Fiction or Fact: Systematic Gender Differences in Financial Investments?

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Abstract: We investigate whether there are systematic gender differences in financial investment decisions. We use an exceptionally comprehensive register based panel data set including both investors who do and do not hold financial assets. This allows us to (*i*) evaluate whether women are less likely to participate in financial markets and to (*ii*) correct for self-selection biases in the investors' portfolio choice. We jointly model the decisions to invest in stocks and bonds and find that the two investment decisions are correlated. Controlling for a wide range of socioeconomic and financial background characteristics, we find that women are not less likely to participate in the stock market and that men and women hold similar proportions of total wealth in stocks and bonds. Marriage and divorce tend to influence men's investment decisions more than women's, but mainly because of the large changes in their income and wealth.

Keywords: Stock market participation; Bond market participation; Gender; Background characteristics; Portfolio choice.

JEL Classifications: G11, J16.

1 Introduction

Do women have a lower propensity to invest in financial assets than men? And once women do invest in financial assets, do they hold less risky portfolios – suggesting that women have a stronger aversion against taking on financial risk? Yes and yes, seem to be the answers in the public opinion. It also seems to be the predominant finding in the academic literature; see e.g. Jianakoplos and Bernasek (1998), Sundén and Surette (1998), Agnew, Balduzzi and Sundén (2003), Säve-Söderberg (2005), and Lyons and Yilmazer (2006). Women have also been found to trade less aggressively which is taken to imply that women are not as overconfident as men; see e.g. Barber and Odean (2001), Agnew *et al.* (2003), and Niessen and Ruenzi (2006). In this paper, we provide new evidence on the possible gender differences in financial investment decisions. Our main result is that the apparent systematic gender differences in financial investment decisions are artifacts of studies based on non-comprehensive and selective data.

The purpose of this paper is to reexamine whether women's seemingly lower propensity to participate in financial markets, and women's supposed propensity to invest less in risky assets once they do participate, is due to differences in background characteristics. Indeed, if differences in background characteristics can account for the observed gender differences in unconditional investment decisions, it is not aversion against taking on *financial* risk that differ between men and women

It is a stylized fact that there are marked differences between men's and women's labor income characteristics and wealth profiles; see e.g. Brown, Moon and Zoloth (1980), Cain (1986), Gunderson (1989), Barron, Black and Loewenstein (1993), Light and Ureta (1990; 1995), and Altonji and Blank (1999). These differences may affect the optimal asset allocation decision of men and women.[1] For a married couple the decision of one of them to invest in stocks and/or bonds might not be unrelated to the decision of the partner. For instance, Sundén and Surette (1998, p. 209), report that "...it is not gender alone that determines investment choice. Rather, investment decisions seem to be driven more by a combination of gender and marital status...".[2]

The high degree of non-participation in the stock market is also a stylized fact.[3] This

[1] Female labor supply is marked by more transitions into and longer periods of non-employment; see e.g. Hotz and Miller (1988). Furthermore, Polachek (1981) and Miller (1987) document occupational segregation by gender, Lazear and Rosen (1990) document gender differences in job ladders, and Altonji and Black (1999) survey the literature on gender differences in the labor market.

[2] Barber and Odean (2001) report that single men are even more likely to be overconfident than married men. Using Italian survey data, Bertocchi, Brunetti and Torricelli (2009) show that single females are less likely to participate in financial markets.

[3] Hong, Kubik and Stein (2004) report that 51% of U.S. households did not hold stocks in 1998 while Guiso, Haliassos and Jappelli (2003) report that 76% of the European households did not hold stocks in 1998.

implies that results from studies using data only on individuals participating in the stock market might not be representative.[4]

Our data consist of a random sample of 10% of the total Danish adult population for the period 1997-2004. The data contain the investors' year-end investment decisions, approximately 3 million observations of individual investor decisions. The data also contain a vast number of variables that we use to control for differences in observable financial and socioeconomic background characteristics. Given that the data are register based and concern a large representative sample, our results are not influenced by self-selection biases. The scope and quality of our data are comparable to other studies using Scandinavian data such as Calvet, Campbell and Sodini (2007, 2009), Massa and Simonov (2005), and Grinblatt and Keloharju (2000, 2001).

Initially, we verify that the data reveal a stronger *unconditional* tendency of women to invest in less risky assets. For instance, 23% of the women in our sample participate in the stock market, whereas the participation rate of men is higher at 27%. Likewise, the average value of men's stock holdings is 21% higher than is the average value of women's stock holdings. For married men, these differences are even more pronounced. Subsequently, we turn to our main goal of evaluating whether the differences are due to a higher aversion of women against taking on financial risk or due to differences in men and women's background characteristics. We do this in three steps.

First, we focus on the selection into financial market participation. We estimate a bivariate probit model in order to evaluate whether women have a lower tendency to hold stocks and bonds at all. The investment decisions regarding stocks and bonds are allowed to be correlated.[5] When we control for socioeconomic and financial variables, women do not have a lower probability of investing in the stock market. In other words, the results that women, and in particular single women, have a lower unconditional propensity to invest in stocks disappear when we take into account that there are systematic differences in background characteristics of men and women.

Second, we investigate whether there are differences between the riskiness of men and women's portfolios, taking self-selection into the groups of stock investors and bond investors

[4]For instance, the studies of Sundén and Surette (1998), Agnew *et al.* (2003), and Lyons and Yilmazer (2006) are based on investors who participate in retirement-savings plans implying that their results could be influenced by self-selection of individuals into jobs that offer certain pension plans. A related kind of bias may arise if the investors of the discount brokerage firm examined in Barber and Odean (2001), or the mutual-fund managers examined in Niessen and Ruenzi (2006), are not representative of the average individual (who has a very high probability of not participating in the stock market at all).

[5]By allowing the two decisions to be correlated, we contribute to the vast literature; see e.g. Mankiw and Zeldes (1991), Haliassos and Bertaut (1995), Guiso *et al.* (2003), Vissing-Jørgensen (2004), and Christiansen, Joensen and Rangvid (2008) that investigates what makes individuals participate in the stock market by investigating not only what makes people hold stocks, but also what makes people hold bonds.

into account. We use a Heckman (1979) type selection model here. We find that women do not hold more risky portfolios than men once we control for background characteristics – if anything, women hold less risky portfolios. We stress that the exact way we define the "riskiness" of the portfolio turns out to be important. We calculate two measures of portfolio riskiness: (i) the value of stocks divided by the financial wealth (cash, bonds, and stocks). (ii) the value of stocks divided by total wealth (financial wealth and real estate). When we evaluate gender differences in the ratio of stocks to financial wealth, women hold less risky portfolios. However, when we evaluate gender differences in the ratio of stocks to total wealth, women do not hold less risky portfolios.

Third, we evaluate what happens to the investment decisions of the subgroup of investors who go from being single to cohabiting (married) and the subgroup that gets divorced.[6] This analysis is based upon the differences-in-differences (DID) estimator and it clearly reveals the impact of cohabitation on investment decisions.[7] First, we find that both men and women's stock market participation and portfolio riskiness decrease after they get married, but it decreases relatively more for men. Corroborating these results, we find the opposite effects when breaking up. Next, we conduct the DID analysis while also accounting for differences in background characteristics; and find that the changes in investment behavior are insignificant.

