Bargaining Over Risk

The Impact of Decision Power on Household Portfolios

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Abstract

This paper investigates the internal financial decision-making process of households, employing a unique panel data set containing the disaggregated wealth of the entire Swedish population over seven years. We utilize a source of exogenous variation in sex-specific labor demand to show that the distribution of decision power among spouses is a driving force behind the aggregation of spouses' preferences on financial decision making. As the decision power of female spouses increases, participation in risky asset markets decreases, the share of wealth allocated to risky investments decreases, the riskiness of the portfolio decreases, and idiosyncratic risk decreases. We also study the effect of underdiversification on household welfare. Women are more aware of the household's limited investment skills and exert their decision power to reduce the economic cost from underdiversification.

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1 Introduction

Financial decisions are arguably among the most important decisions taken within households. This paper addresses how these decisions are taken, i.e., how individual preferences concerning household portfolio composition are aggregated at the household level.

Despite the importance of financial decisions for household welfare, there is limited research on how intra-household financial decisions are made. Papers that look at financial decision making within households mostly focus on the consumption-savings choice. Browning (2000), Mazzocco (2004a), and Lundberg et al. (2003) find that the distribution of decision power within the household affects the consumption-savings decision when spouses differ in their preferences. Many questions remain.

What determines how couples choose to invest their financial wealth? More specifically, what decides whether they participate in risky asset markets and if they do, the share of wealth they allocate to risky assets and the types of risk they take? These questions are of fundamental importance in economics and finance. However, despite widespread interest, there is little research on this topic.

A simple comparison of the financial portfolios of single men, single women, and couples provides insights of how financial decisions are made at the household level. Single men hold more risky and less diversified portfolios, and incur higher economic costs from underdiversification than single women. Financial decisions of couples, on the other hand, appear to be a convex combination of those by single men and women. This suggests that household decisions are determined by the relative decision power of spouses. This only provides descriptive evidence of household financial behavior though. A causal analysis of how household financial decisions are made requires accurately reported data that includes exhaustive breakdown of total financial wealth for a representative sample of households along with an exogenous variation in decision power of household members.

In this paper, we investigate the questions raised here in a comprehensive, high-quality panel of household finances, providing a unique opportunity to assess how financial preferences of spouses are weighted when households make decisions on the composition of their financial portfolios. We exploit an exogenous source of variation in sex-specific labor demand to capture the effect the distribution of decision power within households has on the weight spouses' preferences get. First, we investigate the participation of households in equity and other risky asset markets. Second, we consider how the share of risky assets in the financial portfolios of households is determined. Third, we investigate the determination of the amount of risk in the risky part of household portfolios and how well diversified it is. Fourth, we show how the distribution of decision power within household affects their economic wellbeing. We contribute to the literature on household financial decision making by being, to the best of our knowledge, the first ones to causally estimate how the preferences of spouses are aggregated at the household level in order to take decisions on the composition and characteristics of their financial portfolios and how this affects household welfare.[1]

We begin by assuming that a collective bargaining model describes how a couple makes decisions concerning the composition of the collective financial portfolio of the household. More specifically, we assume that the household decision-making is a bargaining process, i.e., spouses have unique preferences that can be represented by individual utility functions and all differences are resolved through a bargaining process. One testable hypothesis derived from this framework is that greater

[1] A couple of empirical studies investigate household stock investments using survey data (Friedberg and Webb, 2006; Jianakoplos and Bernasek, 2008; Yilmazer and Lyons, 2010; Yilmazer and Lich, 2013).

decision power among women allows them to exert their preferences to a greater extent and therefore implies that the household portfolio takes more after the portfolio they would have opted for.

This prediction is then brought to real data. A spouse's decision power is determined by their threat point, the level of utility each spouse could obtain in case of a separation. This threat point can be proxied by the spouses' fall-back income. Fall-back income is defined as the expected earnings of an individual given their demographic information and we measure female decision power as the ratio of female fall-back income to the total fall-back income of the couple. We then focus on how changes in the distribution of decision power within households affect the financial decision making of the household.

However, for purposes of identification we need to deal with the potential endogeneity of this measure. We do this by using a source of exogenous variation to instrument this decision power measure. The instrument we use is a measure of prevailing female and male wages, reflecting only the exogenous sex-specific demand for labor (see, e.g., Bartik, 1991; Aizer, 2010). Furthermore, this measure does not reflect underlying worker characteristics at the county-level which could be correlated with riskiness of household portfolios.

The data available on each resident is supplied by Statistics Sweden and is systematically compiled by financial institutions and corporations. We observe detailed information on demographic characteristics, income, and, most importantly, wealth portfolios. The portfolio data is highly disaggregated and provides information on the universe of assets owned by each resident at the end of a tax year. All financial assets held outside retirement accounts are reported, including bank accounts, mutual funds and stocks. Such high-quality data provides a unique opportunity to study how financial decisions are made at the household level and allows us to obtain very precise estimates of the effect of decision power on the outcome variables under consideration.

Our data has significant advantages relative to data used in previous studies on household financial decision making. Most papers rely on surveys, such as the Health and Retirement Survey (HRS).[2] The HRS data set only provides information about financial wealth for individuals above the age of 50 by broad asset categories and is subject to misreporting. Our data, in contrast, provides information on individual financial assets, is collected by financial institutions, and is confirmed by their owners when they file their taxes where inaccurate reporting is kept to a minimum via legal penalties.

We first show that the data reveals the same characteristics that are generally found in the literature. When comparing single men and single women, conditional on background characteristics, we find that single men hold on average more risky portfolios, have higher participation rates in equity markets and risky asset markets, are less diversified, and take more idiosyncratic and total risk. We then proceed to our main research question on how the distribution of decision power between spouses affects household portfolios. Our results imply that female decision power has a sizable and significant impact on the composition of household portfolios. More specifically, our results show that decision power plays a role in household financial decision making and that the traditional assumption of a unitary household is not supported by the data. Enhancement of the decision power of married women reduces households' propensity to participate in risky asset markets, it reduces the risky share of those households that do participate, and it reduces the total risk of the risky part of household portfolios, while most of this reduction is brought about via a reduction in the amount of idiosyncratic risk. Most

[2]See, e.g., Mazzocco (2004a), Lundberg et al. (2003), Friedberg and Webb (2006), Babiarz et al. (2012) and Yilmazer and Lich (2013).

importantly though, the welfare cost of underdiversification is reduced as the decision power of wives increases. Our results suggest that women are more conscious of the household's limited investment skills and use their decision power to reduce the economic costs incurred from underdiversification.

Finally, we also consider the role of financial education for both singles and couples as this has been shown to be important for financial investments (Christiansen et al., 2008). Controlling for financial education does not change our previous results, although it does reveal interesting findings. While financial education of both male and female spouses increases participation in risky asset markets, the share of risky assets in their financial portfolios, and the level of risk in their risky portfolios, the relative importance is quite different. Most notably, financial education of female spouses has larger effect on participation and the share of wealth allocated to risky assets while financial education of male spouses has larger effect on the equity share, total risk, and idiosyncratic risk.

The rest of the paper is organized as follows. In Section 2, we provide some background on the riskiness of household portfolios and how spouses take decisions concerning the collective financial portfolio of the household. Section 3 describes the data set. In section 4, we explain the institutional background. In section 5, we explain our identification approach. In section 6, we report our main results while section 7 presents concluding remarks.

2 Conceptual Framework

To examine how couples make financial decisions, we start by discussing theory on financial behavior. We then look at what a bargaining model on how households take decisions on the composition of their financial portfolios predicts. These predictions are then brought to real data in Section 5.

2.1 Background on the riskiness of household portfolios

Risk preferences play an important role in models of financial decisions and in theories of financial portfolio choice. These models trace out an explicit relation between the risky share of portfolios, the fraction of financial wealth invested in risky assets, and risk preferences.

According to the classical Merton (1969) model of consumption and portfolio choice, the optimal fraction of financial wealth invested in risky assets, the risky share, for individual i is

$$\theta_i = \frac{\tau_i r_i^e}{\sigma_i} \tag{1}$$

where r_i^e is the expected risk premium, τ_i the risk tolerance coefficient, and σ_i is the return volatility of risky assets.

In the aggregate, households have to hold the market portfolio and this is the main rationale of a prevalent assumption in the literature that beliefs concerning risky assets are the same for all individuals, i.e., $r_i^e = r^e$ and $\sigma_i^2 = \sigma^2$. Given this assumption, the model infers that all heterogeneity in portfolio composition should be accounted for by differences in risk aversion.[3] This framework therefore suggests that the composition of a household's financial portfolio is independent of wealth. Empirical evidence, on the contrary, suggest that the risky share of household portfolios increases with wealth (see, e.g., Bertaut and Starr-McCluer, 2000; Calvet et al., 2009; Guiso and Sodini, 2013).

[3]Note though that as risk preferences are typically unobserved, a direct test of the model is not feasible without an independent measure of individuals risk attitudes.

The empirical literature has been successful in providing some additional information on household financial behavior. Previous studies show, for instance, that there is a sizable heterogeneity in household portfolio composition that can partly be accounted for by differences in demographics. Calvet et al. (2007b) find that poorer, less educated, retired, and unemployed households are less diversified.

However, even though the empirical literature has been able to provide some descriptive analysis of household portfolios and financial risk taking, it is largely silent on what happens within households as the composition of household portfolios is determined. In order to understand these processes it is necessary to look at how decisions are made within households. It is possible that the considerable amount of diversification heterogeneity across households that cannot be accounted for by demographics can be explained by risk preference heterogeneity within households and bargaining between spouses.

2.2 Spousal Bargaining and Financial Investments

The literature on intra-household dynamics has its roots in the work of Becker (1991), who treated the household as a single decision-making unit with one utility function and pooled income. A limitation of this approach is that it cannot be used to analyze the influence of individual household members with different preferences on household decisions making.

Influential empirical evidence has cast doubt on the soundness of the unitary model (Schultz, 1990; Thomas, 1990, 1994; Hoddinott and Haddad, 1995; Lundberg et al., 1997; Browning and Chiappori, 1998) and given way for cooperative bargaining models first put forth by Manser and Brown (1980) and McElroy and Horney (1981) and collective models introduced by Chiappori (1988, 1992). These studies explicitly take into account that households consist of a number of different members and assume their preferences to be heterogeneous. The general implication of bargaining models is that multiple factors that are usually not considered important when modeling financial investments determine the distribution of decision power within households, and thereby their financial decisions as well.

However, despite the mounting number of game-theoretic models of household decision making that have been supported by data in recent years, household financial decision making has not been analyzed a lot within this framework. Economic models of portfolio investments typically examine the optimal behavior of a single individual who faces alternative amounts of risk in his financial portfolio under different portfolio compositions. These models therefore fail to account for the fact that most adults are a part of a couple and their decisions are the outcome of a joint decision-making process that reflects the preferences of both spouses.

In light of what has been said above, it is clear that a bargaining framework is the obvious choice to analyze the effect of conflicting preferences of spouses on financial decision making. As noted earlier, a collective bargaining alternative to the unitary model explicitly takes into account that the husband and the wife have separate utility functions and allow the couple to "bargain" over the investment path taken by the household. As a first step towards understanding how households take financial decisions, we therefore assume that a very stylized two-person collective bargaining model describes the household decision making and that each spouse derives utility from the current and future consumption of a household public good. Couples therefore maximize a weighted sum of each spouse's utilities subject to a pooled budget constraint where the weighting depends upon the relative decision power of couples. These utility weights are the outcome of an intra-household bargaining process that is assumed to take place among the household members. The collective model does not

impose a bargaining scheme though, the only assumption made is that bargaining within a household results in Pareto efficient allocations of household resources.

The household decisions of interest in this paper concern the composition of the collective financial portfolio of the household. In accordance with empirical findings, spouses are assumed to have unique preferences concerning the composition that can be represented by individual utility functions and all their differences are resolved through a bargaining process. A simple reduced form collective model allows us to test whether variation in our measure of relative decision power affects the composition of household portfolios.

In Appendix I we present a more detailed description of the collective bargaining model assumed to explain the household decision making process. A woman's decision power increases with her labor market potentials, as it is her relative potentials that matter but not her actual earnings (Pollak, 2005). The main result is that an increase in a wife's decision power renders the household portfolio more similar to her preferred portfolio by affecting her outside option. More specifically, the model allows us to draw predictions regarding the effect of the decision power distribution within households on the riskiness of household portfolios and how household wealth affects the aggregation of individual preferences for joint decisions. The most important prediction is that the share of risky investments in the household portfolio increases with the bargaining power of the spouse who has higher preferences for risk. However, we also find that the weight given to that spouse's preferences increases with household wealth.

Furthermore, due to individual characteristics, we expect that the distribution of the effects is not constant on the threat point distribution of wives and simulated results support this. The idea is that there is a level of the outside option at which a woman would be indifferent between leaving the marriage and following her husband's will when it comes to household financial decision making, and the impact of an exogenous variation in decision power should be larger around this margin.

The intuition behind this is straightforward: women with very poor alternatives outside marriage cannot take advantage of their decision power (their decision power is too low for their threats to be credible), while threats made by women with very good outside option are always taken seriously, independent of the relative decision power. We would therefore expect that an exogenous increase in female decision power would have larger impacts on households on the center-bottom part of the fall-back income distribution. This is illustrated in Figure 1. Thus, we believe that a shift in decision power from the husband to the wife causes a larger reduction in risk in household portfolios in households where wives are in the lower part of the threat point distribution.

After discussing the data used in this paper and providing some background information on the composition of financial wealth of Swedish households, these theoretical predictions will be brought to the data to see if they are supported empirically.

3 Data

Our data set contains highly disaggregated data on the entire Swedish population for the period 2000-2006. Statistics Sweden, a government agency, has a mandate to collect extensive data on all individuals that either live in Sweden, are Swedish citizens, or own assets in Sweden. By virtue of the fact that the data is collected by one central agency together with the fact that this data is used for tax purposes, we believe that our data set is of unusually high quality.

The data set consists of four distinct parts which are used together throughout the paper. The first of these parts is the demographic data. This data contains information about age, education, location of residence, family ties, and also other information such as income and real estate wealth. The second part is data on security holdings, detailing the financial portfolios held by individuals. The third part is a data set listing all security sales and the price at which each individual security was sold at. Finally, we complement this with data from third party vendors such as Datastream and Morningstar.

The securities in both the portfolio data and the transaction data are identified by their respective International Security Identification Number (ISIN). By merging these data sets with third party data we are able to accurately price the assets and determine which category the assets fall within (bonds, derivatives, stocks, funds etc.). In addition, it also enables us to obtain historical return series for the securities, which we use to calculate measures of volatility.

Our proxy of spouse's threat points is obtained by matching spouses with single individuals on six individual characteristics. More specifically, it is constructed as the average annual income for singles, defined as non-married and non-cohabiting people with children, conditional on their age, gender, whether they have children, location of residence, as well as the field and level of their highest level of completed education.

This definition implies five restrictions on the data that are important to note. First, since fall-back income is undefined for individuals too young to enter the labor force or individuals that have retired, we only consider individuals between the ages 16 and 65. Second, we drop a small number of married individuals that have very unusual profiles, as there are no single individuals with matching profiles on which the conditional average income can be calculated. Third, information about education is missing for some individuals and are therefore dropped. Fourth, we are only considering individuals that are living in Sweden. Swedish citizens living abroad and foreign citizens with assets holdings in Sweden are hence dropped from our sample. Finally, since we are interested only in married couples for which both spouses have defined fall-back incomes, we drop the spouses of individuals that are excluded due to any of the data restrictions listed above.

Throughout the paper, we refer to married opposite-sex couples as couples and individuals who are living alone or with someone but without a common child as singles. Ideally we would not want to define those living together but without a common child as singles but it is impossible to distinguish them from truly single people in the data. We can identify cohabiting people in the data if they have a common child but since we are not able to identify all cohabiting individuals we only consider couples to be those who are married. To be clear, henceforth, whenever we refer to couples or spouses we mean married people.

