# Gender effects in intra-couple investment decision-making: risk attitude and risk and return expectations*

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**Abstract**

We analyse how risk attitude relates to capital market outcomes (capital market participation at the extensive and intensive margin as well as risky-asset portfolio allocation) in wife- and husband-headed households. By using two measures of risk attitude combined—financial and general—we reduce measurement error and introduce a new notion into the household finance literature, namely that financial risk aversion acts as a mediator variable for the link between general risk aversion and capital market participation. Overall, we find that the interactions between the financial head's gender, risk attitudes, and investment behaviour are more complex than previously thought, and that the average gender gap is often driven by a sizeable gender gap in risk-loving rather than risk-averse households. We also discuss

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how different risk and return expectations between female and male financial heads could explain our findings and report that 40 percent of the 10.57 pp gender gap could be down to gendered views on potential Sharpe ratios.

**Keywords:** Capital market participation, gender, risk attitude, risk and return expectations, risky assets, intra-household decision-making
**JEL codes:** G51, G41, G11, J16

# 1 Introduction

It is well documented that risk attitudes are instrumental in risky financial decision-making (e.g., Kaustia et al., 2023) and that they vary significantly depending on whether the financial decision-maker is a woman or a man (e.g., Falk et al., 2018). And while the literature on gender gaps in capital market participation with a focus on single investors is growing, much less is known about how risky investment decisions are made in married households and how much the interaction between the financial head's gender and their risk attitude matters. We shed light on the complex relation between these concepts by using representative German household data which collect not only a wide range of variables relating to capital market participation but also risk attitudes in financial and general matters.

For our study, we look at married, heterosexual couples for which we observe who the financial head is: the wife or the husband. We use this classification to study how risk attitude and other factors that have been shown to be significant for risky investment decisions impact households' capital market outcomes. Throughout the paper, we interact the financial head's gender with individual and household characteristics to dig deeper into the potential sources that drive the variation in capital market outcomes. Our main explanatory variables of interest are financial and general risk aversion, which we combine in order to capture the household's innate risk attitude more accurately. We show that the interplay between gender, risk attitude and capital market outcomes is complex: gender differences often arise between households that are risk-averse and those that are more risk-loving. This confirms earlier findings by Säve-Söderbergh (2012).

In the first part of our paper, we present the following main insights: first, financial risk attitude plays out differently in wife- and husband-headed households: for husband-headed households, predicted capital market participation is much higher for the financially risk-loving than the risk-averse sub-groups, and this gradient is much steeper (i.e. much more negative) than for wife-headed households. When we set all other independent variables equal to their means, we find that the gender gap is insignificant for financially risk-averse households (2.22 percentage points), whereas it is highly significant (17.92 percentage points) for financially risk-loving households.

To analyse this further, we go back to the roots of portfolio theory (Markowitz, 1952) and its more recent behavioural adaptations (Weber et al., 2013): because we can explicitly control for risk attitudes and a multitude of other relevant factors, any remaining gender gaps in capital market participation could potentially be attributed to differences in investors' risk and return expectations. We therefore assume financial heads are risk



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neutral and set their general risk attitude to an average value to model the case where households' risk expectations do not impact their actual risk taking. Our model predicts a significant gender gap of almost 7 percentage points for this case, which we take as implicit evidence that wife-headed households have less optimistic return expectations, leading them to avoid risky assets more than their husband-headed counterparts. This result corresponds well with, e.g., Amromin and Sharpe (2008), who find that female investors expect both higher uncertainty and lower (medium-term) returns than male investors. Similarly, Weber et al. (2002) find that women perceive financial investments as riskier than men do.

Our findings show further that variables measuring risk attitudes—the financial and the general one—are strongly intertwined and jointly predict capital market participation. Our analyses also reveal that it is reasonable to assume that financial risk aversion is not a pure measure of innate risk attitude but could be contaminated by background risks relating to financial constraints. We therefore hypothesise that financial risk aversion is a mediator variable for the relationship between general risk aversion and capital market participation. By combining the coefficients from our regressions, we can estimate the total ceteris-paribus effect of general risk aversion on capital market participation, which is the sum of the direct effect of general risk attitude on capital market participation and the indirect effect through financial risk attitude. Again, we find differing outcomes for wife- and husband-headed households: the effect is more negative for wife-headed households, implying that a fall in general risk aversion leads to a higher increase in capital market participation in households headed by a wife than in those headed by a husband.

Next, we take a closer look at the gender gap in capital market participation, which we estimate to be 10.57 percentage points. We decompose this gap (Oaxaca, 1973; Blinder, 1973; Neumark, 1988) to come closer to the roots of this raw differential. As is commonly done in the labour literature, we analyse endowment effects (the explained component; about one-third of our observed gap) and coefficient effects (the unexplained component; about two-thirds of the gap), the latter of which we interpret as investment behaviour or investment styles employed by financial heads of different genders. We first find that the gender gap would shrink by 1.64 percentage points if female financial heads had the same financial risk appetite as male financial heads; other individual characteristics matter much less. With a view to different investment styles, we document that the gender gap would *increase* by 11.36 percentage points if wife-headed households were as sensitive to changes in financial risk attitude as husband-headed households. As mentioned earlier, the average gap mainly arises from a significant gender gap among those households who are risk-loving (17.92 percentage points), not in those who are risk-averse (2.22 percentage points). We therefore estimate how the overall gender gap would change if the gender gap among financially risk-loving households was more comparable to that of risk-averse ones, i.e., only 2.22 points. This equates to asking by how much the gap would change if wife-headed households behaved more like their risk-*loving* husband-headed counterparts. We find that around 40 percent of the overall raw gap can be explained by (what we interpret as) a discrepancy in risk and return expectations between financially risk-loving female and risk-loving male financial heads.



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We then modify the conventional Oaxaca–Blinder decomposition exercise to incorporate our hypothesised relationship between general and financial risk attitude and capital market participation. When we adjust the decomposition method accordingly, we find that differences in innate risk aversion do not explain the observed gender gap, whereas it is primarily factors other than the financial head's general risk aversion which significantly relate to the gap.

In the second part of our paper, we examine the share of the total portfolio of financial assets that is devoted to risky assets, conditional on the household holding risky assets. We find that financially risk-averse households invest almost 10 percentage points less in risky assets regardless of the gender of the financial head, but we find no significant gender effects. For households who avoid risks in general, there is a gender gap of almost 3 percentage points. Looking at the four components of risky assets individually (listed shares, fund shares, fixed-income securities and certificates) we find that the overall gender gap in the total risky share is mainly driven by equity holdings. Lastly, our analysis shows that, again, the gap can be mainly attributed to different capital market outcomes between risk-loving and risk-averse households.

Part three of our paper focuses on risky asset portfolios. Here, we find that husband-headed households hold more of their portfolio in riskier categories (mostly listed shares), which is consistent with prior literature showing that men are less risk-averse in financial matters than women (e.g., Jianakoplos and Bernasek, 1998; Halko et al., 2012; Dohmen et al., 2011; Falk et al., 2018). We then run regressions of the allocation to the four types of risky assets for households holding risky assets. Again, we are interested in the differential effects for risk-loving and risk-averse households and find that, compared to their financially risk-loving counterparts, risk-averse wife-headed households would shift their portfolio allocation away from listed shares towards fund shares, while the shares devoted to bonds and certificates would not be affected. By contrast, financially risk-averse husband-headed households would invest a lower proportion in fund shares than their risk-loving male counterparts. In a nutshell, and as shown multiple times in earlier parts of this paper, the interplay between gender, risk attitudes and capital market outcomes is much more complex than previously assumed.

We contribute to the literature in a number of ways. First, we make use of a representative dataset that collects very detailed variables on households' financial situation, as well as an array of individual variables which are valuable for behavioural research in household finance. We therefore add to the literature on risky asset holdings which has primarily dealt with very selected samples (such as sophisticated investors or university faculty) and which often includes studies based on lab experiments with students (e.g., Barber and Odean, 2001; Dorn and Huberman, 2005; Arano et al., 2010; Halko et al., 2012). Because of the representativeness of our dataset, we can draw conclusions which refer to the whole German population.

Second, while literature on the gender effect in equity holdings is abundant, research on other risky-asset categories is much more scarce, especially when risk attitudes are studied explicitly. In our dataset, we can observe holdings in different asset classes which vary in their riskiness. Unlike most other research, we can therefore analyse not only the role of risk attitudes in total risky assets but also in different sub-categories



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which have, to date, been overlooked. This allows us to generate new insights into portfolio allocations in wife-and husband-headed households. We thus expand findings by, e.g., Barber and Odean (2001); Dimmock and Kouwenberg (2010); Halko et al. (2012); Almenberg and Dreber (2015) and Kaustia et al. (2023), who investigate gender gaps in stock holdings and trading.

Third, we find evidence that the sole use of financial risk aversion is not sufficient to study questions of capital market participation. Because households might understand this survey question as a measure of their ability rather than their willingness to take financial risks, this variable might be contaminated by financial constraints. We therefore combine the financial risk aversion question with the general risk aversion question, confident that these two variables together make more sense from a theoretical point of view. Our hypothesis that financial risk attitude is a mediator variable for the relationship between general risk attitude and capital market participation is supported by the data and we can subsequently calculate the total effect of general risk aversion on capital market participation for female and male financial heads. This is an important conceptual contribution to the vast literature on the determinants of risky asset holdings (see Kaustia et al. (2023) for an overview of drivers).

Fourth, the key assumptions of portfolio theory are that portfolio choice depends on the investor's risk attitude and expected risk–return assessment, and prior empirical research has confirmed that both these factors affect actual risk taking individually (e.g., Weber et al., 2013). We elicit the role of risk and return expectations for the portfolio choice of male and female financial heads and shed more light on the gap in expectations between female and male, and risk-loving and risk-averse financial heads. With this, we explore yet another important aspect in the risky asset holdings literature, which looks at risk and/or return expectations, such as Weber et al. (2002); Harris et al. (2006); Amromin and Sharpe (2008); Weber et al. (2013); Bucciol et al. (2017), or Holzmeister et al. (2020).

Fifth, our investigation of capital market outcomes in married households relates strongly to other studies in the broader economics literature that concern themselves with female financial headship (e.g., Friedberg and Webb, 2006; Bertocchi et al., 2014; Guiso and Zaccaria, 2023) and the link between risk attitude and financial decisions in married households (e.g., Arano et al., 2010; Yilmazer and Lich, 2015; Gu et al., 2023).

Lastly, similar to Arano et al. (2010) and Bernasek and Shwiff (2001), we make extensive use of interaction effects of the indicator variable for the financial head with both financial-head as well as spousal characteristics. This makes it possible to study the origins of the gender gap more thoroughly, as it enables us to pin down the subgroups of wife-headed households which are most strongly related to the overall gender differences in capital market outcomes.

The remainder of this paper proceeds as follows. In section 2 we describe the dataset, present our main variables and discuss first descriptive evidence. Section 3 presents the results for our three main research questions on the probability of capital market participation, the share of risky assets in households' total financial assets, and households' risky asset portfolios. Section 4 concludes.



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## 2 Data and method

Similar to, for instance, Campbell (2006), Arrondel et al. (2016) and Black et al. (2018), our analysis of investment behaviour will be divided into the following three parts: first, we investigate if there are significant gender differences in capital market participation between wife- and husband-headed married households given other household characteristics. In the second step, we restrict ourselves to the subsample of married households which participate in the capital market. For these households, we analyse if the share of risky assets in the financial assets varies with the financial head's gender, conditional on other factors. Finally, we examine if there are gender differences in the capital market portfolios of married households participating in the capital market.

Before we conduct the aforementioned three-step study of investment behaviour, we determine which factors explain female financial headship in married households. For this purpose, our analysis has been guided by the methods used in the literature on the determinants of female financial headship (cf., e.g., Friedberg and Webb, 2006; Bertocchi et al., 2014; Guiso and Zaccaria, 2023).

### 2.1 Data

For our analysis, we use data from the second wave of the Panel on Household Finances (PHF) from the German central bank (Deutsche Bundesbank). As a representative panel survey, it covers information on German households' wealth composition, income, work life as well as other demographic characteristics. The data for the second wave was collected from April to November 2014 and contains information on 4,461 households with 8,825 persons aged 16 years or older. The dataset is multiply imputed and provides sampling as well as bootstrap replicate weights such that we are able to compute descriptive statistics for the whole population.[1]

In our study, we confine ourselves to households which consist of exactly one married couple and are headed by one of the couple's spouses. This subset of households contains information on 2,706 married households with 6,232 persons aged 16 years or older.

For our analysis, we need different household characteristics, which are presented in the following paragraphs. The corresponding descriptive statistics are presented in Subsection 2.2.

#### Financial headship

For each household, an interviewer identifies a financially knowledgeable person (FKP) who can provide the necessary information about the household. According to the PHF's questionnaire, the interviewer asks the household the following question to determine the FKP: "We are conducting a household survey supplemented by an individual survey of each individual member of the household. Therefore, we need one contact for the entire household, and he or she would have the best overview of the household's finances. By

[1] Additional information about the PHF can be found in von Kalckreuth et al. (2012) and Altmann et al. (2020).



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that I mean things such as income, savings and checking accounts, pensions, real estate. Who among the household members living here knows the most about the household's finances?" That is, the FKP can be considered as the household's financial manager. From a conceptional point of view, we deem the FKP to be equivalent to the household's financial head—a concept widely acknowledged in the field of household finance (cf., e.g., Friedberg and Webb, 2006; Bertocchi et al., 2014; Yilmazer and Lich, 2015; Guiso and Zaccaria, 2023; Gu et al., 2023). In order to be consistent with the literature's terminology, we will use the term "financial head" instead of "FKP" in the remainder of this paper.

### Dependent variables

We use the following dependent variables:

*Gender of the financial head.* While other studies analyse the gender effect in the context of a single person's portfolio, we will study how the gender of the financial head influences a married household's investment behaviour. For this purpose, we define a dummy variable for the financial head's gender which is one if the wife is the corresponding household's financial head.

*Capital market participation.* We define a dummy variable which is one for households directly holding risky assets, which encompasses fund shares, listed shares, fixed-income securities and certificates. That is, households that possess at least one of these assets are deemed to hold risky assets, i.e., participate in the capital market. We do not incorporate data on indirect holdings, which we define as holdings in risky assets which are part of private pension plans[2], in our analysis. The reason for that is that our data quality on indirect holdings is not good enough for the purpose of our empirical study.[3] In order to cover participation in different categories of capital market assets, we additionally define separate dummy variables for the direct holding of fund shares, listed shares, fixed-income securities and certificates.

*Share of risky assets in the financial assets.* The share of the risky assets in the financial assets is measured as the proportion of directly held fund shares, listed shares, fixed-income securities or certificates relative to the total financial assets of the household. Financial assets constitute the portfolio of risky assets, cash, demand deposits, savings accounts, home loan savings agreement contracts, whole-life insurance contracts, outstanding debts, the credit card balance and other assets[4]. For all households without financial assets, we set the risky share to missing in order to avoid a division by zero.

*Proportions of different categories of capital market assets in the capital market portfolio.* In our study, the capital market portfolio consists of fund shares, listed shares,

[2]The most common form of private pension plans in Germany are "Rürup" and "Riester" contracts, for which the holders receive government subsidies and tax deductions.

[3]In our final multiply imputed dataset, we have comprehensive data on the amount held in Rürup and Riester pension accounts. However, for the majority of contracts, we have no information about the contract type (for example, bank savings plan, fund savings plan, classical pension insurance etc.), which means that we are not able to assign them to risky or to non-risky assets.

[4]Participants can name other assets which they own and are not part of the aforementioned instruments like, for instance, options, futures or precious metals.



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fixed-income securities and certificates. For the purpose of analysing the composition of this portfolio, we define separate variables for the proportions of the above-mentioned categories of capital market assets in the overall portfolio.

### Independent variables

Our independent variables are as follows:

*Individual characteristics.* The PHF survey allows us to control for a range of individual characteristics of both spouses. We include different variables about age, education, labour market status as well as the yearly gross income[5] separately for each spouse. Based on these variables, we additionally construct two well-known measures of the wife's bargaining power in the household (cf., e.g., Bertocchi et al., 2014; Guiso and Zaccaria, 2023): the age difference between the spouses (age of wife minus age of husband) which measures differences in life experience, as well as the wife's share of the spouses' gross yearly income. Taken together, all of these independent variables describe the distribution of household bargaining power between the two spouses. This allows us to replicate studies on the determinants of female financial headship (cf., e.g., Friedberg and Webb, 2006; Bertocchi et al., 2014; Guiso and Zaccaria, 2023) for our dataset. Beyond that, we are able to analyse the impact of the distribution of household bargaining power on the household's investment behaviour.

In addition to these variables, we define a separate dummy variable for each spouse which is one if the corresponding person lived in the former German Democratic Republic (GDR). By introducing these variables, we aim to control for effects of having lived in an anti-capitalist political system on investment behaviour (cf., e.g., Laudenbach et al., 2023).

*Household risk aversion.* In both classical portfolio theory (cf., e.g., Markowitz, 1952) and behavioural finance (cf., e.g., Weber et al., 2013), risk attitude is a crucial determinant of capital market participation. For our analysis, we rely on two different measures of a household's risk attitude: one for financial risk attitude and one for general risk attitude. Financial risk attitude is measured by means of the question presented in Box A.1 in Appendix A. With the help of this question, we construct a dummy variable for financially risk-averse households in the following way: the dummy variable takes on a value of one if the financial head answers the question in box 1 with "We are not ready to take any financial risks.". For all households for which the financial head answers with "No uniform classification is possible for the household as a whole.", we set the dummy variable to missing. General risk attitude is measured by means of the question presented in Box A.2 in Appendix A. We compute a household's general risk attitude by subtracting the financial head's answer from 10.[6] That is, the corresponding measure

[5] A person's yearly gross income is computed as the sum of the following sources of income: employment income (including special payments like, e.g., bonus payments or 13th month's salary), self-employment income, income from the statutory pension insurance scheme, income from private pensions and income from unemployment benefits.

[6] In an ideal setting, we would have answers to the question in Box A.2 in Appendix A for both spouses. Unfortunately, this is not the case for the PHF. To a certain extent, this limits the suitability of our general risk attitude measure on the household level. However, there is evidence that only the risk



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ranges from 0 (very willing to take risks) to 10 (not at all ready to take risks).

For the purpose of our analysis, we include both risk attitude measures at the same time. In general, some studies show that risk attitude measures concerning financial matters are better predictors for the participation in the stock market than measures of general risk aversion (e.g., Dohmen et al., 2011; Halko et al., 2012). From our point of view, the two risk attitude measures used in our analysis are somehow intertwined but not equivalent.[7] When answering the financial risk attitude question, households might implicitly take into account others factors than only their innate risk attitude. For example, background risks which limit their ability to take financial risks, like a part-time job or children in the household, might play a role. General risk attitude, on the other hand, is less likely to be influenced by other factors than innate risk aversion. That is why our general risk attitude measure is our preferred measure of innate risk preferences. By simultaneously using both risk attitude measures, we are able to determine which parts of the possible gender differences in capital market participation between wife- and husband-headed households are driven by innate risk aversion (measured by general risk attitude) and other factors associated with financial risk attitude like the ability or capacity to take financial risks. The methods for doing this are discussed in Subsection 2.3.

*Other household characteristics.*

The PHF survey contains three financial literacy questions, which have been broadly used in the literature on financial literacy (cf., e.g., van Rooij et al., 2011; Lusardi and Mitchell, 2011; Bucher-Koenen et al., 2017) and cover knowledge about the compound interest effect, inflation, and diversification. They are only answered by the household's financial head. In our analysis, we use a dummy for financial illiteracy which is one if the household's financial head answers at least two of the three questions either wrong, with "do not know", or with "refuse to answer". Moreover, we control for the level of the financial head's impatience, which is self-assessed on a scale from 0 (very patient) to 10 (very impatient). We also define a dummy variable for having obtained financial advice from the household's main bank in the three years prior to the interview.

Household net disposable income is estimated by the financial head and measured in €1,000. We perform a 98% winsorisation, which is often done in the literature to lower the influence of outliers on empirical results (cf., e.g., Dimmock and Kouwenberg, 2010; Clark and Mitchell, 2014). Using other conventional values does not make a substantial difference in our results. Furthermore, we determine the household's net wealth by subtracting the household total debt (all liabilities) from the household's gross wealth (all assets). Household net wealth is measured in €10,000. Moreover, we perform the same winsorisation as with household net disposable income. In addition to household

tolerance of the financial head has a significant effect on married households' investment behaviour. For example, Yilmazer and Lich (2015) find that the risk tolerance of the spouse not being the financial head does not have a significant effect on the share of household wealth allocated to risky assets. If such a relationship holds for our sample, the shortcomings of our general risk attitude measure will not significantly impact the results of our results.

[7] Statistically speaking, they are not collinear, which is why we can use both of them at the same time in different regression analyses.



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net disposable income and net wealth, we define two separate dummy variables for households owning their household main residence (HMR) and households with at least one child defined as a person aged 15 years or younger.

Finally, we add different dummy variables in order to control for the state and the area type in which the household lives. The 16 federal states of Germany are grouped into the four regions north (Lower Saxony, Schleswig-Holstein, Hamburg, and Bremen), west (North Rhine-Westphalia, Rhineland-Palatinate, and Saarland), south (Bavaria, Baden-Wuerttemberg, and Hesse), and east (Brandenburg, Mecklenburg-Western Pomerania, Saxony-Anhalt, Saxony, Thuringia, and Berlin) for each of which we construct a dummy variable. Moreover, we define dummy variables for the following five area types: city or municipality outside a metropolitan area, suburbs of a medium-sized metropolitan area, core area of a medium-sized metropolitan area, suburbs of a big metropolitan area, and core area of a big metropolitan area.[8]

## 2.2 Descriptive statistics

In Table 1, we present the descriptive statistics for the variables introduced in Subsection 2.1 for all married households. Table 2 shows the descriptive statistics for married households that participate in the capital market. The correlation matrix for the independent variables is not presented in this paper, as there is no indication of multicollinear variables.[9]

As we can see in Table 1, 41 percent of married households are wife-headed. 29 percent of husband-headed households participate in the capital market, while only 19 percent of wife-headed households do so.

