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Financial risk taking, gender and social identity - Evidence from national surveys of household finance

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Financial risk taking, gender and social identity - Evidence from national surveys of household finance*

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Abstract

Based on household survey data, we compare men's and women's willingness to take investment risk in four European countries, each with a distinct level of gender equality. Our analysis reveals three main results. Firstly, in Italy, the country with the lowest degree of gender equality in our sample, women are less likely to take investment risk as men with the same risk preferences. Social norms seem to explain this result as further investigation of the Italian case confirms. Secondly, in the three countries with a comparatively high degree of gender equality, Austria, The Netherlands and Spain, women self-select into the group of risk-taking investors and are therefore, on average, as risk tolerant as their male counterparts. Thirdly, the risk preferences of both spouses have a significant effect on the couple's risk-taking. Therefore, risk taking within a couple may be gender-independent and be the result of a compromise.

Keywords: Gender, Risk aversion, Financial behavior

JEL classification: G11, J16

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1 Introduction

It is commonly believed that the willingness to take risk in investment decisions is a sex-linked trait. Men are, in general, considered to be more willing to take risks than women. Against this backdrop, the financial industry tends to take gender as a proxy measure for the willingness to invest in risky assets. Financial advice often differs for men and women, and some banks and insurance companies even design gender-specific financial products.[1] The recent financial crisis has renewed the interest on risk taking and consumer finance. This paper is the first to investigate whether the simplistic approach of taking gender as a proxy measure for the readiness to invest in risky assets is valid across countries with distinct gender equality levels.

An analysis of gender effects on the investment decisions requires a multi-country framework, as social norms are an important determinant of gender differences in economic behavior. Social norms that prescribe which behavioral patterns are appropriate for men and women may explain why women avoid risk much more than men. In the social identity framework of Akerlof & Kranton (2000), it can be optimal for a woman (man) to act more (less) risk-averse than she (he) actually is if the social norm prescribes that financial risk-taking is a male domain.

We aim to compare women's willingness to take investment risk in countries with distinct social norms. Specifically, our empirical test of the predictive power of gender for the actual risk taking is based on household survey data from Austria, Italy, the Netherlands and Spain.[2] These surveys provide both pieces of necessary information – financial asset holdings of households and subjective risk preferences of household members. Furthermore the four European countries differ notably in the degree of gender equality according to the Global Gender Gap Report.[3] In particular, Italy is the least gender-egalitarian country and falls significantly behind the other three countries.

The extent of risk taken by investors is measured along two dimensions. The first one regards the decision on whether to include risky financial assets in the portfolio or not (*participation decision*). The second dimension of financial risk-taking is related to the decision about the share of the

[1] See, for example, a recent advertising campaign by the German insurer ERGO group which sells different insurance products to men and women, Handelsblatt No 250, December 27, 2011, page 32.

[2] Austrian Survey of Household Financial Wealth 2004; Italian Survey of Household Income and Wealth (SHIW) Wave 2004; Spanish Survey of Household Finances (EFF) Wave 2005; DNB Household Survey Wave 2004.

[3] http://www.weforum.org/pdf/gendergap/report2009.pdf.

financial portfolio allocated to risky assets (*allocation decision*). Risky assets in our application are defined as directly held stocks and, later in a robustness check, as directly held stocks plus mutual funds.[4] We differentiate between the gross impact of gender (i.e. when individual risk preferences are not taken into account) and the incremental impact of gender (i.e. when risk preferences are controlled for). The effect of gender on the participation decision is estimated using a probit regression model. While analyzing the allocation decision, we use the Heckman two-stage estimation procedure to account for a potential sample selection bias which is likely to emerge when the two portfolio decisions – investing in risky assets and the size of the investment – are correlated through common factors.

Our analysis reveals a significant gross impact of gender in the four countries. This evidence reflects the fact that the share of women investing in risky portfolios is significantly smaller than the share of men (see Figure 1). Thus, the gross effect confirms the common belief that the willingness to actually take investment risk is sex-linked. However, the evidence differs between countries if we account for self-reported risk preferences. Only in the low-index country Italy gender remains significant while in the three countries with a fairly high gender equality index gender loses its significance. Obviously Italian women have a significantly lower propensity to hold risky assets than men with the same risk tolerance. Social norms seem to explain this result as further investigation of the Italian case confirms. Italian women seem to behave more risk averse than they actually are as risk taking is predominantly assigned to men in society. The analysis of the share of wealth allocated by those who invest in risky assets reveals again that Italy is special. The gross impact of gender is significant only for this country. But accounting for risk preferences in the allocation decision renders gender insignificant even for Italy.