There is one limitation of the data that requires some discussion. Between the years 2000 and 2005 banks were required to report their customers' bank account balances only if these accounts had accrued interest payments in excess of 100 SEK. Unfortunately, this means that we miss bank account information for roughly half of our sample. In 2006 this reporting requirement was changed such that all accounts with balances exceeding 10 000 SEK had to be reported. This increased our bank account coverage somewhat, but we still miss bank account balances for a large part of the sample.

Missing bank account data can distort our estimates of the household share of financial wealth held in risky assets but does not affect our estimates of risk held in the the risky part of portfolios nor its

diversification. This situation forces us to impute the balances on the accounts we are missing. The Swedish central bank has information about the total sum of all money deposited in bank accounts. By subtracting the deposits that are accounted for in our data from the total sum of all deposits we arrive at a residual which we allocate equally over all the individuals with missing bank accounts. This method is in line with the method used by Calvet et al. (2007b,a)[4].

In tables A.1 and A.2 we report aggregate wealth statistics of Swedish households and its breakdown into main asset categories by the end of each year under consideration. The tables also include the official wealth statistics published by Statistics Sweden (SCB). A few notes are worth making. Our values match the official values quite well. Discrepancies can be explained by slight differences in classifications of funds. The numbers show that our data set has good aggregation properties, confirming that it's both reliable and accurate. Table 1 provides summary statistics for financial assets as well as other household characteristics for married individuals, single males, and single females.

Table A.3 provides information on intra-household income distribution for Swedish households. The first column shows that in around 67% of marriages, the man has a higher actual income than the woman and more than 70% of the total household income in about 31% of the cases while women earn more than 70% of the household income in approximately 14% of the cases. When we consider fall-back income we see that the proportion of marriages where men have a higher fall-back income than women is similar as for actual income. In about 12% of the cases they have more than 70% of the total household fall-back income while women have more than 70% of the household fall-back income in less than 5% of the cases.

Table A.4 provides information on intra-household age and education distribution for Swedish households. This reveals that in around 18% of marriages, the man is more than five years older than the woman and that in about 2% of the cases the woman is more than 5 years older than the man. When we consider education it can be seen that the proportion of relationships where men have higher education than women is around 21% and that in about 32% of households the woman has higher education.

4 Financial wealth of Swedish households

The composition of financial wealth of Swedish households requires clarification before going further. This is important so as to understand which part of the financial wealth we are analyzing and how its size compares to pension savings and the entire financial wealth of households. An explanation of how a household's financial portfolio is treated in case of a divorce is also needed before laying out the identification strategy.

4.1 Pension system

The Swedish pension system consists of five separate parts. These parts can be classified into three groups depending on whether the funds come from the government through taxes, from the employer or from the individual themselves. The public pension system differs depending on whether the retiree was born before 1938 or after. The system for people born 1938 consists only of defined benefit whereas

[4]Calvet et al. (2007b,a) employed three different imputation methods to address this problem, one of which was the constant balance method, and found that their results were not sensitive to which method they used. Therefore we only consider the method we find most apppealing and do not repeat our calculations using their other methods.

the system for people born after 1938 has both defined benefit and defined contribution components. In the case of the latter system 16% of earnings goes to the defined benefit plan whereas 2.5% goes to the defined contribution plan. The defined contribution plan, PPM, allows the individual to decide where they want to invest their pension money from a menu of funds with different risk and return characteristics.

Employer provided pension is widespread in Sweden with roughly 90% of employees receiving some sort of pension benefits as part of their employment package according to the Swedish Pensions Agency. The amount put into these employer provided schemes is on average roughly 4.5% of the employee's earnings.

In addition to the public pension and the pension provided by the employer, individuals are allowed and encouraged to engage in private pension savings and investments. The Swedish tax system allows for tax deductions for some forms of pension savings. It also allows the individual to decide whether they want to be taxed 30% on realized profits or whether they want to pay a yearly flat tax of about 0.75% of the value of their investments.

Although we do not observe the value of households' defined contribution pension savings[5], our data set contains the majority of household financial wealth (about 85%). We refer the reader to Calvet et al. (2007b, 2009) for detailed presentation of the information on the different categories of household financial wealth in the data set and its coverage.

4.2 Divorce laws

According to Swedish law, a spouse always has the right to obtain a decree for a divorce and is not required to base such a decree on any special grounds. In the absence of a prenuptial agreement all assets are split equally among the spouses at the time of divorce. The couple is encouraged to divide their assets privately but if they are in disagreement they can apply to the district court for the appointment of a marital property administrator. This person will then make a decision regarding what should be included in the division, how their assets should be valued and how they should be divided. The general principle is equal sharing and to ignore who earned the most or brought most into the relationship.[6] Which spouse is at fault for the dissolution of the marriage is also irrelevant as regards the division of their assets. When the divorce is final, the spouses are responsible for their own provision. According to Statistics Sweden roughly 50% of all marriages end in divorce and roughly 12% of all marriages come with a prenuptial agreement (Agell and Brattström, 2011). Non-married couples that are cohabiting are also subject to a weaker version of the divorce laws unless they signed a contract prior to moving in together. Ending a cohabitation does not affect the financial portfolios of either party.

The fundamental idea behind Swedish divorce law is that all forms of economic relations between spouses are cut effectively. Each spouse is therefore individually responsible for his or her own financial support after divorce. Equal splitting of assets and individual responsibility for financial support after divorce make it therefore clear that earnings outside marriage is the appropriate measure of the outside option of spouses in the context of this paper.

[5]These include assets in private pension plans and in public defined contribution accounts.

[6]However, if the result is unreasonably unfair, due for example a short relationship, the court has the ability to modify the division to ensure fairness

5 Empirical Methodology

Our identification approach takes advantage of the segregated nature of the labor market for women versus men in Sweden. More specifically, we exploit the plausibly exogenous variation in sex-specific labor demand across counties. This measure of local sex-specific labor demand is derived by interacting cross-sectional differences in industrial composition with country-wide industry wages. In this section, we start by explaining how decision power has been measured in the literature and the corresponding problems. Next, we explain how we circumvent these problems and how we are able to capture the causal effect of decision power on household outcomes. Finally, we discuss our empirical approach in more detail and the outcome variables under consideration.

5.1 Measures of Decision Power

Several measures of decision power have been used in the literature to show how its distribution affects household decision making.[7] However, endogeneity is a potential problem associated with most of them and prevents causal interpretation. In most cases, decision power measures are based on the assumption that the degree to which spouses are able to exert their preferences in household decision making is determined by the respective resources the spouses contribute to the household (Blood and Wolfe, 1960).[8]

Non-labor income is one of the measures of decision power that has been used in the literature and has been used to study its effect on various household outcomes (e.g. Thomas, 1990; Schultz, 1990). However, non-labor income suffers from potential endogeneity since it is a characteristic of past savings behavior or receipt of, e.g., inheritance, pension or benefits that are also influenced by spouses' power. Many papers use relative earnings or relative income of the wife as a measure of decision power (e.g. Browning et al., 1994; Euwals et al., 2004; Gibson et al., 2006; Lundberg and Ward-Batts, 2000). However, treating earnings or income as an indicator of decision power typically involves the erroneous assumption that earnings observed while married is a good proxy for earnings at the unobserved threat point. Furthermore, income depends upon labor force participation and time allocation decisions which are also influenced by spouses' relative decision power.

A number of other measures of decision power that might be subject to endogeneity have been employed to study its effect on household decisions making. In order to give estimates based on these measures a causal interpretation, their potential endogeneity must be dealt with. The central task of empirical studies of this kind is therefore to identify sources of female power that vary exogenously. In particular, one needs an instrument that is strongly correlated with female decision power but not directly with the decision making of the household.

A spouse's decision power is determined by her or his utility at the threat point. An increase in well-being at a spouse's threat point would thereby also increase her or his relative decision power. Any exogenous shift in a spouse's utility at the threat point can therefore be used to capture the causal effect of relative spousal decision power. Lundberg et al. (1997), for example, find that an exogenous change in public transfers to the wife causes a substantial and significant increase in expenditure on

[7] Most papers have used differences in spousal characteristics as a measure of relative decision power, e.g. differences in education, labor income, non-labor income, age difference, assets brought to marriage, current assets, etc.

[8] Doss (1996) proposes an alternative view: a wife's lack of a wage income may simply reflect her good bargaining position within the household, i.e., she may exert her decision power to choose not to work in the labor market and to let other household members support her.

children's clothing relative to men's clothing, and on women's clothing relative to men's clothing, through increased decision power of women.

Direct control of monetary resources is not the only factor that can contribute to a relative increase in intra-household decision power. Preferable characteristics such as higher education can also increase well-being at the threat point and decision power within the household. Strauss and Thomas (1991), e.g., find that the education of Brazilian mothers can increase children's height via their mother's access to information, measured by indicators of newspaper reading, TV watching, and radio listening.

There are also other channels through which the female decision power within the household can be increased. Regulatory changes, e.g., can be used as a proxy for an exogenous shift in family decision power. Rangel (2006) uses a regulatory change in alimony rights in Brazil as a proxy for an exogenous increase in relative decision power of women and finds that this affects the level of investment in schooling of children. However, any measure of couples' relative power that does not involve an exogenous shift in their utility at the threat point must be instrumented properly.

As discussed by Pollak (2005, 2011), fall-back income, not actual income, determines well-being at the threat point and, hence, decision power as well. Consider, e.g., a highly educated married woman where the household tasks are divided such that she stays at home with the children and takes care of the household. Her earnings are affected by the very fact that she is married, she earns nothing even though she would have high income should they split up and she start working. A spouse whose earnings are low because she or he chooses to allocate working hours to household production instead of market work, does not have less decision power. However, a spouse whose fall-back income is low does have less decision power.

We use the earnings married individuals could expect to earn relative to the couple's combined expected earnings should they divorce as our proxy of the spouse's relative utility at the threat point, and hence also their decision power. In order to estimate this salary we calculate the average salary of people of the same gender and age with the same education living in the same region that either do or do not have children. However, as our decision power measure is based on many choice variables that are very likely correlated with unobservables relegated to the error term, it is prone to endogeneity. OLS estimates based on this measure could thus be biased and we therefore need an exogenous source of variation to instrument it.

5.2 IV measures

In order to deal with the potential endogeneity of the fall-back income measure and establish a causal relationship between the decision power of spouses and the composition of household portfolios, we need exogenous variation in the relative threat points of the spouses as an instrument for our measure of decision power. One measure which is correlated with threat points is labor demand. If demand for an individual's skills increases, ones options outside the partnership increase in value — whether this person is working or not. Examples of channels through which this could occur are increasing earnings, decreasing expected duration of unemployment, and increasing employment stability.

Labor demand and supply operate through wages and hours. However, as actual variation in wages reflects both demand and supply effects, we cannot directly use the relative earnings within households as this measure would be endogenous as discussed before. To provide estimates that can be given causal interpretation, we now turn to an instrumental variables approach pioneered by Bartik

(1991) and Aizer (2010).

Based on gender segregation between industries, the industry composition of counties and the industry-wide wage changes at the country level, we can isolate sex-specific variation in local wages that is driven solely by aggregate labor demand, which is presumably uncorrelated with the worker characteristics in the local labor market under consideration. This allows us to create a measure of prevailing female and male wages that reflects solely the exogenous sex-specific labor demand. Using this to instrument the decision power measure based on the relative fall-back income therefore circumvents the endogeneity problem associated with it. This approach accounts for the fact that fall-back income, not actual income, determines well-being at the threat point and solves the problem of potential endogeneity of the fall-back income. The instrument is based on a measure of average annual wages that are calculated by gender in each county as follows:

$$\bar{w}_{gcey} = \sum_j \alpha_{gcej} w_{-cyj} \tag{2}$$

where α_{gcej} is the proportion of workers of gender g in county c with education e that are working in industry j[9] and w_{-cyj} is the annual wage of workers in industry j in Sweden except for county c in year y. The proportion α_{gcej} is fixed over the entire period so that selective sorting across industries is not reflected in this wage measure. Our data contains 88 different industries, 21 different counties and 3 different education levels.

The reason for excluding the county under consideration when measuring wages over counties is to prevent endogeneity associated with local labor force characteristics, i.e., by doing this we remove from the measure any changes in wages that could be caused by changes in local labor force characteristics. This addresses the concern that the observed change in countrywide wage growth is driven by the concentration of an industry in the county under consideration.

The prevailing female/male labor earnings ratio increased by 0.6 percentage points, from 0.893 to 0.898, between 2000 and 2006. At the same time, the true labor income ratio for couples increased by 7.0 percentage points, from 0.829 to 0.887. These numbers can be found in table A.5. Furthermore, figure 2 shows the actual and fall-back income ratio for each county on maps of Sweden. This illustrates both the variation between counties and the divergence between actual and fall-back wages.

Our identification approach relies on two assumptions that deserve further discussion. First, there is imperfect substitution between gender groups within occupations. Historically, men and women have tended to choose different occupations. Women are, for instance, overrepresented in health care and social services while most workers in construction are men. Second, labor market demand and supply is only partially adjusted in the short run due to mobility costs (Blau et al., 2000; Katz and Murphy, 1992). This assumption allows panel data approaches to exploit short-term fluctuations in labor market conditions to evaluate the effects of shifts in decision power among households, while in the long run individuals will be able to adjust to new conditions by changing either their industry or their geographic location, preventing any causal inference.

If these assumptions hold, country-wide wage growth within industries would influence individuals differently depending on the significance of the occupation under consideration in their county of residence and within their education level and the gender-ratios within that industry and education

[9] $\alpha_{gcej} = N_{gcej}/N_{gce}$ and therefore $\sum_j \alpha_{gcej} = 1$.

level. This allows for the creation of a sex-specific measures of prevailing local wages of individuals based on the occupational structure of the county and countrywide wage growth in occupations. This measure is independent of underlying worker characteristics in the county which could be correlated with decisions taken within households and would thereby bias the results.

Data for Sweden show that the assumption on gender segregation between industries holds in this paper. In 2006, 77.2% of employers in health care, social services and veterinary services were women and 92.0% of construction employees were men. We exploit this segregated nature of the labor market for women versus men within the Swedish labor market where increases in demand in some sectors result in exogenous increases in the relative earnings of females and males. Using the industrial structure of the county under consideration and the country-wide wage growth within industries we can therefore create sex-specific measures of prevailing local wages.

By constructing our measure like this we know that counties with higher concentration of female dominant industries that are experiencing a high country-wide wage growth will experience a greater narrowing in the gender wage gap and our identification is based on this. For instance, let us assume that there are only two counties, Stockholm and Gotland, and three industries, manufacturing, service and farming. Furthermore, the shares of each industry in Stockholm and Gotland are 0.2, 0.7, 0.1 and 0.3, 0.2, 0.5, respectively. Now, if there is a higher countrywide wage growth in services than in the other industries, Stockholm will experience a shrink in the gender wage gap while Gotland does not, causing an upward shift in the relative decision power of women in Stockholm.

5.3 Empirical Approach

We explore the determination of several features of household financial portfolios. First we begin by analyzing the participation of households in equity and other risky assets. Among those households who do participate, we investigate two different measures of how much the household has allocated onto risky assets: the direct equity share and the risky share. We proceed by analyzing the amount of idiosyncratic and systematic risk in household's portfolios of risky assets by comparing the actual diversification of Swedish households to a diversified equity benchmark.[10] Given a global index, G, the capital asset pricing model (CAPM) asserts that the relationship between the excess return of asset i and the excess return of the global index is given by

$$r_{i,t} = \beta_i r_{G,t} + \epsilon_{i,t}, \tag{3}$$

The residuals from the CAPM regressions in (3) measure the idiosyncratic risk of asset i and are obtained in the following way:

$$\epsilon_{i,t} = r_{i,t} - \hat{\beta}_i r_{G,t} \tag{4}$$

If we now consider a portfolio of n risky assets then the volatility matrix of the assets' returns that is due to idiosyncratic risks is given by the covariance matrix of the portfolios's idiosyncratic risks,

[10]Since Sweden is a small and open economy, we opt for a comparison to a diversified portfolio of global stocks. For this purpose, we follow Calvet et al. (2007b,a) and go for the All Country World Index (henceforth "global index") compiled by Morgan Stanley Capital International (MSCI) in U.S. dollars.

