the total mortgages on the whole apartment complex often exceed this tax-assessed value, the value of each individual apartment is given as zero. Nevertheless, we estimate the model with the inclusion of real estate, see Appendix Table II, model IV. Also to control for geographical location, generally considered to be important in housing studies, we also include a dummy for residence in a metropolitan area (Stockholm, Gothenburg and Malmö). There is a significant positive effect on real assets, but there is no changing of the results in general. In addition, even with accounting for household mortgages by using net wealth (defined as financial wealth plus real assets minus debt), see Appendix Table II, model V, we obtain no difference in results.

selves to more pension-savings risk. The same relationship, but less in magnitude, is found for portfolio allocation to mixed assets.

We do not find support for the possession of private pension savings affecting risk-taking behavior. But as the variable considers only deductible private pension savings in 1999 and not pension-savings levels, the result should be interpreted with this shortcoming in mind.

When the type of, or the uncertainty of, occupational pension flows is included, we find that on average employees covered by a contribution-based or risky pension choose a lower portfolio risk.³⁰

To test further whether financial knowledge accounts for differences in risk-taking behavior, dummy variables are included for individuals who are upper-level employees or who are in executive positions. However, none of the dummy variables are significant.³¹ Furthermore, the dummy variable indicating whether the individuals first became eligible to select funds in 2001, shows no specific effect for year or cohort.

To assess any timing effects connected with the initiation of the national fund selection, we find that those who were able to choose at a later point in time, take less risk. However, the effect is only significant in the case of the second region to start, so there is no firm support for a timing effect (or public financial information effect) in general.

4.1 Multinomial logit regressions

In order to assess gender difference at the high or low end of the risk distribution we estimate the multinomial logit model. Results in Table IV are reported as the relative risk of having chosen a high-risk or low-risk portfolio as against a medium-risk portfolio, with respect to the independent variable.

From the multinomial logit model we can establish new results. Similar to above, we find the relative risk for women choosing a high-risk

³⁰ In Granqvist & Ståhlberg (2002) Swedish union and occupational pensions are analyzed from a gender perspective. They find that women are more likely to choose a low risk alternative for the allocation of occupational pensions rights, to a larger extent than men are.

³¹ The result could have been insignificant because of the simultaneous inclusion of education and employee position, since the correlation is 0.3065. But even if the level of education is excluded, both dummy variables remain insignificant.

as against a medium-risk portfolio is less than it is for single men. But, there is no support for women having a higher relative risk of choosing a low-risk portfolio.³² Hence gender differences appear to be driven only at the upper end of the portfolio risk distribution. Contrary to previous studies on women as conservative investors, the results do not support the notion that women mainly prefer or choose safe assets. Instead, we find a gender difference only in the choice of high-risk assets. We furthermore confirm the finding on the female cohabitant effect and find strong effects for the relative risk of choosing a high-risk portfolio.³³

A difference vis-à-vis the OLS regression result is that we find several effects following from background risk in other pension sources. First there is a statistically significant negative effect on portfolio risk from facing a higher unemployment risk.³⁴ Hence there is some support for the notion above that a low labor-income risk can act as a substitute for risk-free assets. Second, the incidence of having pension savings increases the portfolio risk chosen. Finally, a risky occupational pension source induces individuals to invest more conservatively.³⁵

4.2 Sensitivity Analysis

In the above estimations the asset distributions of married and cohabiting couples have been defined as reported in the data or as stated in the government income tax register. But as it is individuals who are married or

³² Moreover, testing the null hypothesis that the effect of being female is identical for both groups is rejected at the 99 percent level. If instead we use a likelihood ratio test we obtain the same conclusion.

³³ An important feature of the multinomial model is that the alternatives (such as choosing a low-risk portfolio, medium-risk portfolio and high-risk portfolio) should be independent of each other, a property known as the independence of irrelevant alternatives (IIA property). This property can be tested with a Hausman specification test for the multinomial logit model (see Hausman & McFadden, 1984). Using the Hausman specification test we find that no model violates the IIA property.

³⁴ In Haliassos & Bertaut (1995), on the other hand, it is found that differences in the incidence of stockholding on industry risk are only prevalent in the low-income group.

³⁵ As the multinomial logit model does not allow for any ordering effect of the dependent variable, and the categories actually can be ordered according to risk, ordered logit model estimates are reported in Appendix Table II, model VI. All results prevail, but there is now again a strong negative effect on risk-taking from facing a high-unemployment risk. Thus as suggested in the multinomial logit model, there is a particular effect of choosing a low risk with high unemployment risk.

cohabiting we may assume that the assets are regarded as jointly owned, and what is actually declared as belonging to one partner or the other is a purely technical tax issue. Consequently, instead of using the individual distributions, the married and cohabitant couple's assets (financial wealth, annual income, pension deductibles) are added and then divided between the two partners. It should be noted in particular that the previous married-male effect could have arisen from the fact that married men possess financial assets of higher value if we use the individual distribution than if we assign it to the couple together. Similarly, women cohabitees were estimated as having lower financial assets than they actually have, if we assume that cohabiting couples consider their assets jointly.