Furthermore, we take advantage of the richness of the data collected by the Dutch survey and investigate the role of gender in households with different structures of financial decision-making. In particular, we distinguish between two groups of couples: those with a clear division of financial decision-making and those where no such division exists. For the first group, we obtain the same

[4] A similar approach to the measurement of financial risk taken has been applied in previous empirical studies of financial risk-taking, in particular, Jianakoplos & Bernasek (1998), Bajtelsmit, Bernasek & Jianakoplos (1999), and Bernasek & Shwiff (2001).

results on the role of gender as we did for the whole sample. However, for the second group, we find that the risk preferences of both spouses have a significant effect on the risk-taking of the couple. If spouses have different risk preferences, this results in a compromise with respect to risk-taking.

In sum, we infer from our comparative analysis three main conclusions. Firstly, adaption to adverse social norms seems to play an important role for female investment behavior in countries with a very low degree of gender equality. Secondly, in countries with a high degree of gender equality female self-selection is still an important factor. The group of women who take investment risk is smaller, and women who self-select into this group of risk-taking investors are those who are on average equally risk tolerant than their male counterparts. Because of self-selection men and women do not differ significantly in the share of wealth that is allocated to risky assets in their portfolios. The self-selection phenomenon speaks clearly against financial advice that is given on the basis of gender. These latter findings for consumers are by and large in line with literature that studies the risk-taking behavior of men and women in specific sub-populations, for example among investment fund managers (Johnson & Powell 1994, Atkinson, Baird & Frye 2003), entrepreneurs (Caliendo & Kritikos 2010) and loan officers (Beck, Behr & Guettler 2013). The main finding there is that men and women who self-select into these risky activities show similar readiness to actually take risks. Thirdly, any prediction with respect to financial risk-taking by couples with mutual decision-making must take into account the preferences of both partners. This conclusion is important for any research involving household data.

Our analysis contributes to a number of research areas: the research on social identity, the link between gender and risk attitude, the stream of literature on the role of cultural determinants in the financial behavior of men and women as well as the research on household/consumer finance and financial advice (see e.g. Hackethal, Haliassos & Jappelli 2012).

The remainder of the paper is organized as follows. In the next section, we review the related literature In Section 3, we formulate our research hypothesis based on Akerlof & Kranton (2000). Section 4 gives a detailed overview of our empirical approach. The econometric model is presented in Section 5. In Section 6, we report the results regarding the gender effect on two types of investment decisions: ownership of risky assets and allocation of wealth to these assets. In Section 7, we check

the robustness of our results. Section 8 concludes.

2 Literature rewiew

Numerous papers studying the financial behavior of individuals find significant gender differences in risk-taking. For instance, portfolios of financial assets held by women seem to be generally less risky than portfolios held by men (Jianakoplos & Bernasek 1998, Bajtelsmit et al. 1999, Bernasek & Shwiff 2001). Recently, Beckmann & Menkhoff (2008) find a higher self-reported risk aversion of female professional investment fund managers. Weber, Weber & Nosic (2012) report a higher willingness to take risk for male UK online-brokerage customers during the financial crisis. Säve-Söderbergh (2012) shows that men with risky portfolios take on significantly more risk than women with risky portfolios. Furthermore, a number of experimental papers document systematic differences between men and women with respect to choices of risky gambles; see Croson & Gneezy (2009) and Eckel & Grossman (2008) for a comprehensive review of this literature. The findings of these studies convey a broadly uniform message that women are less willing to take financial risk than men.

Yet, a growing number of studies put the previous findings into perspective or refute them altogether. In particular, Schubert, Brown, Gysler & Brachinger (1999) show that contextual framing of experiments has a paramount effect on the risk propensity of men and women. When lotteries are framed as gains, men are more risk-loving than women; however, when lotteries are framed in terms of losses, then men are more risk-averse than women. Dohmen, Falk, Huffman, Sunde, Schupp & Wagner (2011) find – based on a representative survey of the German population (GSOEP) – that the gender gap in attitudes towards risk varies over the life cycle. The risk propensity of men decreases steadily with age. Women exhibit the largest decline in risk propensity between their late teens and age thirty. Risk propensity then stabilizes up until the mid-fifties and declines further thereafter. Johnson & Powell (1994) and Atkinson et al. (2003) document equal readiness of male and female fund managers to take risks. Beckmann & Menkhoff (2008) reject the hypothesis that male fund managers are more over-confident than female managers. Recently, Berger, Kick & Schaeck (2012) find that a higher proportion of women in the executive boards of banks is associated with a higher level of risk-taking by the institution.