Table 2 displays summary statistics for married households that participate in the capital market. For this subset of married households, the fraction of wife-headed households is 31 percent. Husband-headed households invest on average 33 percent of their financial assets in risky assets, while the respective share of their female counterparts is 4 percentage points lower. A closer look into the portfolios of households participating in the capital market leads us to remarkable gender gaps in the participation rates in listed shares and certificates. Conditional on capital market participation, 55 percent of the households with a male financial head invest in listed shares compared to 45 percent of those with a female financial head. The corresponding gender gap in certificates amounts to 4 percentage points, where 7 percent of the households with a male financial head participate in certificates in comparison to 3 percent for those with female financial head.

Concerning the spouses' individual characteristics, we find that wives are on average approximately 3 years younger than their husband. Moreover, the financial head of a wife-headed household is on average younger than her male counterpart in a typical

[8]The five area types are coded by means of the ten BIK region size classes for Germany (BIKGK10). More information about the ten BIK region size classes are available under `https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ/beschreibung-gebietseinheiten.pdf?__blob=publicationFile`.

[9]Readers interested in the correlation matrix can contact the authors to get the corresponding results.



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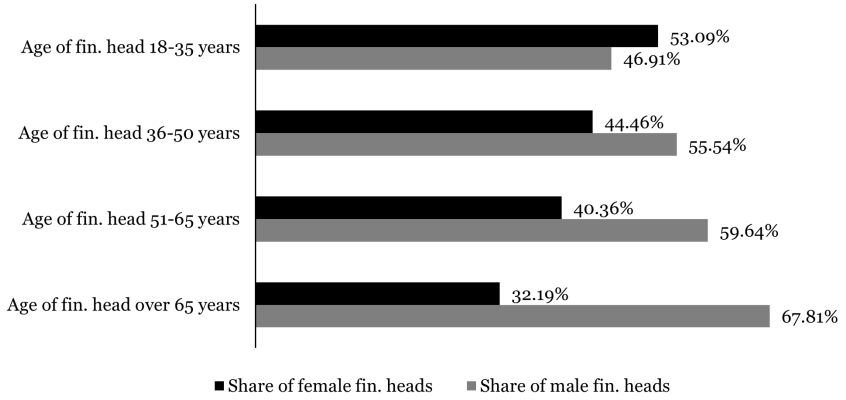
husband-headed household. In younger age cohorts, we find approximately as many female financial heads as male financial heads (see Figure 1). For households with older financial heads, however, the proportion of female financial heads drops remarkably.

Figure 1: Proportion of female financial heads for different age groups




*Note:* This figure shows weighted average shares of female financial heads in different age groups. The weighted average shares were computed as follows: For each of the five implicates, we determined weighted average shares with the help of the sampling weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

Considering all married households, wives have significantly less formal education. However, in wife-headed households, wives more often have a secondary school degree than their husbands, while the share of husbands with a university degree slightly exceeds that of wives. Yet, the observed educational differences in wife-headed households are only significant at the 10% level: the observed overall gender gap in formal education is mainly driven by husband-headed households.

Concerning the spouses' labour force status, we find that husbands are usually employed full-time, while wives are much more often employed part-time or unemployed. Moreover, the share of employed wives in wife-headed households is higher than in husband-headed households. In line with this finding, the wives in wife-headed households have a higher yearly gross income than their counterparts in husband-headed households. On the other side, the average yearly gross income of husbands in husband-headed households considerably exceeds that of husbands in wife-headed households. Overall, the average yearly gross income of wives (€ 18,110) is significantly lower compared to their husbands (€ 41,500). As a result, we get a gender wage gap of approximately € 23,390. Comparing wife- and husband-headed households, it becomes apparent that this gap is remarkably lower in wife-headed households (€ 16,830 for households with female financial head and € 27,960 for households with male financial head). Consistent with this result, the wife's share of the spouses' yearly gross income in wife-headed households is 7 percentage points higher compared to husband-headed households. That is,



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wife-headed households depend more on the wife's yearly gross income.

When we confine ourselves to the subsample of married households participating in the capital market, the aforementioned gender patterns in the spouses' individual characteristics are mostly still observable. Moreover, compared to the overall sample of married households, spouses in households which hold risky assets are better educated, participate more often in the labour market and have higher yearly gross salaries.

Next, we analyse the descriptive statistics with respect to household characteristics. In accordance with the literature, especially Dohmen et al. (2011), Halko et al. (2012) and Falk et al. (2018), households with female financial heads are less often willing to take financial risks than households with male financial heads.[10] Looking at Table 1, three quarters of the wife-headed households are characterised as financially risk-averse compared to 67 percent of their male counterparts. When we only consider married households participating in the capital market (Table 2), the proportion of financially risk-averse households shrinks from 70 to 42 percent. For households with female (male) financial head, it decreases to 52 (38) percent.

With respect to general matters, female financial heads are on average more risk-averse than their male counterparts.[11] This holds true for both the overall sample of married households and the subset of married households participating in the capital market. Overall, the gender gap in our measure of general risk aversion amounts to 0.43 points. For married households participating in the capital market, this gap decreases to 0.22 points. Moreover, the average level of general risk aversion is lower for households participating in the capital market. That is in line with the literature's notion that less risk-averse households participate more often in the capital market.

Also consistent with the literature (cf., e.g., Bucher-Koenen et al., 2017), the proportion of financially illiterate financial heads in our sample is higher for female financial heads. Moreover, female financial heads are about as patient as their male counterparts. In the overall sample of married households, wife-headed households took financial advice less often than their male counterparts. When we confine ourselves to married households participating in the capital market, the share of households taking financial advice increases. Moreover, in this subsample, wife-headed households took financial advice more often than husband-headed households.

The average household net disposable income amounts to approximately €3,190 (€3,070 for wife-headed households and €3,270 for husband-headed households). For households participating in the capital market, the average net disposable income increases to €4,170 (€4,080 for households with female financial head and €4,210 for households with male financial head). Wife-headed households' average net wealth amounts to €272,000, which is lower than the average net wealth of husband-headed households (€327,100). If we consider only the households participating in the capital market, the average net wealth is €626,400 for households with female and €541,400 for households with male financial heads. The average home ownership rates of wife- and husband-headed households are

[10] Here, we only discuss the descriptive statistics for the dummy variable for financially risk-averse households. The shares for the answers to the underlying survey question presented in Box A.1 in Appendix A are shown in Figure C.1 in Appendix C.

[11] The shares for the answers to the underlying survey question are shown in Figure C.2 in Appendix C.



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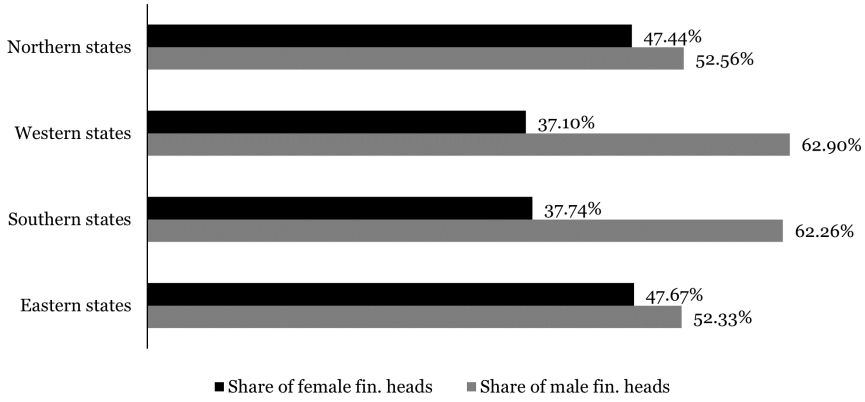
approximately identical for both the overall sample and the subset of married households participating in the capital market.

Female financial headship varies remarkably between different regions. On the one hand, in northern and eastern states, the share of female financial heads is much higher than in southern and western states (see Figure 2). On the other hand, the area type does not seem to have an effect on female financial headship. The average shares of female financial heads are approximately the same in all different area types.[12]

Figure 2: Proportion of female financial heads for different regions




*Note:* This figure shows weighted average shares of female financial heads in different regions. The weighted average shares were computed as follows: For each of the five implicates, we determined weighted average shares with the help of the sampling weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

[12]Readers interested in the average shares of female financial heads in the different area types can contact the authors to get the corresponding results.



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Table 1: Weighted means for married households

| | All households (N = 2,548, Pop. size = 15.77m) | | | | Wife-headed households (N = 922, Pop. size = 6.48m) | | | | Husband-headed households (N = 1,625, Pop. size = 9.29m) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | Wife | Hus. | Difference | All | Wife | Hus. | Difference | All | Wife | Hus. | Difference |
| *Dependent variables* | | | | | | | | | | | | |
| Female financial head (dummy) | 0.41 | | | | 1.00 | | | | 0.00 | | | |
| Capital market participation (dummy) | 0.25 | | | | 0.19 | | | | 0.29 | | | |
| Share of risky assets in the financial assets | 0.08 | | | | 0.05 | | | | 0.10 | | | |
| Participation in fund shares (dummy) | 0.17 | | | | 0.13 | | | | 0.16 | | | |
| Participation in listed shares (dummy) | 0.13 | | | | 0.08 | | | | 0.16 | | | |
| Participation in fix.-inc. sec. (dummy) | 0.05 | | | | 0.03 | | | | 0.05 | | | |
| Participation in certificates (dummy) | 0.02 | | | | 0.01 | | | | 0.02 | | | |
| *Individual characteristics* | | | | | | | | | | | | |
| Age (years) | 54.06 | 52.57 | 55.55 | $-2.99^{***}$ | 53.15 | 51.77 | 54.53 | $-2.76^{***}$ | 54.69 | 53.12 | 56.26 | $-3.14^{***}$ |
| Age of financial head 18-35 years (dummy) | 0.12 | | | | 0.16 | | | | 0.10 | | | |
| Age of financial head 36-50 years (dummy) | 0.31 | | | | 0.33 | | | | 0.29 | | | |
| Age of financial head 51-65 years (dummy) | 0.32 | | | | 0.31 | | | | 0.32 | | | |
| Age of financial head over 65 years (dummy) | 0.26 | | | | 0.20 | | | | 0.29 | | | |
| Degree from secondary school (dummy) | 0.27 | 0.25 | 0.29 | $-0.04^{***}$ | 0.26 | 0.28 | 0.25 | $0.03^{*}$ | 0.28 | 0.24 | 0.33 | $-0.09^{***}$ |
| University degree (dummy) | 0.20 | 0.17 | 0.22 | $-0.06^{***}$ | 0.17 | 0.16 | 0.19 | $-0.03^{*}$ | 0.21 | 0.17 | 0.25 | $-0.08^{***}$ |
| Employed full-time (dummy) | 0.40 | 0.22 | 0.59 | $-0.36^{***}$ | 0.41 | 0.22 | 0.61 | $-0.39^{***}$ | 0.40 | 0.22 | 0.57 | $-0.35^{***}$ |
| Employed part-time (dummy) | 0.14 | 0.24 | 0.03 | $0.21^{***}$ | 0.16 | 0.28 | 0.04 | $0.25^{***}$ | 0.12 | 0.21 | 0.03 | $0.18^{***}$ |
| Retired or pensioner (dummy) | 0.29 | 0.25 | 0.33 | $-0.08^{***}$ | 0.28 | 0.24 | 0.31 | $-0.07^{***}$ | 0.30 | 0.25 | 0.35 | $-0.09^{***}$ |
| Yearly gross income (€1,000) | 29.80 | 18.11 | 41.50 | $-23.39^{***}$ | 28.73 | 20.31 | 37.14 | $-16.83^{***}$ | 30.55 | 16.58 | 44.53 | $-27.96^{***}$ |
| Wife's share of spouses' yearly gross inc. | 0.30 | | | | 0.34 | | | | 0.27 | | | |
| Lived in the former GDR in 1989 (dummy) | 0.17 | 0.17 | 0.17 | 0.01 | 0.18 | 0.19 | 0.18 | 0.01 | 0.16 | 0.16 | 0.16 | 0.00 |
| *Household characteristics* | | | | | | | | | | | | |
| Financially risk-averse household (dummy) | 0.70 | | | | 0.74 | | | | 0.67 | | | |
| Financial head's general risk aversion | 6.36 | | | | 6.61 | | | | 6.18 | | | |
| Financially illiterate financial head (dummy) | 0.10 | | | | 0.13 | | | | 0.09 | | | |
| Impatience of financial head | 4.69 | | | | 4.72 | | | | 4.67 | | | |
| Financial advice (dummy) | 0.27 | | | | 0.25 | | | | 0.29 | | | |
| Household net disposable monthly inc. (€ 1,000) | 3.19 | | | | 3.07 | | | | 3.27 | | | |
| Household net wealth (€ 10,000) | 30.45 | | | | 27.20 | | | | 32.71 | | | |
| Household owns HMR (dummy) | 0.65 | | | | 0.65 | | | | 0.65 | | | |
| Children in the household (dummy) | 0.29 | | | | 0.32 | | | | 0.27 | | | |
| Northern state (dummy) | 0.17 | | | | 0.20 | | | | 0.15 | | | |
| Western state (dummy) | 0.27 | | | | 0.24 | | | | 0.28 | | | |
| Southern state (dummy) | 0.38 | | | | 0.35 | | | | 0.40 | | | |
| Eastern state (dummy) | 0.19 | | | | 0.22 | | | | 0.16 | | | |
| City or municipality outside metro. area (dummy) | 0.24 | | | | 0.24 | | | | 0.24 | | | |
| Suburbs of medium-sized metro. area (dummy) | 0.30 | | | | 0.30 | | | | 0.31 | | | |
| Core area of medium-sized metro. area (dummy) | 0.13 | | | | 0.12 | | | | 0.14 | | | |
| Suburbs of big metro. area (dummy) | 0.10 | | | | 0.11 | | | | 0.09 | | | |
| Core area of big metro. area (dummy) | 0.23 | | | | 0.23 | | | | 0.23 | | | |

*Note:* This table shows weighted means for the variables used in the analysis for married households. These means and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted means as well as bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

Table 2: Weighted means for married households participating in the capital market

| | All households (N = 996, Pop. size = 3.93m) | | | | Wife-headed households (N = 289, Pop. size = 1.21m) | | | | Husband-headed households (N = 707, Pop. size = 2.72m) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | Wife | Hus. | Difference | All | Wife | Hus. | Difference | All | Wife | Hus. | Difference |
| *Dependent variables* | | | | | | | | | | | | |
| Female financial head (dummy) | 0.31 | | | | 1.00 | | | | 0.00 | | | |
| Share of risky assets in the financial assets | 0.32 | | | | 0.29 | | | | 0.33 | | | |
| Participation in fund shares (dummy) | 0.67 | | | | 0.68 | | | | 0.67 | | | |
| Participation in listed shares (dummy) | 0.52 | | | | 0.45 | | | | 0.55 | | | |
| Participation in fix.-inc. sec. (dummy) | 0.19 | | | | 0.19 | | | | 0.19 | | | |
| Participation in certificates (dummy) | 0.06 | | | | 0.03 | | | | 0.07 | | | |
| *Individual characteristics* | | | | | | | | | | | | |
| Age (years) | 55.55 | 53.88 | 57.23 | $-3.35^{***}$ | 56.60 | 55.25 | 57.95 | $-2.69^{***}$ | 55.09 | 53.27 | 56.91 | $-3.64^{***}$ |
| Age of financial head 18-35 years (dummy) | 0.05 | | | | 0.05 | | | | 0.05 | | | |
| Age of financial head 36-50 years (dummy) | 0.35 | | | | 0.38 | | | | 0.34 | | | |
| Age of financial head 51-65 years (dummy) | 0.30 | | | | 0.28 | | | | 0.30 | | | |
| Age of financial head over 65 years (dummy) | 0.31 | | | | 0.29 | | | | 0.31 | | | |
| Degree from secondary school (dummy) | 0.45 | 0.40 | 0.50 | $-0.10^{***}$ | 0.47 | 0.46 | 0.47 | $-0.01$ | 0.44 | 0.37 | 0.51 | $-0.13^{***}$ |
| University degree (dummy) | 0.33 | 0.27 | 0.39 | $-0.12^{***}$ | 0.32 | 0.27 | 0.38 | $-0.11^{**}$ | 0.33 | 0.27 | 0.40 | $-0.13^{***}$ |
| Employed full-time (dummy) | 0.42 | 0.27 | 0.57 | $-0.30^{***}$ | 0.38 | 0.21 | 0.54 | $-0.33^{***}$ | 0.44 | 0.29 | 0.58 | $-0.29^{***}$ |
| Employed part-time (dummy) | 0.17 | 0.30 | 0.03 | $0.26^{***}$ | 0.20 | 0.35 | 0.06 | $0.28^{***}$ | 0.15 | 0.27 | 0.02 | $0.25^{***}$ |
| Retired or pensioner (dummy) | 0.31 | 0.25 | 0.37 | $-0.12^{***}$ | 0.34 | 0.29 | 0.38 | $-0.09^{***}$ | 0.30 | 0.23 | 0.37 | $-0.14^{***}$ |
| Yearly gross income (€1,000) | 42.62 | 26.29 | 58.95 | $-32.66^{***}$ | 40.39 | 28.62 | 52.17 | $-23.54^{***}$ | 43.61 | 25.26 | 61.97 | $-36.71^{***}$ |
| Wife's share of spouses' yearly gross inc. | 0.32 | | | | 0.35 | | | | 0.31 | | | |
| Lived in the former GDR in 1989 (dummy) | 0.12 | 0.13 | 0.11 | 0.02 | 0.12 | 0.14 | 0.11 | 0.03 | 0.11 | 0.12 | 0.11 | 0.01 |
| *Household characteristics* | | | | | | | | | | | | |
| Financially risk-averse household (dummy) | 0.42 | | | | 0.52 | | | | 0.38 | | | |
| Financial head's general risk aversion | 5.89 | | | | 6.04 | | | | 5.82 | | | |
| Financially illiterate financial head (dummy) | 0.05 | | | | 0.05 | | | | 0.04 | | | |
| Impatience of financial head | 4.97 | | | | 4.99 | | | | 4.96 | | | |
| Financial advice (dummy) | 0.44 | | | | 0.47 | | | | 0.42 | | | |
| Household net disposable monthly inc. (€1,000) | 4.17 | | | | 4.08 | | | | 4.21 | | | |
| Household net wealth (€10,000) | 56.76 | | | | 62.64 | | | | 54.14 | | | |
| Household owns HMR (dummy) | 0.76 | | | | 0.75 | | | | 0.77 | | | |
| Children in the household (dummy) | 0.26 | | | | 0.24 | | | | 0.27 | | | |
| Northern state (dummy) | 0.16 | | | | 0.13 | | | | 0.18 | | | |
| Western state (dummy) | 0.24 | | | | 0.22 | | | | 0.25 | | | |
| Southern state (dummy) | 0.46 | | | | 0.50 | | | | 0.45 | | | |
| Eastern state (dummy) | 0.13 | | | | 0.14 | | | | 0.13 | | | |
| City or municipality outside metro. area (dummy) | 0.22 | | | | 0.26 | | | | 0.21 | | | |
| Suburbs of medium-sized metro. area (dummy) | 0.28 | | | | 0.27 | | | | 0.29 | | | |
| Core area of medium-sized metro. area (dummy) | 0.11 | | | | 0.08 | | | | 0.12 | | | |
| Suburbs of big metro. area (dummy) | 0.12 | | | | 0.12 | | | | 0.13 | | | |
| Core area of big metro. area (dummy) | 0.25 | | | | 0.27 | | | | 0.25 | | | |

*Note:* This table shows weighted means for the variables used in the analysis for married households participating in the capital market. These means and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted means as well as bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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## 2.3 Methods

We employ several methods to analyse the determinants of female financial headship as well as wife- and husband-headed households' investment behaviour. For this purpose, we estimate different specifications of simple weighted OLS models[13] for our sample of married households. The sampling weights needed for our study are provided by Deutsche Bundesbank. Standard errors were computed by means of bootstrapping. The required bootstrap replicate weights were also provided by Deutsche Bundesbank. In all estimations, we take into account the multiply imputed nature of our dataset. By using Rubin's combination rules (Rubin, 1987), we consolidate the individual estimates for each of the five implicates into a single set of estimates.

Preceding our three-step analysis of gender differences in married households' investment behaviour, we study the determinants of female financial headship. For this purpose, we regress the dummy variable for female financial heads on a wide array of independent variables. This helps us to get a better understanding of how our sample of married households splits up in wife- and husband-headed households.

Next, we investigate wife- and husband-headed households' capital market participation. To analyse if wife-headed households are less likely to participate in the capital market than their male counterparts, we estimate different specifications of an OLS model for all married households, where the dummy variable for capital market participation is used as the dependent variable.

First, we regress the dummy variable for capital market participation only on the financial head's gender. After that, we add the spouses' individual characteristics to the model. Next, we include household characteristics. In the last step, we incorporate selected interactions terms between certain independent variables and the dummy variable for wife-headed households in the model. By doing so, we are able to study if the effects of our independent variables on capital market participation vary significantly between wife- and husband-headed households. Moreover, adding interaction terms to our model allows heterogeneous gender gaps in capital market participation between different subpopulations of married households. In terms of policy making, this offers important insights into which subgroups of married households show the most pronounced gender gaps in capital market participation.

Moreover, we study the determinants of financial risk attitude which will turn out to be a highly significant and economically sizeable predictor of capital market participation. Especially, we will focus on how strongly financial and general risk attitude overlap across households. As a result, we will see that financial risk attitude acts as a mediator variable for the relationship between general risk attitude and capital market participation. In other words, there are two channels through which general risk attitude can affect capital

[13] We also ran weighted logit, probit and tobit regressions, whose results differ to some extent. From a theoretical point of view, there are several disadvantages of using weighted OLS models instead of weighted logit, probit or tobit models. Nevertheless, we decided to show weighted OLS regression results in this paper, as they are much easier to interpret and offer a better understanding of the complex gender patterns in investment decision making we observe in our dataset. For the sole purpose of making predictions for designing policy measures, we recommend to use weighted logit, probit or tobit models.



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market participation: directly, and indirectly through financial risk attitude. In order to quantify the total ceteris-paribus effect of general risk attitude on capital market participation, we estimate the two individual effects and aggregate them up.