The estimated models using an equal distribution of financial and pension assets are given in Appendix Tables II, model II and III. The model II has an equal division only for the married couple while model III also include an equal division for cohabitants. We then find that both the married male effect and the female cohabitant effect remains. Thus the results were not a mislead coming from the division of assets in the tax return. The differences we obtain by using an equal division is that individuals in a relationship with no financial wealth invest more conservatively, and that having more children is related to more aggressive investing.

Another concern about the above results may be that the choice to actively select funds, or to make an individual investment decision, is not random. Instead there is a selection of individuals into the default versus the group selecting funds. In Engström & Westerberg (2003) it is shown that there are some significant differences between those who actively choose a fund for their premium pension and those who did not. Foremost they find that individuals with a higher financial sophistication are more likely to choose and that characteristics capturing forward-looking behavior help explain why some individuals made an active investment decision.

Therefore we perform a Heckman selection model by identifying the choice of selecting funds first with variables which capture forward-

looking behavior (age, nr of children) and financial sophistication (education, annual income, financial assets, having pension savings and gender).

The results are reported in Appendix Table III, column I. The estimated Heckman model does not show any selection effect following this identification strategy, despite several statistically significant identifying variables.

We then extend the selection to incorporate a unique identifier, the number of funds chosen. This is assumed to be correlated with the choice of risk but not correlated with the decision to actively choose or not. The results are presented in Appendix Table III, column II and III. Even with this identifier we find no selection, and hence the results remain robust.

Previous research has often estimated risk-taking behavior by analyzing the share of stocks chosen for the portfolio, either as a continuous measure or if using survey responses, as ‘mostly stocks’. However, if we look at the share of stocks in the premium pension portfolio instead of the risk measure derived from the volatility of past returns, we are ignoring vital information on risk-taking behavior. By using the risk indices instead, we can look at the risk level without taking the category of the asset into account. Moreover, as the share of stocks chosen for the premium pension is high, 0.74 for men and 0.69 for women (see Table II), and a great many of them have chosen some stock funds, variations in risk-taking behavior will be small.³⁶

Even so, as a comparison with earlier literature on financial risk-taking, an estimation of a Tobit regression on the *share of stocks* chosen for the premium pension allocation has been tested, and the results are reported in Appendix Table II, model VII. We obtain some different results by restricting the analysis to the choice of stock funds. The female cohabitant effect is no longer present. Hence female cohabitants invest less conservatively but not necessarily by choosing fewer stock funds. Furthermore higher unemployment risk induces heavier investments in stock funds.

³⁶ The share of stocks is actually underestimated as it refers to the share of the portfolio allocated to stock funds. Stocks invested indirectly in mixed or generation funds are thus not included. If we were to consider choices that indirectly or directly contain any stocks, then the average share of stocks would be 0.98 for men and 0.97 for women.

However, previous estimates found them to be particularly prone to investing in low-risk portfolio, thus suggesting the choice of low-risk stock funds. We obtain a similar result for the second group having an uncertain occupational pension payment, with taking lower risk but choosing more stock funds.

5 Concluding Remarks

As in previous literature on risk-taking and gender, a result about women being more conservative on average in investment decisions can be established here. But if we divide the choice of average portfolio risk into three choice sub-categories, we only find a gender difference for the high-risk alternative relative to the medium-risk one. This also holds when various differences in background risk such as income, wealth, age, labor-income risk, asset allocation in savings and other pension income sources are controlled for. We do not find, as previous studies have done, that women are likely to choose low-risk alternatives to any extent that differ from other investors. Hence, given a sample that includes all types of workers and that has access to a full picture of the individual's background risk, previous results on gender and investments are hereby contested.

In addition, it is found that civil status has an impact on investment behavior. However, it is not among married women that a difference is revealed, but among women in cohabiting relationships. There is a contractual difference between being married and being a cohabitant in terms of a more flexible contract for the latter as regards assets, which are regarded as jointly owned in the case of a separation. Thus, in view of this difference we would expect cohabiting women to resemble single women more than those who are married. In fact, however, cohabiting women differ from both, as they actually have a greater probability of choosing a high-risk portfolio rather than a medium or a low-risk alternative. Thus these women are the least conservative among women. As the contractual difference does not support the difference found, the results suggest that there may be a selection effect from less risk-averse women in relationships not getting married.

Among men, on the other hand, we find not a cohabitant but a marital effect. Married men are more conservative investors among men as a whole, although the effect is sensitive to model and asset specifications. Thus, as men tend to be married or, if selected into marriage, they invest more conservatively.

To conclude, the issue of gender and portfolio choice needs further investigation, as previous results have not been confirmed here but are disputed. Furthermore, the results suggest that civil status plays an important part for individuals and couples who are considering investment decisions. Further research is thus needed to assess whether or not spouses coordinate their investments and whether or not they choose to go in for sharing the risk.