Beside studies aiming at identifying the gender gap in financial risk-taking, there is also a large body of literature looking for an explanation of gender differences. Some of these studies link gender differences in economic behavior to biological factors. For instance, factors such as the hormone level and the structure of the brain have been found to be relevant for gender differences in behavioral patterns (see e.g. Blanco, Ibánez, Blanco-Jerez, Baca-Garcia & Sáiz-Ruiz 2001, Archer 2006, Hermans, Putman, Baas, Koppeschaar & van Honk 2006). A number of studies document a link between the level of testosterone and gender differences in the likelihood of choosing a career in finance (Sapienza, Zingales & Maestripieric 2009), in the performance of financial professionals (Coates, Gurnell & Rustichini 2009) and in the propensity for financial risk-taking (Stenstrom, Saad, Nepomuceno & Mendenhall 2011, Apicella, Dreber, Campbell, Gray, Hoffman & Little 2008). Moreover, women's willingness to take financial risk has been shown to vary over the menstrual cycle (Bröder & Hohmann 2003).

Increasingly, the literature also discusses social factors as an important determinant of gender differences in risk-taking behavior. Collective values and norms shape individual behavior in various domains of life and are likely to affect financial behavior as well (Carroll, Rhee & Rhee 1994, Fernández & Fogli 2006, Giuliano 2007, Christelis, Georgarakos & Haliassos 2013, Nguyen 2011). They can also be responsible for the distinct behavioral patterns of men and women in financial decision-making. Finucane, Slovic, Mertz, Flynn & Satterfield (2000) study the propensity for risk-taking by men and women in groups with different social background. They find that gender differences vary significantly across ethnic groups in the USA. Gneezy, Leonard & List (2009) follow a simple but convincing approach to show that social factors matter. They compare women's willingness to compete in two distinct societies – one society with a dominating patriarchal social norm and the other with a pronounced matriarchal organization. The results show that in the patriarchal society more men choose to compete, while in the matriarchal society more women are willing to compete than men. Booth & Nolen (2012) confirm the crucial impact of the social environment, too. They show that girls from all-girl schools are as likely as boys from either coed or all-boy schools to choose a risky gamble, while girls from coed schools are more risk-averse than boys. Similar evidence is provided by Lindquist & Säve-Söderbergh (2011) who show in a natural

experiment that females are more risk-averse when assigned to a male-dominated group, than if they are in a mixed or female-only group. On the basis of household survey data we aim to contribute to this literature. Specifically, we compare women's and men's willingness to take investment risk in four societies with a distinct level of gender equality.

3 Theoretical foundation and hypotheses

Akerlof & Kranton (2000) provide the theoretical basis for the analysis of whether financial risk-taking is associated with social norms that ascribe risk taking to men rather than women. They suggest a general model of economic behavior in which the utility derived from an economic action depends on personal identity. Identity is defined as a person's sense of self or self-image. This image comprises such categories as gender, ethnicity, age etc. Each category is associated with a set of attributes and behaviors. Which attributes and behaviors are attached to a category is determined by social norms. For instance, the category gender can be viewed as a set of characteristics and behaviors that in a given society are associated with an ideal man or woman. By following the prescriptions of social norms, a person affirms his/her self-image, which leads to gains in identity. By violating the prescriptions, a person incurs losses to the identity. Hence, a person can experience gains or losses to identity depending on the extent to which an action corresponds to a socially prescribed behavior. This relationship has an important effect on the utility derived from economic actions. Identity enters as an argument into the individual utility function. A decrease in identity reduces utility. And, vice versa, a gain in identity entails an increase in utility. Hence, a dissonance between one's action and social norms reduces the utility derived from the action.

Following Akerlof & Kranton (2000), we can realistically assume that a utility-maximizing individual will tend to adapt his/her behavior to social norms even when this causes him/her to deviate from individual preferences. The key implication of this relationship for risk-taking in financial decisions is as follows. In a society with asymmetric gender roles, where investing in risky assets is considered to be a male domain, it can be optimal for a risk-loving woman to act more risk-averse than she actually is. Similarly, it can also be optimal for a risk-averse man to act more risk-loving than is appropriate given his risk preferences, in order to fit the social prescriptions. Thus, in ad-

dition to the influence of risk preferences, gender can have an incremental effect on the behavior. In the remainder of the paper, we conduct empirical tests of whether investors' gender influences risk-taking beyond the effect captured in the investors' risk attitude. We also analyze whether our results hold for couples.

4 Methodology

Our approach is inspired by Gneezy et al. (2009) who analyze the behavior of men and women in societies that differ with respect to prevailing gender roles. However, instead of experimental data, we use representative national surveys of household finances from Austria, the Netherlands, Spain and Italy. These countries differ in the degree of gender equality, and the surveys provide the required information about investors' gender, actual risk-taking and risk preferences.