Σ.[11] Let a_h denote the portfolio allocation vector of household h, where $a_{h,i}$ represents the fraction of financial wealth invested in risky asset i. The idiosyncratic risk of the risky portfolio of household h is then given by

$$\sigma^2_{\epsilon,h} = a'_h \Sigma a_h, \tag{5}$$

and the systematic risk of the risky portfolio of household h is given by:

$$\sigma^2_{G,h} = \beta^2_h \sigma^2_G \tag{6}$$

where $\beta_h = a'_h \beta$.

The total risk of the household portfolio, σ^2_h, is therefore comprised of systematic risk, $\sigma^2_{G,h}$, and idiosyncratic risk, $\sigma^2_{\epsilon,h}$. These measures capture the contribution of systematic and idiosyncratic risk to the volatility of returns of the risky portfolios of households, respectively.

We have now laid the foundations necessary to examine the outcome variables of interest to us:

Market participation:

$$\mathbb{I}_{\phi_h>0} = \begin{cases} 0 & \text{if} \quad \phi_h = 0 \\ 1 & \text{if} \quad \phi_h > 0 \end{cases}$$

$$\mathbb{I}_{\theta_h>0} = \begin{cases} 0 & \text{if} \quad \theta_h = 0 \\ 1 & \text{if} \quad \theta_h > 0 \end{cases}$$

where ϕ_h is the direct equity share for household h and θ_h is the risky share for household h.

Asset allocation:

Direct equity share:

$$\phi_h = \frac{\sum_{j \in E} Q_{h,j} P_j}{\sum_{j \in A} Q_{h,j} P_j}$$

Risky share:

$$\theta_h = \frac{\sum_{j \in E \cup F} Q_{h,j} P_j}{\sum_{j \in A} Q_{h,j} P_j}$$

[11] This structure of the matrix involved can be illustrated in the following way:

$$\Sigma = \begin{pmatrix} \sigma^2_1 & \sigma_{1,2} & \cdots & \sigma_{1,n} \\ \sigma_{2,1} & \sigma^2_2 & \cdots & \sigma_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_{n,1} & \sigma_{n,2} & \cdots & \sigma^2_n \end{pmatrix}$$

where $\sigma^2_i = var(\epsilon_i)$ and $\sigma_{m,n} = cov(\epsilon_m, \epsilon_n)$.

where E stands for equity, F for risky funds[12], A for all financial assets, $Q_{h,j}$ is the number of shares of asset j owned by household h and P_j is the price of asset j.

Risk taking and diversification:

Total risk: σ_h^2 is the total risk of household h and is measured as the volatility of the risky part of the portfolio, i.e., the annualized standard deviation of the return of the risky part of the portfolio.

Idiosyncratic risk: $\sigma_{\epsilon,h}^2$ is the idiosyncratic risk of household h and is the part of total risk that does not stem from systematic market movements. More precisely, it's the annualized standard deviation of the residuals, (ϵ), in the CAPM regression in equation (3).

We consider the following regression:

$$Y_h = \alpha_0 + \alpha_1 \frac{z_{h2}}{z_{h1} + z_{h2}} + X_h \alpha_2 + \varepsilon_h \tag{7}$$

where Y_h is the outcome variable under consideration of household h, z_{h1} and z_{h2} are fall-back incomes for the husband and the wife in household h, respectively, and ε_h is an unobserved component which captures everything else influencing the outcome variable under consideration. X_h is the vector of additional control variables that is added in order to pick up background factors.

If female decision power was randomly assigned across relationships, we could give the OLS estimates in the above specification causal interpretation. However, female decision power is unlikely to be randomly assigned and it is possible that we are subject to selection on observables or unobservables. The coefficient on fall-back income, α_1, will therefore not necessarily represent the causal effect of women's decision power on household financial portfolios.

In order to overcome this endogeneity problem we need to isolate a source of variation in female decision power that is exogenous to household portfolio outcomes. This we do by employing the instrument discussed earlier which takes advantage of the fact that certain industries have traditionally been dominated by women and others by men and create sex-specific measures of prevailing local wages based on the industrial structure of the county and countrywide wage growth in industries dominant in each county. This measure reflects sex-specific labor demand (see Bartik, 1991; Aizer, 2010) without being affected by underlying worker characteristics in the county which could be correlated with riskiness of household portfolios.

Our hypothesis is that households living in counties that experience an increase in the relative labor demand for women will also experience an increase in women's influence within households through an increase in their relative decision power. These women will renegotiate the financial portfolio composition of their households. We expect this to lead to a reduction in participation in risky asset markets and less risky and better diversified household portfolios.

The first stage regression equation can be written in the following way:

$$FB_h = \frac{z_{h2}}{z_{h1} + z_{h2}} = \delta_0 + \delta_1 DP_h + X_h \delta_2 + u_h \tag{8}$$

where DP is our measure of the relative decision power of spouses, i.e., the ratio of local wages of the female and the local wages of the male and the female in a household:

[12]We define equity funds, hedge funds and mixed funds as risky funds.

$$DP_h = \frac{w_{h2}}{w_{h1} + w_{h2}} \tag{9}$$

where w_{h1} and w_{h2} are local incomes[13] for the husband and the wife in household h, respectively, and u_h is an unobserved component which captures everything else influencing the relative fall-back income of spouses. The predicted value of the relative fall-back income from the first stage, $\widehat{FB}_h$, is then used in the second stage regression:

$$Y_h = \alpha_0 + \alpha_1 \widehat{FB}_h + X_h \alpha_2 + \varepsilon_h \tag{10}$$

In order to be a good instrument, the DP_h variable can only affect household portfolio decision making via the endogenous fall-back income, and not through any other channels. Table A.6 reports the results of a regression of the endogenous variable, FB_h, on the exogenous instruments in our sample of couples. The signs of the coefficients are as expected, on average, a relatively higher local labor demand for a female partner than the male partner implies a relatively higher fall-back income for the female partner. Moreover, the instruments are jointly significant, the F-statistic on the exogenous instruments is well above 1 000 for all the outcomes.

As Staiger and Stock (1997) show, the weak instruments problem can arise even when the first-stage F-tests (based on R-squared) are significant at conventional levels in a large sample. Bound et al. (1995) and others have promoted using the partial R-squared statistic to assess whether a weak instrument problem is present despite high F-statistic. This statistic is not much lower than R-squared (around 0.6) which alleviates concerns about weak instruments biasing our estimates.

6 Results

6.1 Descriptive statistics

We begin by showing that the financial portfolios of Swedish individuals and couples display the same characteristics as are generally found in the literature. Figure 3 provides graphical illustrations of how single men and single women differ from each other and from couples in their financial decision making. We control for wealth and liabilities of agents, their age[14], whether they have ever been married, whether they have children,[15] whether they are homeowners, and their level of education.[16]

The difference in risky asset market participation of single men and single women depends on which measure of participation we consider. Direct equity participation is, consistently, higher among single males than single females. On the other hand, there does not seem to be any consistent difference between the participation of single men and single women when we also consider participation in other risky asset markets. Furthermore, the figures also reveal that the participation among couples in risky

[13] Local income is our sex-specific measure of local wages that was defined in equation (2).

[14] When controlling for the age of a couple, we use their average age.

[15] We control for the number of children under the age of 3, the number of children between 4 and 10 and the number of children between 10 and 17.

[16] We do this by running regressions for the outcome variables of interest to us with wealth, liabilities, age, a dummy for whether the person has ever been married, the numbers of children in each age category, a dummy for whether the person is a homeowner, dummies for different level of education as controls and dummies for whether the person is a part of a couple, a single man or a single woman. We use the estimates obtained from these regression to obtain predicted values for each group under consideration where the values for the controls are the sample-wide averages of households for the controls.

asset markets is higher than among singles. Part of this is mechanical though as the couple is defined as participating if either spouse participates.

We next compare the asset allocation decisions of single males and single females by looking at the direct equity share and risky asset share for these groups. Conditional on participation, single males invest a higher fraction of their financial wealth in equity than single females. The same holds when we also consider other risky assets. However, when using this measure of the share of wealth allocated onto risky assets, the difference between single males and single females is much smaller than when comparing their direct equity shares. This implies that single males might have higher propensity to take idiosyncratic risk. The graph also reveals that couples have a lower direct equity share and a lower risky share than singles.

Conditional on participation, both total and idiosyncratic risk of single males is higher than of single females. Couples' total risk lies between the total risk of single males and single females and the idiosyncratic risk of couples falls between the idiosyncratic risk of single males and single females. The graph therefore suggests that single women take less risk and are more diversified than single men and that the decision on financial risk taking and diversification of couples is a convex combination of the decisions that single men and women take.

The graphs are consistent with the idea that there is something that separates men, women, and married people from each other when it comes to financial decision making and that is not readily explainable by observables. More specifically, the graphs illustrate that when comparing single men and single women, conditional on background characteristics, single men invest a larger share of their financial wealth in risky assets, have higher participation rates in equity markets, are less diversified and take more idiosyncratic, and total risk.

The graphs for equity share, total risk, and idiosyncratic risk are consistent with the idea that when a man and a woman get married they each use their decision power to enforce their preferences. This translates into a situation where the spouses eventually come to terms with an arrangement that falls between the arrangements each of them would have chosen outside the marriage and their relative decision power determines which scenario their collective arrangement is closer to. This is all in line with what one would expect. However, it can also be seen from the graphs for the participation and risky share that not all financial decisions of households are a convex combination of the decisions husbands and wives would take in case they were single, even after controlling for everything conceivable.

One potential explanation for this is that family composition can be viewed as a source of a background risk and therefore plays a role in determining the demand for risky assets and participation in risky asset markets.[17] This is consistent with the finding of Christiansen et al. (2013) who yound that becoming a two-headed household makes investors participate more in the stock market.

Empirical evidence implies that the amount invested in risky assets is not a fixed fraction of financial wealth in the financial portfolios of households. This suggests that a graph that compares the risky share of all single individuals and all couples might therefore be masking a convex combination of preferences within certain wealth groups. Given the prevalence of positive assortative mating, we should rather compare single individuals and couples that belong to a certain part of the wealth

[17]Several papers show, both theoretically and empirically, how the existence of background risk can affect the riskiness of household portfolios (see, e.g., Guiso et al., 1996; Koo, 1999; Heaton and Lucas, 2000; Elmendorf and Kimball, 2000; Viceira, 2001; Haliassos and Michaelides, 2003).

distribution. For the upper part of the wealth distribution we would also expect wealth to play a smaller role as the wealth elasticity of the risky share is diminishing (Calvet and Sodini, 2013). The comparison of the risky share of single men, single women, and couples in the upper quartile of the wealth distribution is therefore better suited to answer the question whether household preferences concerning the share of risky assets in their financial portfolios are a convex combination of individual preferences. When we do this we actually see that both the equity and risky share of couples in the upper part of the wealth distribution falls between that of single men and women. This can be seen in figure A.1.

To summarize, some of the figures present strong evidence of a setup where household decisions are based on a convex combination of the preferences of each spouse. As explained, differences in background risk among the groups compared could explain those cases where we do not see a convex combination of preferences. If it was possible to control for these factors, we should see household preferences that were a weighted average of individual preferences. Another potential explanation is that spouses bargain over the measures discussed so far in order to reach a goal that all these measures affect, like household welfare. As all these measures affect economics cost, some of them do not have to be a convex combination of the choices singles make as this is not the ultimate goal of the couple. However, the graphs do not say anything about what determines how the preferences are weighted, even though one could expect the relative decision power of the spouses to be the force behind how their utilities are weighted when it comes to making decisions on the household level. These graphs can therefore only be taken as descriptive evidence of household behavior and we must turn to formal statistical tests to pursue the question of whether financial decision making of households is determined by the relative decision power of spouses.

6.2 Regression results

Table 2 reports the coefficients on the gender dummy for single individuals, using OLS estimations, and OLS and IV estimated coefficients on decision power for the financial decisions of interest to us along with the first stage coefficients. The following subsections provide separate discussions of our results for market participation, asset allocation, and risk taking and diversification, for both single individuals and households.

6.2.1 Comparison of single males and females

The conclusions drawn from the comparison of market participation of single males and single females are different depending on which participation measure we use. When we look at direct equity participation we find that single males participate more than single women. More specifically, single women are 6.6 percentage points less likely to participate in equity markets, all else the same. This means that direct equity participation is 33.5% lower among single women than among single men. When we consider risky asset market participation on the other hand, single females participate more than single males. Risky asset market participation is 1.5 percentage points higher among single females than among single males, implying that risky asset market participation is 3.5% higher for single women than for single men.

As suggested by the descriptive statistics, the results for the direct equity share and the risky market share for single males and females are more consistent with each other than the participation

results, i.e., the difference between men and women goes in the same direction. For those singles who participate in equity markets, single males place a higher proportion of their financial wealth in equity. More specifically, the direct equity share for single women is 4.8 percentage points lower than for single males, all else equal. This means that the direct equity share for single women is 17.0% lower than for single men.

Looking at the risky share, it turns out that for those who participate, single males have a higher risky share than single women. This means that even though risky market participation is greater among single women than among single men, single men that do participate still invest a higher proportion of their financial wealth in risky assets. The risky share for single women is 1.5 percentage points lower than for single males, all else equal, implying that the risky share is 3.5% lower for single females than for single men.

Our comparison of single males and single females also reveals that single females hold less risk in the risky part of their financial portfolios, i.e., the volatility of the return of the risky part of the financial portfolios of single women is 5.2 percentage points (20.7%) lower than among single males. Furthermore, single females also hold less idiosyncratic risk in their financial portfolios, i.e., idiosyncratic risk is 3.7 percentage points (24.4%) lower among single women than among single men. We therefore conclude that when compared to single males, single females hold less risk in their portfolios and they are better diversified.

Women have been found to have different preferences for risk than men. Previous studies suggest that the gender differences in risky asset market participation could be attributed to this fact (see, e.g., Halko et al., 2012). However, previous work has generally defined risky assets as stocks. In this paper we also consider other risky assets. This more comprehensive measure of risky asset market participation shows that the gender difference in participation in risky asset markets is much smaller than stock market participation implies. This suggests that the difference in stock market participation between men and women cannot be fully explained by differences in risk appetite between men and women, it is rather consistent with men and women having different preferences on how to take risk. Comparison of the gender difference in equity share and the gender difference in risky share reveals the same. The more comprehensive risk measure suggests that there is much less gender difference than the equity share suggests.

So what is the difference between direct stock market participation and risky asset market participation? In addition to stocks, the latter also includes equity funds, hedge funds, and mixed funds. Direct equity participants build and maintain their own portfolio of individual stocks. They therefore use their knowledge and invest their time and energy in their attempt to beat the market, a challenging task at which few succeed. Although risky, investments in equity funds, hedge funds and mixed funds are of different nature. In these cases, investors pay others for their effort to beat the market for them. This implies that more confident investors are less likely to choose this option over buying individual stocks. Our findings that men are more likely to make risky investments that they are in control over themselves, while women rather make risky investment that others are in control over, is therefore in line with the findings of Barber and Odean (2001) that men are in general more overconfident than women about their ability to make financial decisions. Recent work in experimental economics has also examined gender differences in participation of different activities. These studies document that, conditional on performance, men are more eager to compete and react more favorably when exposed

to increased competition. This shows that women are more likely to shy away from participating in competitive activities (see, e.g., Niederle and Vesterlund, 2007). This suggests that women might be reluctant to participate in the equity market due its competitive aspects.

To sum up, women still take less risk than men, which is consistent with the well-known gender difference in risk preferences. However, the difference is not as big as participation in the equity market suggests. The gender difference in equity participation may partly be explained by differences in preferences for competitive environments and overconfidence. More specifically, women's apprehension for holding individual stocks in their portfolio could be driven by their grudge against the sports-like aspects of direct equity participation and the fact that they do not have as high-flown ideas about their investment abilities as men.