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TABLE I FUND DATA AND SUMMARY STATISTICS OF THE INDIVIDUAL FUND CHOICES

	STOCK FUNDS	MIXED FUNDS	GENERATION FUNDS	INTEREST FUNDS	TOTAL
NUMBER OF GUIDE FUNDS	209	19	7	58	293
NUMBER OF NEW FUNDS	214	44	34	40	332
AVERAGE RISK IN GUIDE	24.79 (8.40)	10.26 (3.31)	15.00 (6.19)	4.95 (3.98)	293
MAXIMUM RISK IN GUIDE	57	17	20	19	293
MINIMUM RISK IN GUIDE	13	5	4	0	293
AVERAGE IMPUTED RISK PLUS GUIDE RISK	24.40 (7.50)	10.53 (2.24)	15.57 (3.13)	5.18 (3.65)	627
TOTAL	424	64	41	98	627
Percent	68%	10%	6%	16%	100.00
			MEN		WOMEN
TOTAL VALUE INVESTED, IN SEK			19763.5*** (9093.5)		15542.9 (7442.8)
NUMBER OF FUNDS CHOSEN			3.4		3.4
AVERAGE GUIDE RISK			21.66*** (0.09)		20.84 (0.09)
AVERAGE SHARE GUIDE FUNDS			0.47***		0.44
AVERAGE SHARE OF NEW FUNDS			0.53***		0.56
TOTAL SHARE			1		1
AVERAGE SHARE OF HIGH-RISK FUNDS			0.31***		0.26
AVERAGE SHARE OF MEDIUM-RISK FUNDS			0.56***		0.59
AVERAGE SHARE OF LOW RISK-FUNDS			0.13***		0.15
TOTAL SHARE			1		1
AVERAGE SHARE OF STOCK FUNDS			0.74***		0.69
AVERAGE SHARE OF GENERATION FUNDS			0.17***		0.19
AVERAGE SHARE OF MIXED FUNDS			0.07***		0.09
AVERAGE SHARE OF INTEREST FUNDS			0.02		0.03
TOTAL SHARE			1		1
NO. OF OBSERVATIONS			5381		5721

Note: Standard deviations are given in parentheses. ***/**/* denote a statistically significant gender difference at the 1/5/10 percent levels respectively, using a t-test of equal variance.

TABLE II SUMMARY STATISTICS FOR CONTROL VARIABLES

	MEN	WOMEN
SINGLE	26 %	22 %
MARRIED	53 %	57 %
COHABITANT	21 %	21 %
AGE (16-61)	40.7 (11.5)	40.8 (11.2)
NO HIGH SCHOOL	20 % ***	16 %
HIGH SCHOOL	51 %	51 %
COLLEGE EDU.	29 % ***	32 %
ANNUAL INCOME^A, (SEK)	257 532 *** (172 867)	181 855 (86 647)
FIN. ASSETS^B, (SEK)	202306.1*** (122996.5)	135925.2 (443247.8)
NO FIN. ASSETS	29 % *	31 %
NR OF CHILDREN^C, (EXCL. NO CHILDREN)	1.4 ***	1.6
HAVING NO CHILDREN	33 % ***	24 %
HIGH-UE RISK^D	27 % ***	10 %
RISKY SHARE^E	0.48 (0.406)	0.47 (0.410)
MIXED SHARE^F	0.17** (0.300)	0.18 (0.306)
SAFE SHARE^G	0.35 (0.392)	0.35 (0.393)
DEDUCTIBLE PENSION^H	41 %***	50 %
RISKY O-PENS <i>PW</i>^I	46%***	23 %
RISKY O-PENS <i>ME</i>^J	11%***	43 %
NOT-RISKY O-PENS^K	32 % ***	21 %
UNDEF. O-PENS^L	12 %	13 %
EXECUTIVE^M	2.2 % ***	0.6 %
UPPER EMPLOYEE^M	9.8 % ***	7.7 %
START REGION 1^N	6 %	6 %
START REGION 2^N	44 %	46 %
START REGION 3^N	50 %	48 %
FIRST CHOICE 2001^O	3 % **	4 %
NO. OF OBSERVATIONS	5381	5721

Note: Standard deviations are given in parentheses. ***/**/* denote a statistically significant gender difference at the 1/5/10 percent levels respectively, using a t-test of equal variance. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Market value of bond funds, savings accounts, premium bonds, interest rates on securities. ^H Indicates the incidence of declaring tax-deductible pension savings. ^I Contribution-based occupational pension, private workers (PW) ^J Contribution-based occupational pension, municipal employees (ME). ^K Have pre-determined pension levels (private white-collar, public employees). ^L Undefined occupational pension ^M Having an executive position or being an upper level employee (White-collar) ^N First starting region is northern Sweden, the second is mid-Sweden and the third is southern Sweden for the national fund selection. ^O Fund choice possible first in 2001.