The main conclusion from our paper, is that women appear at first sight to have a lower propensity to hold stocks, and when they do hold stocks, they hold less stocks than men. However, once we control for background characteristics, these differences either go away or become much less clear. In essence, it seems that women's behavior on financial markets to a large extent can be explained by other differences (than financial risk aversion) between men and women, and, thus, does not seem to indicate that women are more averse against taking on financial risk. Why women then differ from men, in the sense that many background characteristics are different, we do not dig into here.

The remainder of the paper is organized as follows. Section 2 introduces the data. Section 3 presents descriptive statistics. Section 4 discusses the results from the bivariate probit models. Section 5 presents results from the selection models that evaluate what determines the riskiness of the individuals' portfolios. Section 6 investigates what happens to investors' portfolios when they change civil status. Finally, Section 7 concludes.

[6] We define "marriage" so it includes couples who are lawfully married as well as couples that cohabit without being married. Our results are robust to the exact definition of marrige.

[7] We stress the unique strength of the data set we use. It allows us to identify individuals who change status from being single to being married while providing access to their overall portfolio decisions and many background characteristics.

2 Data

We use a very rich register-based panel data set comprising a random 10% sample of the Danish population covering the period 1997-2004. The data set is hosted by the Danish Institute of Governmental Research (AKF), and it stems from Statistics Denmark, which has gathered the data from different sources, mainly from administrative registers.

Firstly, the data set provides the gender and marital status of the investor. Secondly, we have the following socioeconomic variables: age, indicator for having children living at home, length of education, and an indicator for having an economics education. We use the economics education indicator due to the results in Christiansen *et al.* (2008) that economists are more likely to hold stocks than investors with any other education. Thirdly, we have access to the year-end value of a number of income and financial variables for each investor: non-capital income, cash holdings, value of stock holdings, value of bond holdings, equity in houses, and the yearly pension contributions.[8] We use non-capital income in order to avoid problems of endogeneity of income that could otherwise arise if parts of the income arose from stock dividends and/or interest payments from bonds. The equity in houses is measured as the taxable property value minus mortgage debt, for non-house owners this variable is zero. Inspired by Palia, Qi and Wu (2009) we calculate the variance of labor income and its correlation with stock and bond returns, so that we also control for various measures of the riskiness of the labor income process.

We restrict the sample to individuals older than 18 years (the age of majority). We have 3,023,110 observations of individual investor decisions for the period 1997-2004**.** Since some people enter the sample when they turn 18 and others leave the sample as they die or move abroad, the data form an unbalanced panel data set.

3 Descriptive Statistics

Table 1 displays descriptive statistics. There are two key insights to notice: (*i*) Men generally have higher income and wealth than woman, and (*ii*) this difference is even more pronounced for married men compared to married women. As an example, the average income of all men (single men and married men) is 43% higher than the average income of all women (DKK 286,094 for men versus DKK 200,034 for women), but the average income of married men is 56% higher than the average income of married women (DKK 330,004 versus DKK 211,533).

[8] Mutual fund investments in equity funds are included in the stock holdings, and mutual fund investments in fixed-income funds are included in the bond holdings. Mixed mutual funds (both bonds and stocks) are counted in the stock holdings. The mixed mutual funds account for only approximately 5% of the Danish mutual funds.

The same kind of comparisons can be made for real estate (103% higher for men in general, but 142% for married men), bond value, and pension contribution. Married men are financially even better off than single men.[9] Finally, the fraction of single women who live with children is more than five times higher than the fraction of single men living with children (11% versus 2%).

Men have a higher tendency to participate in the stock market (27% of men hold stocks versus 23% of women), and – again – this difference is even more pronounced when comparing married men and married women. Likewise, the value of the average stock holdings of men is 21% higher than that of women, but the average stock holdings of *married* men is 170% higher than the average stock holdings of married women. Men clearly have a higher tendency to participate in the stock market, and they also hold more stocks when they participate.

We get a first impression on the effect of background characteristics when considering relative stock holdings. We use two definitions of the wealth portfolio: Financial wealth, which is the investor's cash, bonds, and stocks, and total wealth, which is the investor's financial wealth and equity in houses. For the often used stocks to financial wealth ratio, single women seem to hold less risky portfolios: Stocks make up 26% of single women's financial wealth against 31% of men's financial wealth. For the stocks to total wealth ratio, however, the difference in riskiness is smaller (20% for single men versus 18% for single women). The reason is that the real estate values of men is much higher.

An investor is defined as participating in the stock market if the investor holds stocks at year end and an investor is said to participate in the bond market if the investor owns bonds at year end (excluding mortgage backed-bonds and bond debt). Hereby, we obtain the stock and bond market participation indicators for each individual for each year.

Figures 1 and 2 show the time series of average stock and bond market participation rates, respectively. The figures show the unconditional participation rates for all men, single men, and married men, and equivalently for women. The fraction of individuals that holds stocks falls after the collapse of the bull market in 2000. The fraction of investors who holds bonds decreases until the crisis in 2000 after which the fraction has been increasing.

4 Financial Market Participation

In this section we focus on the factors which influence the decision to become a financial investor. We use a probit model to examine how the probabilities of investing in stocks are influenced by the gender and marital status of the investor, at the same time taking into

[9] This is a well known fact from the literature on the male marriage premium; see e.g. Korenman and Neumark (1991), Hersch and Stratton (1997), Antonovics and Town (2004).

account differences in various background characteristics. Furthermore, as we expect the decision of participation in the stock and bond markets to be correlated, we use the bivariate probit model that accounts for the simultaneity of the two related choices.

At the end of each year t we observe the amount held in stocks and the amount held in bonds by individual i, denoted by S_{it}^* and B_{it}^* respectively, $i = 1, ..., N$ and $t = 1, ..., T_i$. We focus on the two binary choice variables $S_{it} = \mathbf{1}[S_{it}^* > 0]$ and $B_{it} = \mathbf{1}[B_{it}^* > 0]$, where S_{it} is an indicator for participation in the stock market of individual i at time t and B_{it} is an indicator for participation in the bond market of individual i at time t. The simultaneous system of estimation equations is given by:

$$\begin{aligned} S_{it} &= \mathbf{1}[X_{it}\beta_S + \varepsilon_{S_{it}}] \\ B_{it} &= \mathbf{1}[X_{it}\beta_B + \varepsilon_{B_{it}}], \end{aligned} \tag{1}$$

where X_{it} represents the relevant background factors, β_S and β_B are the corresponding parameter vectors, and $\varepsilon_{S_{it}}$ and $\varepsilon_{B_{it}}$ are the unobserved factors affecting stock and bond market participation, respectively. The error term vector $\varepsilon_{it} = (\varepsilon_{S_{it}}, \varepsilon_{B_{it}})$ for individual i at time t is assumed to be independent both over individuals and over time (IID) and it is assumed to follow a bivariate standard normal distribution with correlation coefficient ρ.

The likelihood function for the bivariate probit model is given by the product across the four possible choice probabilities (holding stocks and bonds, holding stocks only, holding bonds only, holding neither stocks nor bonds) times their associated probabilities. The parameters β_S, β_B, and ρ are consistently estimated by maximum likelihood.