6.2.2 Couples

Considering market participation, we find that as the married woman's decision power increases, the household's participation in equity markets decreases. More specifically, one standard deviation increase in the relative decision power of a married woman implies that household participation in the equity market is reduced by 0.15 standard deviations. When we also consider the decision to participate in other risky asset markets, we find that the participation is decreased by 0.12 standard deviations as a result of this shift in decision power. These numbers imply a 16.7% and 8.2% reduction from mean participation in equity and risky asset markets, respectively.

Among households who participate in equity markets, greater decision power of women implies a lower equity share, meaning that they place a lower proportion of their financial wealth in equity. More specifically, the direct equity share drops by 0.11 standard deviations when the decision power of women increases by one standard deviation. Similarly, a greater decision power of women in households who participate in either equity or other risky asset markets results in a lower risky share, meaning that the household places a lower proportion of their financial wealth in equity or other risky assets. A one standard deviation increase in the decision power of women in households reduces the risky share by 0.2 standard deviations. This implies a 11.9% and 14.1% decrease from the mean share of equity and risky assets in the financial wealth of households, respectively.

Finally, we consider risk taking and diversification decisions of households and find that greater decision power of women reduces the former and increases the latter. To be more precise, our results show that a one standard deviation increase in the decision power of married women decreases the total risk in the household's financial portfolio, i.e., the volatility of the return of the risky part of the financial portfolio of the household, by 0.06 standard deviations. This also reduces the idiosyncratic risk in the household's financial portfolio by 0.05 standard deviations. This implies a 3.0% and 3.5% reduction from the mean idiosyncratic and total risk held in financial portfolios of households, respectively.

Idiosyncratic and total risk measure the level of risk in the risky portfolios of households. These measures do not capture the risk of the total financial portfolios though. One might worry that our findings would not hold if our risk measures are weighted by the shares of financial wealth invested in equity and risky assets, which captures the level of idiosyncratic risk and total risk held in the total financial portfolios. We therefore ran regressions using the weighted risk measures and found that these results are consistent with the ones from the unweighted regression, greater decision power of

wives reduces the amount of idiosyncratic and total risk held in the financial portfolios of households. These results are available upon request.

6.3 Interpretation of Results and the Distribution of Effects

Previous findings have shown that marriage affects the financial decisions of individuals and suggests that financial decisions of married individuals reflect the preferences of their partners (Christiansen et al., 2013). In this paper we go one step further and show how the weight of spouses' preferences in household financial decision making is determined. Christiansen et al. (2013) also show that riskiness of individual portfolios is not affected by marital transitions of homosexual investors, implying that the differences in preferences within couples on household portfolio composition is mainly driven by gender-specific differences in preferences but not by assortative mating.

The IV estimates represent the average marginal change from an increase in female fall-back income share (FB_h) for the subgroup affected by the female labor demand share instrument (DP_h). This subgroup is composed of couples whose financial decisions are affected by small shifts in sex-specific labor demand. These estimates cannot be generalized to the larger population without additional assumptions, such as a constant marginal change in financial decision making across households as a result of a change in the household decision power distribution. However, the fact that Sweden is one of the most egalitarian countries in the world (EIGE, 2013) may suggest that the results give a lower bound for global effects.

As discussed earlier, we hypothesized that a shift in decision power from the husband to the wife causes a larger reduction in risk in household portfolios in households where wives are in the lower part of the threat point distribution. More specifically, the portfolio effects should not come from households at the top of the women's decision power distribution. We rather expect the effect to come from households in the lower part of the women's threat point distribution as a shift in decision power towards women in this part of the distribution is predicted to have a larger effect than at the upper part of the distribution. The assumption of a continuous distribution for women's threat points allows us to test this. Figure 4 presents the estimates obtained for different parts of the women's threat point distribution for the different outcome variables we consider. The results support our hypothesis, portfolios of households in which the wife's wage is in the lowest quintile of the threat-point distribution are much more affected by shifts in the distribution of decision power within the household than other households. Figure 5 reveals that these are the households in which the household's fall-back income ratio is in the middle quintile of the fall-back income distribution.

Comparing the results from the OLS and IV regressions, we find that the coefficients from the IV regressions are nearly twice as large as the OLS estimates. However, the standard errors of the IV estimates are much larger than those from the OLS estimates, the larger confidence interval is the price we pay to get a consistent estimator of the effect that the distribution of decision power within households has on their portfolio composition. Part of the difference could therefore be due to this. However, even though the IV estimates are imprecise, the range of the point estimates is well above the corresponding OLS estimates for all outcome variables except for total risk.

A potential explanation for the difference between the estimates from the IV model and those from the OLS specifications is the endogeneity of the fall-back income measure. As discussed earlier, the relative outside options of couples may reflect unobserved characteristics, which would imply

that our measure of the relative decision power of couples suffers from endogeneity so OLS estimates will be biased. For instance, women with very likable personalities, better social networks or that are physically attractive may may be more successful at exerting their preferences such that the household portfolio is more similar to their preferred portfolio than women with disagreeable personalities, poor social networks or that are physically unattractive. Furthermore, our estimation of the outside option is measured with error which could be another source of endogeneity.

Boulier and Rosenzweig (1984) show that physical attractiveness affects household allocations and it could potentially also affect their measure of bargaining power, the size of marital transfer women bring with them into marriage. As self-selection exists in the marriage market, this is actually quite likely. If exogenously less attractive women obtain more education,[18] all else equal, than do more attractive women, the estimated effect of decision power of women on household outcomes where both relative outside options and attractiveness affect the outcome under consideration, would be biased downwards in a simple ordinary least squares analysis. As educational attainment is among the main determinants of one's outside option, less attractiveness among better educated women would bias our OLS estimates downward.

Another explanation for the disparity between the IV and the OLS estimates is heterogenous treatment effects. It is likely that a substantial fraction of those affected by changes in labor market opportunities may be households where women are on the margin of being able to exert their preferences. Therefore, the local average treatment effects identified in the IV specifications may not be very informative about the overall effect of a shift in sex-specific labor demand on household portfolios although it captures the effect for households where women are on the verge of being able to have an impact on the financial decisions within their households.

6.4 Risk decomposition

High idiosyncratic risk in household portfolios can result in a welfare loss. Calvet et al. (2007b) calculated the economic cost of under-diversification in Sweden and found that the median investor experienced an annual return loss from underdiversification of 2.9% on a risky portfolio, or 0.5% of household disposable income. However, there was substantial heterogeneity in these costs and for every one in ten investors this cost was more than 4.7% of disposable income.

As shown earlier, greater decision power of a married woman increases the diversification of the household portfolio. However, we have not been able to say anything about the effect that increased diversification among households where women have more decision power has on household welfare. A good way of determining the welfare losses of sub-optimal financial portfolios is to look at the return loss of household portfolios, the average cost from choosing a suboptimal portfolio. More specifically, the return loss measures the loss in potential return for a given level of risk so it captures the overall efficiency loss in the portfolio. The return loss of household h is calculated as

$$RL_h = r_m \times \theta_h \times \beta_h \times \frac{RSRL_h}{1 - RSRL_h}$$

where r_m is the market risk premium (in our case proxied by the historical average excess return of the

[18] Boulier and Rosenzweig (1984) find that less attractive women receive more schooling. This is supported by the findings of French et al. (2009) that controlling for personality and grooming, physical attractiveness has a negative effect on school performance.

MSCI World Index), θ_h the risky share of the portfolio, β_h the beta of the portfolio, and $RSRL_h$ the relative Sharpe ratio loss of the portfolio. The relative Sharpe ratio loss measures the diversification loss in the risky asset portion of the portfolio and is defined in the following way:

$$RSRL_h = \frac{S_G - S_h}{S_G}$$

where S_G and S_h are the Sharpe ratios of the benchmark and the household portfolio, respectively. A relative Sharpe ratio loss of 20% indicates that the portfolio's Sharpe ratio is 20% below that of the MSCI World Index. In order to determine the relative importance of the individual constituents of the return loss we divide the relative return loss of household h by the return loss for the average household and log-linearize the expression. Noting that $\bar{r}_m = r_m$ for all h we get the following

$$(\ln RL_h - \ln RL) = (\ln \theta_h - \ln \theta) + (\ln \beta_h - \ln \beta) + (\ln \frac{RSRL_h}{1 - RSRL_h} - \ln \frac{RSRL}{1 - RSRL})$$

By estimating a separate identical regression for each term in the expression above, the regression coefficients of the left hand side must necessarily be equal to the sum of the respective regression coefficients of the right hand side, which will allow us to determine the relative importance of the different components for the return loss.

We begin by decomposing the return loss of single individuals so that we can compare the results for married individuals to theirs. This allows us to assess how marriage and intra-household bargaining affects the financial decision making of households. We find that single women have a lower return loss than single men and that this is to a great extent brought about through superior diversification. Comparison to couples reveals interesting findings. As the results for single individuals suggest, increased bargaining power of married women does indeed reduce the return loss of household portfolios. The propagation mechanism is different though. The return loss reduction for household portfolios is primarily driven by the reduction in the risky share. This shows that single women take greater measures to reduce the return loss of their portfolios than single men and once they get married they use their decision power to reduce the return loss of the household portfolio. However, they are not able to do this by the means they would prefer, i.e., via greater diversification as single women do. Instead they manage to reach their goal of reducing the losses caused by the larger idiosyncratic risk they have in their portfolio by allocating less wealth to their risky portfolio. This is consistent with an interpretation in which wives are more aware of the household's limited investment skills than husbands when they bargain on how big the share of risky assets should be in their financial portfolios. The wives are not able to convince their husbands that their investment choices are suboptimal though but manage to reduce the welfare loss of the household by reducing their risky share. Table 3 presents the estimated coefficients from the decomposition regressions for singles and couples.

6.5 The Role of Financial Education

Financial education is known to be important for stock market participation decisions (Christiansen et al., 2008). This implies that financial education should be given a special attention in an analysis like ours. As economists have acquired knowledge about financial markets and risk-return trade-offs

by means of formal education, an indicator of a degree in economics[19] should capture the role financial education has on financial decision making.

Including an indicator for an economics education in our regressions for single individuals allows us to analyze the effect that information and learning have on financial investments. Hong et al. (2004) find that learning from peers affects financial risk taking of individuals and Duflo and Saez (2003) find that retirement planning is subject to peer effects. Being married to an economist makes it more likely to have a high proportion of economists in one's peer group. This suggests that it might be even more important to control for financial education of spouses than singles.

We find that stock market participation and risky asset market participation is positively influenced by being an economist. The same holds for the equity share, the risky share, idiosyncratic risk, and total risk. However, controlling for financial education does not change the significant and sizable gender difference in financial decision making we found before.

Our results for the effect of decision power on portfolio composition of households are robust to the inclusion of an indicator for an economics education. In addition, this allows us to say something about how financial education of male and female spouses affects financial decision making of households and about the relative importance of these variables. We find that financial education of both male and female spouses has positive effect on all our outcome variables. Interestingly, financial education of female spouses has larger effect on participation in the equity market and other risky asset markets than financial education of male spouses. However, financial education of male spouses has larger effect on the equity share while financial education of female spouses has larger effect on the risky share. Finally, financial education of male spouses has larger effect on total risk and idiosyncratic risk than does financial education of female spouses. These results can be found in Table A.7.

6.6 Additional Specifications

In this section we present the results of a number of alternative specifications that verify the robustness of our results and hence their causal interpretation.

The empirical analysis of most studies on household financial decision making is mainly conducted across observations (see, e.g., Yilmazer and Lich, 2013) and one might worry that our findings are only driven by variation across observations. However, our data allows us to isolate the effect of shifts in decision power within households over time on the financial decision making of the household. We do this by re-conducting our analysis using household fixed effects and our estimates verify that a shift in the decision power from one spouse to another does in fact affect the financial decision making of the household. These results can be found in Table A.8.

Next, we show that our results are not sensitive to how the difference in the threat points of spouses is defined. In table A.9, we use an alternative measure of the fall-back income gap, the linear difference in the fall-back income of the spouses. The coefficient estimates are smaller than when we define the fall-back income gap to be the proportion of female fall-back income and the total fall-back income of the couple but this is due to the scale of the gap when defined this way. The implied effects, however, are similar to those obtained in our baseline specification.

We also instrument for decision power using countrywide employment growth in the industries in each county as measures of demand. This instrument is similar to the measure used in our baseline

[19] We also include related fields like finance and business administration.

specification, but using this alternative instrument shows that our findings are not limited to the wage growth instrument used in our baseline specification. The results obtained using this instrument can be found in Table A.10. The estimates are similar to those we obtained in our baseline specification.

In addition, we utilize changes in the industrial composition of counties over time as an alternative source of identifying variation. For this instrument we hold industry wages at the county level fixed at the base year (1999) and create a time-varying measure of the share of women working in each industry. Our findings hold when using this instrument and are presented in Table A.10.[20]

In our main specification, we have chosen to cluster standard errors at the municipality level as it is reasonable to expect that the error terms for individuals in the same municipality are not independent since county wide shocks will induce correlations among individuals at a moment in time. However, our results are robust to alternative clustering schemes. One concern is that labor market shocks will induce correlations between individuals within years. We therefore run our regressions where the standard errors are clustered at the year level and this does not affect the significance of our results. Another concern is that we have correlated standard errors in two cluster dimensions, i.e., that our disturbances are both correlated within municipalities (autocorrelated) and correlated within years (common). It is therefore important to check whether our results are robust for allowing for arbitrary within-cluster correlation in these two cluster dimensions. This does not change our previous findings. The results for alternative clustering schemes than in our main specification are available upon request.

Another way to verify that autocorrelation in our yearly labor demand shocks is not driving the results is to rather consider shifts in labor demand over a couple of years. More specifically, we use the change in the relative fall-back options over four and five years using different start and end years. Table A.11 shows the results obtained from estimating the effect of the shift between 2000 and 2005.[21] We found that this hardly changed our results at all.

Furthermore, our results for different parts of women's threat point distribution show that our main findings are robust to which part we consider and that there is quite some heterogeneity in the size of the effect depending on which subgroup we consider.

Finally, we also ran the same regressions for married individuals as we did for single individuals in order to verify that the married individuals behave differently from single individuals, i.e., that the marriage actually affects their financial decisions making. Controlling for observables, our results for the married individuals are indeed very different from those obtained for single individuals. The results are available upon request.

We also estimated the effect of decision power on the indebtedness of households in order to verify that our findings on the riskiness of household portfolios do not only hold for the asset side of the household balance sheet but also for the liability side. Our results, presented in Table A.12, reveal that higher decision power among married women reduces the indebtedness and liabilities of households, which harmonizes with women being more risk averse and therefore preferring less liabilities and exerting their decision power to reduce the household indebtedness. In fact, a one standard deviation increase in the relative decision power of a married woman implies a 0.08 and 0.17 (winsorized at the 99th percentile) standard deviation reduction in indebtedness and liabilities, respectively.[22]

[20] As noted by Angrist and Pischke (2008), standard over-identification tests such as the Sargan test are invalid for instruments with heterogeneous treatment effects. This explains why we do not report over-identification tests, although our two-stage system is over-identified.

[21] The results for the other periods were almost identical.

[22] The liabilities and indebtedness variables were winsorized at the upper and lower 5% tails of the distribution. The

6.7 The effect of divorce

In this paper we have chosen to use the IV approach for identification rather than an event study, the main reason being that an event study that looks at the effect of entering and exiting marriage would not be capturing stable marriages. However, estimates from an event study can be used to boost the credibility of our findings.

As noted before, all assets are split equally among spouses at the time of divorce if they do not hold a prenuptial agreement. Couples divide their assets privately but in case there is a disagreement, they can apply to the district court for the appointment of a marital property administrator who is then responsible for splitting their assets in a fair way. In general, people therefore divide all assets on their own at the time of divorce, including their financial assets. The splitting of assets gives couples a good opportunity to update their financial portfolios. If it is really the case that women prefer to hold a lower share of risky assets in their portfolios than men and that marriage and the interaction with their partner stands in their way of holding their preferred share of risky assets in their financial portfolio, we should see women decreasing the share of risky assets in their financial portfolios when they divorce and men increasing their share.