TABLE III OLS REGRESSIONS ON THE LEVEL OF PORTFOLIO RISK

	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK
FEMALE	-1.178*** (0.188)	-1.173*** (0.189)	-1.173*** (0.189)	-1.181*** (0.189)	-1.158*** (0.189)
MARRIED MALE	-0.312* (0.179)	-0.340* (0.180)	-0.340* (0.180)	-0.339* (0.180)	-0.358** (0.180)
MARRIED FEMALE	0.213 (0.170)	0.219 (0.170)	0.218 (0.170)	0.232 (0.171)	0.198 (0.170)
COHABIT. MALE	-0.023 (0.201)	-0.040 (0.202)	-0.041 (0.202)	-0.031 (0.202)	-0.047 (0.201)
COHABIT. FEMALE	0.415** (0.197)	0.416** (0.197)	0.416** (0.197)	0.436** (0.198)	0.406** (0.197)
AGE	0.070** (0.034)	0.072** (0.035)	0.072** (0.035)	0.084** (0.037)	0.072** (0.035)
AGE SQUARED	-0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
NO HIGH SCHOOL	-0.318** (0.128)	-0.321** (0.129)	-0.320** (0.129)	-0.335*** (0.129)	-0.322** (0.129)
COLLEGE EDU.	0.604*** (0.108)	0.566*** (0.111)	0.586*** (0.114)	0.563*** (0.111)	0.577*** (0.111)
ANNUAL INCOME^A◇	0.021*** (0.004)	0.022*** (0.004)	0.022*** (0.004)	0.022*** (0.004)	0.022*** (0.004)
FIN. ASSETS^B◇	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
FIN. ASSETS SQ◇◇	-0.000** (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)	-0.000** (0.000)
NO FIN. ASSETS	-0.114 (0.137)	-0.092 (0.137)	-0.094 (0.137)	-0.088 (0.137)	-0.081 (0.137)
NR OF CHILDREN^C	-0.070 (0.053)	-0.068 (0.053)	-0.068 (0.053)	-0.072 (0.054)	-0.070 (0.053)
HIGH UE-RISK^D	-0.206* (0.123)	-0.142 (0.130)	-0.141 (0.130)	-0.142 (0.130)	-0.166 (0.131)
RISKY SHARE^E	1.028*** (0.148)	1.030*** (0.148)	1.029*** (0.148)	1.029*** (0.148)	1.036*** (0.148)
MIXED SHARE^F	0.552*** (0.199)	0.538*** (0.199)	0.534*** (0.199)	0.540*** (0.199)	0.547*** (0.199)

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. ◇ Value in SEK 10 000. ◇◇ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^K Having an executive position or being an upper level employee (White-collar) ^L Fund choice possible first in 2001. ^M The second and third are mid and southern Sweden.

CONT....TABLE III OLS REGRESSIONS ON THE LEVEL OF PORTFOLIO RISK

	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK
DEDUCT. PENSION ^G		0.069 (0.097)	0.070 (0.097)	0.072 (0.097)	0.066 (0.097)
RISKY O-PENS <i>PW</i> ^H		-0.325*** (0.125)	-0.349*** (0.129)	-0.321** (0.125)	-0.332*** (0.125)
RISKY O-PENS <i>ME</i> ^I		-0.294** (0.136)	-0.308** (0.138)	-0.297** (0.136)	-0.326** (0.137)
UNDEF. O-PENS ^J		0.191 (0.177)	0.174 (0.178)	0.164 (0.179)	0.173 (0.177)
EXECUTIVE ^K			0.029 (0.401)		
UPPER EMPLOYEE ^K			-0.148 (0.178)		
FIRST CHOICE 2001 ^L				0.288 (0.290)	
START REGION 2 ^M					-0.430** (0.198)
START REGION 3 ^M					-0.209 (0.197)
CONSTANT	21.478*** (0.633)	21.568*** (0.652)	21.579*** (0.652)	21.315*** (0.700)	21.860*** (0.678)
R-SQUARED	0.111	0.112	0.112	0.112	0.113
ADJ. R-SQUAREED	0.109	0.110	0.110	0.110	0.111
F-VALUE	81.108	66.532	60.771	63.552	61.131
P-VALUE	0.000	0.000	0.000	0.000	0.000
NR OF OBS	11102	11102	11102	11102	11102

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. \diamond Value in SEK 10 000. $\diamond\diamond$ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^K Having an executive position or being an upper level employee (White-collar) ^L Fund choice possible first in 2001. ^M The second and third are mid and southern Sweden.