4.1 Data

The data are assembled from several sources. The Spanish and Dutch data are drawn directly from the countries' representative national survey data sets: the Spanish Survey of Household Finances (EFF) Wave 2005 and the DNB Household Survey Wave 2004. Data for Austria and Italy are drawn from the LWS Database.[5] Hence, for each country we have a cross-sectional data set with the household as a unit of observation.

Each country's data set contains information on both the self-reported risk preferences of the respondents and their actual risk-taking reflected in the asset holdings. Due to the data standardization in the LWS, the Austrian and the Italian data sets provide income and wealth information for the entire household and not for individual household members. The Spanish survey collects information about real and financial assets at the household level, while data on income is available at the level of individual household members. The Dutch survey collects all information items at the individual level. We calculate total household income for Spain and the Netherlands by summing

[5]Luxembourg Wealth Study (LWS) Database, http://www.lisdatacenter.org/. Data runs were completed in October - November 2013. Sources of the LWS data are the Austrian Survey of Household Financial Wealth Wave 2004 and the Italian Survey of Household Income and Wealth (SHIW) Wave 2004. For details about the surveys, see Beer, Mooslechner, Schürz & Wagner (2006) (Austrian survey), Van Els, Van den End & Van Rooij (2005) (Dutch survey), Bover (2008) (Spanish survey) and Faiella, Gambacorta, Iezzi & Neri (2006) (Italian survey).

the incomes across household members. The same method is used to calculate households' asset holdings for the Netherlands. The Dutch survey asks two additional questions about who decides on financial issues within couples. In Section 7.3 we use this information to examine the role of gender in the couple's propensity to invest in risky assets.

Individual specific characteristics like age, education or risk attitudes are reported for the household member who is primary responsible for the financial decisions of the entire household. The definition of who is the decision-maker in a household varies across the national surveys. In the Austrian survey, the decision-maker is the self-declared household head or the household member who has the most accurate knowledge about the household finances. In the Italian survey, this is the household member who declares him/herself as being primarily responsible for the household budget. In the Dutch survey, this is the person who declares him/herself as having the greatest influence on the financial decisions of the household. In the Spanish survey, this is the person who is responsible for the accommodation and also normally chiefly deals with the financial issues.

The four European countries under examination differ with respect to gender roles, which is reflected in the degree of gender equality. Gender equality is measured based on the World Economic Forum's Gender Gap Index. The Gender Gap Index is a composite index calculated for 134 countries. The index takes into account differences between men and women in a given country with respect to access to resources and opportunities in four domains of social life: participation in the labor markets and earnings, educational attainment, political empowerment, health and survival. Based on the index, each country obtains a rating starting with 1 (lowest gender inequality). As reported by the Gender Gap Report, in 2006, Scandinavian countries ranked the best. Our four European countries are ranked as follows: Spain 11th, the Netherlands 12th, Austria 27th and Italy 77th. Hence, with respect to gender equality, Italy falls significantly behind the other three countries.

The Gender Gap Index has previously proved to be a useful source of information in gender-related research. For instance, Guiso, Monte, Sapienza & Zingales (2008) employ the index to investigate whether the degree of sexism in 40 countries relates to cross-country variation in the gender gap in math scores. They find that the gender gap disappears in more gender-equal societies. A related study by Cardenás, Dreber, von Essen & Ranehill (2011) finds boys to be more risk-prone

than girls in Sweden and Columbia, however, the gender gap is smaller in the more gender-egalitarian Sweden.

We use the index to account for social norms that determine prevailing gender roles in the countries' societies. Specifically, we analyze the investment behavior of men and women for each country separately and test whether the results obtained for the country with the highest degree of gender inequality differ from the other three countries.

4.2 Actual risk taken

The extent of risk taken is measured along two dimensions The first dimension regards the decision on whether or not to include risky financial assets in the portfolio. We call this the *participation decision*. Information on participation is operationalized by a dummy variable equal to 1 if a household holds some risky financial assets and 0 otherwise.