The marginal effect of an explanatory variable on the choice probability is given by the change in the probability for an infinitesimal change in the explanatory variable for continuous explanatory variables holding other variables constant at their sample means. For indicator variables, the marginal effect is the change in probability resulting from a change in the value of the explanatory variable from 0 to 1 holding all other variables at their sample means. For discrete explanatory variables, the marginal effect on the choice probability is that of changing the value of the explanatory variable by one unit, all else at sample means.

4.1 Main Participation Results

We estimate two specifications of the bivariate probit model for stock and bond market participation: One, the *simple model* where we control with the usual variables used in the stock market participation literature. Two, the *extended model* where we use an extended set of control variables. Table 2 shows the marginal effects on the stock and bond market participa-

tion probabilities from each of the explanatory variables. We discuss the effects of the control variables in Sections 4.2 and 4.3 below.

We distinguish between three civil status: married, male, and married male (interaction term between married and male). In other words, single women is our reference group. The key finding in the simple model is that men have a higher probability of holding stocks than have single women. Likewise, married men are more likely to hold stocks than married women. Thus, it seems that men are more prone to invest in stocks than women. Regarding the bond market, females and singles have a higher probability of participating than males and married people. Single females are thus most likely to be bond investors. However, married males are more likely to be bond investors than married women.

The main finding from the extended model is that the result that males have a higher tendency to hold stocks is not clear anymore. First of all, there is no significant difference between the stock market participation probability of single men and single women once we include additional control variables. Second, the effect of being married becomes significantly negative. In other words, married people are significantly less likely to participate in the stock market than singles, while married men are more likely to hold stocks than married women. The results regarding bond market participation do not change when including additional control variables.

All in all, these findings indicate that there is no clear gender difference in proneness to invest in risky assets when controlling with all relevant background characteristics. Men are in general not more likely to hold stocks than are women.

4.2 Additional Findings in Simple Model

In this section, we discuss the effects of the control variables in the simple model. The standard set of control variables are: age of the investor, indicator for children living at home, length of the investor's education, indicator for economics education, the logarithm of the noncapital income of the investor, the lagged stock and bond participation decision, and finally the return on the Danish stock market in the previous year (captured by the lagged return on the OMXC20). Variables such as these are often used in stock market participation literature; see e.g. Mankiw and Zeldes (1991), Haliassos and Bertaut (1995), Guiso *et al.* (2003), Vissing-Jørgensen (2004), and Christiansen *et al.* (2008). Part of the participation cost has already been paid if an investor has previously invested on the stock marked, e.g., the start up costs associated with getting to know the workings of the stock market. Because of this, the probability of participating in the stock market this year is most likely greater if the investor also participated in the stock market the previous year.

Therefore, lagged participation indicators are included. Similar arguments hold for the bond market. The return from the aggregate stock market is common to all investors, whereas the other variables are investor specific.

We find that the marginal effect of the age of the investor is significantly positive for both the bond and stock market participation decision. Hence, older individuals are more likely to be financial investors. The marginal effect of having children living at home is significantly negative for both stock and bond market participation, implying that children dampen the propensity of being a financial investor.

Like in the stock market participation literature we find that the stock market participation decision is positively correlated with income, length of education, and being an economist. As a novel feature, we report that the same effects hold for the bond market participation decision. This implies that wealthier individuals are more likely to invest in bonds and stocks which is hardly surprising. The level of education is also of importance for whether or not an investor participates in the bond and stock market. More well-educated individuals are more likely to be financial investors. In particular, having an economics education increases significantly the rate of participation on stock and bond markets. This is consistent with the findings in Christiansen *et al.* (2008).

The stock market participation decision this year is strongly and positively related to the stock market participation last year, and also positively - but less strongly - related to the bond market participation last year. So, once an investor enters the stock market it is very likely that the investor will continue being a stock market investor. The same applies to the bond market.

The point estimate of the correlation between the error terms of the two processes that drive the choices of participation in the stock and bond market is equal to 0.43 and this is significantly different from zero according to the LR test. The positive correlation coefficient implies that the unobserved factors that determine whether an investor participates in the stock market are positively correlated with the unobserved factors that determine whether he or she participates in the bond market.

4.3 Differences in Background Risks in the Extended Model

Labor income risk can affect asset allocation. Indeed, the return to human capital assets in the form of labor income is the most important source of wealth for most individuals. Hence, it is relevant to control for labor income risk. In addition, if females are subject to more risky returns from illiquid assets such as human capital and real estate assets, failing to control for such differences could bias our results. For this reason, we include some second

moment variables in our probit estimation: the standard deviation of the growth rate of the noncapital income and its correlation with the stock market return and with the bond market return. We also include the standard deviation of the growth rate of the equity in houses and its correlation with stock market return, with bond market return, and with growth of noncapital income.[10] In order to motivate our choice of these variables (see also Palia *et al.* 2009), and to briefly repeat how risky labor income can affect the asset allocation decision, we provide a simple stylized model of how an investor optimally invests in financial assets when facing labor income risk, see Appendix A. Finally, we include some additional wealth measures as controls: cash holdings, equity in houses, and pension contributions.

The background variables that are included both in the simple and extended model have identical effects upon the participation decisions. The new financial variables (cash holdings, pension contributions, and equity in houses) all have positive effects upon the stock and bond market participation decisions which implies that the wealthier the investor is, the more likely it is that he/she participates in the financial markets.

Overall, the effect of the second moment variables is not large and in many situations insignificant. What we do find, though, is that the correlation of noncapital income and the return on the bond market has a negative impact upon the likelihood of participating in the stock market, but no effect upon the likelihood of bond market participation. The correlation of the equity in houses and the bond and stock return has positive effects upon stock market participation. The correlation between the equity in houses and the noncapital income has a positive effect upon the bond market participation probability.

When including more explanatory variables, the correlation coefficient between the unobserved factors decreases to 0.30, but it remains significant.

5 Portfolio Riskiness

We examine the effect of gender and marital status on two measures of portfolio riskiness: The proportion of wealth invested in stocks, $\frac{S_{it}^*}{W_{it}}$, and bonds, $\frac{B_{it}^*}{W_{it}}$, respectively. Since these measures of portfolio riskiness only make sense for those investors who participate in the relevant financial market, we have to correct for potential self-selection bias arising from limited participation.