In order to test whether marriage actually changes the financial decision making of individuals, we employ a difference-in-difference (DD) estimation strategy. The outcome variables, the equity share and the risky share, for individual i at time t is denoted Y_{it}. We consider only individuals who were married 1999-2001 and let $T = 1$ for those individuals divorced in 2002 and remained so during the sample period, while $T = 0$ for those who remained married during the period. We are interested in estimating the average effect on the equity share and the risky share for individuals who divorce:

$$E[Y_{1i} - Y_{0i}|T = 1] \tag{11}$$

where Y_{1i}^1 is the outcome of individual i when he has divorced and Y_{0i}^0 is the outcome of individual i if he remains married. Since an individual's outcome cannot be observed both when he divorces and remains married, the main challenge when attempting to evaluate this effect is the construction of counterfactuals.

The simple DD estimator compares the change in the outcome variable for an individual that is married in the first part of the sample period but divorced in 2002 with the change in the outcome variable for an individual that remained married throughout the sample period. The implicit identifying assumption is that if no couples had divorced, the change in the outcome variable would have been the same for both groups of investors, i.e, formally

$$E[Y_{0i,t\geq 2002} - Y_{0i,t<2002}|T = 1] = E[Y_{0i,t\geq 2002} - Y_{0i,t<2002}|T = 0], \tag{12}$$

The unconditional DD estimator is then calculated as:

$$E[Y_{1i,t\geq 2002} - Y_{0i,t<2002}|T = 1] - E[Y_{0i,t\geq 2002} - Y_{0i,t<2002}|T = 0] \tag{13}$$

We also control for additional background variables using a regression framework to generalize specification (13). Let $after = \mathbb{I}(t \geq 2002)$ denote the indicator of whether the observation is after

corresponding numbers for the non-winsorized measures are very similar.

the year of divorces we chose to consider. The DD estimator of the effect of the divorce is the estimated coefficient γ_{DD} to $after \times T$ in the following OLS regression of the outcome variables Y_i on T, $after \times T$ and various control variables

$$Y_{it} = \gamma_0 + \gamma_1 T + \gamma_{DD}[after \times T] + X_{it}\delta + \epsilon_{it}, \tag{14}$$

where X_{it} is the vector of additional control variables, and $\epsilon_{it} \sim N(0, \sigma^2)$ is the unobserved idiosyncratic variation in outcomes across individuals and treatment groups.

We find that at the point of divorce, couples split their assets such that both the equity share and the risky share of women decreases while it increases for men. This suggests that women take relatively less risky assets than men out of the financial portfolio of the household during this cherry picking of assets that the divorce law stipulates when couples opt out of marriage. These findings show that marriage does really affect the share of risk men and women hold in their portfolios and is consistent with the findings of Christiansen et al. (2013) who investigate how changes in marital status affect financial risk taking. Table A.13 reports our results.

7 Conclusion

In this paper, we have used a unique Swedish data set to show that the household cannot be treated as one unit when analyzing its financial decisions making. We make several contributions to the existing literature. First, we show that the relative decision power of spouses is an important factor in financial decision making of households. In order to carry out this empirical test we constructed a measure of decision power that captures the utility of spouses at their threat points and employed a source of exogenous variation as an instrument for this measure to circumvent the endogeneity problems related to it. Since women, on average, prefer less risky portfolios than do men, we would expect the portfolios of couples where the decision power of the woman is relatively high to exhibit lower levels of risk as compared to portfolios of couples where the decision power of the woman is relatively low. This is exactly what we find when we take this hypothesis to the data. More specifically, as the decision power of a married woman increases, the participation in risky asset markets decreases, given that the household participates in risky asset markets, the share of wealth invested in risky assets decreases, the riskiness of the household portfolio decreases, and the diversification increases. Second, we show that household welfare is affected by the distribution of decision power among couples. Relatively higher decision power of married women reduces the welfare cost associated with underdiversified portfolios and is this mainly brought about by a reduction in the risky share. This implies that women are more aware of the households limited investment skills and exert their decision power to lower the economic cost incurred from holding a sub-optimal portfolio. Third, financial education of male and female spouses increases participation in risky asset markets, the share of wealth allocated to risky assets, and the total and idiosyncratic risk of household portfolios. However, the relative importance of financial education of spouses depends on the outcome under consideration. Female spouses with formal financial education increase participation and the share of wealth allocated to risky assets more than male spouses with financial education, while financial education of male spouses has larger effect on the equity share, total risk and idiosyncratic risk.

We have managed to look inside the black-box of how couples make financial decisions in this

current study but many questions remain. We show that the decision power of spouses does affect the composition of the financial portfolios of households but there could be additional channels through which the composition is affected that might be interesting to study. One possibility is that single men and single women obtain information in different ways. This would imply that once people are in a relationship, their information accumulation changes which might cause a difference in financial decision making between singles and couples. Another channel through which differences between singles and couples could come about is peer effects as the composition of the peer group of a single individual is very likely to be affected by their relationship status. Financial investments can also affected by relationship status through division of labor market risk, as couples are able to pool their labor market risk whereas singles cannot. These interesting extensions are left to future work.

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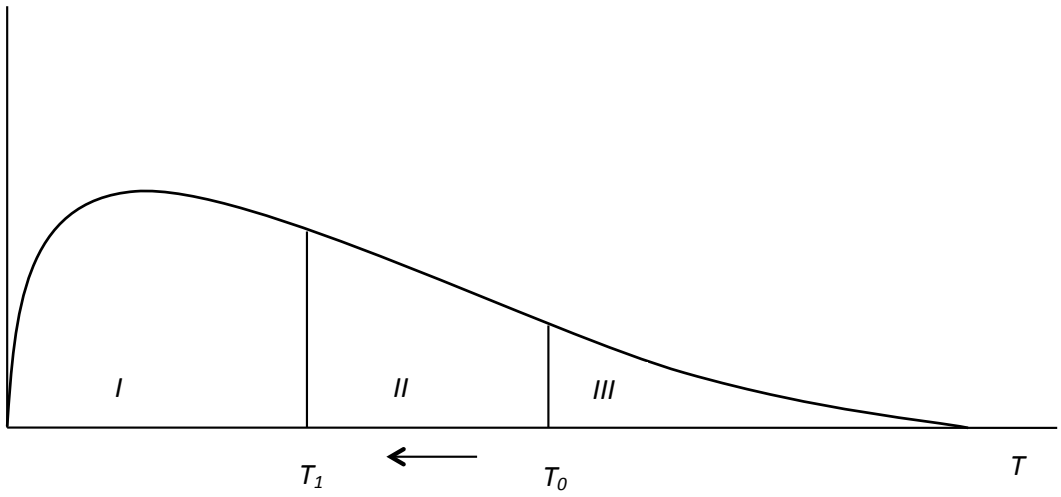

Figure 1: Effects of a shift in bargaining position for different parts of the threat point distribution of wives

Before the exogenous shift in sex-specific labor demand, in favor of women, a woman who is indifferent between a divorce and being part of a marriage where she cannot influence the financial decision making (hereafter, the marginal woman) had a threat point denoted by T_0. When the shift occurs the marginal woman will be to the left of the previous marginal woman, say at T_1. For husbands whose wife's outside option lies in between T_0 and T_1, it was optimal to make investments only based on his own preferences before the shift but now this is no longer the case. Women in part II will therefore benefit from this shift in bargaining position. For women in part I, the shift is not sufficiently large for their divorce threats to become credible and render them able to enforce their preferences when it comes to household financial decision making. The shift also has no effect for women in part III since they were able to enforce their preferences from the beginning due to their good bargaining position within the household.

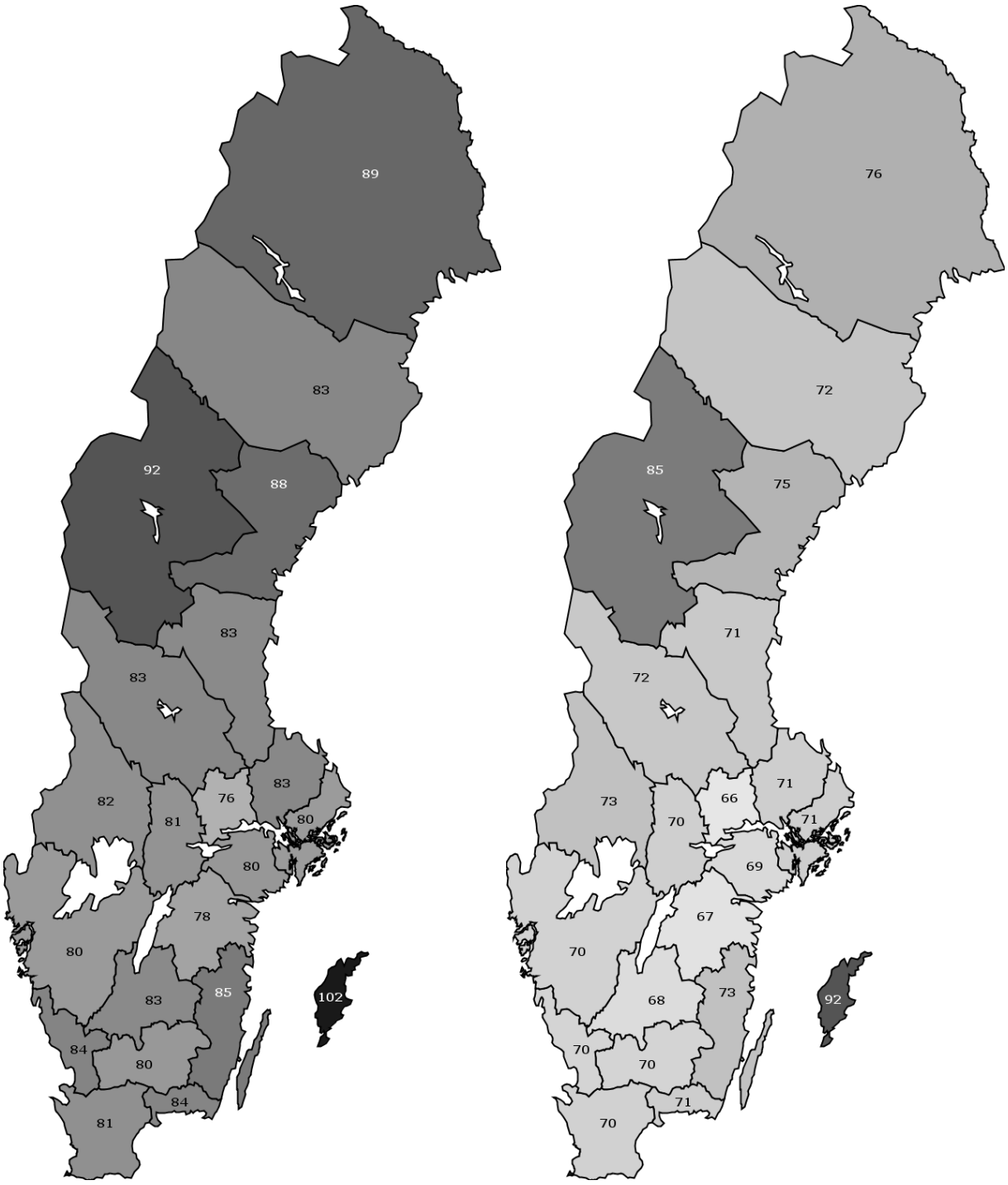

Figure 2: Fall-back and actual income ratios by counties

The graph to the left shows the average fall-back income ratios of households in each county in Sweden. A darker color means that the fall-back incomes of spouses are more similar in the county under consideration. The graph to the right shows the average actual income ratios of households in each county in Sweden. A darker color means that the actual incomes of spouses are more similar in the county under consideration. The numbers displayed are percentages and are for the year 2006.

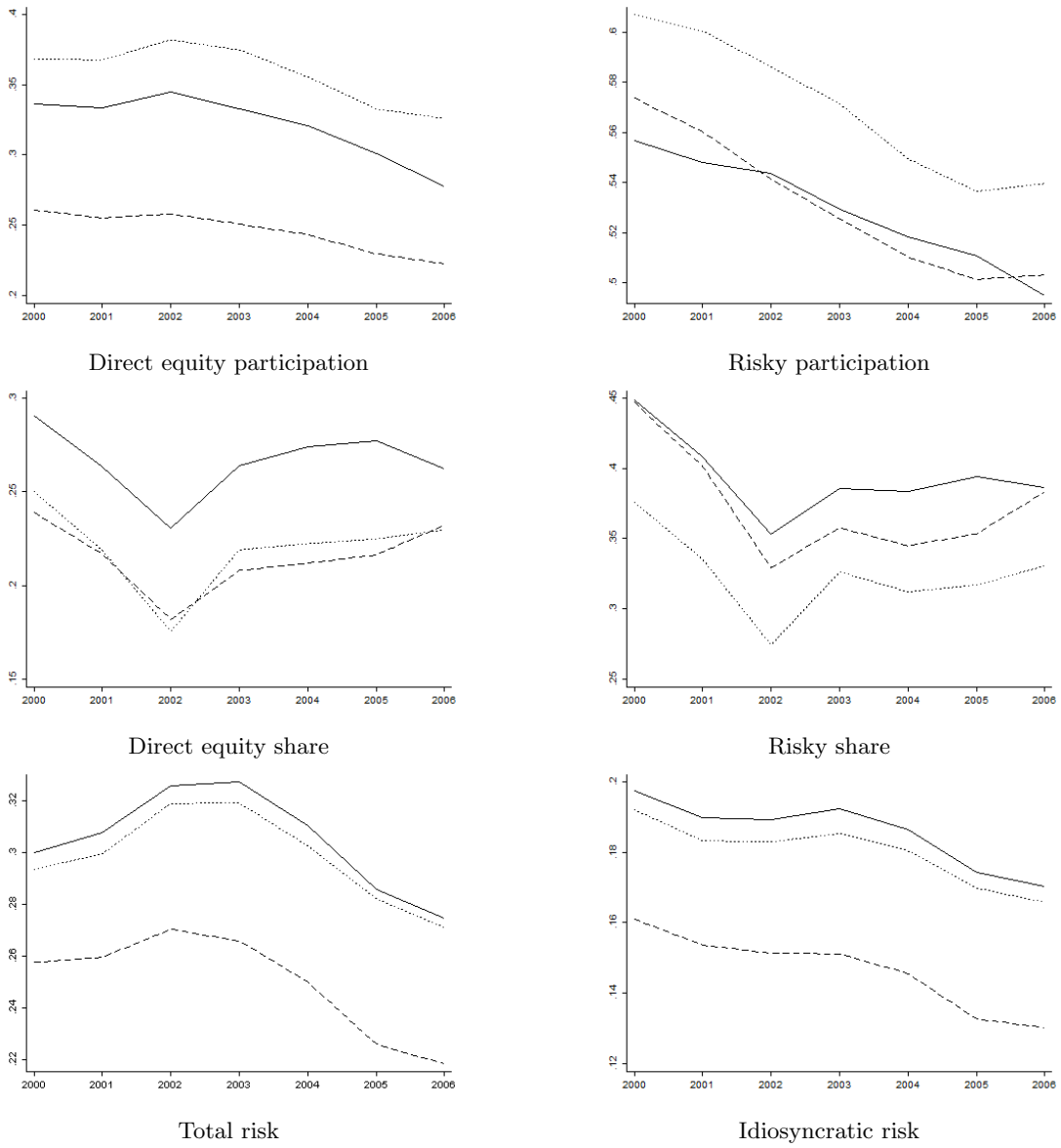

Figure 3: The solid line represents single men, the dashed line represents single women and the dotted line couples. We control for wealth, liabilities, age, whether individuals have ever been married, whether they have children, whether they are homeowners, and their level of education. The values used for the controls are the subgroup averages.