The second dimension regards the decision about the share of the financial portfolio allocated to risky assets. We refer to it as the *allocation decision*. This measure of riskiness is defined following the approach first proposed by Friend & Blume (1975) and then adapted in a number of empirical studies (e.g., Guiso, Haliassos & Jappelli 2002). Accordingly, a risk-averse investor allocates his/her wealth between risk free and risky assets in proportions that maximize the investor's utility. The share of risky assets is proportional to the Arrow-Pratt measure of risk aversion and reflects the investor's risk preferences. The higher the portfolio share allocated to risky assets, the more risky the portfolio is.[6]

Risky financial assets in our study comprise only directly held stocks. Ignoring other financial securities should not be critical as the participation and the share of these instruments in household portfolios is generally small (Guiso & Sodini 2012). In contrast, indirect stock ownership through mutual funds is widely spread among households and its portfolio share is significant (Guiso et al. 2002; Guiso & Sodini 2012). Thus, ignoring investments in mutual funds may lead to a significant underestimation of portfolios' riskiness. Moreover, recent analyzes reveal strong gender differences in the choice of stock holding mode. Conditional on ownership of stocks in any form, single males are

[6]We use this simplified approach to measure risk, as we do not know the variation of returns on the risky assets.

found to be more willing to invest in stocks directly, while females with similar characteristics seem to prefer holding stocks through mutual funds (Christelis, Georgarakos & Haliassos 2011). Hence, by not considering mutual funds, we may underestimate the risks taken by females more than those taken by males. In order to test the sensitivity of our analysis with respect to the definition of risky assets, we run a robustness check including both directly held stocks and mutual funds as risky assets. The results are by and large similar to those obtained for the narrow definition of risky assets (i.e. directly held stocks).[7]

For each country we calculate the participation rate for risky financial assets, i.e. the proportion of individuals in a country who hold risky assets in their portfolios. The rate differs between gender groups and across countries (see Figure 1a). The common pattern is that the participation rate is higher among men than women. However, the magnitude of the gender gap varies between countries. The largest gap – 12 percentage points – is observed in Spain, followed by Austria with a 10 percent gap, the Netherlands with an 8 percent gap and Italy with a 3 percent gap. In all four countries, the higher participation rates observed for men are statistically significant.[8]

Interestingly, there is no such clear gender difference in the share of risky assets. In Austria and Italy, women even seem to allocate, on average, a bigger portfolio share to stocks than men, although the difference is not statistically significant (see Figure 1b). The shares of men and women are similar in Spain. Only in the Netherlands do women have a smaller share of stocks than men, by 10 percent, although this difference is again not statistically significant.

4.3 Risk preferences

Individual risk preferences are a crucial piece of information in our framework. This information is obtained in the household surveys by asking the respondents to provide an assessment of their willingness to take financial risks. The exact formulation of the questions and the scales on which the extent of willingness is measured vary across the four national surveys (see Table 3 in the Appendix). The Dutch survey applies a 7-point scale, whereas the Austrian, Italian and Spanish

[7] We do not present the estimation results of this robustness check in the paper. The interested reader is referred to the discussion paper version of this manuscript Barasinska & Schäfer (2013).

[8] We test the significance using a two-tailed T-test.

surveys use a less detailed 4-point scale.[9] Based on the original categorization of risk preferences, we generate a set of dummy variables *Risk Tolerance j* with $j = [1, 4]$ for Austria, Italy and Spain and $j = [1, 7]$ for the Netherlands.[10] Higher values of j correspond to greater willingness to take risk and, therefore, indicate a higher risk tolerance.

Figure 2 presents the country-specific distribution of men and women by self-reported tolerance towards financial risk. In all countries, women clearly outnumber men in the group with the lowest risk tolerance. According to a two-sided T-test, differences are statistically significant at the 1% level. At higher levels of risk tolerance (*Risk Tolerance* ≥ 2), the proportion of men exceeds the proportion of women, although the differences are not statistically significant.

5 Econometric model

Given the two aspects of risk-taking, participation and allocation, we formulate two hypotheses regarding the extent of financial risk taken by men and women in countries with different degree of gender equality:

HYPOTHESIS 1: "Participation decision"

Men are more likely to invest in risky assets than women with equal risk attitude if the degree of gender inequality in the country is high, ceteris paribus.

HYPOTHESIS 2: "Allocation decision"

Men allocate a larger share of their financial portfolios to risky assets than women with equal risk attitude if the degree of gender inequality in the country is high, ceteris paribus.

To test the first hypothesis, we estimate the effects of gender on the probability of holding

[9]The Italian data set is characterized by a high rate of non-response to the question regarding the willingness to take financial risk: about 65 percent of respondents skipped the question. Non-responding individuals are excluded from the data set, which leads to a significant reduction of the sample. In order to see whether the decision to report risk attitude is influenced by gender we fit the data to a probit regression model. The dependent variable is an indicator variable equal to 1 if risk attitude is reported and 0 if not. Our results show that the probability of non-response is independent of gender. However, the sub-set of individuals who provide information on their risk attitudes is wealthier and, therefore, more homogeneous with respect to financial resources than the overall population. This greater homogeneity in the Italian sample could bias our results toward finding no gender effects but not toward the contrary.