TABLE IV MULTINOMIAL LOGIT REGRESSIONS RESULTS ON THE *RISK INDEX*, SHOWN IN RELATIVE RISK RATIOS

	MODEL 1		MODEL 2		MODEL 3	
	THE RELATIVE RISK OF CHOOSING A (COMPARED TO A MEDIUM-RISK PORTFOLIO):					
	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO
FEMALE	1.340* (0.236)	0.623*** (0.054)	1.300 (0.229)	0.625*** (0.054)	1.329 (0.234)	0.626*** (0.054)
MARRIED MALE	0.962 (0.154)	0.851** (0.070)	0.960 (0.154)	0.850** (0.070)	0.982 (0.157)	0.845** (0.069)
MARRIED FEMALE	0.794* (0.104)	1.095 (0.091)	0.820 (0.108)	1.088 (0.090)	0.807 (0.106)	1.087 (0.090)
COHABIT. MALE	0.953 (0.199)	1.015 (0.090)	0.968 (0.203)	1.010 (0.090)	0.959 (0.201)	1.013 (0.090)
COHABIT. FEMALE	0.644** (0.124)	1.215** (0.112)	0.673** (0.131)	1.203** (0.111)	0.647** (0.125)	1.211** (0.111)
AGE	0.888*** (0.028)	0.956*** (0.016)	0.914*** (0.030)	0.950*** (0.017)	0.889*** (0.028)	0.956*** (0.016)
AGE SQUARED	1.002*** (0.000)	1.000 (0.000)	1.002*** (0.000)	1.000 (0.000)	1.002*** (0.000)	1.000 (0.000)
NO HIGH SCHOOL	1.252** (0.117)	0.917 (0.058)	1.231** (0.115)	0.924 (0.059)	1.259** (0.118)	0.916 (0.058)
COLLEGE EDU.	0.931 (0.096)	1.276*** (0.065)	0.923 (0.096)	1.279*** (0.065)	0.923 (0.096)	1.282*** (0.065)
ANNUAL INCOME^A◇	0.994 (0.005)	1.007*** (0.002)	0.996 (0.005)	1.007*** (0.002)	0.994 (0.005)	1.008*** (0.002)
FIN. ASSETS^B◇	0.998* (0.001)	1.001*** (0.001)	0.998* (0.001)	1.001*** (0.001)	0.998* (0.001)	1.001*** (0.001)
FIN. ASSETS SQ◇◇	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)	1.000 (0.000)
NO FIN. ASSETS	1.021 (0.112)	0.984 (0.064)	1.029 (0.113)	0.982 (0.064)	1.009 (0.111)	0.988 (0.065)
NR OF CHILDREN^C	0.982 (0.051)	0.981 (0.024)	0.981 (0.051)	0.983 (0.024)	0.981 (0.051)	0.980 (0.024)
HIGH UE-RISK^D	1.318** (0.144)	0.997 (0.060)	1.316** (0.143)	0.997 (0.060)	1.339*** (0.147)	0.987 (0.060)

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. ◇ Value in SEK 10 000. ◇◇ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^KThe second and third are mid and southern Sweden. ^L Fund choice possible first in 2001.

CONT.....TABLE IV MULTINOMIAL LOGIT REGRESSIONS RESULTS ON THE RISK INDEX, SHOWN IN RELATIVE RISK RATIOS

	MODEL 1		MODEL 2		MODEL 3	
THE RELATIVE RISK OF CHOOSING A (COMPARED TO A MEDIUM-RISK PORTFOLIO):						
	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO	LOW-RISK PORT FOLIO	HIGH- RISK PORT FOLIO
RISKY SHARE^E	0.593***	1.334***	0.595***	1.335***	0.591***	1.338***
	(0.076)	(0.092)	(0.076)	(0.092)	(0.076)	(0.092)
MIXED SHARE^F	0.774	1.141	0.781	1.140	0.774	1.146
	(0.130)	(0.106)	(0.131)	(0.106)	(0.130)	(0.107)
DEDUCT. PENSION^G	0.788***	0.968	0.795***	0.967	0.786***	0.966
	(0.065)	(0.044)	(0.065)	(0.044)	(0.064)	(0.044)
RISKY O-PENS <i>PW</i>^H	1.043	0.908*	1.055	0.906*	1.047	0.905*
	(0.115)	(0.052)	(0.116)	(0.052)	(0.115)	(0.052)
RISKY O-PENS <i>ME</i>^I	1.094	0.914	1.098	0.915	1.127	0.904
	(0.130)	(0.058)	(0.130)	(0.058)	(0.134)	(0.058)
UNDEF. O-PENS^J	1.084	1.041	1.001	1.052	1.108	1.036
	(0.160)	(0.086)	(0.151)	(0.088)	(0.164)	(0.086)
START REGION 2^K					1.588**	0.894
					(0.305)	(0.081)
START REGION 3^K					1.352	0.974
					(0.259)	(0.088)
FIRST CHOICE 2001^L			2.267***	0.881		
			(0.562)	(0.118)		
CONSTANT	0.156***	2.014**	0.077***	2.283**	0.107***	2.134**
	(0.104)	(0.612)	(0.053)	(0.751)	(0.074)	(0.673)
LR (CHI2)	1405.69	1405.69	1418.01	1418.01	1420.52	1420.52
PROB>CHI2	0.000	0.000	0.000	0.000	0.000	0.000
PSEUDO R-SQ	0.073	0.073	0.074	0.074	0.074	0.074
LOG LIKE	-8921.48	-8921.48	-8915.32	-8915.32	-8914.07	-8914.07
NR OF OBS	11102	11102	11102	11102	11102	11102

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. \diamond Value in SEK 10 000. $\diamond \diamond$ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^K The second is mid-Sweden and the third is southern Sweden for the national fund selection. ^L Fund choice possible first in 2001.