Table 1: Summary Statistics

	Married Individuals			Single Males			Single Females		
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
Portfolio characteristics:									
Financial wealth ($)	46 451	10 997	5 306 305	29 585	3 635	498 440	21 865	3 255	464 817
Direct equity ($)	19 645	0	5 235 688	8 899	0	467 181	4 839	0	438 555
Direct equity share	0.23	0.13	0.24	0.3	0.2	0.28	0.26	0.16	0.26
Direct equity participation	0.45	0	0.5	0.23	0	0.42	0.17	0	0.37
Risky assets ($)	27 601	1 491	5 257 069	14 890	0	479 544	9 719	0	441 501
Risky share	0.39	0.36	0.28	0.44	0.42	0.31	0.42	0.4	0.29
Risky participation	0.68	1	0.47	0.44	0	0.5	0.43	0	0.5
Total risk	0.27	0.26	0.15	0.28	0.27	0.16	0.23	0.23	0.14
Idiosyncratic risk	0.16	0.14	0.11	0.17	0.15	0.12	0.13	0.12	0.09
Financial characteristics:									
Disposable income ($)	33 128	29 443	113 016	26 041	24 849	103 504	23 800	23 412	24 419
Salary income ($)	35 005	33 693	27 997	27 127	27 321	28 758	21 989	20 504	21 112
Real estate wealth ($)	287 533	196 836	790 645	76 216	0	375 991	64 561	0	195 420
Total liabilities ($)	63 708	40 993	181 162	39 639	11 859	122 740	32 256	10 325	85 124
Demographic characteristics:									
Unemployment dummy	0.17	0	0.37	0.13	0	0.34	0.15	0	0.36
Entrepreneur dummy	0.2	0	0.4	0.1	0	0.29	0.05	0	0.22
Student dummy	0.04	0	0.2	0.14	0	0.35	0.19	0	0.39
Age	47.69	48.5	10.11	38.15	36	13.66	38.74	38	14.31
Household size	3.2	3	1.19	1.28	1	0.7	1.55	1	0.91
High school dummy	0.92	1	0.27	0.77	1	0.42	0.81	1	0.39
Post-high school dummy	0.46	0	0.5	0.28	0	0.45	0.36	0	0.48
Immigrant dummy	0.22	0	0.41	0.14	0	0.34	0.15	0	0.36

Note: The table reports summary statistics of the main financial and demographic characteristics of Swedish households at the end of 2006. We convert all financial variables into U.S. dollars using the exchange rate at the end of 2006 (1 SEK = $ 0.1463). The computations are based on all individuals between the ages of 16 and 65 considered throughout the empirical analysis. Missing bank balances are imputed using the constant imputation method discussed in the data section. All logarithms are computed in the natural base. We consider couples to be a man and a woman who are married and singles to be those who are living alone or are living with someone but without a common child. The reported numbers for married individuals are the numbers for them and their spouse divided by two.

Table 2: Impact of female's decision power on household financial portfolios

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Idiosyncratic Risk	(6) Total Risk
Panel A: Singles						
Female dummy	-0.0664	0.0154	-0.0478	-0.0150	-0.0374	-0.0524
	(0.0022)	(0.0028)	(0.0012)	(0.0012)	(0.0009)	(0.0012)
R^2	0.2123	0.2454	0.0284	0.0945	0.0610	0.0635
Observations	16 600 000	16 600 000	3 770 588	7 696 315	8 217 888	8 217 888
Individuals	2 425 143	2 425 143	577 476	1 145 492	1 197 370	1 197 370
Panel B: Couples						
DP - OLS	-0.0131	0.0391	-0.0497	-0.0182	-0.0211	-0.0273
	(0.0043)	(0.0027)	(0.0023)	(0.0015)	(0.0016)	(0.0022)
R^2	0.2669	0.2780	0.0649	0.1738	0.0261	0.0286
DP - IV	-0.4566	-0.3405	-0.1662	-0.3385	-0.0292	-0.0575
	(0.0541)	(0.0368)	(0.0397)	(0.0414)	(0.0124)	(0.0156)
SD effect*	-0.15	-0.12	-0.11	-0.20	-0.05	-0.06
R^2	0.2465	0.2598	0.0590	0.1439	0.0259	0.0273
$Fstatistic$	1 574	1 574	1 370	1 483	1 540	1 540
Observations	6 232 765	6 232 765	3 020 791	4 436 489	4 577 526	4 577 526
Households	928 164	928 164	456 279	684 693	678 189	678 189

Notes: Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage ratio is instrumented using the prevailing local wage ratio. The direct equity share is defined as the value of stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk. SD effect* refers to the effect on the outcome of interest from a 1 sd increase in the bargaining power ratio of couples, measured in sd of the outcome variable.

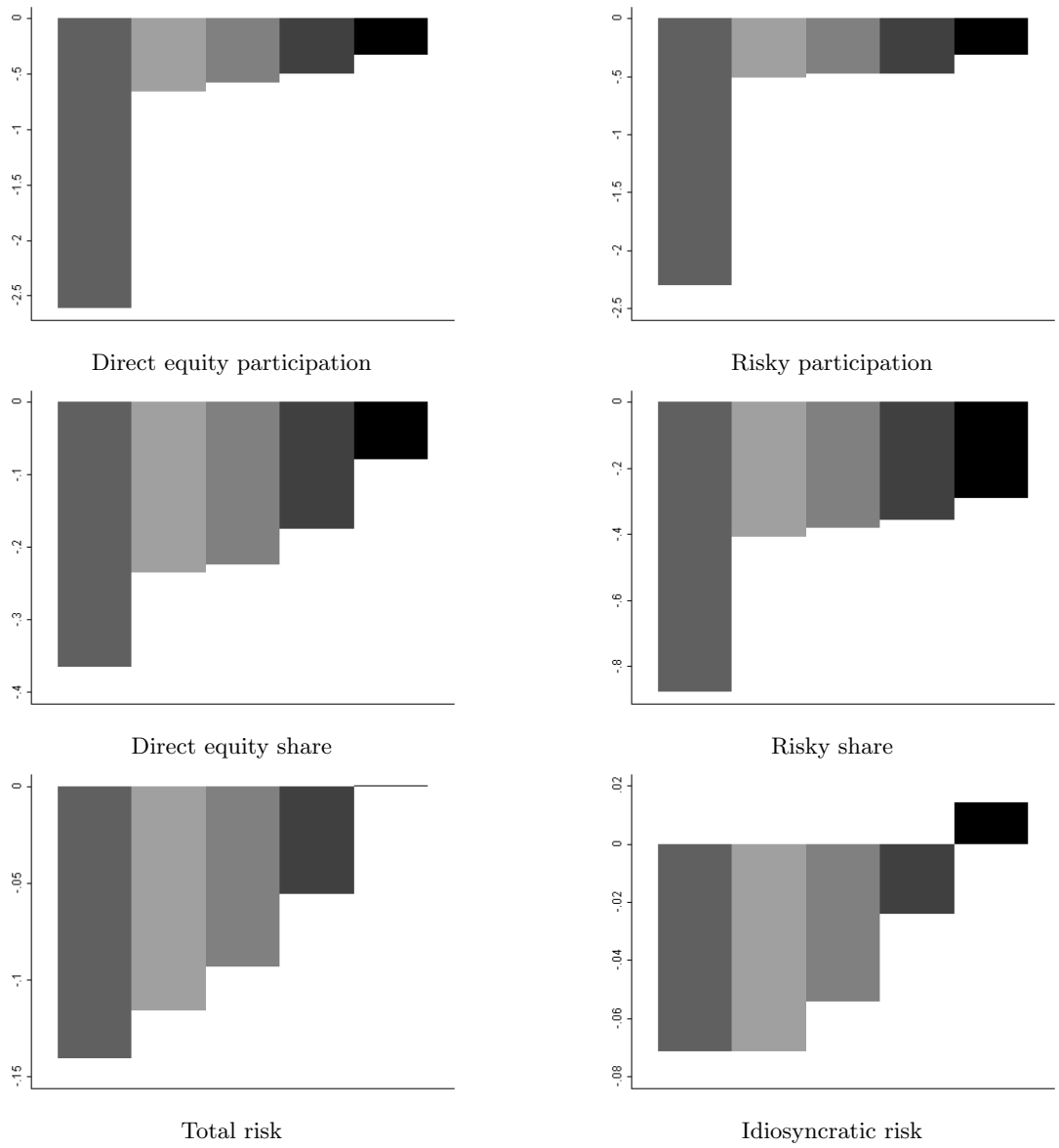

Figure 4: The graph shows the effect of decision power on different outcomes variables of households for the different quintiles of the threat point distribution of wives, where each column represents a particular quantile. Each entry is separate instrumental variable regression and standard errors are clustered at the municipality level. The fall-back wage ratio is instrumented using the prevailing local wage ratio.

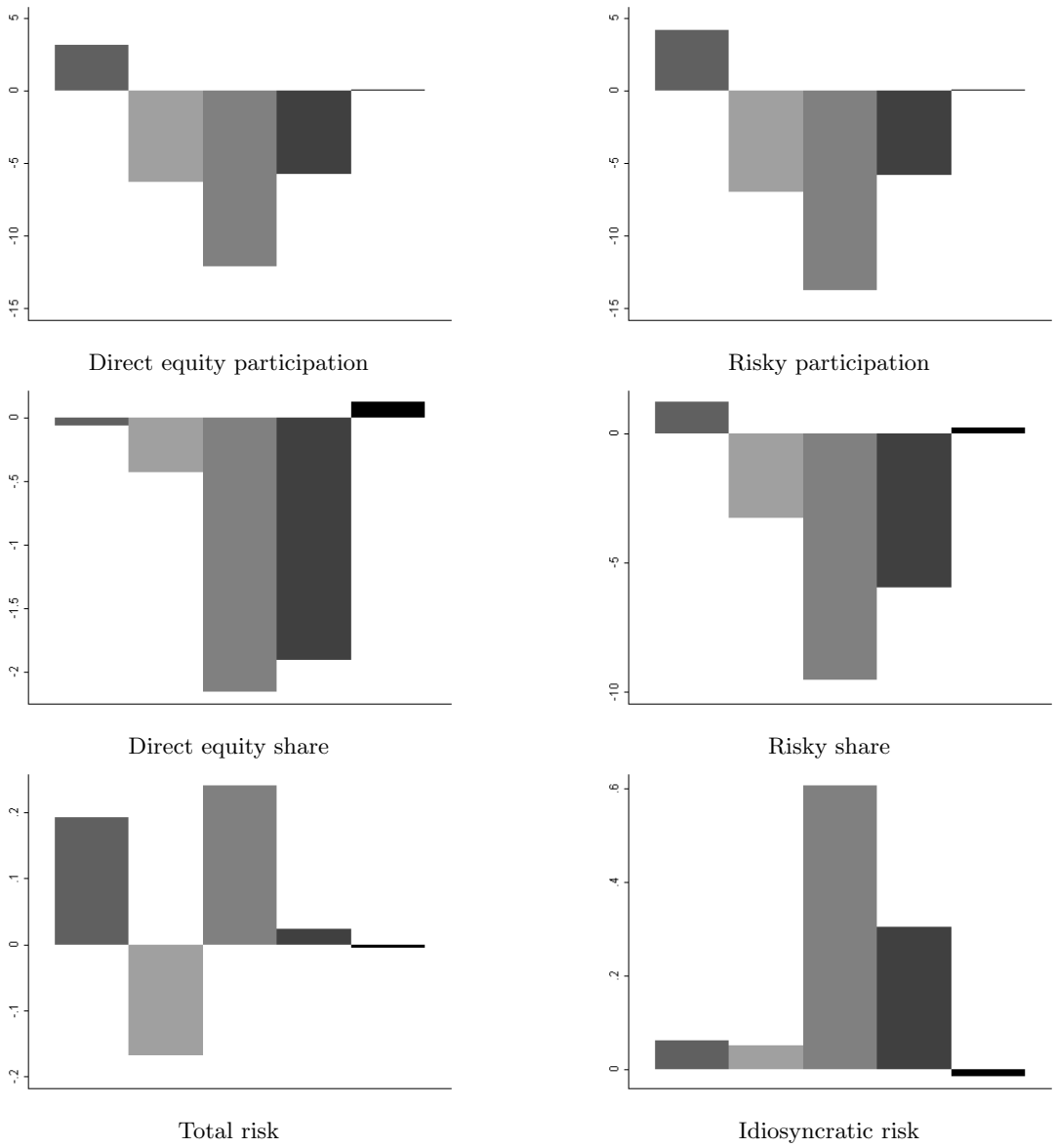

Figure 5: The graph shows the effect of decision power on different outcomes variables of households for the different quintiles of the fall-back income ratio distribution of couples, where each column represents a particular quantile. Each entry is separate instrumental variable regression and standard errors are clustered at the municipality level. The fall-back wage ratio is instrumented using the prevailing local wage ratio.

Table 3: Decomposition results

	Return Loss	Risky Share	Beta	Relative SR Loss
Panel B: Singles				
DP - IV	-0.1686	0.0220	-0.1168	-0.0737
	(0.0069)	(0.0041)	(0.0017)	(0.0020)
Observations	7 672 612	7 672 612	7 672 612	7 672 612
Panel B: Couples				
DP - IV	-1.564	-1.328	-0.3033	0.0679
	(0.1784)	(0.1528)	(0.0319)	(0.0425)
Observations	4 408 150	4 408 150	4 408 150	4 408 150

Notes: All figures are reported in the natural logarithm. Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage ratio is instrumented using the prevailing local wage ratio. The return loss is defined as the average return loss by the investor from choosing a suboptimal portfolio and captures the overall efficiciency loss in the portfolio. The risky share is the share of risky assets in the financial portfolios of households. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. The relative Sharpe ratio loss is a measure of the diversification loss in the risky asset portion of the portfolio.

Appendix I

In this appendix we present a simple model of household bargaining that incorporates decisions on portfolio composition and shows how womens relative job market potential affect household portfolios. This model is based on the framework provided in Mazzocco (2004b) and Neelakantan et al. (2013), in which the household members have CRRA preferences while the risky share of the household portfolio exhibits positive wealth elasticity.

We assume that a couple is comprised of a husband (1) and a wife (2) that live together for two periods, when young (t) and when old ($t+1$). The state of the economy, ω, fluctuates between booms (B) and recessions (R). We assume that the state of the economy is i.i.d. and that booms and recessions have the same probabilities of 0.5. Initially, each spouse i brings wealth m_t^i into the marriage. The household only consumes a public good, c_t as young and c_{t+1} as old. What the couple does not consume as young they can save by making a risk-free investment, k, that earns a certain return, r_f, and a risky investment, s, that earns a stochastic return, $r_s(\omega)$. These investments determine the financial portfolio of the household.