[10]For Spain, we reverse the scale in order to allow higher values to express greater subjective willingness to take risks. For the Netherlands, we also tried to pool the risk groups together in order to reduce the number of categories from 7 to 4. However, using 4 dummies instead of 7 did not change our results in the subsequent regression analysis. We therefore decided to leave the original division into 7 groups.

risky assets using a probit regression. We refer to this regression model as *Model I*. The dependent variable is a binary variable equal to 1 if an investor owns some risky assets and 0 otherwise. The effect of gender is captured by the binary variable $Male$, equal to 1 if an investor is male and 0 if female. A positive and statistically significant coefficient on this variable would indicate that, *ceteris paribus*, men are more likely to invest in risky financial assets than women.

To test our second hypothesis, we rely on a Heckman regression. According to Haliassos & Bertaut (1995), an investor will not hold any risky assets if the utility gained from ownership of the optimal amount is smaller than the incurred participation costs. Hence, holdings of risky assets are observed only for some investors, while they are censored at zero for the rest. The non-random selection of individuals according to those who own risky assets and those who do not potentially leads to the sample selection bias. This bias is likely to emerge when the decision to hold risky assets and the decision about the amount of these assets are correlated either through observable characteristics of individuals or via common factors. For example, one such factor is individual financial knowledge, which certainly affects both decisions but is rarely observed by researchers. A suitable econometric approach in this case is the Heckman sample selection model.[11] The model represents the portfolio decision as a two-step procedure. The first step is whether to own risky assets. Accordingly, we estimate the probit model with a binary dependent variable equal to 1 if an investor owns some risky assets and 0 otherwise. From this regression, we obtain the correction term Mills Ratio which is then included in the second-stage regression equation. The second-stage equation has the share of financial wealth allocated to risky assets as the dependent variable and, hence, depicts investors' allocation decision. In the following, we refer to this two-stage regression model as *Model II*. As in the first hypothesis, the effect of gender in *Model II* is captured by the binary variable $Male$ that is included in the regression at both stages of the Heckman estimation. The estimated coefficient of the explanatory variable $Male$ in the second-stage equation would show whether men tend to hold larger shares of risky assets than women, *ceteris paribus*.

Two specifications are estimated for each model. The first specification captures the gross effect

[11] The Tobit estimation technique would also deal with the left-hand censoring problem but not with sample selection. Instead, the two-stage approach to the modeling of portfolio decisions by private investors deals appropriately with the sample-selection problem; see, for example, Guiso, Haliassos, Jappelli & Claessens (2003), Guiso et al. (2002).

of gender. It includes all observable socioeconomic variables, including gender, but excluding the measure of risk attitude. The second specification additionally includes a set of dummy variables capturing the subjective risk tolerance. Table 1 summarizes the model specifications.

The rest of the explanatory variables in both models are chosen in line with existing literature on the role of household characteristics in the portfolio decisions.

An important determinant of portfolio decision-making is income. We control for income by including the logarithm of the household's net income $ln(Income)$. Total financial wealth should affect the participation decision as well. As shown by Guiso et al. (2003), the effect of wealth is nonlinear. To allow a flexible pattern of wealth effect, we include four dummy variables *I wealth quartile*, *II wealth quartile*, *III wealth quartile* and *IV wealth quartile* indicating to which quartile of the wealth sample distribution the household belongs. Guiso et al. (2003) document a hump-shaped relation between age and holdings of risky assets by households in European countries. In particular, the participation rate among the young and elderly is low compared to the middle-aged households. To capture this non-linearity, we include 6 dummies indicating age groups: $Age < 20$, $Age\ 30-39$, $Age\ 40-49$, $Age\ 50-59$, $Age\ 60-69$ and $Age \geq 70$, each equal to 1 if an individual falls into the respective age group. Following a number of theoretical and empirical studies pointing at the important role of house ownership (e.g., Chetty & Szeidl 2007), we include an indicator of ownership of residential property (dummy variable $RealProperty$). Education is another important factor in the ownership decision, since it is be associated with informational costs of participation in the financial markets, and also with financial literacy. A dummy variable *Education* equals 1 if the respondent earned a college (or higher) degree and 0 otherwise. We also control for the marital status of the household's head and the presence of children, as these factors are likely to affect portfolio decisions through a bequest motive; moreover they may be also correlated with unobservable socioeconomic factors affecting portfolio choice. A dummy variable *Single* equals 1 if the individual is single and 0 otherwise. *Children* captures the number of children under the age of 18. As advocated by Guiso et al. (2008), individuals facing high labor income risk are more risk-averse and could thus avoid exposure to portfolio risk by holding less or no risky assets. To capture an additional background risk resulting from risky entrepreneurial income, we include a

binary variable *Self-Employed* indicating the self-employment status of the household head.