To further explore the origins of the raw gender gap in capital market participation rates, we conduct a Oaxaca–Blinder decomposition according to the method proposed by Neumark (1988). That is, we decompose the raw gender gap as follows:

$$\Delta\overline{CMP} = \underbrace{\boldsymbol{\beta^p}\Delta\overline{\boldsymbol{X}}}_{\text{exp. comp.}} + \underbrace{\left[\left(\boldsymbol{\beta^h} - \boldsymbol{\beta^p}\right)\overline{\boldsymbol{X}}^{\boldsymbol{h}} + \left(\boldsymbol{\beta^p} - \boldsymbol{\beta^w}\right)\overline{\boldsymbol{X}}^{\boldsymbol{w}}\right]}_{\text{unexplained component}}, \tag{1}$$

where $\Delta\overline{CMP} = \overline{CMP}^h - \overline{CMP}^w$ and $\Delta\overline{\boldsymbol{X}} = \overline{\boldsymbol{X}}^{\boldsymbol{h}} - \overline{\boldsymbol{X}}^{\boldsymbol{w}}$. The variables are defined in the following way: the mean capital market participation rates for wife- and husband-headed households are denoted by $\overline{CMP}^h$ and $\overline{CMP}^w$; $\overline{\boldsymbol{X}}^{\boldsymbol{h}}$ and $\overline{\boldsymbol{X}}^{\boldsymbol{w}}$ are the mean vectors of control variables; and $\boldsymbol{\beta^p}$, $\boldsymbol{\beta^h}$ as well as $\boldsymbol{\beta^w}$ denote the estimates (including intercepts) of the weighted OLS regressions—the dependent variable is the dummy variable for capital market participation—for the pooled sample of households, the subsample of husband-headed households and the subsample of wife-headed households, respectively.

The first part of the decomposition shown in Equation (1) is called the explained component of the raw differential in capital market participation rates. That explained component measures changes in the mean capital market participation rate for the case that a wife-headed household has a husband-headed household's average *endowment* of, say, income, wealth or risk attitude. The second part is called the unexplained component of the raw differential in capital market participation rates. It measures the effect on capital market participation for the case that a wife-headed household behaves like its male counterpart, that is, has his regression *coefficients* while keeping her average endowments.

In addition to the Oaxaca–Blinder decomposition presented above, we conduct an adjusted Oaxaca–Blinder decomposition which takes into account that financial risk attitude acts as a mediator variable for the relationship between general risk attitude and capital market participation. More details on this decomposition method are provided in Appendix B. By adjusting for the aforementioned mediator relationship, we are able to quantify how much of the raw gender gap in capital market participation is driven by gender differences in general risk attitude and other factors related to financial risk attitude, respectively.

In the second step of our analysis of investment behaviour, we estimate different specifications of a model in which the household's share of risky assets in the financial assets is used as the dependent variable. We only consider households participating in the capital market and analyse both the risky share and its four components separately.

Third, we investigate the average capital market portfolio of households participating in the capital market with a focus on the financial head's gender. For this purpose, we fit different models to examine if the observed differences in portfolio composition between wife- and husband-headed households are significant once we control for other household characteristics.



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# 3 Results

## 3.1 Investment decisions by household type

We motivate our analysis with a few statistics on investment outcomes in single and married households, by gender of the financial head. Table 3 shows that there is a gender gap in average extensive capital market participation rates in married households. This gap—around 10.5 percentage points—is substantial and statistically significant. For single women and single men, no such gap exists. For the intensive capital market participation (the share of financial assets invested in risky assets conditional on participating in the capital market), we see that the gender gap between married households disappears.

This discrepancy between single and married households on the one hand, and female and male financial heads on the other hand, gives rise to the question how strongly well-known predictors of risky investment behaviour influence the investment decision in married households when the household is wife- or husband-headed. We are particularly interested in risk attitudes and other individual and household characteristics, such as each spouse's education and labour market status, and how they jointly shape investment outcomes in married households.

## 3.2 What determines female financial headship?

It is possible that in married households, the likelihood of a wife or a husband selecting, or being selected, into financial headship is correlated with sociodemographic or economic factors at the individual or household level. Therefore, we first examine the factors relating to the probability of financial headship of the wife. Table 4 reports the results of a regression where we account for both individual characteristics as well as within-couple differentials alongside other household and location controls.

Among the individual characteristics, we find that neither the age of the financial head nor the age difference between the spouses determine if the wife or the husband becomes the financial head of the household. So, more life experience, measured by the age difference between spouses, does not play an important role as a source of bargaining power in the negotiation of the financial head. This finding contradicts Bertocchi et al. (2014), who find a significant and positive effect of the age difference between spouses on female financial headship.

Surprisingly, we also do not find significant fixed effects for the analysed age cohorts, states and area types (unlike, e.g., Guiso and Zaccaria (2023) who use data from Italy, where traditional gender norms are more prevalent than in Germany). That is, in our data, cultural effects and social norms do not seem to play an important role in the determination of the financial head: once controlling for other independent variables, the raw gender gaps in female financial headship between age cohorts and states observed in Figure 1 and Figure 2 are not significant anymore.

However, education and occupation are highly correlated with whether the household is headed by the wife or the husband: wives are around 12.5 percentage points more likely to become the financial head when they have a secondary school degree, but 10.47



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Table 3: Investment behaviour of single and married households

| | All house. | Female fin. head | Male fin. head | Difference |
|---|---|---|---|---|
| *Capital market participation (dummy)* | | | | |
| Singles and single parents | 16.67% | 15.39% | 18.01% | −2.62% |
| Married households | 23.75% | 17.60% | 28.11% | −10.51%*** |
| Difference between household types | −7.08%*** | −2.21% | −10.10%*** | |
| Tot. fin. wealth (singles and single par., € bn.) | 592.66 | 281.05 | 311.61 | |
| Tot. fin. wealth (married households, € bn.) | 1,095.88 | 355.67 | 740.21 | |
| N (singles and single parents) | 1,042 | 542 | 500 | |
| N (married households) | 2,706 | 983 | 1,723 | |
| Pop. size (singles and single par., millions) | 16.15 | 8.26 | 7.89 | |
| Pop. size (married households, millions) | 16.89 | 7.01 | 9.86 | |
| *Conditional risky share* | | | | |
| Singles and single parents | 37.92% | 37.94% | 37.90% | 0.04% |
| Married households | 31.93% | 28.99% | 33.23% | −4.24% |
| Difference between household types | 5.99%* | 8.95%* | 4.67% | |
| Tot. fin. wealth (singles and single par., € bn.) | 283.28 | 127.24 | 156.04 | |
| Tot. fin. wealth (married households, € bn.) | 623.81 | 169.43 | 454.38 | |
| N (singles and single parents) | 232 | 103 | 129 | |
| N (married households) | 1,037 | 302 | 735 | |
| Pop. size (singles and single par., millions) | 2.69 | 1.27 | 1.42 | |
| Pop. size (married households, millions) | 4.01 | 1.23 | 2.78 | |

*Note:* This table shows different weighted means for the dummy variable for capital market participation and the conditional share of risky assets in the financial assets. The weighted means for the share of risky assets in the financial assets are computed for the subset of households participating in the capital market. The means and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted means as well as bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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percentage points less likely when their husbands have one. This is in line with previous literature (Bertocchi et al., 2014; Friedberg and Webb, 2006; Guiso and Zaccaria, 2023). Whether the wife is employed part-time is marginally significant and beneficial for her being the financial head too, which can be interpreted as a division-of-labour mechanism in the sense of Bertocchi et al. (2014), as she has more time to devote to financial decisions than if she was employed full-time.

Moreover, retirement makes a difference for financial headship: the wife is significantly more likely to be the financial head if one of the spouses is retired. A possible explanation is that in retirement, day-to-day financial decision making becomes more important than investment decision making. Wives might be better trained in these tasks, which makes them more likely to assume the role of the financial head. Lastly, the more the wife contributes to the spouses' gross yearly income, the higher is the probability that she is the financial head. This is in line with previous literature which has identified the wife's income share as a significant source of bargaining power in within-couple negotiation over the household financial head (Bertocchi et al., 2014; Friedberg and Webb, 2006; Guiso and Zaccaria, 2023).

Turning now to household controls, the share of female financial heads is significantly lower in households participating in the capital market. This could mean that wives are better day-to-day financial decision makers, which is why they are considerably more often the financial head in households without risky assets. Husbands, on the other hand, may be considered to be better financial investment decision makers, which is why they are more likely to be the financial head in households participating in the capital market. Lastly, the financial head's general risk attitude has a significantly positive effect on female financial headship: women are more risk averse than men, which is why we find a higher share of female financial heads in the subgroup of financial heads with higher general risk aversion.

## 3.3 Do wife-headed households participate less often in the capital market?

### 3.3.1 Baseline regressions

To study how financial decisions are made in married households, we first estimate the gap between wife-headed and husband-headed households' extensive capital market participation and subsequently observe how that gap changes when we adjust for the influence of variables at the individual and household level. In the final specification, we add selected interaction terms to show variables which moderate gender differences in investment behaviour. Table 5 presents the results.

Column (1) shows that wife-headed households are much less likely to participate in the capital market than husbanded-headed ones: the raw gap is 10.51 percentage points, which is statistically and economically significant. The low $R^2$ of around 1.5 percent, however, calls for further controls. We start by adding education and occupation as well as other individual controls for both spouses in column (2).

Adding more controls increases the explanatory power of our model but affects the



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Table 4: Determinants of female financial headship

| | Female financial head (dummy) |
|---|---|
| Age of financial head (years) | −0.0076 |
| | (0.01) |
| Age$^2$ of financial head (years) | −0.0001 |
| | (0.00) |
| Age of financial head 18-35 years (dummy) | −0.1372 |
| | (0.14) |
| Age of financial head 36-50 years (dummy) | −0.0616 |
| | (0.06) |
| Age of wife – age of husband (years) | 0.0030 |
| | (0.00) |
| Wife has degree from secondary school (dummy) | 0.1245*** |
| | (0.04) |
| Husband has degree from secondary school (dummy) | −0.1047** |
| | (0.04) |
| Wife is employed full-time (dummy) | −0.0161 |
| | (0.05) |
| Husband is employed full-time (dummy) | 0.1062 |
| | (0.07) |
| Wife is employed part-time (dummy) | 0.0883* |
| | (0.05) |
| Husband is employed part-time (dummy) | 0.0633 |
| | (0.11) |
| Wife is retired or pensioner (dummy) | 0.1701*** |
| | (0.06) |
| Husband is retired or pensioner (dummy) | 0.2582*** |
| | (0.08) |
| Wife's share of spouses' gross yearly income | 0.2636*** |
| | (0.08) |
| Capital market participation (dummy) | −0.1107*** |
| | (0.04) |
| Financially risk-averse household (dummy) | 0.0328 |
| | (0.04) |
| Financial head's general risk aversion | 0.0183*** |
| | (0.01) |
| Constant | 0.7540 |
| | (0.46) |
| Other independent variables (individual charact.) | Yes |
| Other independent variables (household charact.) | Yes |
| State and area type fixed effects | Yes |
| N | 2,600 |
| Population size (millions) | 16.29 |
| $R^2$ | 0.1192 |

*Note:* This table shows weighted OLS regression results for the female financial headship model for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.1 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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gap in capital market participation between wife- and husband-headed households only slightly. Having completed secondary school is a significant predictor of capital market participation for both spouses, as is employment of the wife. Since most husbands work full-time already, a working wife increases the household's total income and thereby has benefits for diversification possibilities and household income volatility (e.g., Guiso and Zaccaria, 2023). This increases the likelihood of a household holding risky assets. A retired husband raises capital market participation by another 16.07 percentage points: retirees or pensioners typically have a certain income stream as well as more time they can devote to making investment decisions.

In column (3), adding regional controls and controls at the household level, such as the household's risk attitude, income, wealth, and other unreported variables, more than doubles the $R^2$ of our model and reduces the gap in capital market participation to less than 7 percentage points. When income and wealth are accounted for, the wife's education and full-time labour market participation are no longer significant and the indicator for a retired husband loses a bit of significance. This is not surprising, as, in column (2), these variables likely proxied for the household's income and wealth situation, which we account for explicitly in the specification in column (3). The dummy variable indicating whether the household is financially risk-averse is highly significant and large, which is in line with previous literature: it lowers capital market participation by a staggering 21.29 percentage points. The financial head's general risk attitude, on the other hand, does not matter for the household's decision whether to hold risky assets. This seems somewhat counter-intuitive at first glance but will be analysed further in Subsection 3.3.2. Lastly, financial advice plays a significant role: households seeking professional financial advice are 14.32 percentage points more likely to hold risky assets.

In the last column, we introduce selected interaction terms between certain independent variables and the dummy variable for wife-headed households. This allows us to examine possible differences in investment behaviour between households with a female or a male financial head. Including these terms shows that the observed differences in investment behaviour seem to explain a substantial part of the gender gap in capital market participation: the $R^2$ increases only slightly but the gender gap observed previously turns insignificant.

Most notably, we report results on the nexus between the financial head's gender and the role of risk attitudes that previous literature has overlooked. First, we find that financial risk attitude plays out differently in wife- and husband-headed households: while husband-headed households are 27.76 percentage points less likely to hold risky assets when they are unwilling to take financial risks, the corresponding effect for wife-headed households is much less pronounced ($-12.06$ percentage points). That means that for husband-headed households, the gradient between financial risk attitude and predicted capital market participation is much steeper—more negative—than for wife-headed households. When all other independent variables are at their means, our model predicts differing gender gaps in capital market participation for financially risk-averse and risk-loving households. This finding aligns with Säve-Söderbergh (2012). Figure 3 (a) summarises these observations. For financially risk-averse households, we get an insignificant gender gap of 2.22 percentage points, while the corresponding gap for fi-



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nancially risk-loving households is 17.92 percentage points and significant. We will delve deeper into these findings and offer possible interpretations with respect to a household's risk and return expectations in Subsection 3.3.3. Furthermore, in Subsection 3.3.4, we quantify how strongly the observed raw gender gap in capital market participation would decrease if the gap observed for financially risk-loving households was comparable to that of financially risk-averse households.

Regarding the financial head's general risk aversion, we find no significant relationship with capital market participation on average. However, Figure 3 (b) reveals that financial heads who are more-than-averagely risk-averse in general have a significantly higher predicted probability to participate in the capital market when they are husband- rather than wife-headed. We will elaborate on the role of risk attitudes further in Subsection 3.3.2.

In the full specification, the controls for a financial head's impatience, financial advice seeking and household net disposable income continue to be significant. With respect to household net wealth, we find significantly different effects for wife- and husband-headed households. While household net wealth has no significant effect on capital market participation for husband-headed households, the opposite is true for wife-headed households. If a wife-headed household's net wealth increases by €10,000, it becomes 0.17 percentage points more likely that this household invests in risky assets. Moreover, we find significant gender differences regarding the effect of home ownership. Only for wife-headed households, home ownership has a significant effect. Ceteris paribus, capital market participation in wife-headed households owning their main residence is 6.65 percentage points lower compared to households with female financial head that do not live in their own home.

Our analyses have shown that risk attitude does not translate in the same way into capital market participation in wife- as in husband-headed households. In the next step, we therefore regress participation in different assets (fund shares, listed shares, fixed-income securities and certificates) on the same battery of control variables as in the full model in Table 5. These assets are characterised by different levels of riskiness and should therefore reveal patterns that correspond to the investment behaviours that we observed in the previous table.

Table 6 reports the results of those regressions where we display only the coefficients of interest. Overall, it shows that for all asset categories, there is a (marginally) significant and negative relationship between holding those assets and financial risk attitude, with husband-headed households being between 2.34 percentage points (certificates) and 25.76 percentage points (fund shares) less likely to hold certain risky assets when they are unwilling to take financial risks.

The coefficients on the interaction terms show that financially risk-averse households with a female financial head are *less* likely to shy away from certain risky assets than their husband-headed counterparts. This effect is particularly sizeable for fund shares, which financially risk-averse wife-headed households are 20.84 percentage points more likely to participate in, and which corresponds well with the positive interaction term between female headship and financial risk attitude in Table 5. For certificates, the coefficient is 2.17 percentage points and significant at the 10 percent level. We also find differences



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Table 5: Determinants of capital market participation

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Female financial head (dummy) | −0.1051*** | −0.0912*** | −0.0680*** | −0.0423 |
| | (0.03) | (0.02) | (0.02) | (0.07) |
| Wife has degree from secondary school (dummy) | | 0.0997** | 0.0568 | 0.0659 |
| | | (0.04) | (0.04) | (0.04) |
| Husband has degree from secondary school (dummy) | | 0.1457*** | 0.0845** | 0.0733** |
| | | (0.04) | (0.03) | (0.03) |
| Wife has university degree (dummy) | | 0.0052 | −0.0190 | −0.0303 |
| | | (0.05) | (0.04) | (0.04) |
| Husband has university degree (dummy) | | 0.0601 | 0.0308 | 0.0274 |
| | | (0.04) | (0.03) | (0.03) |
| Wife is employed full-time (dummy) | | 0.1103*** | 0.0253 | 0.0337 |
| | | (0.04) | (0.04) | (0.04) |
| Husband is employed full-time (dummy) | | 0.0726 | −0.0109 | −0.0182 |
| | | (0.05) | (0.04) | (0.04) |
| Wife is employed part-time (dummy) | | 0.1235*** | 0.0711* | 0.0776* |
| | | (0.04) | (0.04) | (0.04) |
| Husband is employed part-time (dummy) | | 0.0315 | 0.0158 | 0.0266 |
| | | (0.08) | (0.07) | (0.07) |
| Wife is retired or pensioner (dummy) | | 0.0308 | 0.0214 | 0.0215 |
| | | (0.05) | (0.04) | (0.04) |
| Husband is retired or pensioner (dummy) | | 0.1607*** | 0.1014** | 0.0971* |
| | | (0.05) | (0.05) | (0.05) |
| Wife's share of spouses' gross yearly income | | 0.0470 | 0.0789 | 0.0691 |
| | | (0.06) | (0.06) | (0.06) |
| Financially risk-averse household (dummy) | | | −0.2129*** | −0.2776*** |
| | | | (0.03) | (0.04) |
| Female fin. head (dummy) × fin. risk-averse house. (dummy) | | | | 0.1570** |
| | | | | (0.06) |
| Financial head's general risk aversion | | | 0.0036 | 0.0117 |
| | | | (0.01) | (0.01) |
| Female fin. head (dummy) × fin. head's general risk aversion | | | | −0.0170 |
| | | | | (0.01) |
| Impatience of the financial head | | | 0.0086** | 0.0087** |
| | | | (0.00) | (0.00) |
| Financial advice (dummy) | | | 0.1432*** | 0.1420*** |
| | | | (0.03) | (0.03) |
| Household net disposable income (€ 1,000) | | | 0.0337*** | 0.0366*** |
| | | | (0.01) | (0.01) |
| Household net wealth (€ 10,000) | | | 0.0009*** | 0.0004 |
| | | | (0.00) | (0.00) |
| Female fin. head (dummy) × household net wealth (€ 10,000) | | | | 0.0013*** |
| | | | | (0.00) |
| Household owns HMR (dummy) | | | 0.0002 | 0.0396 |
| | | | (0.02) | (0.03) |
| Female fin. head (dummy) × household owns HMR (dummy) | | | | −0.1061** |
| | | | | (0.04) |
| Constant | 0.2811*** | −0.5194* | −0.0963 | −0.0610 |
| | (0.02) | (0.30) | (0.32) | (0.32) |
| Other independent variables (individual characteristics) | No | Yes | Yes | Yes |
| Other independent variables (household characteristics) | No | No | Yes | Yes |
| State and area type fixed effects | No | No | Yes | Yes |
| N | 2,706 | 2,692 | 2,597 | 2,597 |
| Population size (millions) | 16.89 | 16.72 | 16.28 | 16.28 |
| $R^2$ | 0.0148 | 0.1311 | 0.2725 | 0.2842 |

*Note:* This table shows weighted OLS regression results for different specifications of the capital market participation model for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.2 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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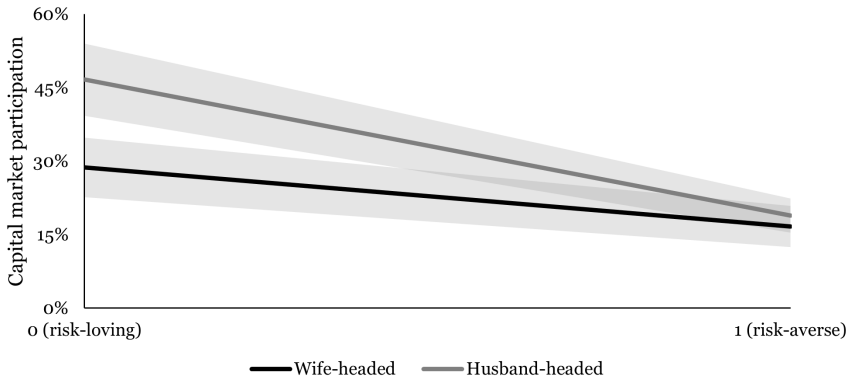
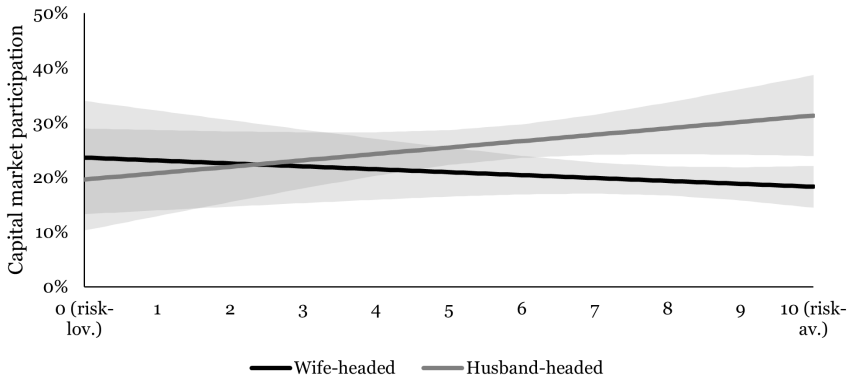
Figure 3: Risk attitude and predicted capital market participation




(a) Financially risk-averse household (dummy)




(b) Financial head's general risk aversion

*Note:* This figure shows selected margins plots for the weighted OLS regression results shown in column (4) of Table 5. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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for financial risk attitude within wife-headed households: wife-headed households are 9.29 percentage points less likely to hold listed shares when they avoid financial risks than when they don't; for all other assets, the effect of financial risk attitude on the participation rate is insignificant for wife-headed households.

For general risk attitude, no clear patterns emerge—the effect for certificates is significant but small—and the interaction terms are marginally significant at best.