There is no altruism, i.e., the utility of spouses does not depend directly upon their partner's utility. The interdependence in the marriage therefore operates solely through the consumption of the public good, c_t and c_{t+1}. The utility of spouse i is given by:

$$U_i = u^i(c_t) + \beta^i u^i(c_{t+1})$$

where β^i is the discount factor of spouse i and the utility functions exhibit a constant relative risk aversion (CRRA) and constant relative prudence (CRP)[23] and are of the following form

$$u^1(c_t) = \frac{c_t^{1-\gamma_1}}{1-\gamma_1} \qquad \text{and} \qquad u^2(c_t) = \frac{c_t^{1-\gamma_2}}{\delta(1-\gamma_2)}$$

The parameter δ is needed as we want wealth to act as a weight on the utilities of the spouses. More specifically, δ reflects that household wealth affects whether household preferences take more after the preferences of the male or the female spouse (see, e.g., Mazzocco, 2004b; Neelakantan et al., 2013).[24]

Given the total wealth brought into marriage, $m_t = m_t^1 + m_t^2$, and the returns to risk-free and risky investments, r_f and $r_s(\omega)$, the couple needs to make a decision on how much to

[23]Risk aversion and prudence are defined as $u''(\cdot) < 0$ and $u'''(\cdot) > 0$, respectively. Risk preferences cannot be fully described with risk aversion alone, it is just one feature of individuals' risk preferences, which needs to be supplemented with higher-order risk preferences that also play a role in affecting savings and financial decisions. Prudence is closely related to risk aversion though as the latter measure captures the individual's sensitivity to risk while the former represents the strength of the precautionary saving motive under income uncertainty. More simply, a risk averse individual merely dislikes facing risk, whereas a prudent one takes action to offset the effects of the risk, by increasing savings or changing the portfolio composition. A prudent investor would decrease his demand for a risky asset in the face of a downward shift in the return of the asset (see, e.g., Kimball, 1990; Menegatti, 2007)

[24]If the male and spouse prefers a more risky portfolio than the female spouse, there is a threshold of household wealth, $\hat{m}$, above which the household preferences take more after the preferences of the male spouse and below which it closer to the preferences of the female spouse. From a simulation viewpoint, it is important to allow for an arbitrary $\hat{m}$ and therefore we do not normalize δ to be equal to 1.

consume as young and thereby also how much to save for old age. Furthermore, the couple needs to decide on how to invest what they save, which is the focus of this paper. For a given set of Pareto weights, λ, that are the result of a bargaining process within the household, the couple therefore solves the following maximization problem by choosing a consumption path, c_t and $c_{t+1}(\omega)$, and making risky (s) and risk-free (k) investments

$$\max_{c_t, c_{t+1}(\omega), s, k} \lambda[u^1(c_t) + \beta_1 E u^1(c_{t+1})] + (1-\lambda)[u^2(c_t) + \beta_2 E u^2(c_{t+1})]$$

$$\text{subject to} \qquad c_t + k_t + s_t \leq m_t$$

$$c_{t+1} \leq (1+r_f)k_{t+1} + (1+r_s(\omega))s_{t+1} \qquad \forall \omega$$

Let $\kappa_t = k_t + s_t = \pi m_t$ denote household financial portfolio where π is the savings rate and let $\theta = \frac{s_t}{\kappa_t}$ be the risky share of household financial portfolio, i.e., the share of financial wealth that is invested in risky assets. Assuming nonsatiation, we can replace the inequality signs of the budget constraints of the problem above with equality signs and rewrite it as

$$\max_{\pi,\theta} \lambda[u^1((1-\pi)m_t) + \beta_1 E u^1((1+r_f)(1-\theta)\pi m_t + (1+r_s)\theta\pi m_t)] \quad + \tag{15}$$

$$(1-\lambda)[u^2((1-\pi)m_t) + \beta_2 E u^2((1+r_f)(1-\theta)\pi m_t + (1+r_s)\theta\pi m_t)]$$

Before going further it is useful to analyze the relationship between household and individual risk preferences. It is well established in the literature (see, e.g., Vermeulen, 2002; Mazzocco, 2004a) that household decisions can be characterized using the preferences of the representative agent of the household, υ_λ, for a given set of Pareto weights, λ

$$\upsilon_\lambda(m) = \lambda \frac{c^{1-\gamma_1}}{1-\gamma_1} + (1-\lambda)\frac{c^{1-\gamma_2}}{\delta(1-\gamma_2)}$$

$$\text{subject to} \qquad c \leq m$$

where m is the level of resources available to the household at a given point in time, t, and state, ω.

Household relative risk aversion is thus given by

$$\gamma_{hh}(m) = -m\frac{\upsilon''_\lambda(m)}{\upsilon'_\lambda(m)} = \frac{\lambda\gamma_1 c^{-\gamma_1} + (1-\lambda)\delta^{-1}\gamma_2 c^{-\gamma_2}}{\lambda c^{-\gamma_1} + (1-\lambda)\delta^{-1} c^{-\gamma_2}} = \frac{\lambda\gamma_1 + (1-\lambda)\delta^{-1}\gamma_2 c^{\gamma_1-\gamma_2}}{\lambda + (1-\lambda)\delta^{-1} c^{\gamma_1-\gamma_2}}$$

and household relative prudence is given by

$$P_{hh}(m) = -m\frac{\upsilon'''_\lambda(m}{\upsilon''_\lambda(m)} = \frac{\lambda\gamma_1(1+\gamma_1)c^{-(1+\gamma_1)} + (1-\lambda)\delta^{-1}\gamma_2(1+\gamma_2)c^{-(1+\gamma_2)}}{\lambda\gamma_1 c^{-(1+\gamma_1)} + (1-\lambda)\delta^{-1}\gamma_2 c^{-(1+\gamma_b)}}$$

Furthermore, the derivative of household relative risk aversion, γ_{hh}, with respect to wealth, is given by

$$\frac{\partial \gamma_{hh}}{\partial m} = \frac{\lambda(1-\lambda)(\gamma_1-\gamma_2)\delta^{-1}(\gamma_1-\gamma_2)c^{\gamma_1-\gamma_2-1}}{\lambda\gamma_1 c^{-(1+\gamma_1)} + (1-\lambda)\delta^{-1}\gamma_2 c^{-(1+\gamma_2)}} < 0$$

The household utility function therefore exhibits decreasing relative risk aversion (DRRA), which is in line with the findings of Calvet and Sodini (2013) who analyze the determinants of risk taking in household portfolios. All this clarifies that saving decisions depend on household risk preferences and only indirectly on individual risk preferences.

The optimal size of financial wealth, κ_0^*, and the optimal portfolio composition, θ^*, are the solutions to the following first order conditions of the utility maximization problem of the household in equation (2)

$$\frac{\lambda\delta\beta_1(\pi^* m_t)^{\gamma_2-\gamma_1}}{\beta_2(1-\lambda)}\left\{-\frac{((1-\pi^*)m_t)^{-\gamma_1}}{\beta_1(\pi^* m_t)^{-\gamma_1}} + E\left[((r_s-r_f)\theta^*+1+r_f)^{1-\gamma_1}\right]\right\} + \tag{16}$$
$$-\frac{((1-\pi^*)m_t)^{-\gamma_2}}{\beta_2(\pi^* m_t)^{-\gamma_2}} + E\left[((r_s-r_f)\theta^*+1+r_f)^{1-\gamma_2}\right] = 0$$

$$\frac{\lambda\delta\beta_1(\pi^* m_t)^{\gamma_2-\gamma_1}}{\beta_2(1-\lambda)}\left\{E\left[(r_s-r_f)((r_s-r_f)\theta^*+1+r_f)^{-\gamma_1}\right]\right\} + \tag{17}$$
$$E\left[(r_s-r_f)((r_s-r_f)\theta^*+1+r_f)^{-\gamma_2}\right] = 0$$

The first equation is the stochastic version of the household consumption Euler equation (simplified), i.e., the couple equates expected (discounted) marginal utility as old to marginal utility as young. The equation essentially says that the couple must be indifferent between consuming one more unit today and saving that unit for future consumption. The household objective function (and consequently the Euler equation) depend on the decision power of each spouse. In fact, previous theoretical and empirical work on household Euler equations indicate that it is crucial to model behavior of households with several decisions makers by individual preferences and different decision power (Mazzocco, 2007). The second condition equates the expected marginal utility of the household from a dollar invested in the risk free asset with that of a dollar invested in the risky asset at time t, i.e., when the couple is young.

Numerical Simulations

We describe the properties of the model using numerical simulations. In particular, we are interested in how the share of risky assets in the financial portfolio of households is affected by the distribution of decision power between husbands and wives and how the weight of the preferences of each of the spouses is affected by household wealth. This will give us testable predictions on how household wealth and decision power of spouses affects the aggregation of individual preferences within households. As to describe how these variables interact we numerically solve Equations (7) and (8) to calculate the risky share, θ, for various values of household wealth and decision power of wives, γ_2.

We assume that the risk free return, r_f, is 1 percent. We assume that the return on risky assets in booms (B) and recessions (R), $r_s(B)$ and $r_s(R)$, is 30 and -18 percent, respectively.

For simplification we assume that both spouses discount time in the same way such that $\beta_1 = \beta_2 = 0.95$. We let women be more risk averse and assume that $\gamma_1 = 3$ and $\gamma_2 = 5$. An appropriate value is chosen for δ such that the model produces realistic simulations. We let initial wealth brought into marriage, w_0 vary from $50,000$ SEK to $5,000,000$ SEK and focus on how the wife's share of decision power affects the risky share of the household portfolio, θ, for different levels of wealth.

Figure A.2 shows that the share of risky assets in the financial portfolio of households increases with wealth for a given decision power distribution. When initial household wealth is low, the allocation of household savings is closer to the allocation favored by wives, i.e., it is less risky. When wealth is high, the preferences of the husband are given a higher weight. This is consistent with empirical findings that the amount invested in risky assets is not a fixed fraction of wealth (e.g. Calvet et al., 2007b; Carroll, 2002).

The figure also shows that as the decision power of wives increases, the share of risky assets in the household financial portfolio decreases. This suggests that as the decision power of women increases they are more able to exert their preferences concerning the financial decision making within the household and that a shift in bargaining power from husbands to wives should decrease the riskiness of household portfolios.

Figure A.2 also shows that a shift in decision power between spouses has different implications for the riskiness of household portfolios for different parts of the threat point distribution of wives. A shift from a decision power of 0.1 to 0.2 has a much larger effect than a shift from 0.8 to 0.9.

Appendix II

Table A.1: Aggregate Wealth Statistics 2000-2003 (in billions of U.S. dollars)

	2000		2001		2002		2003	
	Micro Data (1)	Official Statistics (2)	Micro Data (3)	Official Statistics (4)	Micro Data (5)	Official Statistics (6)	Micro Data (7)	Official Statistics (8)
Financial assets:								
Bank accounts	44.6	42.2	44.0	41.6	3 916.8	49.1	69.9	66.5
Mutual funds	57.3	55.5	47.0	43.5	3 268.9	39.0	58.4	60.8
Stocks	57.3	55.7	42.0	40.9	2 493.9	31.8	50.8	47.6
Bonds and derivatives	8.2	9.2	6.9	7.6	633.7	9.3	10.0	11.0
Taxable insurance	16.6	16.3	14.1	13.9	1 011.0	13.3	17.1	17.0
Real estate:								
Residential	228.2	223.0	216.0	211.3	21 278.0	275.1	362.4	352.8
Non-residential	81.6	79.2	76.9	74.6	7 689.2	98.4	127.8	123.1
Total real estate	309.8	302.2	292.8	285.9	28 967.2	373.5	490.2	475.9
Total gross wealth	518.0	498.4	465.2	449.0	41 434.2	528.6	716.4	691.8
Total wealth	394.4	360.7	354.0	319.0	31 270.1	366.8	554.3	477.4
Households:								
Observations	4 817 135	4 817 135	4 843 010	4 843 010	4 869 448	4 869 448	4 893 661	4 893 661
Gross wealth	$107 538	$103 461	$96 062	$92 704	$8 509 007	$108 553	$146 400	141 364
Net wealth	$81 874	$74 875	$73 100	$65 877	$6 421 700	$75 322	$113 272	$97 546

Note: The table reports aggregate wealth statistics for Swedish households on December 31 for 2000, 2001, 2002 and 2003. We convert all financial variables into billions of U.S. dollars using the exchange rate at the end of each year (2000: 1 SEK = $ 0.1060, 2001: 1 SEK = $ 0.0953, 2002: 1 SEK = $ 0.1148, 2003: 1 SEK = $ 0.1390). In columns 1, 3, 5 and 7, we aggregate up the value of the asset holdings observed for all individuals in our micro data set. Columns 2, 4, 6 and 8 report the corresponding official statistics published by Statistics Sweden.

Table A.2: Aggregate Wealth Statistics 2004-2006 (in billions of U.S. dollars)

	2004		2005		2006	
	Micro Data (1)	Official Statistics (2)	Micro Data (3)	Official Statistics (4)	Micro Data (5)	Official Statistics (6)
Financial assets:						
Bank accounts	67.6	64.2	58.5	55.7	106.1	101.0
Mutual funds	68.5	66.4	71.8	68.9	89.5	86.3
Stocks	66.3	62.2	71.2	66.7	97.8	90.4
Bonds and derivatives	12.5	12.2	12.2	12.0	16.6	14.8
Taxable insurance	18.7	18.6	15.4	15.4	17.6	17.9
Real estate:						
Residential	437.9	441.7	423.3	413.3	546.9	535.6
Non-residential	153.0	147.3	148.7	143.6	189.1	183.3
Total real estate	590.9	589.0	572.0	556.9	736.0	718.9
Total gross wealth	844.7	827.2	816.6	788.4	1 082.8	1 043.6
Total wealth	669.2	572.6	670.1	553.5	912.4	745.6
Households:						
Observations	4 915 190	4 915 190	4 945 947	4 945 947	4 989 488	4 989 488
Gross wealth	$171 859	$168 293	$165 113	$159 398	$217 019	$209 168
Net wealth	$136 146	$116 496	$135 479	$111 915	$182 855	$149 444

Note: The table reports aggregate wealth statistics for Swedish households on December 31 for 2004, 2005 and 2006. We convert all financial variables into billions of U.S. dollars using the exchange rate at the end of each year (2004: 1 SEK = $ 0.1505, 2005: 1 SEK = $ 0.1257, 2006: 1 SEK = $ 0.1461. In columns 1, 3 and 5, we aggregate up the value of the asset holdings observed for all individuals in our micro data set. Columns 2, 4 and 6 report the corresponding official statistics published by Statistics Sweden.

Table A.3: Descriptives - Income

	(1) M>F	(2) M>0.7 *(M+F)	(3) F>0.7 *(M+F)	(4) M>F	(5) M>0.7 *(M+F)	(6) F>0.7 *(M+F)
2000	68.3%	31.0%	14.4%	67.9%	12.0%	4.7%
2001	68.1%	30.9%	14.3%	67.7%	11.9%	4.6%
2002	67.7%	30.7%	14.5%	67.2%	11.3%	4.5%
2003	67.2%	30.6%	14.7%	66.8%	11.3%	4.5%
2004	66.8%	30.6%	14.7%	66.2%	11.5%	4.7%
2005	66.9%	30.9%	14.4%	66.5%	12.0%	4.5%
2006	66.9%	30.5%	14.1%	66.2%	11.8%	4.6%

(1)-(3): income, (4)-(6): fall-back income.

Table A.4: Descriptives - age and education

	(1) M age> F age + 5	(2) F age > M age + 5	(3) M edu > F edu	(4) F edu > M edu
2000	17.5%	2.1%	22.7%	31.0%
2001	17.5%	2.2%	22.4%	31.2%
2002	17.5%	2.2%	22.2%	31.3%
2003	17.6%	2.2%	21.9%	31.6%
2004	17.7%	2.3%	21.7%	31.8%
2005	17.9%	2.3%	21.5%	31.8%
2006	18.1%	2.4%	21.2%	32.0%

(1) shows the proportion of couples where the male is more than five years older, (2) shows the proportion of couples where the female is more than five years older, (3) shows the proportion of couples where the male has higher education and (4) shows the proportion of couples where the female has higher education.

Table A.5: Comparison of IV measure of the female/male wage ratio and the actual ratio

	2000	2001	2002	2003	2004	2005	2006
IV	0.893	0.893	0.906	0.902	0.904	0.901	0.898
Actual	0.829	0.841	0.858	0.872	0.882	0.883	0.887

Actual earnings ratios are conditional on both spouses being employed.