APPENDIX TABLE I CHOICE OF HIGH, MEDIUM AND LOW-RISK FUNDS FOR MEN AND WOMEN

		STOCK FUND			MIXED FUNDS			GENERATION FUNDS			INTEREST FUNDS		
		Low ^A	Medium ^B	High ^C	Low	Medium	High	Low	Medium	High	Low	Medium	High
MEN	21.66***	.	18.67	28.01*	10.95	14.93	.	8.32	17.62	.	2.50	18.40	.
	(0.09)		(1.29)	(5.99)	(1.72)	(1.81)		(1.71)	(1.94)		(2.20)	(0.55)	
WOMEN	20.84	.	18.63	27.48	10.75	14.53	.	8.36	17.67	.	2.49	19.00	.
	(0.09)		(1.32)	(5.78)	(1.94)	(1.70)		(1.67)	(1.92)		(2.12)	(.)	

Note: Standard deviations are given in parentheses. A Low is defined as funds with a risk in the guide (or imputed to be) between 0 and <13.

B Medium is defined as funds with a risk in the guide (or imputed to be) between 13 and <22. C High is defined as funds with a risk in the guide (or imputed to be)

* denote a statistically significant gender difference at the 1/5/10 percent levels respectively.

APPENDIX TABLE II SENSITIVITY ANALYSIS OF MODEL SPECIFICATION

	I	II	III	IV	V	VI	VII
	<i>WITH CO- HAT*CHILD</i>	<i>EQUAL MAR. ASSET</i>	<i>EQUAL MAR. COHAB ASSET</i>	<i>WITH REAL ASSETS</i>	<i>WITH NET WEALTH</i>	<i>ORDERED LOGIT</i>	<i>TOBIT</i>
	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	STOCK SH
FEMALE	-1.203*** (0.189)	-1.204*** (0.190)	-1.173*** (0.189)	-1.215*** (0.189)	-1.212*** (0.189)	-0.489*** (0.081)	-0.197*** (0.037)
MARRIED MALE	-0.513*** (0.179)	-0.429** (0.179)	-0.412** (0.179)	-0.573*** (0.178)	-0.517*** (0.178)	-0.183** (0.076)	-0.060* (0.035)
MARRIED FEMALE	0.098 (0.171)	-0.048 (0.172)	-0.060 (0.172)	0.039 (0.171)	0.094 (0.171)	0.080 (0.074)	0.032 (0.032)
COHABIT. MALE	-0.147 (0.200)	-0.187 (0.200)	-0.092 (0.200)	-0.183 (0.200)	-0.148 (0.200)	-0.059 (0.084)	-0.047 (0.040)
COHABIT. FEMALE	0.397* (0.230)	0.360* (0.197)	0.339* (0.196)	0.301 (0.197)	0.339* (0.197)	0.188** (0.083)	0.060 (0.038)
AGE	0.041 (0.034)	0.028 (0.034)	0.036 (0.034)	0.034 (0.034)	0.041 (0.034)	0.048*** (0.015)	-0.009 (0.007)
AGE SQUARED	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)
NO HIGH SCHOOL	-0.330** (0.129)	-0.293** (0.129)	-0.303** (0.128)	-0.302** (0.129)	-0.320** (0.128)	-0.163*** (0.056)	-0.030 (0.025)
COLLEGE EDU.	0.590*** (0.111)	0.555*** (0.111)	0.545*** (0.111)	0.545*** (0.112)	0.566*** (0.112)	0.229*** (0.047)	0.047** (0.022)
ANNUAL INCOME^A◇	0.022*** (0.004)	0.030*** (0.005)	0.029*** (0.005)	0.017*** (0.004)	0.020*** (0.004)	0.008*** (0.002)	0.002** (0.001)
FIN. ASSETS^B◇	0.005*** (0.001)	0.006*** (0.001)	0.005*** (0.001)	0.004*** (0.001)		0.002*** (0.000)	0.001*** (0.000)
FIN. ASSETS SQ◇◇	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)		-0.000*** (0.000)	-0.000*** (0.000)