The Heckman (1979) selection model for the proportion of stocks to wealth is given by the outcome equation:

$$\frac{S_{it}^*}{W_{it}} = X_{it}'\beta_{SA} + \varepsilon_{SA_{it}}, \tag{2}$$

[10] When calculating these second moment variables, the dataset becomes smaller, since we only include individuals with more than three observations.

and the selection/participation equation indicates that $\frac{S_{it}^*}{W_{it}}$ is only observed if:

$$S_{it}^* = X_{it}\beta_S + \varepsilon_{S_{it}} > 0. \tag{3}$$

The distribution of the error terms is given by $\varepsilon_{SA_{it}} \sim N(0, \sigma)$, $\varepsilon_{S_{it}} \sim N(0, 1)$, and $corr(\varepsilon_{SA_{it}}, \varepsilon_{S_{it}}) = \rho_S$. Since the proportion of stocks in the portfolio of total assets is only observed for those investors who participate in the stock market, an ordinary least squares regression of (2) would produce biased estimates if $\rho_S \neq 0$. This is the case because $E[\varepsilon_{SA_{it}}|X_{it}, S_{it} = 1] \neq 0$ when $\rho_S \neq 0$, even if $E[\varepsilon_{SA_{it}}|X_{it}] = 0$. Since the unobserved factors (such as risk aversion) affecting the participation decision are very likely correlated with the unobserved factors affecting the degree of participation, we estimate the selection model in (2) and (3) to account for the correlation between the error terms. Hereby we get consistent estimates of the parameters in the stocks to wealth equation (2). The exclusion restriction, i.e. the variable included in X_{it} but not in X'_{it}, is the lagged stock market participation indicator, S_{it-1}. Thus, the identifying assumption is that lagged stock market participation affects current stock market participation, but it only affects the share of wealth invested in stocks through its effect on current participation. This is a conventional assumption in the literature, see e.g. Vissing-Jørgensen (2004).

The model for the proportion of bonds to wealth is specified equivalently.

5.1 Empirical Results for Portfolio Riskiness

We relate the rich attributes of the data to the previous literature by examining the effect of gender and marital status on the riskiness of individuals' wealth portfolios. We use two definitions of wealth when calculating the riskiness measures: Financial wealth and total wealth. We present the results from our regressions when using total wealth in Table 3 and when using financial wealth in Table 4.

5.1.1 Using total wealth to calculate portfolios riskiness. Table 3 shows the coefficients from the outcome equations (2). The results from the *simple model* with the standard control variables and the results from the *extended model* where we also control with financial variables and second moment variables are identical with respect to gender and martial effects.

Overall, we find that women, and particularly single women, do not hold less risky portfolios. Considering the summary statistics in Table 1, this is not surprising: Married men hold a considerably lower fraction of their total wealth in stocks than do single women. This feature of the data carries through into the selection models.

In addition to this, it is important to correct for self-selection bias, since the coefficient to the inverse Mills' ratio is significantly positive, indicating that investors who have unobserved characteristics that make them hold a higher share of stocks (bonds) in their asset portfolio are also more likely to participate in the stock (bond) market.

5.1.2 Using financial wealth to calculate portfolios riskiness. What are the results when using financial wealth to calculate portfolio riskiness, as it is generally done in the asset allocation literature? Table 4 reveals that when using the ratio of stock holdings to financial assets, women's portfolios are generally less risky, as the coefficient to the male dummy and the married dummy are estimated to be positive in both the simple and the extended models.

Concluding on this investigation, we find that if we exclude housing from the definition of wealth, men seem to hold more risky portfolios, as is often reported in the literature. Many studies in the literature do not include real estate value in the wealth portfolio most likely due to data availability issues. When using detailed and comprehensive data, and including the value of real estate as part of the wealth portfolio, the picture of women investing less risky is blurred.

6 Asset Allocation and Moving in Together

We use the difference-in-differences (DID) estimator to investigate what happens to the stock market participation probability of an investor when the investor changes civil status and goes from being single to cohabiting and vice versa.[11] We also investigate what happens to an investor's portfolio riskiness, measured by the stocks to wealth ratio, when marital status is changed.

We select a subsample of single males and let $married_i = 1$ for males who get married or start cohabiting and $married_i = 0$ for males who remain single for the whole observation period. We do the same division with the female population. We want to estimate the average effect on stock market participation for the investors who get married, i.e. $E\left[S_{it}^1 - S_{it}^0 | married_i = 1\right]$ for $t > 0$, where S_{it}^1 is the stock market participation indicator for investor i at time t when the investor is married, and equivalently S_{it}^0 is the stock market participation indicator when the investor is single. Since an investor's stock market participation at any point in time cannot be observed both when he is married and single, the central problem of evaluating this effect is the construction of counterfactuals.

The DID estimator compares the change in participation rates for investors getting married

[11] We observe in Figure 1 and 2 that it is important to account for common macro economic or year effects. Hence, the DID estimator is more appropriate than the before-after (BA) estimator.

with the changes in participation rates for investors who stay single. The implicit identifying assumption is that the change in stock market participation rates would have been the same for the two groups of investors if none of the investors had married. Hence, the DID estimator is given by:

$$E[S^1_{i,t>0} - S^0_{i,t<0}|married_i = 1] - E[S^0_{i,t>0} - S^0_{i,t<0}|married_i = 0]. \quad (4)$$

The results for stock market participation are presented in Table 4. This DID estimator reports that the stock market participation rate decreases with around 11% for men and 4% for women

However, since married men in general have higher income and wealth than single men, and the difference is larger than the difference between single and married women, we test if the differences are robust towards controlling for investor-specific background characteristics. Let $after_{it} = \mathbf{1}[t > 0]$ denote the indicator of whether the observation is after the individual is married. The DID estimator of the effect of cohabitation on the stock market participation is the estimated coefficient to $after_{it} * married_i$ in a regression of S_{it} on $married_i$, $after_{it}$, $after_{it} * married_i$, and various additional control variables; see e.g. Heckman, LaLonde and Smith (1999) for details. We use the same host of socioeconomic and financial control variables as in the previous sections. The results are reported in Table 5. We find that the reductions in stock market participation rates become smaller after we condition on investor-specific background characteristics. In contrast, it decreases insignificantly for men and increases significantly for women when we also control for financial variables. The large changes we observe for men at first sight are thus primarily due to the large changes in men's wealth and income after they get married.

Corroborating these results, we find effects in the opposite direction when individuals break up. These results are presented in the last three columns of Table 4 which shows that women appear to have a higher probability of investing in the stock market after a divorce. However, when accounting for background variables this difference become insignificant.

6.1 Riskiness of Portfolio

We conduct the same kind of analysis for the changes in the ratios of the stocks to total assets and stocks to financial assets. The results are reported in Tables 6 and 7, respectively. For single men that get married the ratio of stocks to total assets decreases significantly with 14%, whereas there is no significant change in portfolio riskiness for women when we use no control variables. The ratio of stocks to total assets decreases significantly for men when only controlling for socioeconomic variables, while it becomes insignificant when financial controls are also

included. Similarly, when including both socioeconomic and financial controls, women's ratio of stocks to total assets decreases but insignificantly so after marriage. The effects change sign when individuals break up, but they become insignificant when including background characteristics.

When evaluating the changes in the ratio of stock holdings to financial assets when investors get marred or get divorce, we see that none of the effects are significant.[12] However, the signs of the changes are similar to those for stocks to total assets.

In general, at first sight the DID results indicate that there are seemingly large changes in investor behavior when investors change marital status. However, once we also account for differences in investor specific background variables, these changes in investor behavior become much smaller and often insignificant.

7 Conclusion

In this paper, we have extended upon the findings of the previous literature that single women have a higher probability of holding less risky portfolios and a lower probability of holding more risky portfolios by using a comprehensive representative sample. In simple models that do not control for labor income risk and financial wealth, we recover that single women have a lower propensity to invest in stocks and a higher propensity to invest in bonds, than have married women and men (married and single). Once we control for various background characteristics, women's seemingly higher risk aversion disappears. Our results indicate that it is pivotal to properly control for background risks and self-selection when estimating the effects of gender and marriage on financial portfolio riskiness.