Table 6: Determinants of the participation in different capital market assets

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Female financial head (dummy) | −0.0869 | −0.0331 | −0.0133 | −0.0427 |
| | (0.07) | (0.06) | (0.04) | (0.03) |
| Financially risk-averse household (dummy) | −0.2576*** | −0.1634*** | −0.0377* | −0.0234** |
| | (0.04) | (0.04) | (0.02) | (0.01) |
| Female fin. head (dummy) × fin. risk-av. house. (dummy) | 0.2084*** | 0.0705 | 0.0255 | 0.0217* |
| | (0.06) | (0.05) | (0.03) | (0.01) |
| Financial head's general risk aversion | 0.0114 | −0.0012 | −0.0025 | −0.0061*** |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0146* | −0.0054 | 0.0005 | 0.0039 |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Household net wealth (€ 10,000) | −0.0002 | 0.0009*** | 0.0003** | 0.0003** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Female fin. head (dummy) × household net wealth (€ 10,000) | 0.0011** | 0.0000 | −0.0000 | −0.0002 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Household owns HMR (dummy) | 0.0217 | 0.0288 | −0.0132 | −0.0094 |
| | (0.03) | (0.02) | (0.02) | (0.01) |
| Female fin. head (dummy) × household owns HMR (dummy) | −0.0708* | −0.0505* | −0.0153 | 0.0012 |
| | (0.04) | (0.03) | (0.02) | (0.01) |
| Constant | 0.0683 | −0.0997 | 0.1416 | 0.1086 |
| | (0.29) | (0.24) | (0.12) | (0.11) |
| Other independent variables (individual characteristics) | Yes | Yes | Yes | Yes |
| Other independent variables (household characteristics) | Yes | Yes | Yes | Yes |
| State and area type fixed effects | Yes | Yes | Yes | Yes |
| N | 2,597 | 2,597 | 2,597 | 2,597 |
| Population size (millions) | 16.28 | 16.28 | 16.28 | 16.28 |
| $R^2$ | 0.1978 | 0.1945 | 0.1024 | 0.0668 |

*Note:* This table shows weighted OLS regression results for the participation models of different categories of capital market assets for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.3 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

### 3.3.2 Risk attitude

When households answer the financial risk attitude question, they might implicitly be taking into account background risks that might constrain them in their *ability* or *capacity* to take financial risks. For instance, a household with children might be more financially constrained and, hence, less willing or *able* to take risks in financial matters. In this sense, our measure of financial risk attitude may not be as accurate as other questions in identifying innate risk aversion. To analyse this, and because financial risk aversion has proven to be a significant predictor of risky asset holding whose effect varies with the financial head's gender, we regress that dummy variable on our full set of control variables. We explicitly control for general risk attitude, which we deem less likely to be



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Table 7: Determinants of being a financially risk-averse household

| | (1) | (2) | (3) |
|---|---|---|---|
| Female financial head (dummy) | 0.2002** | 0.1760** | 0.2429** |
| | (0.08) | (0.09) | (0.10) |
| Financial head's general risk aversion | 0.0782*** | 0.0647*** | 0.0643*** |
| | (0.01) | (0.01) | (0.01) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0243** | −0.0213* | −0.0211* |
| | (0.01) | (0.01) | (0.01) |
| Wife has degree from secondary school (dummy) | | −0.0854** | −0.0256 |
| | | (0.04) | (0.05) |
| Female fin. head (dummy) × wife has deg. from sec. sch. (dummy) | | | −0.1338** |
| | | | (0.06) |
| Husband has degree from secondary school (dummy) | | −0.1090*** | −0.1884*** |
| | | (0.04) | (0.05) |
| Female fin. head (dummy) × hus. has deg. from sec. sch. (dummy) | | | 0.2171*** |
| | | | (0.05) |
| Wife is retired or pensioner (dummy) | | 0.0369 | 0.0463 |
| | | (0.05) | (0.05) |
| Husband is retired or pensioner (dummy) | | −0.1509*** | −0.1371** |
| | | (0.06) | (0.05) |
| Financial advice (dummy) | | −0.0840*** | −0.0849*** |
| | | (0.03) | (0.03) |
| Household net disposable income (€1,000) | | −0.0430*** | −0.0417*** |
| | | (0.01) | (0.01) |
| Household net wealth (€10,000) | | −0.0006* | −0.0006** |
| | | (0.00) | (0.00) |
| Western state (dummy) | | −0.0264 | 0.0373 |
| | | (0.03) | (0.04) |
| Female fin. head (dummy) × western state (dummy) | | | −0.1441** |
| | | | (0.06) |
| Southern state (dummy) | | −0.0487 | −0.0162 |
| | | (0.03) | (0.04) |
| Female fin. head (dummy) × southern state (dummy) | | | −0.0689 |
| | | | (0.06) |
| Eastern state (dummy) | | 0.0165 | 0.0921 |
| | | (0.05) | (0.06) |
| Female fin. head (dummy) × eastern state (dummy) | | | −0.1625** |
| | | | (0.06) |
| Constant | 0.1940*** | 0.5764 | 0.5792 |
| | (0.05) | (0.40) | (0.40) |
| Other independent variables (individual characteristics) | No | Yes | Yes |
| Other independent variables (household characteristics) | No | Yes | Yes |
| Area type fixed effects | No | Yes | Yes |
| N | 2,614 | 2,597 | 2,597 |
| Population size (millions) | 16.46 | 16.28 | 16.28 |
| $R^2$ | 0.1257 | 0.2462 | 0.2584 |

*Note:* This table shows weighted OLS regression results for different specifications of the model of financial risk attitude for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.4 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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influenced by financial constraints. Our aim here is to examine how strongly financial and general risk attitude overlap across households.

The regression in column (1) of Table 7 contains the variables for a female financial head and for the financial head's general risk attitude, as well as the interaction term between the two. We document that the relationship between general and financial risk attitude depends on the gender of the financial head: in husband-headed households, an increment in general risk aversion by one point increases the probability of being risk-averse in financial matters much more strongly (7.82 percentage points) than in wife-headed households (5.39 percentage points).

To study these dynamics further and to test the stability of the general risk attitude measure, we introduce variables reflecting financial constraints. In particular, we first control for the educational background of the two spouses in column (2) and interaction effects between education and the gender of the financial head in column (3), along with other individual and household characteristics. This results in an increase of the models' $R^2$'s to over 25 percent, that is, a sizeable share of a household's willingness to take financial risks seems to be explained by other household characteristics above and beyond general risk preferences.

In column (2), some of the significant independent variables measure, to a certain extent, how financially constrained a household is. For example, a household in which neither of the spouses possesses secondary education is more likely financially constrained because lower education is associated with lower wages and higher labour market risk. This provides empirical evidence for our previously mentioned concern that the financial risk attitude question alone has its limits in identifying innate risk aversion. To some degree, it seems to be a measure of the ability instead of the willingness to take financial risks. The strength of the relationship between financial and general risk attitude remains largely unchanged when we account for financial constraints, reassuring us that the general measure does not reflect financial constraints to a great extent.

Secondary education, income and wealth, as well as having a retired husband in the household make it less likely for the household to avoid financial risks completely. The same is true for financial advice, which seems to help households to assess financial risks more realistically. Lastly, the coefficient for a female financial head shrinks slightly to 17.60 percentage points.

In column (3), we add selected interaction terms to the model. Like before, we find that financial heads who reveal an aversion to risks in general are more likely to also avoid financial risks, but this link is slightly stronger for male than for female financial heads. Moreover, we find that the negative relationship between secondary education and financial risk attitudes is not the same in husband- and wife-headed households and depends on who has secondary education: in wife-headed households, the effect of secondary education on financial risk attitude is more pronounced for an educated wife ($-15.94$ percentage points) than for an educated husband (insignificant 2.87 percentage points); in husband-headed households, the effect is more pronounced for an educated husband ($-18.84$ percentage points) than for an educated wife (insignificant $-2.56$ percentage points). In other words, the negative effect of secondary education on financial risk attitude is much stronger if the spouse who possesses secondary education is also



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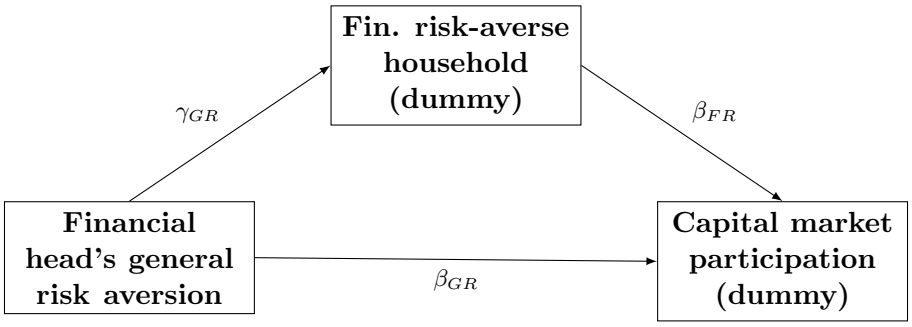
Figure 4: Total effect of general risk attitude on capital market participation




the financial head of the household.

The region in which the household resides makes a difference only when the wife is the financial head, and only in western and eastern Germany: those regions have weaker labour markets and higher unemployment rates than the rest of Germany. Moreover, since women are more likely to be in employment in wife- than in husband-headed households, labour market risks are better diversified in wife-headed households. That implies that in western and eastern Germany, wife-headed households are less exposed to labour market risks and can thus be a bit more daring in taking financial risks than in regions where wives are less likely to contribute to a diversified household income. The coefficients on retirement of the husband, financial advice, and wealth and income have roughly the same magnitude and significance as before. Lastly, the inclusion of all these variables increases the coefficient on the female financial head dummy by about half.

We have previously found that both risk attitude variables—the financial and the general one—strongly predict capital market participation and that they are not completely independent from each other. Moreover, we have shown that the financial risk attitude question used in our analysis has its limits in identifying innate risk aversion. In order to determine the effect of innate risk aversion on capital market participation more accurately, it is possible to rely on general risk aversion as a measure for innate risk aversion. We deem this variable less likely to be influenced by financial constraints than the financial risk attitude question. Based on our previous analysis, we hypothesise that financial risk aversion might act as a mediator variable for the relationship between general risk aversion and capital market participation, as depicted in Figure 4. In other words, there are two channels through which general risk attitude can affect capital market participation: directly, and indirectly through financial risk attitude. In order to assess the total ceteris-paribus effect of general risk aversion on capital market participation, we can estimate the two individual effects and aggregate them up. The corresponding calculations are presented in Table 8.

For wife-headed households, we observe an insignificant and negative direct effect of general risk attitude on holding risky assets as well as a significant and negative indirect effect of comparable magnitude. For husband-headed households, surprisingly, the direct effect of general risk attitude is positive but insignificant, while the indirect effect via the mediator variable is negative and highly significant. That is, the direct



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Table 8: Direct, indirect and total effect of general risk attitude on capital market participation

| | Wife-headed | Hus.-headed | Difference |
|---|---|---|---|
| Direct effect ($\beta_{GR}$) | $-0.0053$ | $0.0117$ | $-0.0170$ |
| | (0.0065) | (0.0079) | (0.0105) |
| Indirect effect ($\gamma_{GR} \times \beta_{FR}$) | $-0.0052^{**}$ | $-0.0179^{***}$ | $0.0126^{***}$ |
| | (0.0021) | (0.0033) | (0.0040) |
| Total effect | $-0.0105^{*}$ | $-0.0062$ | $-0.0044$ |
| | (0.0059) | (0.0073) | (0.0093) |

*Note:* This table shows weighted OLS regression estimates for the direct, indirect and total effect of a financial head's general risk aversion on capital market participation by the gender of the financial head, as illustrated in Figure 4. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients for the models presented in column (4) of Table 5 and column (3) of Table 7 with the help of the sampling weights provided by Deutsche Bundesbank. Next, we used the resulting coefficients to determine the direct, indirect and total effect of general risk aversion on capital market participation for each implicate. The corresponding bootstrap standard errors were computed by means of the bootstrap replicate weights provided by Deutsche Bundesbank. Finally, the individual estimates were consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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effect mitigates the indirect effect which is much higher than in wife-headed households. In total, the ceteris-paribus effect of general risk attitude on capital market participation is $-0.0105$ (marginally significant) for wife- and $-0.0062$ (insignificant) for husband-headed households: when the financial head's general risk aversion goes up, ceteris paribus, by one point, capital market participation decreases by 1.05 percentage points in wife- but only 0.62 percentage points in husband-headed households; but if both households get a little more risk-loving in general matters, wife-headed households start to invest in the capital market. The total effect in wife-headed households is driven, in about equal measure, by the direct and indirect negative effect of general risk attitude. In husband-headed households, though, an aversion to general risks measured directly does not keep households from investing in the capital market ($\beta_{GR} = 0.117$), while an aversion to financial risks ($\beta_{FR} = -0.2776^{***}$) does.

### 3.3.3 Risk and return expectations

Next, we discuss the potential role of a household's risk and return expectations in explaining the results presented in the previous subsections. Besides risk attitude, expectations are considered to be crucial determinants of a household's financial risk-taking behaviour in both classical portfolio theory (cf., e.g., Markowitz, 1952) and behavioural finance (cf., e.g., Loewenstein et al., 2001; Weber et al., 2013). As pointed out by behavioural research, "investors' expectations may not be based only on economic data, but also on affective reactions such as hopes and fears" (Weber et al., 2013, p. 857). Unfortunately, a household's risk and return estimates cannot be explicitly included as control variables in our empirical analysis, since we do not have appropriate measures for them.[14] That is why we can only hypothesise on their effects on capital market participation.

First, we interpret the effect of financial risk attitude on capital market participation with respect to a household's risk and return expectations. In Subsection 3.3.1, we have shown that there are differing gender gaps in capital market participation for financially risk-averse and risk-loving households (see Figure 3 (a)). The gender gap for financially risk-averse households is insignificant. For financially risk-loving households, however, the gap is significant and economically sizeable. As we explicitly control for a household's financial risk attitude, both classical portfolio and behavioural finance theory suggest that the observed gap can be explained by different risk and return expectations, which, in our case, differ between wife- and husband-headed households. That is, our empirical results provide implicit evidence that financially risk-loving wife-headed households have

[14] In the wave of the PHF that we used, there is no question about how a household assesses capital market risk. Concerning returns, the financial head is asked about their subjective and numeric return expectations for German stocks for the next twelve months (see Weber et al. (2013) for the difference between subjective and numeric return expectations). Although the respective questions are, from a theoretical point of view, suitable for our analysis, we decided not to include them in our analysis because of two reasons. First, including corresponding independent variables in our empirical analysis would substantially decrease our sample size and thus limit the generalisability of our results. Second, once we add controls for the two questions in our analysis, their effects turn out to be insignificant and the direction of our results does not change.



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less optimistic risk and return expectations than their male counterparts. For financially risk-averse households, on the other side, our empirical study does not offer clear evidence for gender differences in risk and return expectations.

Furthermore, classical finance theory posits that risk-neutral investors only care about the returns of their investment, not about any expected potential risk. Hence, in the first step, we shut down the effect of risk expectations on capital market participation. If we assume that a household is risk-neutral in general matters—that is, the financial head's general risk aversion is equal to 5 on the 11-point Likert scale—, we would assume that the household's risk-taking behaviour is not influenced by any pessimistic risk expectations. In this case, a gender difference in capital market participation could be explained by wife-headed households' return expectations being different from husband-headed households'. Based on the models presented in column (4) of Table 5 and column (3) of Table 7, we predict mean capital market participation rates of 21.25 and 28.17 percentage points for risk-neutral wife- and husband-headed households, respectively.[15] That is, we find a significant gender gap of 6.92 percentage points. An interpretation of this gender difference could be that husband-headed households have more optimistic return expectations. This confirms earlier findings, e.g. by Hurd et al. (2011) for the Netherlands, rendering women less likely to own stocks.

Next, concerning a household's risk expectations, the different total effects of general risk attitude on capital market participation shown in Table 8 leave room for interpretation. As already pointed out above, capital market participation in wife-headed households is more sensitive to changes in a household's general risk attitude than it is in husband-headed households. A possible explanation for this higher sensitivity could be as follows: wife-headed households have higher risk expectations than their male counterparts and therefore react more strongly to changes in general risk attitude.

Overall, different views on risk and return of an investment can be interpreted as different views on that investment's Sharpe ratio. When looking at the average rather than the extremes, our findings are consistent with, e.g., Weber et al. (2002) and Amromin and Sharpe (2008), who find that female investors expect financial investments to provide them with lower benefits but higher uncertainty than what male investors would expect. Bucciol et al. (2017), however, report that female investors are more optimistic about Sharpe performances of stocks and net bonds.

[15] The presented mean participation rates are computed as follows: First, we estimate the model presented in column (3) of Table 7 separately for each implicate. Then, using the model estimates, we predict mean shares of financially risk-averse households per implicate for both types of households when their general risk aversion level is equal to 5 and all other independent variables are at their means. Next, we estimate the model presented in column (4) of Table 5 separately for each implicate. Based on these results, we compute the estimated mean capital participation rates per implicate when the general risk aversion level is equal to 5, the mean shares of financially risk-averse households are the ones determined in the previous step and all other independent variables are at their means. The corresponding standard errors were computed by means of the bootstrap replicate weights provided by Deutsche Bundesbank. Finally, the individual estimates were consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987).



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### 3.3.4 A decomposition of the gender gap in capital market participation: risk attitude and risk and return expectations

When we consider all households for which we have no missing values in the relevant control variables, we find a highly significant raw gender gap in capital market participation of 10.57 percentage points. We decompose this gap following Oaxaca (1973), Blinder (1973) and Neumark (1988). This permits us to analyse which factors contribute how much to the observed difference in average capital market participation rates between wife- and husband-headed households and if it is factor endowments that drive this gap or returns to these endowments, the latter of which we interpret as a household's investment behaviour. This exercise resembles a policy thought experiment[16] that allows us to predict by how much the gap would shrink or widen if wife- and husband-headed household possessed the same factor endowments (explained component), behaved in the same way (unexplained component), or both.

Table 9 reports our findings. We estimate an explained component of 3.78 percentage points and an unexplained component of 6.80 percentage points, both highly significant and jointly making up the observed gender gap of 10.57 percentage points. Without doubt, it is first and foremost the regression coefficients that drive the gap in capital market participation rates (representing 65 percent of the gap), while observable characteristics make up only 35 percent of it. That is, if wife-headed households' factor endowments translated into capital market participation in the same way as they do in husband-headed households—that is, if they had the same investment behaviour—, households with female financial heads would be 6.80 percentage points more likely to hold risky assets, or in other words, the gap would shrink by this much. If wife-headed households had the same average individual and household characteristics that husband-headed ones have, the gap would shrink by only 3.78 percentage points.

When we take a closer look at the explained component, we see that neither of the endowment differences with respect to age, education, employment and other individual characteristics explains a significant share of the overall gender gap. An unwillingness to take financial risk contributes negatively to the gap. That is, if wife-headed households had the same average financial risk appetite as husband-headed households, they would shy away less from risky investments and the gender gap in capital market participation would decrease by 1.64 percentage points. Lastly, household net wealth is responsible for 4.64 percent of the gap: giving wife-headed households the average net wealth of an average husband-headed household would close the gap by 0.49 percentage points. In a nutshell, the explained component shows us that only a small fraction of the total gap in capital market participation is driven by observable characteristics, which are on average less favourable for wife-headed households. Around 40 percent of that part is down to different levels of financial risk attitude.

The lion's share of the gap, however, is "unexplained", which means that we cannot explain it with observable data at the individual and household level. It measures the change in the predicted average capital market participation if a typical wife-headed

[16] Some of our independent variables may be highly endogenous and therefore our results should not be interpreted as causal.



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Table 9: Oaxaca–Blinder decomposition of the gender gap in capital market participation

| | Explained component: Observable factors | | Unexplained component: Investment styles | |
|---|---|---|---|---|
| | Effect | % of raw differential | Effect | % of raw differential |
| **Individual characteristics** | | | | |
| Age effects | 0.0046 | 4.35 | 0.5774 | 546.26 |
| | (0.01) | | (0.66) | |
| Education effects | 0.0049 | 4.64 | 0.0034 | 3.22 |
| | (0.00) | | (0.02) | |
| Employment effects | −0.0009 | −0.85 | 0.0313 | 29.61 |
| | (0.01) | | (0.08) | |
| Financial head's general risk aversion | −0.0017 | −1.61 | 0.1331* | 125.92 |
| | (0.00) | | (0.07) | |
| Other effects | −0.0041 | −3.88 | −0.0109 | −10.31 |
| | (0.00) | | (0.04) | |
| **Household characteristics** | | | | |
| Fin. risk-averse household (dummy) | 0.0164*** | 15.52 | −0.1136** | −107.47 |
| | (0.01) | | (0.05) | |
| Household net disposable income (€1,000) | 0.0061 | 5.77 | −0.0294 | −27.81 |
| | (0.00) | | (0.06) | |
| Household net wealth (€10,000) | 0.0049** | 4.64 | −0.0317*** | −29.99 |
| | (0.00) | | (0.01) | |
| Household owns HMR (dummy) | 0.0000 | 0.00 | 0.0628** | 59.41 |
| | (0.00) | | (0.03) | |
| State fixed effects | 0.0010 | 0.95 | −0.0453 | −42.86 |
| | (0.00) | | (0.05) | |
| Area type fixed effects | −0.0012 | −1.14 | 0.0499 | 47.21 |
| | (0.00) | | (0.04) | |
| Other effects | 0.0078 | 7.38 | 0.0482 | 45.60 |
| | (0.01) | | (0.04) | |
| Constant | | | −0.6072 | −574.46 |
| | | | (0.68) | |
| **Of raw differential (0.1057***)** | 0.0378*** | 35.76 | 0.0680*** | 64.33 |
| | (0.01) | | (0.02) | |
| **Adjusted Oaxaca–Blinder decomposition** | | | | |
| Fin. risk-averse household (dummy): Other factors | 0.0452** | 42.76 | −0.0587** | −55.53 |
| | (0.02) | | (0.03) | |
| Financial head's general risk aversion | 0.0039 | 3.69 | 0.0437 | 41.34 |
| | (0.00) | | (0.07) | |
| N | 2,597 | | | |
| Population size (millions) | 16.28 | | | |

*Note:* This table shows weighted Oaxaca–Blinder decomposition results for the financial head's gender for married households. The decomposition is expressed from the viewpoint of a wife-headed household and is computed according to the method of Neumark (1988). The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined the coefficients of the corresponding weighted Oaxaca–Blinder decomposition as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). Moreover, the table shows selected results for the weighted adjusted Oaxaca–Blinder decomposition for the financial head's gender for married households. More details on the estimation procedure are provided in Appendix B. ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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household had a typical husband-headed household's coefficients—that is, if a female financial head *behaved* like a male one while retaining her factor endowments. Any significant coefficients in the second-to-last column of Table 9 thus indicate that investment *behaviour*, or investment styles, are different for wife- and husband-headed households.