CONT.....APPENDIX TABLE II SENSITIVITY ANALYSIS OF MODEL SPECIFICATION

	I	II	III	IV	V	VI	VII
	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	STOCK SH
NO FIN. ASSETS	-0.108 (0.138)	-0.219* (0.121)	-0.291** (0.118)	-0.050 (0.138)		0.009 (0.059)	-0.018 (0.026)
NR OF CHILDREN^C	0.085 (0.055)	0.088* (0.053)	0.089* (0.053)	0.052 (0.054)	0.075 (0.053)	0.022 (0.023)	0.004 (0.010)
HIGH UE-RISK^D	-0.166 (0.131)	-0.160 (0.130)	-0.154 (0.130)	-0.133 (0.131)	-0.145 (0.131)	-0.093* (0.056)	0.048* (0.025)
RISKY SHARE^E	1.029*** (0.148)	0.979*** (0.137)	1.055*** (0.141)	1.041*** (0.148)	1.076*** (0.118)	0.396*** (0.063)	0.204*** (0.029)
MIXED SHARE^F	0.528*** (0.199)	0.421** (0.212)	0.519** (0.220)	0.517*** (0.199)	0.553*** (0.178)	0.202** (0.085)	0.050 (0.038)
DEDUCT. PENSION^G	0.071 (0.097)	-0.004 (0.099)	-0.020 (0.099)	0.040 (0.097)	0.060 (0.097)	0.046 (0.042)	0.025 (0.019)
RISKY O-PENS <i>PW</i>^H	-0.341*** (0.125)	-0.359*** (0.124)	-0.351*** (0.124)	-0.328*** (0.125)	-0.343*** (0.124)	-0.102* (0.053)	0.014 (0.024)
RISKY O-PENS <i>ME</i>	-0.355*** (0.137)	-0.334** (0.136)	-0.341** (0.136)	-0.314** (0.138)	-0.342** (0.137)	-0.095 (0.059)	0.060** (0.026)
UNDEF. O-PENS^J	0.149 (0.176)	0.174 (0.176)	0.162 (0.175)	0.172 (0.176)	0.152 (0.176)	0.007 (0.076)	0.131*** (0.034)
START REGION 2^K	-0.426** (0.198)	-0.459** (0.199)	-0.456** (0.198)	-0.451** (0.207)	-0.450** (0.207)	-0.213** (0.084)	-0.075* (0.038)
START REGION 3^K	-0.209 (0.197)	-0.223 (0.197)	-0.225 (0.197)	-0.267 (0.197)	-0.244 (0.197)	-0.105 (0.083)	-0.048 (0.038)
COHAB*FEM*CHILD	-0.053 (0.126)						
REAL ASSETS^{L◇◇}				0.008*** (0.002)			
CITY^M				-0.136	-0.079		

CONTAPPENDIX TABLE II SENSITIVITY ANALYSIS OF MODEL SPECIFICATION

	I	II	III	IV	V	VI	VII
	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	AV. RISK	STOCK SH
NET WEALTH ^N ◇◇				(0.142)	(0.141)		
					0.005***		
					(0.001)		
NET WEALTH SQ◇◇					-0.000**		
					(0.000)		
SE							0.815***
							(0.011)
CUT-OFF 1						-2.895***	
						(0.287)	
CUT-OFF 2						0.613**	
						(0.287)	
CONSTANT	22.414***	22.659***	22.504***	22.606***	22.424***		1.502***
	(0.673)	(0.677)	(0.669)	(0.672)	(0.667)		(0.132)
RSQUARED	0.113	0.115	0.116	0.115	0.114		
ADJ.R-SQUAREED	0.111	0.113	0.114	0.113	0.112		
F-VALUE	58.61	62.44	63.03	55.583	61.968		
PSEUDO_RSQ						0.0557	0.0317
LR- CHI2(1)						1071.96	675.12
CENSORED<1							1440
CENSORED>1							5566
NR OF OBS	11102	11077	11102	11102	11102	11102	11102

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. ◇ Value in SEK 10 000. ◇◇ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^KThe second and third are mid- and southern Sweden ^L Market value of owner-occupied housing(regional purchase price indices). ^M City is residence in metropolitan area (Stockholm, Gothenburg, Malmö). ^N Net wealth is the sum of financial assets and real assets minus household mortgage.