A unique feature of our data is that we can directly evaluate the (short term) effect of marriage and divorce on financial market behavior. We find that both men and women tend to tilt towards less risky portfolios upon marriage, and towards more risky portfolios upon divorce - men seemingly more so. However, these changes are mainly driven by the large changes in income and wealth. An interesting avenue of future research would be to open the black box of how couples make financial investment decisions, as well as what determines the differences in background risks. In this paper, we have quantified the total effects of marriage and divorce on stock and bond investments. There are several potential channels through which cohabiting can affect individual asset allocations: (i) When credit markets are imperfect, two of the economic reasons to form a partnership are: risk sharing,

[12] The fact that the DID estimates are insignificant is mainly caused by large standard errors which arise because the main changes in the individual's portfolio in connection with changes in marital status occur in the value of equity.

and extending credit by coordinating investments. (*ii*) The pooling of income, information, and other resources as well as risk sharing and bargaining in the household complicate the asset allocation issue substantially. (*iii*) Division of labor in the household, e.g. to exploit comparative advantages, may further alter the labor supply, hence the labor income of each household member. Basically, a full analysis of these issues has to both quantify the gains of marriage, and take a stance on how these gains are distributed in the household.

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8 Appendix A

In this appendix, we present a simple general framework which qualitatively illustrates some of the factors that can explain gender difference in asset allocation. We divide our discussion into two parts: First, we review some basic insights from the asset allocation literature. Second, we discuss what we expect will happen to asset allocations when a man and a woman move in together and/or get married.

8.1 Asset Allocation of Single Men and Single Women

In what follows, we assume that each individual $i = 1, ..., N$ has constant relative risk aversion (CRRA) flow utility given by $U(c_t) = \frac{c_t^{1-\gamma}-1}{1-\gamma}$, where γ is the coefficient of relative risk aversion. Individuals can invest in two different assets: a stock yielding a stochastic return of r_{t+1}^s between time t and $t+1$, and a risk-free asset with a return of r_{t+1}^f.

In each period $t = 0, 1, ..., T$ individuals face two decisions: (i) how much to consume and save in period t, and (ii) how to allocate the period t savings between stocks and the risk-free asset. Let ω_t denote the fraction of savings that is invested in stocks, i.e. the riskiness of the portfolio. The problem of the consumer is to choose a path of consumption decisions and portfolio allocations that maximizes expected lifetime utility, i.e.:

$$\max_{(c_{t+\tau},\omega_{t+\tau})_{\tau=0}^T} U_t = E_t \left[\Sigma_{\tau=0}^T \delta^\tau \frac{c_{t+\tau}^{1-\gamma} - 1}{1-\gamma} \right] \tag{5}$$

where c_t is period t consumption and δ is the constant rate of time preferences. The savings and consumptions decisions are subject to a flow constraint for the dynamics of liquid financial wealth w:

$$w_{t+1} = (w_t + y_t - c_t)(1 + r_{t+1}^p) \tag{6}$$

where y_t is risky non-tradeable non-financial labor income and the return on the portfolio is $r_{t+1}^p = \omega_t r_{t+1}^s + (1-\omega_t) r_{t+1}^f = r_{t+1}^f + \omega_t (r_{t+1}^s - r_{t+1}^f)$.

8.1.1 Income Risks. For our purpose, it is adequate to state the solution to a simpler two-period problem. Of course, there are issues that a two-period model cannot deal with, in particular life-cycle considerations.[13] Campbell and Viceira (2002, chapter 6) show that the optimal fraction to invest in the risky asset in the two-period version of the model presented in equations (5) and (6) is given as:

$$\omega_t = \frac{1}{\rho} \left(\frac{E(r_{t+1}^s - r^f) + var\left(r_{t+1}^s\right)/2}{\gamma var\left(r_{t+1}^s\right)} \right) + \left(1 - \frac{1}{\rho}\right) \left(\frac{cov(r_{t+1}^s, y_{t+1})}{var\left(r_{t+1}^s\right)} \right) \tag{7}$$

where ρ is a loglinearization constraint that empirically is smaller than, but close to, 1 and $cov(r^s, y)$ measures the covariance between stock returns and labor income.

[13] In particular, Browning (2000) shows that the stylized fact that women on average have higher life expectancy than men implies that women have more incentives to save more for the old age – an issue a 2-period model naturally cannot analyze. A 2-period model will thus have a tendency to yield a too low fraction of stocks for women.

Equation (7) reveals that an individual who is subject to uninsurable background risk (y_t) that is positively correlated with stock returns, will be less prone to invest in stocks (remembering that $\rho < 1$). In other words, the higher $cov(r^s, y)$ is, the lower ω_t is. Intuitively, an individual with y_t being a close substitute to stock returns will already have a risky (total) wealth portfolio and will optimally invest a lower share of liquid financial wealth in the risky stock. In the same way, if $cov(r^s, y) < 0$, stocks provide a hedge to shocks to labor income, and an individual with $cov(r^s, y) < 0$ will hold a higher fraction of risky assets.

We would also like to investigate what happens if labor income risk increases? Given the fact that labor income is non-tradeable, a higher volatility of labor income makes the total wealth portfolio more risky, as investors cannot diversify away the risk from a non-tradeable labor income process. In general, this implies that the fraction held in stocks decreases. In the two-period model, Campbell and Viceira (2002) show that a sufficiently risk-averse investor (an investor with $\gamma > 1/\rho > 1$) will reduce the amount of savings invested in stocks when there is a mean-preserving increase in the variance of labor income. Viceira (2001, Figure 2) illustrates that the negative relation between labor income volatility and the fraction invested in stocks also holds in a more general model. Bodie, Merton and Samuelson (1992), Heaton and Lucas (1997), and Cocco, Gomes and Maenhout (2005) also study the effect of risky labor income on portfolio allocation and find a negative relation.

Differences in risk aversion also affect portfolio allocation. Holding other terms constant, equation (7) shows that a higher degree of risk aversion implies a lower fraction of wealth invested in the risky asset. Assume that there are two types of agents (men and women) that might differ in their coefficient of relative risk aversion, γ_m and γ_f, respectively. If men have a lower coefficient of relative risk aversion than women, $\gamma_m < \gamma_f$, men would invest a higher fraction of their wealth in stocks, holding other terms constant, i.e. even in the absence of uninsurable background risk, we might observe that men hold more risky portfolios than women.

Gender differences in financial portfolio risk might either be due to differences in preferences or systematic differences in uninsurable background risk factors. In the empirical strategy, we exploit the correlation structure between tradeable and non-tradeable risks in order to account for individual differences in background risks. Particularly, we focus on individual differences in the volatility of non-financial income growth (i.e. the component of individuals' income that can be considered background risk) as well as the correlation of the non-financial income growth with stock (and bond) returns. This allows us to test the hypothesis of whether females hold less risky financial portfolios, because they are less risk averse or because they hold more risky human capital (and real estate) assets. If the gender of the investor does not have a significant effect on the riskiness of the financial portfolio when we control for background risk factors, then the data tends to support that there are no gender differences in risk aversion. Rather, any gender differences will tend to be a consequence of differences in background risks.