Concerning the unexplained components, the effects from financial and general risk attitude emerge as particularly interesting. Looking at the two risk aversion types individually, we find that, if a wife-headed household was as sensitive to changes in financial risk attitude as a husband-headed household, capital market participation would *fall* by 11.36 percentage points and the gap would increase. This echoes the positive interaction effect of financial risk aversion for female financial heads in Table 5, which showed that for wife-headed households, higher financial risk aversion would not lead them to stay out of the capital market to the same extent as it would otherwise comparable husband-headed households. Another way of viewing this finding is the following: if the gender gap in capital market participation for financially risk-averse households was as big as for financially risk-loving households (see Figure 3 (a)), the overall raw gender gap would increase by 11.36 percentage points. In this hypothetical case, we would also have an economically sizeable gender gap for financially risk-averse households which, following our line of reasoning in Subsection 3.3.3, can be interpreted as implicit evidence for gender differences with respect to risk and return expectations in this subgroup.

An interesting follow-up question is the following: by how much would the overall raw gender gap in capital market participation change if the gender gap for financially risk-loving households was comparable to that of financially risk-averse households, e.g., only 2.22 percentage points rather than 17.92? This is equivalent to asking by how much the gap would change if wife-headed households behaved more like their risk-loving husband-headed counterparts. In this hypothetical case, by replacing female financial heads' with male financial heads' behaviour, we rule out gender differences with respect to the risk and return expectations and are able to quantify how much the latter contribute to the overall gender gap. To do this, we include a dummy variable for financially risk-loving households instead of the dummy variable for financially risk-averse households in our Oaxaca–Blinder decomposition. This dummy variable is defined as one minus the dummy variable for financially risk-averse households and its unexplained component corresponds to the number we are interested in. We find a significant share of 4.47 percentage points (see Table D.5 in Appendix D). That is, around 40 percent of the overall gender gap in capital market participation can be explained by potential gender differences in the risk and return expectations of financially risk-loving households.

For general risk aversion, we observe an unexplained component which is only marginally significant. As illustrated in the margins plot in Figure 3 (b), a husband-headed household's likelihood to participate in the capital market would increase if the financial head's general risk aversion went up, while the opposite holds true for wife-headed households. That is, if wife-headed households behaved like their husband-headed counterparts in this respect, their capital market participation would *rise* by 13.31 percentage points.

However, as pointed out in our analysis in Subsection 3.3.2, financial risk attitude acts as a mediator variable for the relationship between general risk attitude and capital market participation. That is, the effects of general and financial risk aversion on



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capital market participation are somehow intertwined. A shortcoming of the conventional Oaxaca–Blinder decomposition method is that it only accounts for direct effects of the analysed independent variables on capital market participation. Indirect effects via mediator variables, however, cannot be estimated. This limits the validity of the unexplained component of the financial head's general risk aversion which is our preferred measure of a household's innate risk aversion. In Appendix B, we present a method to derive the unexplained component of the financial head's general risk aversion which accounts for both its direct and indirect effect (via financial risk aversion) on capital market participation. This method implicitly filters out the part of the effect of financial risk attitude on capital market participation which can be explained by a household's level of general risk aversion and relates it to the total effect of general risk attitude on capital market participation. The bottom panel in Table 9 reports the results of this adjusted Oaxaca–Blinder decomposition.[17]

Interestingly, in the adjusted Oaxaca–Blinder decomposition of the gender gap in capital market participation, both the explained and the unexplained component of general risk aversion, as well as the sum of the two components are insignificant. That is, from a statistical point of view, differences in innate risk aversion do not explain the observed gender gap in capital market participation. On the other hand, both the explained (4.52 percentage points) and unexplained component (−5.87 percentage points) of the part of financial risk attitude which can be attributed to factors other than a financial head's general risk aversion (such as the household's ability to take financial risks, other socioeconomic characteristics etc.) are significant. This is a considerable result which calls for further future research.

Apart from the significant unexplained components with respect to risk attitude, we find significant gender differences in investment styles in connection with a household's net wealth. If the effect of household net wealth on capital market participation for wife-headed households was identical to that in husband-headed households, the gender gap in capital market participation would rise by 3.17 percentage points. This finding is in line with the significant and positive interaction effect for household net wealth presented in Table 5.

Lastly, home ownership plays a role: ceteris paribus, husband-headed households who live in their own home are more likely to hold risky assets, and if the same relationship held for owner-occupying wife-headed households, capital market participation of the latter would rise by 6.28 percentage points. In other words, in husband-headed households, capital market participation goes up for homeowners, as they may try to diversify their portfolio which is likely dominated by the main residence; in wife-headed households, however, capital market participation decreases for homeowners, as households may want to avoid capital market risk which might make them fall into arrears on their mortgage payments. These opposing effects are reflected in the different signs of the coefficients in Table 5.

[17] In Table D.5 in Appendix D, we report the results of the adjusted Oaxaca–Blinder decomposition for the case in which we include the dummy variable for financially risk-loving households instead of that for financially risk-averse households.



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In a nutshell, our analysis provides three main insights into how differences with respect to risk attitude drive the gender gap in capital market participation. First, giving wife-headed households the same financial risk attitude of husband-headed households would significantly increase their capital market participation. Second, a substantial part of the overall gender gap is potentially due to gender differences in the risk and return expectations of financially risk-loving households. Third, once we account for the fact that financial risk attitude acts as a mediator variable for the relationship between general risk attitude and capital market participation, differences in innate risk aversion, measured by a financial head's level of general risk aversion, do not explain the lower participation rate of wife-headed households. Instead, other factors beyond innate risk aversion explaining financial risk attitude seem to be a key driver of the observed gender gap.

### 3.4 Conditional on capital market participation, is there a gender gap in the portfolio's share of risky assets?

Having analysed capital market participation by the financial head's gender, we now want to investigate the share of the total portfolio of financial assets that is devoted to risky assets, conditional on the household holding risky assets. One of the benefits of our dataset is that we can observe multiple asset classes that can be considered risky. To make our results more comparable with other papers on the topic, which primarily looked at equity holdings only, we first calculate raw gender gaps in the total risky share and its four components. This is summarised in Table 10.

We first note that the median value of the total portfolio of financial assets (both risky and non-risky) is €81,600 for wife- and €88,020 for husband-headed households. Both household types hold comparable shares of their portfolio in risky assets: wife-headed households devote about 29 percent to risky assets, husband-headed ones a third. While there is no significant gender gap in the total risky share, wife-headed households devote about 4.2 percentage points less to listed shares than their husband-headed counterparts, conditional on holding risky assets in the first place. All gender gaps in the remaining asset categories are minuscule and statistically insignificant. We also display the share devoted to non-risky assets in that table for further information.

Next, we examine how individual and household characteristics, particularly risk attitudes, relate to the share devoted to risky assets in the total portfolio (i.e. the sum over the household's holdings of fund shares, listed shares, bonds and certificates divided by the value of the total portfolio) as well as to its components for households participating in the capital market. Table 11 reports the results. We observe a significant negative effect for the dummy variable for female financial heads on the total risky share. That is, once a risk-loving household in which the spouses are of the same age and have neither a secondary school nor a university degree has decided to hold risky assets, wife-headed households devote considerably less of their portfolio ($-0.3144$) to risky assets than husband-headed ones, everything else equal. This gender gap increases marginally for households in which wives are older than their husbands. So, if the wife's bargaining power—in this case measured with respect to life experience—increases, the gender



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Table 10: Composition of the conditional financial assets portfolio

| | All | Wife-headed | Hus.-headed | Difference |
|---|---|---|---|---|
| Total devoted to risky assets | 31.93% | 28.99% | 33.23% | −4.24% |
| Fund shares | 18.03% | 17.88% | 18.09% | −0.21% |
| Listed shares | 9.56% | 6.64% | 10.85% | −4.21%*** |
| Fixed-income securities | 3.73% | 3.87% | 3.67% | 0.20% |
| Certificates | 0.61% | 0.59% | 0.61% | −0.02% |
| Total devoted to non-risky assets | 68.07% | 71.01% | 66.77% | 4.24% |
| Demand deposits and cash | 9.99% | 10.10% | 9.95% | 0.15% |
| Savings accounts | 29.55% | 29.85% | 29.42% | 0.43% |
| Home loan sav. agreement contracts | 7.57% | 7.47% | 7.61% | −0.14% |
| Whole-life insurance contracts | 18.47% | 20.50% | 17.56% | 2.94% |
| Other assets | 2.50% | 3.09% | 2.24% | 0.85% |
| Median value of the total fin. assets | €85,980 | €81,600 | €88,020 | |
| N | 1,037 | 302 | 735 | |
| Population size (millions) | 4.01 | 1.23 | 2.78 | |

*Note:* This table shows the weighted average shares of households' financial assets portfolios that are devoted to risky and non-risky assets as well as their corresponding components, for married households participating in the capital market. The average shares and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted average shares as well as bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

gap in risky assets holdings also increases. In addition, the gender difference in the portfolio share devoted to risky assets varies significantly with the spouses' educational endowments. For example, when all other independent variables are at their means, our model predicts a gender difference of 8.3 percentage points (insignificant) for households in which neither of the spouses has a secondary school or university degree, while the corresponding gap for households in which both spouses have a university degree is only 4.65 percentage points (insignificant). Moreover, households who avoid financial risks invest 9.59 percentage points less in risky assets irrespective of the gender of the financial head; for increasing general risk aversion, the risky share is 2.94 percentage points higher in wife-headed households.

We also see that the gender gap in the risky share is primarily driven by equity holdings: everything else constant and regardless of their financial risk attitude, wife-headed households with risky assets hold 22.21 percentage points lower portions of listed shares than their husband-headed counterparts. This is in line with with previous studies that found significant gender gaps in the share of equity in the total assets, such as Halko et al. (2012). Financial risk attitude does not play any role in this, but general risk attitude does: in husband-headed households, the share invested in listed shares decreases with the financial head's general risk aversion (−0.0255), whereas in wife-headed households, that share is almost independent of general risk aversion (0.0028). In other words, the gender gap in the portion devoted to listed shares is not the same for risk-loving and risk-averse households (see Figure 5).



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Table 11: Determinants of the conditional risky share in the financial assets portfolio

| | Total risky share | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|---|
| Female financial head (dummy) | −0.3144*** | −0.0931 | −0.2212*** | −0.0206 | 0.0204 |
| | (0.09) | (0.08) | (0.07) | (0.03) | (0.04) |
| Age of wife − age of husband (years) | 0.0033 | 0.0030 | 0.0001 | −0.0001 | 0.0003 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Female fin. head (dummy) × Age of wife − age of husband (years) | −0.0146* | −0.0134* | 0.0001 | −0.0004 | −0.0008 |
| | (0.01) | (0.01) | (0.00) | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | −0.0753* | −0.0708** | 0.0029 | −0.0042 | −0.0032 |
| | (0.04) | (0.03) | (0.03) | (0.01) | (0.01) |
| Fem. fin. head (dummy) × wife has deg. from sec. sch. (dummy) | 0.1834*** | 0.1266** | 0.0146 | 0.0454 | −0.0032 |
| | (0.07) | (0.06) | (0.04) | (0.04) | (0.01) |
| Husband has degree from secondary school (dummy) | −0.0347 | −0.0274 | −0.0098 | 0.0040 | −0.0015 |
| | (0.05) | (0.05) | (0.03) | (0.01) | (0.01) |
| Fem. fin. head (dummy) × hus. has deg. from sec. sch. (dummy) | 0.1863** | 0.0944 | 0.0428 | 0.0550 | −0.0058 |
| | (0.08) | (0.08) | (0.04) | (0.04) | (0.02) |
| Wife has university degree (dummy) | 0.1530*** | 0.1341*** | 0.0135 | 0.0066 | −0.0012 |
| | (0.04) | (0.03) | (0.03) | (0.01) | (0.00) |
| Female fin. head (dummy) × wife has university deg. (dummy) | −0.2047*** | −0.1424*** | 0.0010 | −0.0599 | −0.0034 |
| | (0.07) | (0.06) | (0.05) | (0.04) | (0.01) |
| Husband has university degree (dummy) | 0.0159 | 0.0259 | −0.0075 | −0.0118 | 0.0092 |
| | (0.04) | (0.04) | (0.02) | (0.01) | (0.01) |
| Female fin. head (dummy) × husband has university deg. (dummy) | −0.1285 | −0.1035 | 0.0188 | −0.0303 | −0.0135 |
| | (0.08) | (0.08) | (0.04) | (0.04) | (0.01) |
| Financially risk-averse household (dummy) | −0.0959*** | −0.0834** | −0.0169 | 0.0042 | 0.0002 |
| | (0.04) | (0.03) | (0.02) | (0.02) | (0.00) |
| Female fin. head (dummy) × fin. risk-averse household (dummy) | 0.0228 | 0.0720 | −0.0196 | −0.0122 | −0.0175 |
| | (0.06) | (0.06) | (0.04) | (0.03) | (0.02) |
| Financial head's general risk aversion | −0.0130 | 0.0148* | −0.0255*** | −0.0002 | −0.0021* |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | 0.0294** | −0.0006 | 0.0283*** | 0.0022 | −0.0005 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) |
| Constant | 0.3006 | −0.0786 | 0.2040 | 0.1890 | −0.0138 |
| | (0.42) | (0.34) | (0.26) | (0.13) | (0.05) |
| Other independent variables (individual characteristics) | Yes | Yes | Yes | Yes | Yes |
| Other independent variables (household characteristics) | Yes | Yes | Yes | Yes | Yes |
| State and area type fixed effects | Yes | Yes | Yes | Yes | Yes |
| N | 996 | 996 | 996 | 996 | 996 |
| Population size (millions) | 3.93 | 3.93 | 3.93 | 3.93 | 3.93 |
| $R^2$ | 0.2759 | 0.2040 | 0.2049 | 0.1696 | 0.0617 |

*Note:* This table shows weighted OLS regression results for the risky share in the financial assets and the shares of different categories of capital market assets in the financial assets for married households participating in the capital market. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.6 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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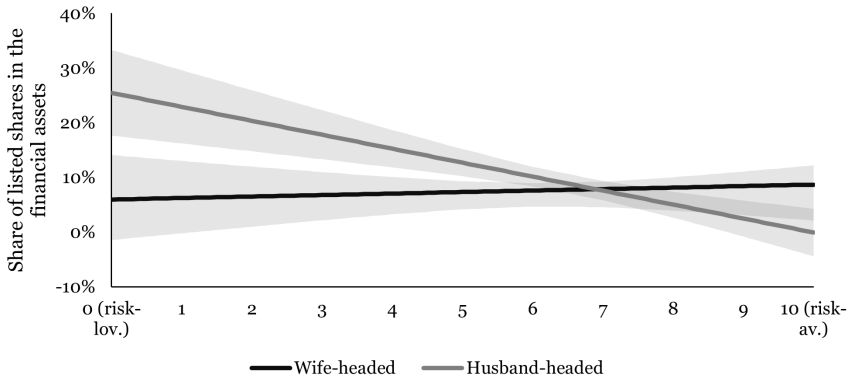
Figure 5: General risk aversion and the predicted conditional share of listed shares in the financial assets portfolio




*Note:* This figure shows the predicted conditional share of listed shares in the financial assets for different levels of a financial head's general risk aversion. The underlying model is presented in column (3) of Table 11. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

Concerning the part of the financial assets portfolio invested in fund shares, we find (marginally) significant gender patterns with respect to the age difference between the spouses and the wife's educational attainment. Also, financial risk attitude has a significant negative effect on the portion allocated to this asset class ($-0.0834$). As for general risk attitude, we observe that households with more risk-averse financial heads invest a higher share of their financial assets in fund shares, although this effect is only marginally significant.

There are no significant gender differences in the share of the total portfolio devoted to fixed-income securities or certificates, and financial risk attitude plays no role in the share of the portfolio invested in these categories once the household has decided to participate in the capital market. As for general risk attitude, we find that household heads of both genders invest less in certificates the more risk-averse they are in general matters; but this effect is only marginally significant.

### 3.5 Do wife-headed households invest in different categories of capital market assets than husband-headed households?

In our last research question, we take a closer look at how wife- and husband-headed households that participate in the capital market compose their risky assets portfolios. In Figure 6, we first display typical portfolios by the household head's gender. We note that the median values of the capital market portfolio are € 15,800 for wife- and € 15,960 for husband-headed households. Looking at portfolio allocations, fund shares dominate both portfolios, but much more so for households headed by wives (57.29 percent) than by husbands (52.05 percent), who in turn invest more in listed shares than their female counterparts (36.88 vs 30.85 percent). The shares of certificates and fixed-income securi-



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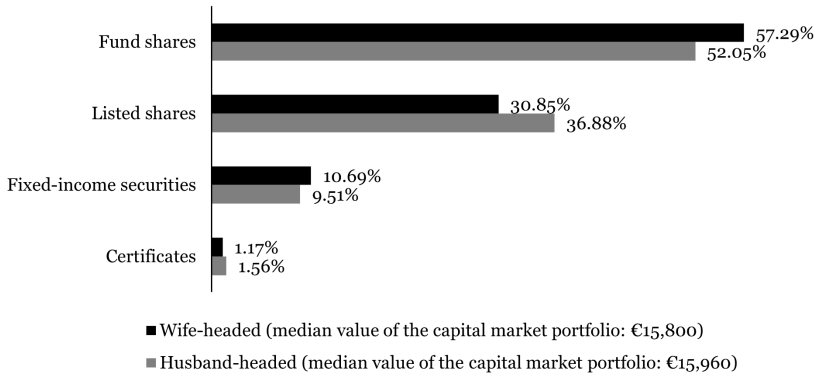
ties are comparable and amount to approximately 10 percent of the total capital market portfolio—even though we can observe that husband-headed (wife-headed) households invest slightly more in certificates (fixed-income securities). In conclusion, husband-headed households hold more of their portfolio in the riskier categories of capital market assets—which is consistent with our finding that households with male financial heads are less risk-averse than households with female heads.

Figure 6: Composition of the capital market portfolio




*Note:* This figure shows the weighted average proportions of different categories of capital market assets for married households participating in the capital market divided by wife- and husband-headed households as well as the corresponding weighted median values of the capital market portfolio. The average proportions and median values were computed as follows: For each of the five implicates, we determined weighted average proportions as well as weighted median values with the help of the sampling weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). *Source:* 2014 Deutsche Bundesbank PHF, own calculations.

To determine how asset allocation within the portfolio relates to gender and risk attitudes, we perform regressions of the allocation to the four types of risky assets for households participating in the capital market. Our aim is to make an intra-gender comparison of participation rates in the four asset classes when the risk attitude of the household changes. We report these results in Table 12.

Again, we observe a rather complex interplay between the financial head's gender and risk attitudes, which has not been studied in prior literature. Consistent with our previous analyses, we observe that wife-headed households who shy away from financial risk devote a larger portion of their portfolio to fund shares—insignificant 13.74 percentage points—than otherwise comparable risk-loving wife-headed households. Compared to that same group, their allocation to listed shares decreases marginally significantly by 14.64 percentage points. Concerning the allocations to fixed-income securities and certificates, we find neither a statistically nor an economically significant impact of financial risk attitude. In total, we find that—compared to its financially risk-loving counterpart—a financially risk-averse wife-headed would shift its portfolio away from



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listed shares into fund shares, while the shares devoted to fixed-income securities and certificates would stay unchanged. Conventionally, fund shares, due to their diversified nature, are viewed as a rather safe investment for investors who are willing to participate in the capital market—especially compared to investments in individual stocks. From this point of view, the observed change in wife-headed households' investment behaviour associated with a higher level of financial risk aversion seems plausible.

By contrast, we find a different portfolio shift in connection with financial risk attitude for husband-headed households. Interestingly, financially risk-averse husband-headed households invest a lower share of their portfolio in fund shares—marginally significant 10.62 percentage points— than their financially risk-loving counterparts. The lower share allocated to fund shares goes along with higher portions devoted to listed shares and fixed-income securities. In total, the different effects of financial risk attitude on asset allocation induce varying gender differences in the capital market portfolios of financially risk-loving and risk-averse households.

Table 12: Determinants of the conditional shares of different capital market assets in the capital market portfolio

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Female financial head (dummy) | −0.2949 | 0.2831 | −0.0336 | 0.0455 |
| | (0.24) | (0.21) | (0.10) | (0.06) |
| Wife is retired or pensioner (dummy) | −0.0955 | 0.1330 | −0.0344 | −0.0031 |
| | (0.10) | (0.08) | (0.06) | (0.02) |
| Female fin. head (dummy) × wife is ret. or pens. (dummy) | 0.3719** | −0.1055 | −0.2845** | 0.0181 |
| | (0.19) | (0.14) | (0.12) | (0.03) |
| Husband is retired or pensioner (dummy) | 0.1723 | −0.1063 | −0.0633 | −0.0027 |
| | (0.14) | (0.16) | (0.08) | (0.03) |
| Female fin. head (dummy) × husband is ret. or pens. (dummy) | −0.0539 | −0.1055 | 0.1907* | −0.0312 |
| | (0.17) | (0.13) | (0.11) | (0.02) |
| Financially risk-averse household (dummy) | −0.1062* | 0.0522 | 0.0552 | −0.0011 |
| | (0.06) | (0.06) | (0.05) | (0.01) |
| Female fin. head (dummy) × fin. risk-averse house. (dummy) | 0.2436** | −0.1986* | −0.0368 | −0.0082 |
| | (0.11) | (0.10) | (0.08) | (0.03) |
| Financial head's general risk aversion | 0.0325** | −0.0224* | −0.0035 | −0.0065* |
| | (0.01) | (0.01) | (0.01) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0162 | 0.0096 | 0.0062 | 0.0004 |
| | (0.03) | (0.03) | (0.01) | (0.01) |
| Household net disposable income (€1,000) | −0.0375** | 0.0220 | 0.0082 | 0.0073** |
| | (0.02) | (0.02) | (0.01) | (0.00) |
| Female fin. head (dummy) × house. net dis. inc.(€1,000) | 0.0540** | −0.0522** | 0.0077 | −0.0094** |
| | (0.02) | (0.02) | (0.01) | (0.00) |
| Constant | 1.0863 | −0.8026 | 0.6680 | 0.0483 |
| | (0.79) | (0.79) | (0.45) | (0.12) |
| Other independent variables (individual characteristics) | Yes | Yes | Yes | Yes |
| Other independent variables (household characteristics) | Yes | Yes | Yes | Yes |
| State and area type fixed effects | Yes | Yes | Yes | Yes |
| N | 989 | 989 | 989 | 989 |
| Population size (millions) | 3.91 | 3.91 | 3.91 | 3.91 |
| $R^2$ | 0.1804 | 0.1608 | 0.2044 | 0.0824 |

*Note:* This table shows weighted OLS regression results for the shares of different categories of capital market assets in the capital market portfolio of married households participating in the capital market. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. More detailed results are shown in Table D.7 in Appendix D. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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With respect to a financial head's general risk aversion, we find no significant gender patterns. For both wife- and husband-headed households alike, increasing general risk aversion leads to an equal, significant portfolio shift away from listed shares, fixed-income securities and certificates into fund shares. The effects of general risk attitude on the portfolio allocations towards listed shares and certificates are marginally significant, while the negative impact on fixed-income securities is insignificant and small.