Table A.6: The relationship between couple's fall-back income ratio and local income ratio (first stage)

Dependent variable: Fall-back income ratio

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Total Risk	(6) Idiosyncratic Risk
lnWealth	0.0041	0.0041	0.0017	0.0018	0.0019	0.0019
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
#children < 3	-0.0180	-0.0180	-0.0155	-0.0144	-0.0145	-0.0145
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
#children 4-10	-0.0076	-0.0076	-0.0075	-0.0072	-0.0072	-0.0072
	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)
#children 11-17	-0.0081	-0.0081	-0.0098	-0.0094	-0.0094	-0.0094
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Homeowner	0.0028	0.0028	-0.0004	0.0007	0.0008	0.0008
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
lnDebt of female partner	0.0032	0.0032	0.0015	0.0017	0.0018	0.0018
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
lnDebt of male partner	-0.0028	-0.0028	-0.0017	-0.0019	-0.0019	-0.0019
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Male age	0.0009	0.0009	0.0025	0.0021	0.0021	0.0021
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Female age	0.0012	0.0012	-0.0002	0.0000	0.0001	0.0001
	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Length of marriage	0.0001	0.0001	0.0002	0.0000	0.0000	0.0000
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
#marriages of male partner	-0.0199	-0.0199	-0.0157	-0.0147	-0.0145	-0.0145
	(0.0006)	(0.0006)	(0.0010)	(0.0008)	(0.0008)	(0.0008)
#marriages of female partner	0.0094	0.0094	0.0031	0.0035	0.0037	0.0037
	(0.0006)	(0.0006)	(0.0009)	(0.0007)	(0.0007)	(0.0007)
R^2	0.0622	0.0622	0.0790	0.0744	0.0733	0.0733
$PartialR^2$	0.0329	0.0329	0.0506	0.0465	0.0457	0.0457
$Fstatistic$	1574	1574	1370	1483	1540	1540
Observations	6 232 765	6 232 765	3 020 791	4 436 489	4 577 526	4 577 526
Households	928 164	928 164	456 279	684 693	678 189	678 189

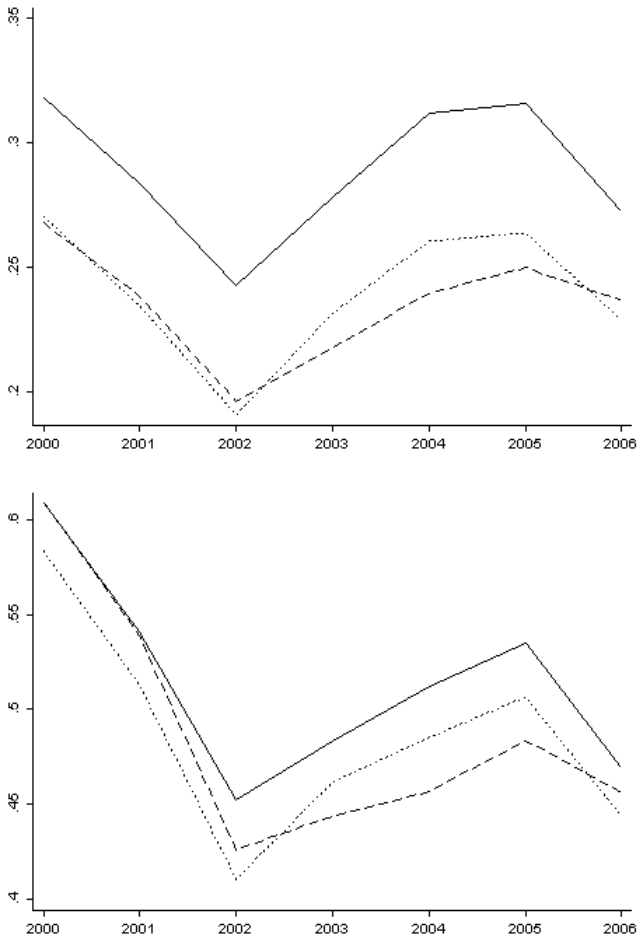

Figure A.1: Comparision of the equity (above) and risky (below) shares of single individuals and couples in the highest quartile of the wealth distribution.

The solid lines represents single men and the dashed lines represents single women. We control for wealth, liabilities, age, whether individuals have ever been married, whether they have children, whether they are homeowners, and their level of education. The values used for the controls are the subgroup averages.

Table A.7: Impact of female's decision power on household financial portfolios controlling for financial education

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Idiosyncratic Risk	(6) Total Risk
Panel A: Singles						
Female dummy	-0.0693	0.0129	-0.0489	-0.0158	-0.0380	-0.0532
	(0.0022)	(0.0029)	(0.0012)	(0.0012)	(0.0009)	(0.0011)
Economist dummy	0.0809	0.0685	0.0223	0.0209	0.0146	0.0211
	(0.0063)	(0.0028)	(0.0011)	(0.0010)	(0.0011)	(0.0015)
R^2	0.2153	0.2468	0.0291	0.0950	0.0629	0.0656
Observations	16 600 000	16 600 000	3 770 588	7 696 315	8 217 888	8 217 888
Individuals	2 425 143	2 425 143	577 476	1 145 492	1 197 370	1 197 370
Panel B: Couples						
DP - OLS	-0.0133	0.0375	-0.0443	-0.0157	-0.0199	-0.0258
	(0.0041)	(0.0026)	(0.0020)	(0.0016)	(0.0015)	(0.0020)
Male economist - OLS	0.0514	0.0239	0.0350	0.0210	0.0130	0.0185
	(0.0016)	(0.0020)	(0.0019)	(0.0013)	(0.0005)	(0.0007)
Female economist - OLS	0.0390	0.0282	-0.0016	0.0031	0.0035	0.0059
	(0.0015)	(0.0011)	(0.0011)	(0.0011)	(0.0003)	(0.0004)
R^2	0.2685	0.2787	0.0668	0.1742	0.0279	0.0306
DP - IV	-0.4491	-0.3443	-0.1519	-0.3373	-0.0237	-0.0503
	(0.0541)	(0.0378)	(0.0389)	(0.0415)	(0.0123)	(0.0154)
SD effect*	-0.15	-0.12	-0.10	-0.20	-0.04	-0.06
Male economist - IV	0.0325	0.0074	0.0305	0.0072	0.0128	0.0175
	(0.0023)	(0.0028)	(0.0018)	(0.0013)	(0.0007)	(0.0009)
Female economist - IV	0.0562	0.0433	0.0022	0.0147	0.0037	0.0068
	(0.0023)	(0.0020)	(0.0019)	(0.0020)	(0.0004)	(0.0006)
R^2	0.2490	0.2605	0.0619	0.1445	0.0279	0.0297
Fstatistic	1 556	1 556	1 368	1 486	1 546	1 546
Observations	6 232 765	6 232 765	3 020 791	4 436 489	4 577 526	4 577 526
Households	928 164	928 164	456 279	684 693	678 189	678 189

Notes: Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage ratio is instrumented using the prevailing local wage ratio. The direct equity share is defined as the value of stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk. SD effect* refers to the effect on the outcome of interest from a 1 sd increase in the bargaining power ratio of couples, measured in sd of the outcome variable.

Table A.8: Impact of female's decision power on household financial portfolios - couple fixed effects

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Total Risk	(6) Idiosyncratic Risk
BP measured as linear difference						
DP - IV	0.3334	-0.3226	-1.2319	-0.3817	-0.2470	-0.3098
	(0.1553)	(0.1519)	(0.1798)	(0.1165)	(0.0397)	(0.0552)
SD*	0.11	-0.11	-0.84	-0.22	-0.38	-0.35
R^2	-0.1736	-0.1735	-0.9038	-0.0580	-0.3477	-0.2929
Observations	3 871 469	3 871 469	1 610 336	2 547 076	2 564 436	2 564 436
Households	553 067	553 067	230 048	363 868	366 348	366 348

Notes: These regressions include only couples who are together during the whole sample period (7 years). Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage difference is instrumented using the prevailing local wage difference, i.e., female fall-back income minus male fall-back income. The direct equity share is defined as the value stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk.

Table A.9: Impact of female's decision power on household financial portfolios - alternative specification

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Total Risk	(6) Idiosyncratic Risk
BP measured as linear difference						
DP - OLS	-0.0010	-0.0001	-0.0008	-0.0005	-0.0003	-0.0005
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.2669	0.2780	0.0649	0.1738	0.0261	0.0271
DP - IV	-0.0040	-0.0031	-0.0015	-0.0031	-0.0003	-0.0005
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
R^2	0.2621	0.2714	0.0643	0.1610	0.0270	0.0282
$Fstatistic$	2 230	2 230	1 198	1 339	1 393	1 393
Observations	6 232 611	6 232 611	3 021 556	4 437 648	4 578 775	4 578 775
Households	928 676	928 676	456 378	684 862	678 356	678 356

Notes: The coefficients have been multiplied by 10 000. Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage difference is instrumented using the prevailing local wage difference, i.e., female fall-back income minus male fall-back income. The direct equity share is defined as the value stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk.

Table A.10: Impact of female's decision power on household financial portfolios - alternative instrument

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Idiosyncratic Risk	(6) Total Risk
Panel A: EMPLOYMENT IV						
DP	-0.3374	0.4970	-0.4261	-0.2492	-0.1989	-0.2676
	(0.0420)	(0.0631)	(0.0335)	(0.0188)	(0.0170)	(0.0216)
R^2	0.2560	0.2516	0.0041988	0.1582		
$Fstatistic$	1 130	1 130	1 245	1 458	1 512	1 512
Panel B: INDUSTRY IV						
DP	-0.2974	0.0400	-0.2495	-0.2486	-0.0912	-0.1332
	(0.0244)	(0.0302)	(0.0130)	(0.0135)	(0.0038)	(0.0053)
R^2	0.2585	0.2780	0.0478	0.1583	0.0130	0.0131
$Fstatistic$	2 742	2 742	2 983	3 401	3 652	3 652
Observations	6 232 765	6 232 765	3 020 791	4 436 489	4 577 526	4 577 526
Households	928 164	928 164	456 279	684 693	678 189	678 189

Notes: Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In panel A we instrument for the fall-back wage ratio using countrywide growth in employment by industry weighted by the countyspecific shares in these industries. In panel B we instrument for the fall-back wage ratio using countrywide growth male/female share weighted by the countyspecific wages in these industries. The direct equity share is defined as the value stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk.

Table A.11: Impact of female's decision power on household financial portfolios - alternative specification(00-05 shock)

	(1) Direct Equity Participation	(2) Risky Participation	(3) Direct Equity Share	(4) Risky Share	(5) Total Risk	(6) Idiosyncratic Risk
BP measured as linear difference						
DP - OLS	-0.0131	0.0432	-0.0541	-0.0129	-0.0212	-0.0260
	(0.0042)	(0.0029)	(0.0027)	(0.0020)	(0.0017)	(0.0022)
R^2	0.2899	0.3122	0.0578	0.1813	0.0270	0.0196
DP - IV	-0.4381	-0.3502	-0.1488	-0.3092	-0.0253	-0.0483
	(0.0599)	(0.0395)	(0.0485)	(0.0448)	(0.0131)	(0.0154)
SD*	-0.14	-0.12	-0.10	-0.18	-0.04	-0.05
R^2	0.2717	0.2948	0.0540	0.1539	0.0270	0.0192
$Fstatistic$	1 522	1 522	1 265	1 356	1 395	1 395
Observations	1 797 568	1 797 568	860 564	1 285 136	1 311 067	1 311 067
Households	928,164	928 164	456 279	684 693	678 189	678 189

Notes: The coefficients have been multiplied by 10 000. Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. In the IV model the fall-back wage difference is instrumented using the prevailing local wage difference, i.e., female fall-back income minus male fall-back income. The direct equity share is defined as the value stocks divided by total financial wealth. The risky share is defined as stocks, equity funds, hedge funds and mixed funds divided by total financial wealth. Direct equity (risky) participation is equal to one for those whose direct equity (risky) share is positive and zero otherwise. Equity portfolio turnover is calculated as the sum of all household trades during the year divided by market value of the household portfolio at year end. Total risk is defined as the volatility of the risky part of the portfolio, measured as the annualized standard deviation of the return of the risky part of the portfolio. This measure captures the volatility of the risky part of the household portfolio. Idiosyncratic risk is defined as the volatility of the part of the portfolio that is subject to idiosyncratic risk, measured as the annualized standard deviation of the return of the part of the portfolio that is subject to idiosyncratic risk. This measure captures the volatility of the risky part of the household portfolio that is due to idiosyncratic risk.

Table A.12: Impact of female's decision power on indebtedness and debt

	(1) Indebtedness	(2) Winsorized Indebtedness	(3) Debt	(4) Winsorized Debt
Panel A: Singles				
Female dummy - OLS	-72.72	-0.1913	-36,637	-20,797
	(16.8162)	(0.0433)	(1,240)	(1,451)
R^2	0.0015	0.4095	0.0880	0.3810
Observations	16 890 327	16 890 327	16 931 967	16 931 967
Individuals	2 488 774	2 488 774	2 492 115	2 492 115
Panel B: Couples				
DP - OLS	0.2355	0.2907	6 227	6 350
	(5.1836)	(0.0364)	(25 758)	(20 094)
R^2	0.0008	0.3496	0.0205	0.1319
DP - IV	-201.94	-1.6010	-701 858	-738 976
	(43.69)	(0.4220)	(154 038)	(151 553)
R^2	0.0005	0.3408	0.0167	0.1019
$Fstatistic$	17 340	17 340	17 343	17 343
Observations	6 232 256	6 232 256	6 232 765	6 232 765
Households	928 100	928 100	928 164	928 164

Notes: Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression. The OLS estimates are not statistically significant. In the IV model the fall-back wage ratio is instrumented using the prevailing local wage ratio. The winsorization was done at the 99th percentile. The instrumental variable used was constructed using wage growth within industries.

Table A.13: Impact of divorce on financial portfolios of males and females

	(1) Direct Equity Share	(2) Risky Share
Panel A: Females		
after × T	-0.0111	-0.0312
	(0.0040)	(0.0029)
R^2	0.062	0.0910
Observations	1 624 596	3 369 375
Panel B: Males		
after × T	0.0182	0.0031
	(0.0031)	(0.0031)
R^2	0.0235	0.0241
Observations	2 371 756	4 436 489

Notes: Standard errors are clustered at the municipality level and are within parentheses. Each entry is separate regression.

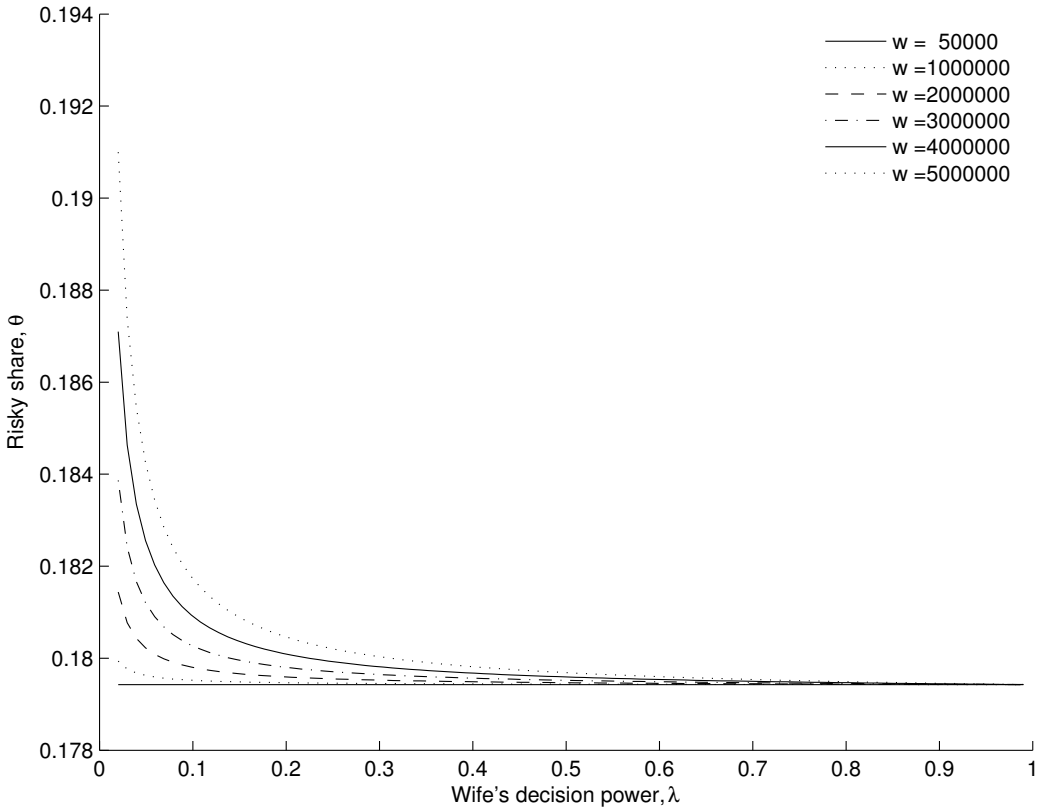

Figure A.2: Simulated effects of a shift in bargaining position on the risky share of household financial portfolios for different levels of household wealth