8.1.2 Interest Rate Risk. Many models in the strategic asset allocation literature (e.g. Heaton and Lucas, 1997 and Cocco et al., 2005) work with a constant risk-free asset. It seems empirically reasonable to allow for a non-zero correlation between labor income and the level of the interest rate in the economy. However, if the interest rate is correlated with the business cycle, there will most likely also be correlations between individuals' labor incomes and the general level of the interest rate in the economy. In models with a constant interest rate,

it is, of course, not possible to investigate the consequences for the optimal share invested in risky assets resulting from changes in the correlation between the interest rate and labor income. A recent paper by Munk and Sørensen (forthcoming) allows for stochastic interest rates and labor income.[14] Munk and Sørensen (forthcoming) show that if the correlation between income and the interest rate is positive, the investor should hold more in risky bonds and less in the risk-free asset compared to the situation where the correlation between the interest rate and labor income is negative, i.e. the lower is the correlation between the interest rate and labor income, the less risky the total portfolio should be.

8.1.3 Real Estate. In the empirical analysis we consider what happens to portfolio choice taking into account fluctuations in the value of an investor's real estate. Cocco (2005) analyzes how housing decisions affect portfolio choice in an asset allocation model that includes both stochastic labor income, a housing decision, and stock market participation costs. By including participation costs, Cocco (2005) also models the stock-market participation decision.[15] Cocco (2005) finds that house price risk tends to crowd out equity market gains, in particular for investors with a low financial net worth.

8.2 Asset Allocation of Cohabiting and Married Investors

So far we have considered the behavior of individual investors, focusing on the potential differences between single female investors and single male investors. We now discuss what we expect will happen to the optimal asset allocation upon marriage.

For parsimony, we consider the following simple model. Assume that there are two agents in the household - a male and a female - that are altruistic towards each other. Each agent i maximizes his social utility which is given by: $U_i(c) = u_i(c_i) + \alpha u_j(c_j)$, for $i, j = m, f$, $i \neq j$, where $0 < \alpha < 1$, since agents care for each other's private utility, $u_j(\cdot)$, but not as much as they care about their own utility. Hence, if there are gender differences in risk aversion, for example that males are less risk averse, $\gamma_m < \gamma_f$, one would expect that the male's portfolio would become less risky and the female's portfolio more risky after marriage. The share invested in financial assets for each household member would now depend on the combination of risk aversion in the household and altruism, α. It should be noted that this simplified discussion of two-person households abstracts from background risks, i.e. assumes $y_t \equiv 0$, hence can be viewed as a *ceteris paribus* perspective.

[14] Another paper allowing for time varying interest rates in an asset allocation set-up is Koijen, Nijman & Werker (2007). They assume a constant expected growth in labour income and a constant labour income volatility, however, and focus on life-cycle perspectives of the strategic asset allocation decisions – an issue we do not focus much upon here.

[15] Yao and Zhang (2005) also investigate the role of housing in portfolio allocation decisions, in particular how the rent-a-house versus own-a-house decision affects portfolio allocation.Yao and Zhang do not consider the labor income process, though, and nor the stock market participation costs, which is why we focus on the description of Cocco's results in the text.

Table 1: Descriptive Statistics

	Mean/Proportion						
		Males			Females		
Variable	All	All	Single	Married	All	Single	Married
Bond Market Participation Rate	0.10	0.10	0.08	0.11	0.10	0.13	0.07
Stock Market Participation Rate	0.25	0.27	0.21	0.31	0.23	0.23	0.24
Married	0.63	0.63	0.00	1.00	0.63	0.00	1.00
Male	0.50	1.00	1.00	1.00	0.00	0.00	0.00
Children	0.23	0.21	0.02	0.32	0.24	0.11	0.32
Age	46.0	45.2	38.9	48.9	46.7	46.6	46.7
Length of Education	11.4	11.6	11.1	11.8	11.3	10.9	11.5
Noncapital Income	242,820	286,094	210,510	330,004	200,034	180,329	211,533
Cash Holdings	-18,274	-36,927	-14,759	-49,788	245	21,221	-11,757
Equity in Houses	398,606	535,230	255,611	697,672	263,523	221,953	287,784
Pension Contribution	15,814	19,091	11,095	23,736	12,574	8,573	14,909
Stock Value	30,024	32,945	21,147	39,798	27,136	48,332	14,766
Bond Value	39,728	45,506	28,436	55,422	34,015	56,578	20,848
Ratio Stock/Financial Assets Value	0.30	0.31	0.31	0.31	0.29	0.26	0.31
Ratio Bond/Financial Assets Value	0.31	0.30	0.31	0.30	0.32	0.33	0.31
Ratio Stock/Total Assets Value	0.15	0.13	0.20	0.10	0.18	0.18	0.19
Ratio Bond/Total Assets Value	0.21	0.18	0.23	0.16	0.24	0.25	0.23
Ratio Stock/Bond Value	39,737	46,086	44,735	46,626	32,602	42,612	26,436
Observations	3,023,110	1,502,977	552,291	950,686	1,520,133	560,205	959,928

Notes: The table shows the mean or proportion (as appropriate) for each variable for various sub groups. The ratio of stocks (bonds) to financial/total assets is the average amongst the investors who participate in the stock (bond) market. The ratio of the value of stocks to bonds is the average amongst the investors who hold both stocks and bonds. The amounts are in real 2000 DKK. The average exchange rate in 2000 was 0.1237 USD/DKK.

Table 2: Results from Bivariate Probit Models

	Simple Model				Extended Model			
Explanatory Variable	**Stocks**		**Bonds**		**Stocks**		**Bonds**	
Constant	-4.142	(0.020) *	-3.531	(0.024) *	-4.776	(0.105) *	-5.501	(0.114) *
Married	0.029	(0.003) *	-0.240	(0.004) *	-0.095	(0.013) *	-0.255	(0.014) *
Male	0.035	(0.004) *	-0.123	(0.005) *	-0.018	(0.015)	-0.202	(0.016) *
Married Male	0.045	(0.005) *	0.199	(0.006) *	0.075	(0.017) *	0.185	(0.019) *
Age	0.011	(0.000) *	0.018	(0.000) *	0.007	(0.000) *	0.016	(0.000) *
Children	-0.110	(0.002) *	-0.201	(0.004) *	-0.039	(0.007) *	-0.066	(0.009) *
Length of Education	0.025	(0.000) *	0.038	(0.000) *	0.010	(0.001) *	0.027	(0.001) *
Economist	0.368	(0.006) *	0.132	(0.008) *	0.283	(0.019) *	0.199	(0.020) *
Log Noncapital Income	0.140	(0.002) *	0.027	(0.002) *	0.097	(0.009) *	-0.009	(0.009)
Lagged Stock Participation	2.597	(0.002) *	0.394	(0.003) *	2.330	(0.007) *	0.208	(0.008) *
Lagged Bond Participation	0.076	(0.003) *	2.406	(0.003) *	-0.013	(0.010)	2.115	(0.009) *
Lagged Stock Return	-0.084	(0.004) *	0.157	(0.005) *	-0.428	(0.021) *	1.015	(0.024) *
Cash Holdings					0.122	(0.003) *	0.108	(0.003) *
Equity in Houses					0.055	(0.004) *	0.113	(0.004) *
Pension Contribution					0.013	(0.003) *	0.023	(0.003) *
St.Dev.(Growth Noncapital Income)					0.000	(0.000)	0.000	(0.000)
Correlation (Noncapital Income; Stock Return)					-0.007	(0.009)	0.009	(0.010)
Correlation (Noncapital Income; Bond Return)					-0.026	(0.010) *	-0.006	(0.012)
St.Dev. (Growth Equity in Houses)					0.000	(0.000)	0.000	(0.000)
Correlation (Equity in Houses; Stock Return)					0.045	(0.009) *	0.004	(0.010)
Correlation (Equity in Houses; Bond Return)					0.033	(0.009) *	-0.009	(0.010)
Correlation (Equity in Houses; Noncapital Income)					-0.002	(0.008)	0.019	(0.009) *
Correlation coefficient	0.425 (0.002)*				0.301 (0.005)*			
Observations	2,928,016				946,578			