Apart from the described gender patterns associated with a household's risk attitude, we find significant gender differences for the effects of retirement and net disposable income on the allocation of the capital market portfolio. At first, we take a closer look at the different effects of retirement on asset allocation. For this purpose, we focus our analysis on two types of households: households in which both spouses are retired and households in which neither of the spouses is retired (henceforth *retired* and *non-retired* households). For wife-headed households, the asset allocation of retired households significantly differs from that of non-retired households: everything else equal, wife-headed households entering retirement significantly increase their portfolio proportion devoted to fund shares by 39.48 percentage points, while the shares devoted to the other asset categories decrease. In contrast to their female counterparts, there are no significant differences in the composition of the capital market portfolio between retired and non-retired households for husband-headed households.

Finally, we study the effect of household net disposable income on asset allocation. Wife-headed households marginally significantly shift their portfolio away from listed shares into fund shares as well as fixed-income securities when their income increases. For husband-headed households, however, we do not observe such a change in investment behaviour. Ceteris paribus, increasing a husband-headed household's net disposable household income by €1,000 reduces the share devoted to fund shares by 3.75 percentage points (significant), while the proportion devoted to other assets types increases accordingly. That is, husband-headed households with higher income invest a higher proportion of their portfolio in riskier capital market assets such as individual stocks and certificates.

# 4 Conclusion

This paper presented a comprehensive analysis of intra-couple investment decision-making and how gender and risk attitudes play into it. Using representative data on German households who agree on a uniform financial risk attitude, we show that the relation between gender, risk attitudes (both in general and financial matters) and risky investment is much more complex than prior literature has acknowledged. Often, a pronounced average gender gap is not due to different capital market outcomes in risk-averse but in risk-loving households. We attribute this gap to gender differences in risk and return expectations: wife-headed households are much more inclined to stay out of the capital markets than their husband-headed counterparts when their general risk aversion increases, implying higher risk expectations of the former. Likewise, setting general risk attitude to an average value to model a risk-neutral investor revealed that a part of the



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sizeable gender gap could be due to more optimistic return expectations of male financial heads.

We also used a decomposition method to quantify the likely impact of different risk and return expectations between wife- and husband-headed households on the gender gap. This analysis has shown that risk-loving, wife-headed households seem to have a less optimistic risk and return assessment than their husband-headed counterparts. Overall, 40 percent of the 10.57 percentage point gap in capital market participation potentially arises from a less favourable view on investment Sharpe ratios taken by female financial heads.

Furthermore, we presented evidence that is in line with financial risk attitude acting as a mediator variable for the impact on general risk attitude on capital market outcomes. General risk attitudes are our preferred measure of innate risk attitudes since the financial risk attitude question can easily be contaminated by financial constraints, and understood by survey participants as a question of their capacity to take risks rather than their willingness. This is an important conceptual contribution to the literature on the determinants of capital market participation.

Our paper also has an important policy dimension. Our extensive use of interaction effects between the gender of the household's financial head and certain other characteristics makes it possible to come closer to the roots of the observed gender differences in capital market outcomes. Ideally, this analysis will facilitate better policy-making helping women to take more control of their financial matters.



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# Appendix A

## Questions about a household's financial and general risk attitude

Box A.1: Question about the household's financial risk attitude

If savings or investment decisions are made in your household: Which of the statements on the following list best describes the attitude toward risk? Try to characterize the household as a whole, even if it is not always easy.

1. *We take significant risks and want to generate high returns.*
2. *We take above-average risks and want to generate above-average returns.*
3. *We take average risks and want to generate average returns.*
4. *We are not ready to take any financial risks.*
5. *No uniform classification is possible for the household as a whole.*

*Source:* 2014 Deutsche Bundesbank PHF.

Box A.2: Question about the financial head's general risk attitude

How do you view yourself: Are you in general a risk-taking person or do you try to avoid risks?

*Please use the numbers from 0 to 10: 0 means that you are "not at all ready to take risks" and 10 means that you are "very willing to take risks". With the values in between you can graduate your rating.*

*Source:* 2014 Deutsche Bundesbank PHF.



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# Appendix B

## Adjusted Oaxaca–Blinder decomposition for the total effect of the financial head's general risk attitude on capital market participation

In Subsection 3.3.4, we present a Oaxaca–Blinder decomposition of the gender gap in capital market participation based on the decomposition method of Neumark (1988). This decomposition accounts only for the direct effects of the analysed independent variables on capital market participation. Indirect effects via mediator variables, however, are not considered. This shortcoming of the usual Oaxaca–Blinder decomposition limits the validity of the explained and unexplained components of the financial head's general risk aversion which is our preferred measure of a household's innate risk aversion.

In Subsection 3.3.2, we show that financial risk attitude acts as a mediator variable for the relationship between general risk attitude and capital market participation. That is, there exists a significant indirect effect of general risk attitude on capital market participation. In the following, we present a method to derive the explained and unexplained component of the financial head's general risk aversion which accounts for both its direct and indirect effect on capital market participation.

First, for each of the five implicates, we run weighted OLS regressions for the pooled sample of wife- and husband-headed households for the following two models:

$$CMP_i = \beta_0 + \beta_{Female} Female_i + \beta_{FR} FR_i + \beta_{GR} GR_i + \boldsymbol{\beta X_i} + \varepsilon_i, \tag{B.1}$$

$$FR_i = \gamma_0 + \gamma_{Female} Female_i + \gamma_{GR} GR_i + \boldsymbol{\gamma X_i} + \varepsilon_i, \tag{B.2}$$

where $CMP_i$ is the dummy variable for capital market participation; $Female_i$ denotes the dummy variable for a household with a female financial head; $FR_i$ is the dummy variable for a financially risk-averse household; $GR_i$ denotes the financial head's general risk aversion; and $\boldsymbol{X_i}$ is a vector of other control variables.

In addition, again for each of the five implicates, we estimate weighted OLS regression coefficients separately for wife- and husband-headed households for the following two models:

$$CMP_i = \beta_0 + \beta_{FR} FR_i + \beta_{GR} GR_i + \boldsymbol{\beta X_i} + \varepsilon_i, \tag{B.3}$$

$$FR_i = \gamma_0 + \gamma_{GR} GR_i + \boldsymbol{\gamma X_i} + \varepsilon_i, \tag{B.4}$$

where the variables have the same meaning as above.

Next, we compute the direct, indirect and total effects of general risk attitude on capital market participation per implicate separately for the pooled sample, the wife-headed households, and the husband-headed households. Moreover, we determine the weighted means of general risk aversion for each of the three samples which we denote by $\overline{GR}^p$, $\overline{GR}^w$, and $\overline{GR}^h$. After that, we consider the part of the gender gap in capital market participation which is explained by the financial head's general risk aversion when we account for the mediator relationship shown in Subsection 3.3.2 (see Figure 4).



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That is, we analyse

$$\beta^h_{GR,total}\overline{GR}^h - \beta^w_{GR,total}\overline{GR}^w, \tag{B.5}$$

where $\beta_{GR,total}$ is the total effect of general risk aversion on capital market participation and the superscripts $h$ and $w$ refer to the corresponding coefficients of husband- and wife-headed households, respectively.

Following the ideas of Neumark (1988), we can decompose (B.5) as follows:

$$\begin{aligned}\beta^h_{GR,total}\overline{GR}^h - \beta^w_{GR,total}\overline{GR}^w = \beta^p_{GR,total}\left(\overline{GR}^h - \overline{GR}^w\right) + \Big[\overline{GR}^h\left(\beta^h_{GR,total} - \beta^p_{GR,total}\right) \\ + \overline{GR}^w\left(\beta^p_{GR,total} - \beta^w_{GR,total}\right)\Big],\end{aligned}$$

where the superscript $p$ refers to the corresponding coefficients for the pooled sample of all married households. The first part of the decomposition can be interpreted as the explained component of the financial head's general risk aversion in the sense of Neumark (1988), while the second part represents the unexplained component. We estimate both components separately for each of the five implicates. Furthermore, we compute the corresponding bootstrap standard errors by means of the bootstrap replicate weights provided by Deutsche Bundesbank. Finally, the individual estimates were consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). The corresponding results are shown in Table 9 in Subsection 3.3.4.

The decomposition method shown above implicitly filters out the part of the effect of financial risk attitude on capital market participation which can be explained by a household's level of general risk aversion and attributes it to the total effect of general risk aversion on capital market participation. In order to illustrate this property in more detail, we take a closer look at the part of the gender gap which the usual Oaxaca–Blinder decomposition explains by financial risk attitude—that is,

$$\beta^h_{FR}\overline{FR}^h - \beta^w_{FR}\overline{FR}^w,$$

where $\overline{FR}$ denotes the corresponding means of financial risk attitude and the superscripts $h$ and $w$ refer to the coefficients of husband- and wife-headed households, respectively.

By inserting (B.4), we get

$$\begin{aligned}\beta^h_{FR}\overline{FR}^h - \beta^w_{FR}\overline{FR}^w &= \beta^h_{FR}\Big(\gamma^h_0 + \gamma^h_{GR}\overline{GR}^h + \boldsymbol{\gamma}^h\overline{\boldsymbol{X}}^h\Big) - \beta^w_{FR}\Big(\gamma^w_0 + \gamma^w_{GR}\overline{GR}^w + \boldsymbol{\gamma}^w\overline{\boldsymbol{X}}^w\Big) \\ &= \beta^h_{FR}\Big(\overline{FR}^h_{OF} + \gamma^h_{GR}\overline{GR}^h\Big) - \beta^w_{FR}\Big(\overline{FR}^w_{OF} + \gamma^w_{GR}\overline{GR}^w\Big) \\ &= \beta^h_{FR}\overline{FR}^h_{OF} - \beta^w_{FR}\overline{FR}^w_{OF} + \beta^h_{FR}\gamma^h_{GR}\overline{GR}^h - \beta^w_{FR}\gamma^w_{GR}\overline{GR}^w,\end{aligned}$$

where $\overline{FR}_{OF} = \overline{FR} - \gamma_{GR}\overline{GR}$ and the superscripts $h$ and $w$ refer to the corresponding coefficients of husband- and wife-headed households, respectively. In this equation, the term $\beta^h_{FR}\gamma^h_{GR}\overline{GR}^h - \beta^w_{FR}\gamma^w_{GR}\overline{GR}^w$ captures the gender gap in capital market participation caused by the part of the effect of financial risk attitude on capital market participation which can be explained by a household's level of general risk aversion.



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Next, we write (B.5) as follows:

$$\begin{aligned}\beta^h_{GR,total}\overline{GR}^h - \beta^w_{GR,total}\overline{GR}^w &= \left(\beta^h_{GR} + \gamma^h_{GR}\beta^h_{FR}\right)\overline{GR}^h - \left(\beta^w_{GR} + \gamma^w_{GR}\beta^w_{FR}\right)\overline{GR}^w \\ &= \beta^h_{GR}\overline{GR}^h - \beta^w_{GR}\overline{GR}^w + \beta^h_{FR}\gamma^h_{GR}\overline{GR}^h - \beta^w_{FR}\gamma^w_{GR}\overline{GR}^w.\end{aligned}$$

That is, in our adjusted version of the usual Oaxaca–Blinder decomposition, we attribute the gender gap $\beta^h_{FR}\gamma^h_{GR}\overline{GR}^h - \beta^w_{FR}\gamma^w_{GR}\overline{GR}^w$ to general risk attitude and not to financial risk attitude.

For the gender gap in capital market participation which is caused by the part of financial risk attitude associated with other factors than general risk attitude, we get the following decomposition:

$$\begin{aligned}\beta^h_{FR}\overline{FR}^h_{OF} - \beta^w_{FR}\overline{FR}^w_{OF} = \beta^p_{FR}\left(\overline{FR}^h_{OF} - \overline{FR}^w_{OF}\right) + \Big[\overline{FR}^h_{OF}\left(\beta^h_{FR} - \beta^p_{FR}\right) \\ + \overline{FR}^w_{OF}\left(\beta^p_{FR} - \beta^w_{FR}\right)\Big],\end{aligned}$$

where the superscript $p$ refers to the corresponding coefficients for the pooled sample of all married households. The first part of the decomposition can be interpreted as the explained component of the remaining part of financial risk attitude in the sense of Neumark (1988), while the second part represents the unexplained component. We estimate both components separately for each of the five implicates. In addition, we compute the corresponding bootstrap standard errors by means of the bootstrap replicate weights provided by Deutsche Bundesbank. Finally, the individual estimates were consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). The corresponding results are shown in Table 9 in Subsection 3.3.4.



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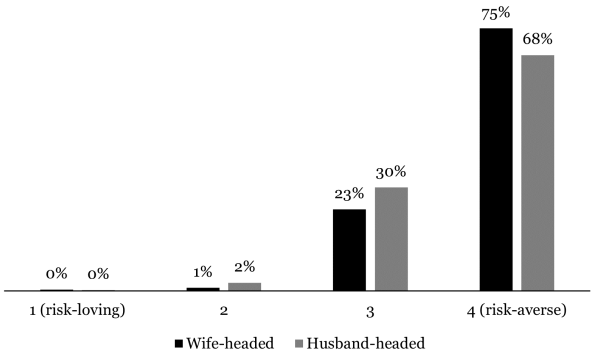
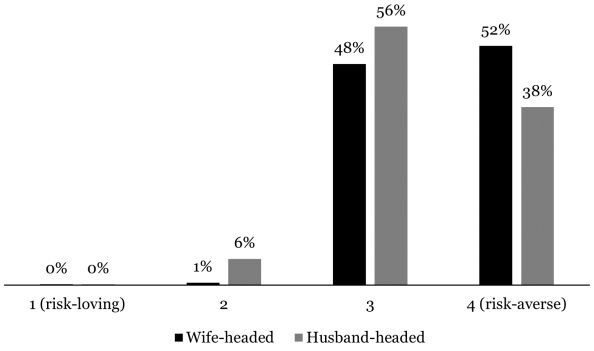
# Appendix C

## Figures

Figure C.1: Household willingness to take financial risks by gender and household type




(a) All married households




(b) Married households participating in the capital market

*Note:* This figure shows the weighted distribution of levels of willingness to take financial risks by gender of the financial head and household type. Willingness to take financial risks ranges from 1 = "We take significant risks and want to generate high returns." to 4 = "We are not ready to take any financial risks.". The average proportions were computed as follows: For each of the five implicates, we determined weighted average proportions with the help of the sampling weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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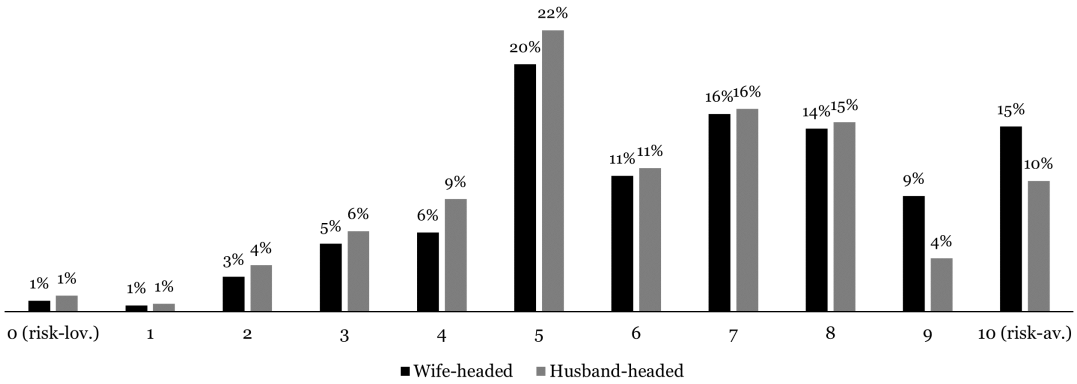
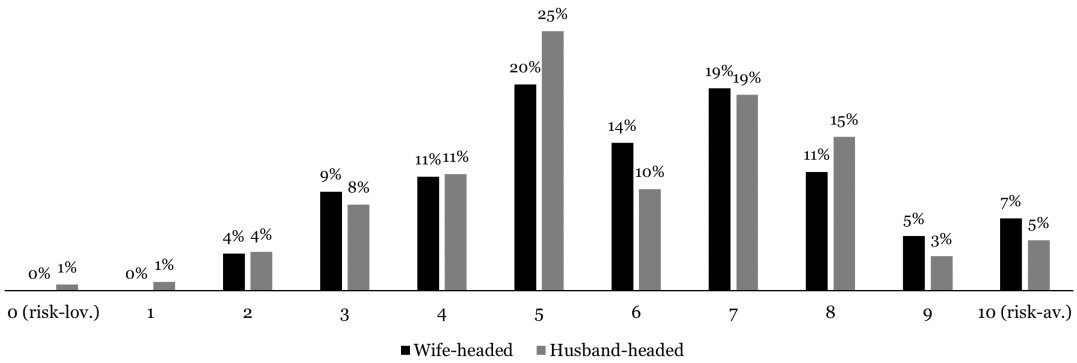
Figure C.2: Financial head's general risk aversion




(a) All married households




(b) Married households participating in the capital market

*Note:* This figure shows the weigthed distribution of levels of the financial head's general risk aversion by gender of the financial head and household type. General risk aversion ranges from 0 = "Very willing to take risks" to 10 = "Not at all willing to take risks". The average proportions were computed as follows: For each of the five implicates, we determined weighted average proportions with the help of the sampling weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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# Appendix D

## Tables

Table D.1: Determinants of female financial headship

| | Female financial head (dummy) |
|---|---|
| Age of financial head (years) | −0.0076 |
| | (0.01) |
| Age$^2$ of financial head (years) | −0.0001 |
| | (0.00) |
| Age of financial head 18-35 years (dummy) | −0.1372 |
| | (0.14) |
| Age of financial head 36-50 years (dummy) | −0.0616 |
| | (0.06) |
| Age of wife – age of husband (years) | 0.0030 |
| | (0.00) |
| Wife has degree from secondary school (dummy) | 0.1245$^{***}$ |
| | (0.04) |
| Husband has degree from secondary school (dummy) | −0.1047$^{**}$ |
| | (0.04) |
| Wife has university degree (dummy) | −0.0618 |
| | (0.04) |
| Husband has university degree (dummy) | 0.0143 |
| | (0.05) |
| Wife is employed full-time (dummy) | −0.0161 |
| | (0.05) |
| Husband is employed full-time (dummy) | 0.1062 |
| | (0.07) |
| Wife is employed part-time (dummy) | 0.0883$^{*}$ |
| | (0.05) |
| Husband is employed part-time (dummy) | 0.0633 |
| | (0.11) |
| Wife is retired or pensioner (dummy) | 0.1701$^{***}$ |
| | (0.06) |
| Husband is retired or pensioner (dummy) | 0.2582$^{***}$ |
| | (0.08) |
| Wife's share of spouses' gross yearly income | 0.2636$^{***}$ |
| | (0.08) |
| Wife lived in the former GDR in 1989 (dummy) | −0.0449 |
| | (0.07) |
| Husband lived in the former GDR in 1989 (dummy) | −0.1038 |
| | (0.09) |
| Capital market participation (dummy) | −0.1107$^{***}$ |
| | (0.04) |
| Financially risk-averse household (dummy) | 0.0328 |
| | (0.04) |

(continued)



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Table D.1: Determinants of female financial headship (continued)

| | Female financial head (dummy) |
|---|---|
| Financial head's general risk aversion | 0.0183*** |
| | (0.01) |
| Household net disposable income (€ 1,000) | −0.0015 |
| | (0.01) |
| Household net wealth (€ 10,000) | 0.0003 |
| | (0.00) |
| Children in the household (dummy) | −0.0337 |
| | (0.04) |
| Western state (dummy) | −0.0631 |
| | (0.05) |
| Southern state (dummy) | −0.0673 |
| | (0.04) |
| Eastern state (dummy) | 0.0983 |
| | (0.08) |
| Suburbs of medium-sized metro. area (dummy) | 0.0003 |
| | (0.04) |
| Core area of medium-sized metro. area (dummy) | −0.0485 |
| | (0.05) |
| Suburbs of big metro. area (dummy) | 0.0375 |
| | (0.05) |
| Core area of big metro. area (dummy) | −0.0092 |
| | (0.04) |
| Constant | 0.7540 |
| | (0.46) |
| N | 2,600 |
| Population size (millions) | 16.29 |
| $R^2$ | 0.1192 |

*Note:* This table shows weighted OLS regression results for the female financial headship model for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.2: Determinants of capital market participation