The second-stage equation includes largely the same variables as the first-stage equation with two adjustments that enable the identification restriction. Firstly, in line with Guiso et al. (2008), we expect that the share of risky assets is a concave increasing function of wealth. We therefore include a logarithm of household financial wealth $ln(Financial\ Wealth)$ instead of dummies for wealth quartiles in the equation. Secondly, the dummy variable *Property* is excluded from the equation. The mere fact of house ownership may influence participation but should not affect the optimal share of risky assets in the portfolio.

The descriptive statistics of variables are summarized in Table 2. In all countries, men earn more, have higher financial wealth and more often own residential property. The percentage of self-employed individuals is higher throughout the sample and, with the exception of Austria, men more frequently have a high level of education.

6 Gender Effects

6.1 The probability of owning risky assets

In this section, we report our findings regarding the participation decision. Table 4 reports marginal effects estimated for country-specific means of continuous variables and for base categories of dummy and categorical variables. Column (1) shows the *Gross Effect* of gender. Column (2) shows the estimates for the model with risk tolerance levels included (*Incremental Effect*). The inclusion increases R^2 compared to the model on the *gross effect*. Hence, accounting for risk attitudes improves the explanatory power of the regression.

In line with our expectations, the probability of risky assets in the portfolio increases significantly with wealth. Education is found to increase the likelihood of ownership in all countries. However, in the Netherlands the effect is statistically insignificant. Effects of real property, age and family status differ across countries.[12]

[12]The differences in the estimated effects may be caused by cross-country differences in factors that have common effects on the behavior of individuals regardless of their gender. For example, Guiso et al. (2003) consider differences in national capital gains taxes, fixed costs of participation in the financial markets and financial literacy as important determinants of investment decisions.

It is obvious that the results obtained for the model on the *gross effect of gender* confirms the common belief that the willingness to actually take investment risk is sex-linked. The coefficients on the dummy variable *Male* are positive and statistically significant. *Ceteris paribus*, men are more likely to invest in risky assets than women by about 4 percentage points in Austria, by 8 percent in the Netherlands, by 9 percent in Italy and by 2 percent in Spain. If these results were the end of the story, we would conclude that the gender stereotype can be confirmed and that gender serves as a strong predictor of risk-taking. We could then say that it is appropriate for the financial advice to be geared to the risk propensity of an "average" woman and an "average" man.

Yet, the picture changes in Column (2). Controlling for risk attitudes renders coefficients on the dummy variable *Male* statistically insignificant in the three countries with a relatively high degree of gender equality. At the same time, coefficients on risk tolerance dummies meet expectations as they are all highly significant and positive.

In Austria, the Netherlands and Spain, investors' gender seems to contain no additional information about risk propensity beyond that already captured in the self-reported risk preferences. In other words, gender has no incremental impact on risk-taking when risk preferences are taken into account. In those countries financial advice given to an individual based on the information about his/her risk preference can improve the individual's utility compared to advice based on gender only.

A different finding emerges for Italy. Here, the dummy variable *Male* remains significant, even after we control for risk tolerance. Holding risk tolerance constant, men are almost 8 percent more likely to invest in risky assets than women. Italian women are less likely to acquire risky assets than their male counterparts with the same degree of risk tolerance. In Italy – i.e. in the country with the gender equality level far below the other three countries – information about an investor's gender can improve the assessment of his/her risk propensity elicited from the self-reported risk tolerance. The results in column 2 confirm Hypothesis 1. Following Akerlof & Kranton (2000), we interpret this result as a consequence of the conflict between risk preferences and social identity of men and women in a society with highly asymmetric gender roles.

6.2 The share of wealth allocated to risky assets

The effect of gender on the share of risky assets is estimated using the Heckman two-stage estimation procedure (*Model II*). The first-stage regression corresponds to that used in the analysis of the ownership decision (see Table 4). The second-stage regression includes the same explanatory variables as the first-stage regression with two adjustments: wealth enters as a set of dummies indicating the 1st, 2nd, 3rd and 4th quartiles of the sample distribution; and the dummy variable *Real Property* is excluded from the equation. This adjustment is necessary in order to enable identification of the model. Coefficient estimates obtained for the second-stage regression are reported in Table 5.