Notes: The table shows the results from the simple and extended bivariate probit model; the marginal effect of each explanatory variable upon the probability of participating in the stock market and bond market, respectively. Standard errors in parentheses. * indicates that the variable in significant at 1% level of significance.

Table 3: Results from Selection Models for Stocks (Bonds) to Total Assets

	Simple Model				Extended Model			
Explanatory Variable	**Stocks/Total Assets**		**Bonds/Total Assets**		**Stocks/Total Assets**		**Bonds/Total Assets**	
Constant	-1.162	(0.037) *	-0.714	(0.047) *	-5.051	(0.066) *	-3.747	(0.118) *
Married	-0.034	(0.007) *	-0.120	(0.008) *	-0.225	(0.012) *	-0.167	(0.017) *
Male	-0.118	(0.008) *	-0.248	(0.009) *	-0.172	(0.013) *	-0.241	(0.019) *
Married Male	-0.659	(0.010) *	-0.277	(0.012) *	-0.167	(0.016) *	-0.044	(0.024) *
Age	-0.460	(0.007) *	-0.154	(0.009) *	0.091	(0.013) *	0.264	(0.024) *
Children	-0.481	(0.005) *	-0.435	(0.008) *	-0.338	(0.007) *	-0.286	(0.014) *
Length of Education	-0.071	(0.008) *	-0.159	(0.009) *	0.428	(0.012) *	0.163	(0.018) *
Economist	0.220	(0.009) *	-0.095	(0.013) *	0.242	(0.014) *	0.121	(0.022) *
Log Noncapital Income (*100,000)	0.038	(0.012) *	0.081	(0.009) *	0.012	(0.013)	0.064	(0.012) *
Lagged Stock Return	-0.187	(0.002) *	0.159	(0.003) *	-0.133	(0.004) *	0.110	(0.006) *
Cash Holdings (*100,000)					0.005	(0.000) *	0.002	(0.004)
Equity in Houses (*100,000)					-0.001	(0.009)	-0.002	(0.001)
Pension Contribution (*100,000)					-0.134	(0.100)	-0.096	(0.091)
St.Dev.(Growth Noncapital Income) (*100,000)					0.759	(0.607)	0.250	(0.180)
Correlation (Noncapital Income; Stock Return)					0.034	(0.008) *	0.045	(0.013) *
Correlation (Noncapital Income; Bond Return)					-0.035	(0.009) *	-0.068	(0.015) *
St.Dev. (Growth Equity in Houses) (*100,000,000)					-0.002	(0.000)	0.337	(0.433)
Correlation (Equity in Houses; Stock Return)					-0.095	(0.007) *	-0.032	(0.011) *
Correlation (Equity in Houses; Bond Return)					-0.189	(0.007) *	-0.143	(0.011) *
Correlation (Equity in Houses; Noncapital Income)					0.062	(0.007) *	0.018	(0.011)
Mills Lambda	0.091	(0.004) *	0.088	(0.004) *	0.156	(0.006) *	0.155	(0.008) *
Observations	2,928,016		2,928,016		946,578		946,578	

Notes: The table shows the estimated coefficients from the regression equation of the simple and extended Heckman (1979) selection model. First, the explained variable is the ratio of the value of stocks to total assets, and second, it is the ratio of the value of bonds to total assets. Standard errors in parenthesis. * indicates that the variable is significant at 1% level of significance.

Table 4: Results from Selection Models for Stocks (Bonds) to Financial Assets

	Simple Model				Extended Model			
Explanatory Variable	Stocks/Financial Assets		Bonds/Financial Assets		Stocks/Financial Assets		Bonds/FinancialAssets	
Constant	-1.574	(0.029) *	-1.466	(0.034) *	-1.966	(0.055) *	-2.481	(0.086) *
Married	0.216	(0.005) *	-0.102	(0.006) *	0.163	(0.010) *	-0.098	(0.012) *
Male	0.167	(0.006) *	-0.159	(0.007) *	0.108	(0.011) *	-0.184	(0.014) *
Married Male	-0.217	(0.008) *	0.083	(0.008) *	-0.187	(0.013) *	0.101	(0.017) *
Age	-0.280	(0.005) *	0.052	(0.006) *	-0.199	(0.011) *	0.181	(0.017) *
Children	0.127	(0.004) *	-0.105	(0.006) *	0.099	(0.006) *	-0.056	(0.010) *
Length of Education	0.116	(0.006) *	0.021	(0.007) *	0.199	(0.010) *	0.134	(0.013) *
Economist	0.209	(0.007) *	-0.082	(0.009) *	0.110	(0.012) *	0.040	(0.016) *
Log Noncapital Income (*100,000)	0.008	(0.000)	0.590	(0.000) *	0.117	(0.000)	0.437	(0.000) *
Lagged Stock Return	-0.177	(0.002) *	0.149	(0.002) *	-0.138	(0.003) *	0.106	(0.005) *
Cash Holdings (*100,000)					-0.036	(0.000) *	-0.005	(0.000) *
Equity in Houses (*100,000)					0.103	(0.000) *	0.022	(0.000) *
Pension Contribution (*100,000)					-0.033	(0.000)	-0.418	(0.000)
St.Dev.(Growth Noncapital Income) (*100,000)					0.696	(0.000)	0.803	(0.000)
Correlation (Noncapital Income; Stock Return)					-0.005	(0.007)	-0.031	(0.009) *
Correlation (Noncapital Income; Bond Return)					0.011	(0.008)	-0.045	(0.011) *
St.Dev. (Growth Equity in Houses) (*100,000)					0.005	(0.000)	0.015	(0.000)
Correlation (Equity in Houses; Stock Return)					-0.013	(0.006) *	-0.005	(0.008)
Correlation (Equity in Houses; Bond Return)					-0.004	(0.006)	-0.001	(0.008)
Correlation (Equity in Houses; Noncapital Income)					0.005	(0.006) *	-0.009	(0.008)
Mills Lambda	0.019	(0.003) *	0.069	(0.003) *	0.027	(0.005) *	0.131	(0.006) *
Observations	2,928,016		2,928,016		946,578		946,578	

Notes: The table shows the estimated coefficients from the regression equation of the simple and extended Heckman (1979) selection model. First, the explained variable is the ratio of the value of stocks to financial assets, and second, it is the ratio of the value of bonds to financial assets. Standard errors in parenthesis. * indicates that the variable is significant at 1% level of significance.