APPENDIX TABLE III HECKMAN SELECTION MODEL FOR AN ACTIVE PARTICIPATION DECISION AND PORTFOLIO RISK

	First	Second	First	Second	First	Second
FEMALE	-1.202*** (0.189)	0.056*** (0.021)	-1.256*** (0.184)	0.056*** (0.021)	-1.258*** (0.184)	0.048 (0.036)
MARRIED MALE	-0.506*** (0.178)		-0.549*** (0.173)		-0.553*** (0.179)	0.286*** (0.037)
MARRIED FEMALE	0.104 (0.171)		0.136 (0.166)		0.133 (0.172)	0.288*** (0.035)
COHABIT. MALE	-0.143 (0.200)		-0.208 (0.194)		-0.211 (0.197)	0.193*** (0.042)
COHABIT. FEMALE	0.346* (0.196)		0.333* (0.191)		0.330* (0.196)	0.258*** (0.041)
AGE	0.038 (0.040)	0.099*** (0.006)	-0.024 (0.039)	0.099*** (0.006)	-0.028 (0.036)	0.083*** (0.007)
AGE SQUARED	-0.002*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)
NO HIGH SCHOOL	-0.324** (0.134)	-0.186*** (0.025)	-0.171 (0.131)	-0.186*** (0.025)	-0.164 (0.128)	-0.162*** (0.026)
COLLEGE EDU.	0.593*** (0.112)	-0.088*** (0.024)	0.444*** (0.109)	-0.088*** (0.024)	0.447*** (0.109)	-0.067*** (0.025)
ANNUAL INCOME^A◇	0.022*** (0.005)	0.014*** (0.001)	0.017*** (0.004)	0.014*** (0.001)	0.017*** (0.004)	0.008*** (0.001)
FIN. ASSETS^B◇	0.005*** (0.001)	0.000 (0.000)	0.005*** (0.001)	0.000 (0.000)	0.005*** (0.001)	0.000 (0.000)
FIN. ASSETS SQ◇◇	-0.000** (0.000)	-0.000* (0.000)	-0.000** (0.000)	-0.000* (0.000)	-0.000** (0.000)	-0.000** (0.000)
NO FIN. ASSETS	-0.100 (0.149)	-0.293*** (0.022)	-0.001 (0.145)	-0.294*** (0.022)	0.007 (0.137)	-0.171*** (0.029)
NR OF CHILDREN^C	0.078 (0.053)	0.014 (0.011)	0.112** (0.052)	0.014 (0.011)	0.113** (0.052)	-0.027** (0.012)
HIGH UE-RISK^D	-0.166 (0.130)		-0.107 (0.127)		-0.109 (0.129)	0.161*** (0.031)
RISKY SHARE^E	1.030*** (0.148)		0.895*** (0.144)		0.893*** (0.146)	0.175*** (0.033)
MIXED SHARE^F	0.527*** (0.199)		0.536*** (0.194)		0.535*** (0.194)	0.113** (0.045)
DEDUCT. PENSION^G	0.062 (0.117)	0.356*** (0.022)	-0.055 (0.114)	0.356*** (0.022)	-0.066 (0.106)	0.319*** (0.023)
RISKY O-PENS PW^H	-0.341*** (0.125)		-0.228* (0.121)		-0.227* (0.121)	-0.044 (0.029)

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. ◇ Value in SEK 10 000. ◇◇ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^K First starting region is northern Sweden, the second is mid-Sweden and the third is southern Sweden for the national fund selection. ^L The individual number of funds chosen.

CONT...APPENDIX TABLE III HECKMAN SELECTION MODEL FOR AN ACTIVE PARTICIPATION DECISION AND PORTFOLIO RISK

	First	Second	First	Second	First	Second
RISKY O-PENS ^{ME}	-0.356*** (0.137)		-0.299** (0.133)		-0.298** (0.133)	-0.066** (0.032)
UNDEF. O-PENS ^J	0.150 (0.177)		0.434** (0.172)		0.440** (0.184)	-0.356*** (0.036)
START REGION 2^K	-0.425** (0.198)		-0.350* (0.193)		-0.347* (0.197)	-0.266*** (0.047)
START REGION 3^K	-0.208 (0.197)		-0.073 (0.192)		-0.070 (0.195)	-0.258*** (0.047)
NO OF FUNDS ^L			0.830*** (0.033)		0.830*** (0.033)	
ρ	-0.172		0.158		-0.155	
σ	4.813		4.678		4.675	
λ		-0.827 (1.475)		0.741 (1.436)		-0.725 (1.651)
CONSTANT	22.512*** (0.924)	-1.762*** (0.114)	20.293** (0.905)	-1.761*** (0.114)	20.360** (0.802)	-1.270*** (0.130)
WALD/ CHI2 (.)	1 387.91	1387.91	2095.66	2095.66	2102.68	2102.68
P-VALUE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LR- CHI2(1)	0.02	0.02	0.01	0.01	0.01	0.01
P-VALUE	0.8919	0.8919	0.9055	0.9055	0.9373	0.9373
CENSORED	6 885	6885	6885	6885	6885	6885
UNCENSORED	11 102	11 102	11102	11102	11102	11102
NR OF OBS	17 987	17 987	17987	17987	17987	17987

Note: Standard deviations are given in parentheses. ***/**/* denote statistical significance at the 1/5/10 percent levels respectively. \diamond Value in SEK 10 000. $\diamond\diamond$ Value in SEK 100 000. ^A Including social transfers, public and private pension incomes. ^B Sum of Risky, Mixed and Safe Assets ^C Biological Children ^D Derived from the number of notified workers for each industry divided by the number of individuals employed in the industry in 2000. High UE-risk industries are those which are not within one standard deviation from the mean. ^E Market value of stocks, stock funds, dividend payments and other securities. ^F Market value of mixed funds, "other valuables" (cars, foreign securities etc). ^G Indicates the incidence of declaring tax-deductible pension savings. ^H Contribution-based occupational pension, private workers (PW) ^I Contribution-based occupational pension, municipal employees (ME). ^J Undefined occupational pension ^K First starting region is northern Sweden, the second is mid-Sweden and the third is southern Sweden for the national fund selection. ^L The individual number of funds chosen.