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Female financial head (dummy) | −0.1051*** | −0.0912*** | −0.0680*** | −0.0423 |
| | (0.03) | (0.02) | (0.02) | (0.07) |
| Age of financial head (years) | | 0.0167* | 0.0034 | 0.0018 |
| | | (0.01) | (0.01) | (0.01) |
| Age$^2$ of financial head(years) | | −0.0001 | −0.0000 | −0.0000 |
| | | (0.00) | (0.00) | (0.00) |
| Age of financial head 18-35 years (dummy) | | 0.0531 | 0.0225 | 0.0095 |
| | | (0.08) | (0.08) | (0.08) |
| Age of financial head 36-50 years (dummy) | | 0.0620 | 0.0556 | 0.0475 |
| | | (0.05) | (0.05) | (0.05) |
| Age of wife – age of husband (years) | | −0.0030 | −0.0036* | −0.0040* |
| | | (0.00) | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | | 0.0997** | 0.0568 | 0.0659 |
| | | (0.04) | (0.04) | (0.04) |
| Husband has degree from secondary school (dummy) | | 0.1457*** | 0.0845** | 0.0733** |
| | | (0.04) | (0.03) | (0.03) |
| Wife has university degree (dummy) | | 0.0052 | −0.0190 | −0.0303 |
| | | (0.05) | (0.04) | (0.04) |
| Husband has university degree (dummy) | | 0.0601 | 0.0308 | 0.0274 |
| | | (0.04) | (0.03) | (0.03) |
| Wife is employed full-time (dummy) | | 0.1103*** | 0.0253 | 0.0337 |
| | | (0.04) | (0.04) | (0.04) |
| Husband is employed full-time (dummy) | | 0.0726 | −0.0109 | −0.0182 |
| | | (0.05) | (0.04) | (0.04) |
| Wife is employed part-time (dummy) | | 0.1235*** | 0.0711* | 0.0776* |
| | | (0.04) | (0.04) | (0.04) |
| Husband is employed part-time (dummy) | | 0.0315 | 0.0158 | 0.0266 |
| | | (0.08) | (0.07) | (0.07) |
| Wife is retired or pensioner (dummy) | | 0.0308 | 0.0214 | 0.0215 |
| | | (0.05) | (0.04) | (0.04) |
| Husband is retired or pensioner (dummy) | | 0.1607*** | 0.1014** | 0.0971* |
| | | (0.05) | (0.05) | (0.05) |
| Wife's share of spouses' gross yearly income | | 0.0470 | 0.0789 | 0.0691 |
| | | (0.06) | (0.06) | (0.06) |
| Wife lived in the former GDR in 1989 (dummy) | | −0.0279 | −0.0190 | −0.0424 |
| | | (0.04) | (0.05) | (0.05) |
| Husband lived in the former GDR in 1989 (dummy) | | −0.0543 | −0.0188 | −0.0033 |
| | | (0.05) | (0.05) | (0.05) |
| Financially risk-averse household (dummy) | | | −0.2129*** | −0.2776*** |
| | | | (0.03) | (0.04) |
| Female fin. head (dummy) × fin. risk-averse house. (dummy) | | | | 0.1570** |
| | | | | (0.06) |
| Financial head's general risk aversion | | | 0.0036 | 0.0117 |
| | | | (0.01) | (0.01) |
| Female fin. head (dummy) × fin. head's general risk aversion | | | | −0.0170 |
| | | | | (0.01) |
| Financially illiterate financial head (dummy) | | | −0.0351 | −0.0421 |
| | | | (0.04) | (0.04) |
| Impatience of the financial head | | | 0.0086** | 0.0087** |
| | | | (0.00) | (0.00) |
| Financial advice (dummy) | | | 0.1432*** | 0.1420*** |
| | | | (0.03) | (0.03) |
| Household net disposable income (€ 1,000) | | | 0.0337*** | 0.0366*** |
| | | | (0.01) | (0.01) |

(continued)



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Table D.2: Determinants of capital market participation (continued)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Household net wealth (€10,000) | | | 0.0009*** | 0.0004 |
| | | | (0.00) | (0.00) |
| Female fin. head (dummy) × household net wealth (€10,000) | | | | 0.0013*** |
| | | | | (0.00) |
| Household owns HMR (dummy) | | | 0.0002 | 0.0396 |
| | | | (0.02) | (0.03) |
| Female fin. head (dummy) × household owns HMR (dummy) | | | | −0.1061** |
| | | | | (0.04) |
| Children in the household (dummy) | | | −0.0345 | −0.0328 |
| | | | (0.04) | (0.04) |
| Western state (dummy) | | | 0.0028 | −0.0000 |
| | | | (0.03) | (0.03) |
| Southern state (dummy) | | | 0.0386 | 0.0376 |
| | | | (0.03) | (0.03) |
| Eastern state (dummy) | | | 0.0210 | 0.0336 |
| | | | (0.04) | (0.04) |
| Suburbs of medium-sized metropolitan area (dummy) | | | 0.0055 | 0.0110 |
| | | | (0.03) | (0.03) |
| Core area of medium-sized metropolitan area (dummy) | | | −0.0296 | −0.0312 |
| | | | (0.04) | (0.03) |
| Suburbs of big metropolitan area (dummy) | | | 0.0435 | 0.0337 |
| | | | (0.04) | (0.04) |
| Core area of big metropolitan area (dummy) | | | −0.0067 | −0.0090 |
| | | | (0.03) | (0.03) |
| Constant | 0.2811*** | −0.5194* | −0.0963 | −0.0610 |
| | (0.02) | (0.30) | (0.32) | (0.32) |
| N | 2,706 | 2,692 | 2,597 | 2,597 |
| Population size (millions) | 16.89 | 16.72 | 16.28 | 16.28 |
| $R^2$ | 0.0148 | 0.1311 | 0.2725 | 0.2842 |

*Note:* This table shows weighted OLS regression results for different specifications of the capital market participation model for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.3: Determinants of the participation in different capital market assets

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Female financial head (dummy) | −0.0869 | −0.0331 | −0.0133 | −0.0427 |
| | (0.07) | (0.06) | (0.04) | (0.03) |
| Age of financial head (years) | −0.0004 | 0.0062 | −0.0061 | −0.0018 |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Age$^2$ of financial head (years) | −0.0000 | −0.0000 | 0.0001* | 0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Age of financial head 18-35 years (dummy) | −0.0592 | 0.0268 | −0.0165 | −0.0109 |
| | (0.08) | (0.06) | (0.03) | (0.02) |
| Age of financial head 36-50 years (dummy) | −0.0184 | 0.0294 | −0.0095 | 0.0058 |
| | (0.05) | (0.03) | (0.01) | (0.01) |
| Age of wife – age of husband (years) | −0.0027 | −0.0014 | −0.0011 | −0.0003 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | 0.0662* | 0.0000 | 0.0186 | 0.0040 |
| | (0.04) | (0.03) | (0.02) | (0.01) |
| Husband has degree from secondary school (dummy) | 0.0464 | 0.0194 | 0.0152 | 0.0016 |
| | (0.03) | (0.03) | (0.01) | (0.01) |
| Wife has university degree (dummy) | −0.0161 | 0.0028 | −0.0159 | −0.0017 |
| | (0.04) | (0.04) | (0.02) | (0.01) |
| Husband has university degree (dummy) | 0.0169 | 0.0410 | 0.0234 | 0.0116 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Wife is employed full-time (dummy) | 0.0136 | 0.0069 | 0.0059 | 0.0070 |
| | (0.04) | (0.03) | (0.01) | (0.01) |
| Husband is employed full-time (dummy) | −0.0053 | −0.0303 | −0.0161 | −0.0200 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Wife is employed part-time (dummy) | 0.0477 | 0.0011 | 0.0202 | 0.0021 |
| | (0.04) | (0.02) | (0.02) | (0.01) |
| Husband is employed part-time (dummy) | 0.0014 | 0.0115 | 0.0303 | −0.0206 |
| | (0.05) | (0.06) | (0.03) | (0.01) |
| Wife is retired or pensioner (dummy) | 0.0195 | 0.0238 | −0.0212 | 0.0041 |
| | (0.04) | (0.03) | (0.02) | (0.01) |
| Husband is retired or pensioner (dummy) | 0.0784 | 0.0009 | 0.0103 | −0.0013 |
| | (0.05) | (0.04) | (0.02) | (0.02) |
| Wife's share of spouses' gross yearly income | 0.0182 | 0.0540 | 0.0135 | −0.0069 |
| | (0.05) | (0.05) | (0.03) | (0.01) |
| Wife lived in the former GDR in 1989 (dummy) | −0.0504 | 0.0405 | 0.0103 | −0.0088 |
| | (0.06) | (0.04) | (0.02) | (0.01) |
| Husband lived in the former GDR in 1989 (dummy) | 0.0158 | −0.0674* | −0.0026 | 0.0090 |
| | (0.05) | (0.03) | (0.02) | (0.01) |
| Financially risk-averse household (dummy) | −0.2576*** | −0.1634*** | −0.0377* | −0.0234** |
| | (0.04) | (0.04) | (0.02) | (0.01) |
| Female fin. head (dummy) × fin. risk-av. house. (dummy) | 0.2084*** | 0.0705 | 0.0255 | 0.0217* |
| | (0.06) | (0.05) | (0.03) | (0.01) |
| Financial head's general risk aversion | 0.0114 | −0.0012 | −0.0025 | −0.0061*** |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0146* | −0.0054 | 0.0005 | 0.0039 |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Financially illiterate financial head (dummy) | −0.0396 | −0.0337 | 0.0099 | −0.0003 |
| | (0.03) | (0.02) | (0.02) | (0.00) |
| Impatience of the financial head | 0.0068** | 0.0048 | 0.0016 | 0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Financial advice (dummy) | 0.1120*** | 0.0376* | 0.0705*** | 0.0139* |
| | (0.02) | (0.02) | (0.01) | (0.01) |
| Household net disposable income (€1,000) | 0.0250*** | 0.0223*** | 0.0116** | 0.0046 |
| | (0.01) | (0.01) | (0.00) | (0.00) |

(continued)



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Table D.3: Determinants of the participation in different capital market assets (continued)

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Household net wealth (€10,000) | −0.0002 | 0.0009*** | 0.0003** | 0.0003** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Female fin. head (dummy) × household net wealth (€10,000) | 0.0011** | 0.0000 | −0.0000 | −0.0002 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Household owns HMR (dummy) | 0.0217 | 0.0288 | −0.0132 | −0.0094 |
| | (0.03) | (0.02) | (0.02) | (0.01) |
| Female fin. head (dummy) × household owns HMR (dummy) | −0.0708* | −0.0505* | −0.0153 | 0.0012 |
| | (0.04) | (0.03) | (0.02) | (0.01) |
| Children in the household (dummy) | −0.0237 | −0.0040 | −0.0080 | −0.0089 |
| | (0.04) | (0.03) | (0.01) | (0.01) |
| Western state (dummy) | 0.0569** | −0.0454* | −0.0114 | 0.0027 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Southern state (dummy) | 0.0893*** | −0.0195 | −0.0048 | 0.0091 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Eastern state (dummy) | 0.0866** | −0.0118 | −0.0235 | 0.0053 |
| | (0.04) | (0.04) | (0.02) | (0.01) |
| Suburbs of medium-sized metropolitan area (dummy) | 0.0229 | −0.0171 | −0.0057 | −0.0010 |
| | (0.03) | (0.02) | (0.02) | (0.01) |
| Core area of medium-sized metropolitan area (dummy) | −0.0111 | 0.0002 | −0.0097 | 0.0167 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Suburbs of big metropolitan area (dummy) | 0.0209 | 0.0254 | −0.0188 | −0.0006 |
| | (0.03) | (0.03) | (0.02) | (0.01) |
| Core area of big metropolitan area (dummy) | −0.0115 | 0.0145 | −0.0024 | −0.0027 |
| | (0.03) | (0.02) | (0.02) | (0.01) |
| Constant | 0.0683 | −0.0997 | 0.1416 | 0.1086 |
| | (0.29) | (0.24) | (0.12) | (0.11) |
| N | 2,597 | 2,597 | 2,597 | 2,597 |
| Population size (millions) | 16.28 | 16.28 | 16.28 | 16.28 |
| $R^2$ | 0.1978 | 0.1945 | 0.1024 | 0.0668 |

*Note:* This table shows weighted OLS regression results for the participation models of different categories of capital market assets for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.4: Determinants of being a financially risk-averse household

| | (1) | (2) | (3) |
|---|---|---|---|
| Female financial head (dummy) | 0.2002** | 0.1760** | 0.2429** |
| | (0.08) | (0.09) | (0.10) |
| Financial head's general risk aversion | 0.0782*** | 0.0647*** | 0.0643*** |
| | (0.01) | (0.01) | (0.01) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0243** | −0.0213* | −0.0211* |
| | (0.01) | (0.01) | (0.01) |
| Age of financial head (years) | | 0.0005 | −0.0008 |
| | | (0.01) | (0.01) |
| Age$^2$ of financial head (years) | | 0.0000 | 0.0000 |
| | | (0.00) | (0.00) |
| Age of financial head 18-35 years (dummy) | | 0.0275 | 0.0114 |
| | | (0.11) | (0.11) |
| Age of financial head 36-50 years (dummy) | | 0.0276 | 0.0153 |
| | | (0.06) | (0.06) |
| Age of wife – age of husband (years) | | −0.0015 | −0.0020 |
| | | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | | −0.0854** | −0.0256 |
| | | (0.04) | (0.05) |
| Female fin. head (dummy) × wife has deg. from sec. school (dummy) | | | −0.1338** |
| | | | (0.06) |
| Husband has degree from secondary school (dummy) | | −0.1090*** | −0.1884*** |
| | | (0.04) | (0.05) |
| Female fin. head (dummy) × hus. has deg. from sec. school (dummy) | | | 0.2171*** |
| | | | (0.05) |
| Wife has university degree (dummy) | | 0.0377 | 0.0280 |
| | | (0.04) | (0.04) |
| Husband has university degree (dummy) | | 0.0262 | 0.0217 |
| | | (0.04) | (0.04) |
| Wife is employed full-time (dummy) | | −0.0145 | −0.0120 |
| | | (0.04) | (0.04) |
| Husband is employed full-time (dummy) | | −0.0929* | −0.0787 |
| | | (0.05) | (0.05) |
| Wife is employed part-time (dummy) | | −0.0444 | −0.0470 |
| | | (0.04) | (0.04) |
| Husband is employed part-time (dummy) | | −0.1097 | −0.1102 |
| | | (0.09) | (0.09) |
| Wife is retired or pensioner (dummy) | | 0.0369 | 0.0463 |
| | | (0.05) | (0.05) |
| Husband is retired or pensioner (dummy) | | −0.1509*** | −0.1371** |
| | | (0.06) | (0.05) |
| Wife's share of spouses' gross yearly income | | 0.0226 | 0.0337 |
| | | (0.08) | (0.08) |
| Wife lived in the former GDR in 1989 (dummy) | | −0.0496 | −0.0619 |
| | | (0.06) | (0.07) |
| Husband lived in the former GDR in 1989 (dummy) | | 0.0143 | 0.0274 |
| | | (0.06) | (0.06) |
| Financially illiterate financial head (dummy) | | 0.0129 | 0.0103 |
| | | (0.04) | (0.04) |
| Impatience of the financial head | | 0.0026 | 0.0029 |
| | | (0.01) | (0.01) |
| Financial advice (dummy) | | −0.0840*** | −0.0849*** |
| | | (0.03) | (0.03) |
| Household net disposable income (€1,000) | | −0.0430*** | −0.0417*** |
| | | (0.01) | (0.01) |

(continued)



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Table D.4: Determinants of being a financially risk-averse household (continued)

| | (1) | (2) | (3) |
|---|---|---|---|
| Household net wealth (€10,000) | | −0.0006* | −0.0006** |
| | | (0.00) | (0.00) |
| Household owns HMR (dummy) | | −0.0130 | −0.0150 |
| | | (0.02) | (0.02) |
| Children in the household (dummy) | | −0.0330 | −0.0265 |
| | | (0.04) | (0.04) |
| Western state (dummy) | | −0.0264 | 0.0373 |
| | | (0.03) | (0.04) |
| Female fin. head (dummy) × western state (dummy) | | | −0.1441** |
| | | | (0.06) |
| Southern state (dummy) | | −0.0487 | −0.0162 |
| | | (0.03) | (0.04) |
| Female fin. head (dummy) × southern state (dummy) | | | −0.0689 |
| | | | (0.06) |
| Eastern state (dummy) | | 0.0165 | 0.0921 |
| | | (0.05) | (0.06) |
| Female fin. head (dummy) × eastern state (dummy) | | | −0.1625** |
| | | | (0.06) |
| Suburbs of medium-sized metropolitan area (dummy) | | −0.0099 | −0.0120 |
| | | (0.04) | (0.04) |
| Core area of medium-sized metropolitan area (dummy) | | 0.0015 | −0.0013 |
| | | (0.04) | (0.05) |
| Suburbs of big metropolitan area (dummy) | | −0.0419 | −0.0432 |
| | | (0.04) | (0.04) |
| Core area of big metropolitan area (dummy) | | −0.0435 | −0.0490 |
| | | (0.04) | (0.04) |
| Constant | 0.1940*** | 0.5764 | 0.5792 |
| | (0.05) | (0.40) | (0.40) |
| N | 2,614 | 2,597 | 2,597 |
| Population size (millions) | 16.46 | 16.28 | 16.28 |
| $R^2$ | 0.1257 | 0.2462 | 0.2584 |

*Note:* This table shows weighted OLS regression results for different specifications of a model of financial risk attitude for married households. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.5: Oaxaca–Blinder decomposition of the gender gap in capital market participation for the dummy variable for financially risk-loving households

| | Explained component: Observable factors | | Unexplained component: Investment styles | |
|---|---|---|---|---|
| | Effect | % of raw differential | Effect | % of raw differential |
| **Individual characteristics** | | | | |
| Age effects | 0.0046 | 4.35 | 0.5774 | 546.26 |
| | (0.01) | | (0.66) | |
| Education effects | 0.0049 | 4.64 | 0.0034 | 3.22 |
| | (0.00) | | (0.02) | |
| Employment effects | −0.0009 | −0.85 | 0.0313 | 29.61 |
| | (0.01) | | (0.08) | |
| Financial head's general risk aversion | −0.0017 | −1.61 | 0.1331* | 125.92 |
| | (0.00) | | (0.07) | |
| Other effects | −0.0041 | −3.88 | −0.0109 | −10.31 |
| | (0.00) | | (0.04) | |
| **Household characteristics** | | | | |
| Fin. risk-loving household (dummy) | 0.0164*** | 15.52 | 0.0447** | 42.29 |
| | (0.01) | | (0.02) | |
| Household net disposable income (€ 1,000) | 0.0061 | 5.77 | −0.0294 | −27.81 |
| | (0.00) | | (0.06) | |
| Household net wealth (€ 10,000) | 0.0049** | 4.64 | −0.0317*** | −29.99 |
| | (0.00) | | (0.01) | |
| Household owns HMR (dummy) | 0.0000 | 0.00 | 0.0628** | 59.41 |
| | (0.00) | | (0.03) | |
| State fixed effects | 0.0010 | 0.95 | −0.0453 | −42.86 |
| | (0.00) | | (0.05) | |
| Area type fixed effects | −0.0012 | −1.14 | 0.0499 | 47.21 |
| | (0.00) | | (0.04) | |
| Other effects | 0.0078 | 7.38 | 0.0482 | 45.60 |
| | (0.01) | | (0.04) | |
| Constant | | | −0.7656 | −724.31 |
| | | | (0.68) | |
| **Of raw differential (0.1057***)** | 0.0378*** | 35.76 | 0.0680*** | 64.33 |
| | (0.01) | | (0.02) | |
| **Adjusted Oaxaca–Blinder decomposition** | | | | |
| Fin. risk-loving household (dummy): Other factors | 0.0452** | 42.76 | 0.0997** | 94.32 |
| | (0.02) | | (0.04) | |
| Financial head's general risk aversion | 0.0039 | 3.69 | 0.0437 | 41.34 |
| | (0.00) | | (0.07) | |
| N | 2,597 | | | |
| Population size (millions) | 16.28 | | | |