Table 5: DID Results for Stock Market Participation

	Single to Married			Married to Single		
Men						
DID estimator	-0.112 *	-0.026 *	-0.012	0.025 *	0.048 *	0.104 *
St. dev.	(0.004)	(0.003)	(0.014)	(0.004)	(0.003)	(0.014)
Observations in group		70,119			87,462	
Women						
DID estimator	-0.042 *	-0.007 *	0.028	0.039 *	0.001	0.030
St. dev.	(0.004)	(0.003)	(0.016)	(0.004)	(0.002)	(0.014)
Observations in group		61,300			93,861	
Additional Control Variables						
Socioeconomic Variables		+	+		+	+
Financial Variables			+			+

Notes: The table shows the difference in difference (DID) results for the stock market participation for men and women when they go from being single to cohabiting and vice verse. The bottom part of the table shows which additional control variables that have been included in the estimations. * indicates that the variable in significant at 1% level of significance.

Table 6: DID Results for Stocks to Total Assets

	Single to Married			Married to Single		
Men						
DID estimator	-0.136 *	-0.027 *	-0.005	0.069 *	0.000	0.005
St. Dev.	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.007)
Observations in group		70,119			87,462	
Women						
DID estimator	0.001	-0.007	-0.021	0.005	0.023 *	0.011
St. Dev.	(0.006)	(0.006)	(0.009)	(0.005)	(0.005)	(0.008)
Observations in group		61,300			93,861	
Additional Control Variables						
Socioeconomic Variables		+	+		+	+
Financial Variables			+			+

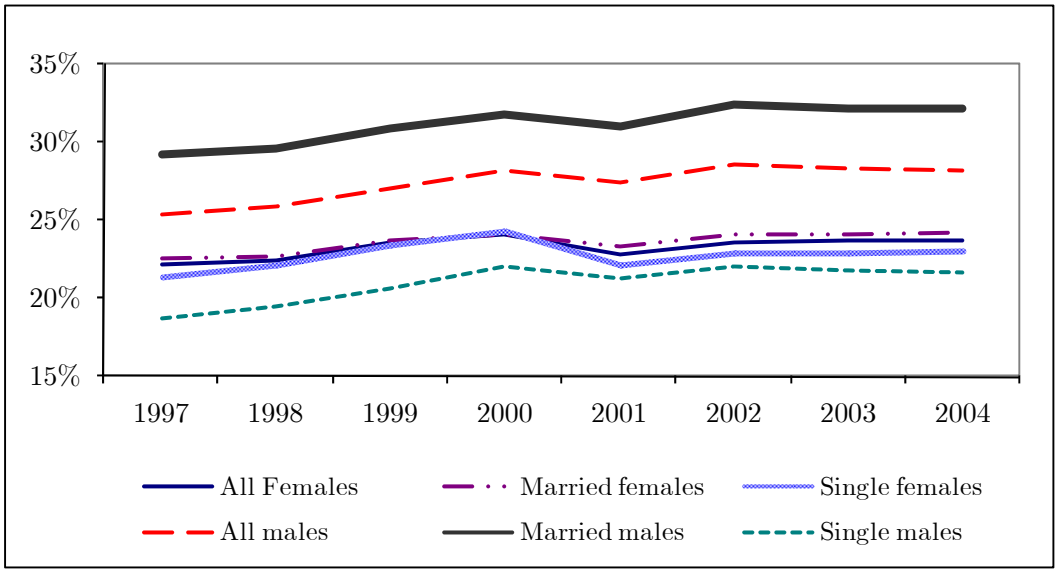
Notes: The table shows the difference in difference (DID) results for the stocks to total assets for men and women when they go from being single to cohabiting and vice versa. The bottom part of the table shows which additional control variables that have been included in the estimations. * indicates that the variable in significant at 1% level of significance.

Table 7: DID Results for Stocks to Financial Assets

	Single to Married			Married to Single		
Men						
DID estimator	-0.039	-0.048	-0.129	0.340	0.427	0.731
St. Dev.	(0.385)	(0.405)	(0.784)	(0.383)	(0.394)	(0.791)
Observations in group		70,119			87,462	
Women						
DID estimator	-0.064	-0.710	-0.070	-0.069	0.288	0.501
St. Dev.	(2.260)	(2.360)	(1.220)	(1.936)	(2.009)	(1.068)
Observations in group		61,300			93,861	
Additional Control Variables						
Socioeconomic Variables		+	+		+	+
Financial Variables			+			+

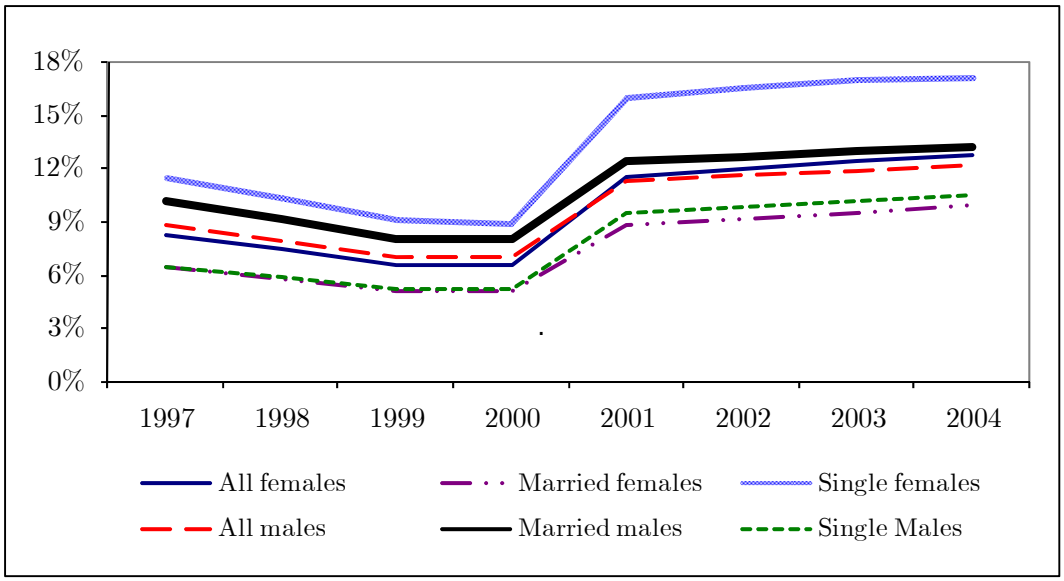
Notes: The table shows the difference in difference (DID) results for the stocks to financial assets for men and women when they go from being single to cohabiting and vice versa. The bottom part of the table shows which additional control variables that have been included in the estimations. * indicates that the variable in significant at 1% level of significance.

Figure 1: Stock Market Participation Rates



Notes: The figure shows the time series of the proportion of stock market participants for various investor groups.

Figure 2: Bond Market Participation Rates



Notes: The figure shows the time series of the proportion of bond market participants for various investor groups.