*Note:* This table shows weighted Oaxaca–Blinder decomposition results for the financial head's gender for married households when we use the dummy variable for financially risk-loving households instead of the one for financially risk-averse households. The decomposition is expressed from the viewpoint of a wife-headed household and is computed according to the method of Neumark (1988). The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined the coefficients of the corresponding weighted Oaxaca–Blinder decomposition as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). Moreover, the table shows selected results for the weighted adjusted Oaxaca–Blinder decomposition for the financial head's gender for married households. More details on the estimation procedure are provided in Appendix B. ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.6: Determinants of the conditional risky share in the financial assets portfolio

| | Total risky share | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|---|
| Female financial head (dummy) | −0.3144*** | −0.0931 | −0.2212*** | −0.0206 | 0.0204 |
| | (0.09) | (0.08) | (0.07) | (0.03) | (0.04) |
| Age of financial head (years) | −0.0003 | 0.0058 | 0.0030 | −0.0098** | 0.0008 |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| $Age^2$ of financial head (years) | 0.0000 | −0.0001 | −0.0000 | 0.0001*** | −0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Age of financial head 18-35 years (dummy) | −0.0251 | 0.0333 | −0.0246 | −0.0345 | 0.0008 |
| | (0.14) | (0.12) | (0.07) | (0.03) | (0.01) |
| Age of financial head 36-50 years (dummy) | −0.1187** | −0.0623 | −0.0478 | −0.0127 | 0.0042 |
| | (0.05) | (0.05) | (0.04) | (0.02) | (0.01) |
| Age of wife − age of husband (years) | 0.0033 | 0.0030 | 0.0001 | −0.0001 | 0.0003 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Female fin. head (dummy) × Age of wife − age of husband (years) | −0.0146* | −0.0134* | 0.0001 | −0.0004 | −0.0008 |
| | (0.01) | (0.01) | (0.00) | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | −0.0753* | −0.0708** | 0.0029 | −0.0042 | −0.0032 |
| | (0.04) | (0.03) | (0.03) | (0.01) | (0.01) |
| Fem. fin. head (dummy) × wife has deg. from sec. sch. (dummy) | 0.1834*** | 0.1266** | 0.0146 | 0.0454 | −0.0032 |
| | (0.07) | (0.06) | (0.04) | (0.04) | (0.01) |
| Husband has degree from secondary school (dummy) | −0.0347 | −0.0274 | −0.0098 | 0.0040 | −0.0015 |
| | (0.05) | (0.05) | (0.03) | (0.01) | (0.01) |
| Fem. fin. head (dummy) × hus. has deg. from sec. sch. (dummy) | 0.1863** | 0.0944 | 0.0428 | 0.0550 | −0.0058 |
| | (0.08) | (0.08) | (0.04) | (0.04) | (0.02) |
| Wife has university degree (dummy) | 0.1530*** | 0.1341*** | 0.0135 | 0.0066 | −0.0012 |
| | (0.04) | (0.03) | (0.03) | (0.01) | (0.00) |
| Female fin. head (dummy) × wife has university deg. (dummy) | −0.2047*** | −0.1424*** | 0.0010 | −0.0599 | −0.0034 |
| | (0.07) | (0.06) | (0.05) | (0.04) | (0.01) |
| Husband has university degree (dummy) | 0.0159 | 0.0259 | −0.0075 | −0.0118 | 0.0092 |
| | (0.04) | (0.04) | (0.02) | (0.01) | (0.01) |
| Female fin. head (dummy) × husband has university deg. (dummy) | −0.1285 | −0.1035 | 0.0188 | −0.0303 | −0.0135 |
| | (0.08) | (0.08) | (0.04) | (0.04) | (0.01) |
| Wife is employed full-time (dummy) | −0.0824* | −0.1019** | 0.0184 | 0.0044 | −0.0033 |
| | (0.05) | (0.04) | (0.03) | (0.02) | (0.00) |
| Husband is employed full-time (dummy) | 0.0927 | 0.1341*** | −0.0556 | 0.0237 | −0.0094 |
| | (0.06) | (0.05) | (0.06) | (0.02) | (0.01) |
| Wife is employed part-time (dummy) | −0.0602 | −0.0542 | −0.0193 | 0.0151 | −0.0018 |
| | (0.04) | (0.04) | (0.02) | (0.02) | (0.00) |
| Husband is employed part-time (dummy) | 0.1214 | 0.1573** | −0.0304 | 0.0039 | −0.0095 |
| | (0.08) | (0.08) | (0.06) | (0.03) | (0.01) |
| Wife is retired or pensioner (dummy) | −0.0121 | −0.0278 | 0.0487 | −0.0382 | 0.0053 |
| | (0.04) | (0.06) | (0.04) | (0.02) | (0.01) |
| Husband is retired or pensioner (dummy) | 0.0701 | 0.1126* | −0.0451 | 0.0046 | −0.0021 |
| | (0.07) | (0.07) | (0.06) | (0.03) | (0.01) |
| Wife's share of spouses' gross yearly income | −0.1368* | −0.0814 | −0.0748 | 0.0186 | 0.0007 |
| | (0.07) | (0.07) | (0.05) | (0.03) | (0.01) |
| Wife lived in the former GDR in 1989 (dummy) | 0.0109 | −0.0107 | 0.0150 | 0.0054 | 0.0013 |
| | (0.06) | (0.05) | (0.04) | (0.02) | (0.01) |
| Husband lived in the former GDR in 1989 (dummy) | 0.0420 | 0.0397 | −0.0127 | 0.0125 | 0.0026 |
| | (0.09) | (0.06) | (0.05) | (0.02) | (0.01) |
| Financially risk-averse household (dummy) | −0.0959*** | −0.0834** | −0.0169 | 0.0042 | 0.0002 |
| | (0.04) | (0.03) | (0.02) | (0.02) | (0.00) |
| Female fin. head (dummy) × fin. risk-averse household (dummy) | 0.0228 | 0.0720 | −0.0196 | −0.0122 | −0.0175 |
| | (0.06) | (0.06) | (0.04) | (0.03) | (0.02) |
| Financial head's general risk aversion | −0.0130 | 0.0148* | −0.0255*** | −0.0002 | −0.0021* |
| | (0.01) | (0.01) | (0.01) | (0.00) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | 0.0294** | −0.0006 | 0.0283*** | 0.0022 | −0.0005 |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) |
| Financially illiterate financial head (dummy) | 0.0040 | −0.0612 | 0.0346 | 0.0336 | −0.0030 |
| | (0.05) | (0.06) | (0.04) | (0.04) | (0.01) |
| Impatience of the financial head | 0.0047 | 0.0017 | 0.0005 | 0.0018 | 0.0008 |
| | (0.01) | (0.00) | (0.00) | (0.00) | (0.00) |
| Financial advice (dummy) | 0.0133 | 0.0272 | −0.0511*** | 0.0307*** | 0.0065 |
| | (0.03) | (0.02) | (0.01) | (0.01) | (0.01) |
| Household net disposable income (€1,000) | −0.0092 | −0.0154** | 0.0006 | 0.0042 | 0.0014 |
| | (0.01) | (0.01) | (0.00) | (0.00) | (0.00) |
| Household net wealth (€10,000) | 0.0003 | 0.0001 | 0.0002 | −0.0000 | 0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Household owns HMR (dummy) | 0.0081 | −0.0324 | 0.0358 | 0.0045 | 0.0002 |
| | (0.04) | (0.03) | (0.02) | (0.01) | (0.00) |
| Children in the household (dummy) | 0.0018 | −0.0027 | 0.0154 | −0.0097 | −0.0012 |
| | (0.03) | (0.04) | (0.02) | (0.01) | (0.00) |
| Western state (dummy) | 0.0862** | 0.0966*** | −0.0157 | 0.0028 | 0.0024 |
| | (0.04) | (0.03) | (0.03) | (0.02) | (0.01) |
| Southern state (dummy) | 0.0740** | 0.0859*** | 0.0021 | −0.0143 | 0.0003 |
| | (0.03) | (0.02) | (0.02) | (0.01) | (0.01) |

(continued)



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Table D.6: Determinants of the conditional risky share in the financial assets portfolio (continued)

| | Total risky share | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|---|
| Eastern state (dummy) | 0.0184 | 0.0712 | −0.0153 | −0.0322* | −0.0052 |
| | (0.07) | (0.05) | (0.04) | (0.02) | (0.01) |
| Suburbs of medium-sized metropolitan area (dummy) | 0.0586 | 0.0800** | 0.0162 | −0.0384** | 0.0008 |
| | (0.04) | (0.03) | (0.03) | (0.02) | (0.01) |
| Core area of medium-sized metropolitan area (dummy) | 0.0714* | 0.0185 | 0.0487 | −0.0120 | 0.0161 |
| | (0.04) | (0.04) | (0.03) | (0.02) | (0.02) |
| Suburbs of big metropolitan area (dummy) | 0.0358 | 0.0279 | 0.0176 | −0.0143 | 0.0046 |
| | (0.04) | (0.03) | (0.02) | (0.02) | (0.01) |
| Core area of big metropolitan area (dummy) | 0.0274 | 0.0358 | 0.0206 | −0.0291 | 0.0001 |
| | (0.04) | (0.03) | (0.02) | (0.02) | (0.01) |
| Constant | 0.3006 | −0.0786 | 0.2040 | 0.1890 | −0.0138 |
| | (0.42) | (0.34) | (0.26) | (0.13) | (0.05) |
| N | 996 | 996 | 996 | 996 | 996 |
| Population size (millions) | 3.93 | 3.93 | 3.93 | 3.93 | 3.93 |
| $R^2$ | 0.2759 | 0.2040 | 0.2049 | 0.1696 | 0.0617 |

*Note:* This table shows weighted OLS regression results for the risky share in the financial assets and the shares of different categories of capital market assets in the financial assets for married households participating in the capital market. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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Table D.7: Determinants of the conditional shares of different capital market assets in the capital market portfolio

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Female financial head (dummy) | −0.2949 | 0.2831 | −0.0336 | 0.0455 |
| | (0.24) | (0.21) | (0.10) | (0.06) |
| Age of financial head (years) | −0.0120 | 0.0415* | −0.0296** | 0.0001 |
| | (0.02) | (0.02) | (0.01) | (0.00) |
| $Age^2$ of financial head (years) | −0.0000 | −0.0003* | 0.0003** | −0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Age of financial head 18-35 years (dummy) | −0.0797 | 0.2227 | −0.1337 | −0.0092 |
| | (0.24) | (0.24) | (0.12) | (0.03) |
| Age of financial head 36-50 years (dummy) | −0.1017 | 0.0946 | −0.0098 | 0.0168 |
| | (0.11) | (0.12) | (0.06) | (0.03) |
| Age of wife − age of husband (years) | 0.0005 | −0.0000 | −0.0010 | 0.0005 |
| | (0.01) | (0.01) | (0.00) | (0.00) |
| Wife has degree from secondary school (dummy) | 0.0097 | −0.0427 | 0.0427 | −0.0097 |
| | (0.07) | (0.06) | (0.04) | (0.01) |
| Husband has degree from secondary school (dummy) | 0.0193 | −0.0678 | 0.0566* | −0.0082 |
| | (0.05) | (0.06) | (0.03) | (0.02) |
| Wife has university degree (dummy) | 0.0303 | 0.0107 | −0.0310 | −0.0100 |
| | (0.07) | (0.07) | (0.04) | (0.01) |
| Husband has university degree (dummy) | −0.0332 | 0.0582 | −0.0449 | 0.0199 |
| | (0.06) | (0.06) | (0.03) | (0.02) |
| Wife is employed full-time (dummy) | −0.0594 | 0.0615 | 0.0048 | −0.0070 |
| | (0.07) | (0.08) | (0.04) | (0.01) |
| Husband is employed full-time (dummy) | 0.0892 | −0.0876 | 0.0278 | −0.0294 |
| | (0.12) | (0.13) | (0.07) | (0.02) |
| Wife is employed part-time (dummy) | −0.0282 | −0.0134 | 0.0411 | 0.0005 |
| | (0.06) | (0.06) | (0.04) | (0.01) |
| Husband is employed part-time (dummy) | −0.0023 | −0.0639 | 0.0997 | −0.0335 |
| | (0.15) | (0.16) | (0.12) | (0.02) |
| Wife is retired or pensioner (dummy) | −0.0955 | 0.1330 | −0.0344 | −0.0031 |
| | (0.10) | (0.08) | (0.06) | (0.02) |
| Female fin. head (dummy) × wife is ret. or pens. (dummy) | 0.3719** | −0.1055 | −0.2845** | 0.0181 |
| | (0.19) | (0.14) | (0.12) | (0.03) |
| Husband is retired or pensioner (dummy) | 0.1723 | −0.1063 | −0.0633 | −0.0027 |
| | (0.14) | (0.16) | (0.08) | (0.03) |
| Female fin. head (dummy) × husband is ret. or pens. (dummy) | −0.0539 | −0.1055 | 0.1907* | −0.0312 |
| | (0.17) | (0.13) | (0.11) | (0.02) |
| Wife's share of spouses' gross yearly income | −0.1300 | 0.0716 | 0.0559 | 0.0025 |
| | (0.14) | (0.14) | (0.06) | (0.02) |
| Wife lived in the former GDR in 1989 (dummy) | −0.0956 | 0.0491 | 0.0551 | −0.0086 |
| | (0.12) | (0.12) | (0.06) | (0.02) |
| Husband lived in the former GDR in 1989 (dummy) | 0.1544 | −0.1421 | −0.0249 | 0.0126 |
| | (0.15) | (0.16) | (0.05) | (0.02) |
| Financially risk-averse household (dummy) | −0.1062* | 0.0522 | 0.0552 | −0.0011 |
| | (0.06) | (0.06) | (0.05) | (0.01) |
| Female fin. head (dummy) × fin. risk-averse house. (dummy) | 0.2436** | −0.1986* | −0.0368 | −0.0082 |
| | (0.11) | (0.10) | (0.08) | (0.03) |
| Financial head's general risk aversion | 0.0325** | −0.0224* | −0.0035 | −0.0065* |
| | (0.01) | (0.01) | (0.01) | (0.00) |
| Female fin. head (dummy) × fin. head's general risk aversion | −0.0162 | 0.0096 | 0.0062 | 0.0004 |
| | (0.03) | (0.03) | (0.01) | (0.01) |
| Financially illiterate financial head (dummy) | −0.0651 | −0.0533 | 0.1262 | −0.0077 |
| | (0.13) | (0.12) | (0.12) | (0.02) |

(continued)



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Table D.7: Determinants of the conditional shares of different capital market assets in the capital market portfolio (continued)

| | Fund sh. | Lis. sh. | Fix.-inc. sec. | Cert. |
|---|---|---|---|---|
| Impatience of the financial head | 0.0044 | −0.0023 | −0.0020 | −0.0001 |
| | (0.01) | (0.01) | (0.01) | (0.00) |
| Financial advice (dummy) | 0.0621 | −0.1508*** | 0.0731*** | 0.0156 |
| | (0.04) | (0.04) | (0.03) | (0.01) |
| Household net disposable income (€1,000) | −0.0375** | 0.0220 | 0.0082 | 0.0073** |
| | (0.02) | (0.02) | (0.01) | (0.00) |
| Female fin. head (dummy) × house. net dis. inc.(€1,000) | 0.0540** | −0.0522** | 0.0077 | −0.0094** |
| | (0.02) | (0.02) | (0.01) | (0.00) |
| Household net wealth (€10,000) | −0.0004 | 0.0006* | −0.0002 | −0.0000 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| Household owns HMR (dummy) | −0.0391 | 0.0600 | −0.0190 | −0.0020 |
| | (0.06) | (0.05) | (0.04) | (0.01) |
| Children in the household (dummy) | 0.0043 | 0.0086 | −0.0036 | −0.0093 |
| | (0.08) | (0.08) | (0.03) | (0.01) |
| Western state (dummy) | 0.1755*** | −0.1309* | −0.0464 | 0.0018 |
| | (0.06) | (0.07) | (0.04) | (0.02) |
| Southern state (dummy) | 0.1675*** | −0.1200* | −0.0461 | −0.0015 |
| | (0.06) | (0.06) | (0.04) | (0.02) |
| Eastern state (dummy) | 0.1277 | −0.0401 | −0.0781* | −0.0095 |
| | (0.14) | (0.15) | (0.05) | (0.02) |
| Suburbs of medium-sized metropolitan area (dummy) | 0.0370 | 0.0280 | −0.0601 | −0.0048 |
| | (0.07) | (0.07) | (0.04) | (0.01) |
| Core area of medium-sized metropolitan area (dummy) | −0.0870 | 0.0860 | −0.0206 | 0.0216 |
| | (0.08) | (0.08) | (0.05) | (0.03) |
| Suburbs of big metropolitan area (dummy) | 0.0172 | 0.0480 | −0.0660 | 0.0007 |
| | (0.07) | (0.07) | (0.05) | (0.02) |
| Core area of big metropolitan area (dummy) | −0.0267 | 0.0800 | −0.0446 | −0.0087 |
| | (0.06) | (0.06) | (0.04) | (0.02) |
| Constant | 1.0863 | −0.8026 | 0.6680 | 0.0483 |
| | (0.79) | (0.79) | (0.45) | (0.12) |
| N | 989 | 989 | 989 | 989 |
| Population size (millions) | 3.91 | 3.91 | 3.91 | 3.91 |
| $R^2$ | 0.1804 | 0.1608 | 0.2044 | 0.0824 |

*Note:* This table shows weighted OLS regression results for the shares of different categories of capital market assets in the capital market portfolio of married households participating in the capital market. The coefficients and the corresponding standard errors were computed as follows: For each of the five implicates, we determined weighted OLS coefficients as well as their bootstrap standard errors with the help of the sampling and bootstrap replicate weights provided by Deutsche Bundesbank. The individual estimates were then consolidated into a single set of estimates by using Rubin's combination rules (Rubin, 1987). ***, ** and * denote the statistical significance at the 1, 5 and 10% levels. Standard errors are reported in parentheses. *Source:* 2014 Deutsche Bundesbank PHF, own calculations.



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## References


Almenberg, J. and A. Dreber (2015). Gender, stock market participation and financial literacy. *Economics Letters 137*, 140–142.

Altmann, K., R. Bernard, J. Le Blanc, E. Gabor-Toth, M. Hebbat, L. Kothmayr, T. Schmidt, P. Tzamourani, D. Werner, and J. Zhu (2020). The Panel on Household Finances (PHF) - Microdata on household wealth in Germany. *German Economic Review 21*(3), 373–400.

Amromin, G. and S. A. Sharpe (2008). Expectations of Risk and Return Among Household Investors: Are Their Sharpe Ratios Countercyclical?

Arano, K., C. Parker, and R. Terry (2010). Gender-based risk aversion and retirement asset allocation. *Economic Inquiry 48*(1), 147–155.

Arrondel, L., L. Bartiloro, P. Fessler, P. Lindner, T. Y. Mathä, C. Rampazzi, F. Savignac, T. Schmidt, M. Schürz, and P. Vermeulen (2016). How do households allocate their assets? Stylized facts from the Eurosystem Household Finance and Consumption Survey. *International Journal of Central Banking 12*(2), 129–220.

Barber, B. M. and T. Odean (2001). Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal of Economics 116*(1), 261–292.

Bernasek, A. and S. Shwiff (2001). Gender, risk, and retirement. *Journal of Economic Issues 35*(2), 345–356. ISBN: 00213624.

Bertocchi, G., M. Brunetti, and C. Torricelli (2014). Who holds the purse strings within the household? The determinants of intra-family decision making. *Journal of Economic Behavior & Organization 101*, 65–86.

Black, S. E., P. J. Devereux, P. Lundborg, and K. Majlesi (2018). Learning to Take Risks? The Effect of Education on Risk-Taking in Financial Markets. *Review of Finance 22*(3), 951–975.

Blinder, A. S. (1973). Wage Discrimination: Reduced Form and Structural Estimates. *Journal of Human Resources 8*(4), 436–455.

Bucciol, A., R. Miniaci, and S. Pastorello (2017). Return expectations and risk aversion heterogeneity in household portfolios. *Journal of Empirical Finance 40*, 201–219.

Bucher-Koenen, T., A. Lusardi, R. Alessie, and M. van Rooij (2017). How Financially Literate Are Women? An Overview and New Insights. *Journal of Consumer Affairs 51*(2), 255–283.

Campbell, J. Y. (2006). Household Finance. *Journal of Finance 61*(4), 1553–1604.

Clark, R. L. and O. S. Mitchell (2014). How does retiree health insurance influence public sector employee saving? *Journal of Health Economics 38*, 109–118.




Electronic copy available at: https://ssrn.com/abstract=4628230

Dimmock, S. G. and R. Kouwenberg (2010). Loss-aversion and household portfolio choice. *Journal of Empirical Finance 17*(3), 441–459.

Dohmen, T., A. Falk, D. Huffman, and G. G. Wagner (2011). Individual risk attitudes: measurement, determinants, and behavioral consequences. *Journal of the European Economic Association 9*(3), 522–550.

Dorn, D. and G. Huberman (2005). Talk and Action: What Individual Investors Say and What They Do. *Review of Finance 9*(4), 437–481.

Falk, A., A. Becker, T. Dohmen, B. Enke, D. Huffman, and U. Sunde (2018). Global Evidence on Economic Preferences. *Quarterly Journal of Economics 133*(4), 1645–1692.

Friedberg, L. and A. Webb (2006). Determinants and Consequences of Bargaining Power in Households. *NBER Working Paper 12367*.

Gu, R., C. Peng, and W. Zhang (2023). The Gender Gap in Household Bargaining Power: A Revealed-Preference Approach. *SSRN Electronic Journal*.

Guiso, L. and L. Zaccaria (2023). From patriarchy to partnership: Gender equality and household finance. *Journal of Financial Economics 147*(3), 573–595.

Halko, M.-L., M. Kaustia, and E. Alanko (2012). The gender effect in risky asset holdings. *Journal of Economic Behavior and Organization 83*(1), 66–81.

Harris, C. R., M. Jenkins, and D. Glaser (2006). Gender Differences in Risk Assessment: Why do Women Take Fewer Risks than Men? *Judgment and Decision Making 1*(1), 48–63.

Holzmeister, F., J. Huber, M. Kirchler, F. Lindner, U. Weitzel, and S. Zeisberger (2020). What Drives Risk Perception? A Global Survey with Financial Professionals and Laypeople. *Management Science 66*(9), 3977–4002.

Hurd, M., M. Van Rooij, and J. Winter (2011). Stock market expectations of Dutch households. *Journal of Applied Econometrics 26*(3), 416–436.

Jianakoplos, N. A. and A. Bernasek (1998). Are women more risk averse? *Economic Inquiry 36*(4), 620–630.

Kaustia, M., A. Conlin, and N. Luotonen (2023). What drives stock market participation? The role of institutional, traditional, and behavioral factors. *Journal of Banking & Finance 148*, 106743.

Laudenbach, C., U. Malmendier, and A. Niessen-Ruenzi (2023). The long-lasting effects of experiencing communism on attitudes towards financial markets. *Working Paper*.

Loewenstein, G. W., E. U. Weber, C. K. Hsee, and N. Welch (2001). Risk as Feelings. *Psychological Bulletin 127*(2), 267–286.



Electronic copy available at: https://ssrn.com/abstract=4628230

Lusardi, A. and O. S. Mitchell (2011). Financial Literacy and Planning: Implications for Retirement Wellbeing. *NBER Working Paper 17078*.

Markowitz, H. (1952). Portfolio Selection. *Journal of Finance 7*(1), 77–91.

Neumark, D. (1988). Employers' Discriminatory Behavior and the Estimation of Wage Discrimination. *Journal of Human Resources 23*(3), 279–295.

Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review 14*(3), 693–709.

Rubin, D. B. (1987). *Multiple Imputation for Nonresponse in Surveys.* John Wiley & Sons.

Säve-Söderbergh, J. (2012). Self-Directed Pensions: Gender, Risk, and Portfolio Choices: Self-directed pensions. *Scandinavian Journal of Economics 114*(3), 705–728.

van Rooij, M., A. Lusardi, and R. Alessie (2011). Financial literacy and stock market participation. *Journal of Financial Economics 101*(2), 449–472.

von Kalckreuth, U., M. Eisele, J. Le Blanc, T. Schmidt, and J. Zhu (2012). The PHF: A Comprehensive Panel Survey on Household Finances and Wealth in Germany. *Deutsche Bundesbank Discussion Paper 13/2012*.

Weber, E. U., A.-R. Blais, and N. E. Betz (2002). A domain-specific risk-attitude scale: measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making 15*(4), 263–290.

Weber, M., E. U. Weber, and A. Nosić (2013). Who takes Risks When and Why: Determinants of Changes in Investor Risk Taking. *Review of Finance 17*(3), 847–883.

Yilmazer, T. and S. Lich (2015). Portfolio choice and risk attitudes: a household bargaining approach. *Review of Economics of the Household 13*(2), 219–241.



Electronic copy available at: https://ssrn.com/abstract=4628230