The coefficient on *Male* in column (1) shows that there is no gross gender effect on the portfolio share of risky assets in all countries except Italy. When risk tolerance is taken into account even the gender effect for Italy becomes insignificant. Hence, our analysis suggests that there are no differences between men and women in the portfolio allocation decisions once self-reported risk tolerance is controlled for. This evidence rejects Hypothesis 2 but corresponds to findings that are derived for the sub-populations of investment fund managers, entrepreneurs and loan officers (see Johnson & Powell (1994), Atkinson et al. (2003), Beckmann & Menkhoff (2008), Caliendo & Kritikos (2010) and Beck et al. (2013)).

Other observable characteristics have little effect on the allocation decision. Although wealth is found to have negative effect on the share of risky assets in all four countries, the effect is statistically significant only in the Netherlands. Furthermore, the degree of risk tolerance is significant only in Italy and Austria. Hence, conditional on ownership of risky assets, the decision about what portion of wealth to invest in these assets is driven by unobserved individual-specific effects rather than by the observed socioeconomic characteristics. Weak explanatory power of the included variables is not surprising, even when they have affected the likelihood of owning risky assets. Some factors that determine the ownership decision are irrelevant for the allocation decision. For example, information costs may prevent individuals with low income and low education from participating in the markets for risky financial assets. However, once information is acquired, information costs should not play a role in the allocation decision.

7 Robustness checks

7.1 The special case of Italy

Italy is a particularly interesting case with its outstanding result for the participation decision. Alesina, Lotti & Mistrulli (2013) point out that "Italy is towards the extreme in terms of viewing women in a traditional role".[13] In order to further test whether our hypothesis of high gender inequality is responsible for this result, we perform a number of additional estimations specifically for Italy. Firstly, we test whether the effect of gender is specific to particular classes of risk tolerance. To this end, we group the observations into four sub-samples: the first one includes households with the lowest degree of risk tolerance (Risk Tolerance =1), the second one includes those with Risk Tolerance = 2; the third sub-sample includes households with Risk Tolerance = 3 and the fourth sub-sample consists of households with Risk Tolerance = 3 or 4. We do not create a specific sub-sample of observations with only Risk Tolerance = 4 as the size of this group is very small and a regression analysis is not feasible. Then, we estimate *Model I* by running a probit regression for each of the four sub-samples separately. The estimated marginal effects of the dummy variable *Male* are reported in Table 6.

Gender has a significant effect on the probability of holding risky financial assets in the two sub-samples with low risk tolerance. In the sub-samples with higher risk tolerance, men and women are equally likely to invest in risky assets. Thus, the incremental gender effect obtained in the earlier regression, in which risk tolerance groups were pooled together, is driven by the distinct behavior of men and women with low risk tolerance. This result may imply that, compared to men, the conflict between a decision to hold risky assets and the social identity of a woman is particularly strong within the groups in which taking risks is unpopular anyway.

Apart from social norms, strong differences in income between men and women could also cause such an effect. In order to evaluate this conjecture, we now focus only on those Italian households who report low risk tolerance (i.e. Risk Tolerance = 1 or Risk Tolerance = 2). Within this group, we construct four sub-samples of households that belong to different income classes. The first sub-

[13] See also Alesina & Giuliano (2010).

sample includes households whose income falls into the 1st quartile of the sample distribution; the second, third and the fourth sub-samples include those households whose income falls into the 2nd, 3rd and 4th quartiles of the distribution, respectively. Then, *Model I* is estimated separately for each income class. The results are reported in Table 7.

Gender has no effect in the group with the lowest income. This is not surprising, since liquidity constraints prevent both men and women from investing in risky financial assets. Among the households belonging to a higher income class, the effect of gender on the probability of investing in risky financial assets is significant in all three classes. However, the predicted gender differences are largest among the households in the upper two income quartiles. Hence, despite similar financial resources and similar risk propensity, men and women behave differently. This finding rules out income differences as an explanation for the observed incremental effect of gender in Italy and supports the dissonance hypothesis according to Akerlof & Kranton (2000).

7.2 The case of single households

We show that in countries with a high degree of gender equality, women who self-select into risk-taking have equally structured portfolios, than men with the same degree of risk tolerance *ceteris paribus*. This finding differs from the evidence provided by Bajtelsmit et al. (1999) and Jianakoplos & Bernasek (1998), who reveal significant differences in the structure of portfolios of men and women holding some risky assets. The specifics of the data used in these studies may be responsible for the discrepancy in the evidence. Bajtelsmit et al. (1999) analyze risk-taking only in the defined contribution pension plans rather than in the entire financial portfolios as we do. The inference of Jianakoplos & Bernasek (1998) relies on the risk-taking behavior of single women only. Yet, we cannot be sure that behavior of single persons is representative of the behavior of all people. Even if we take into account that married women are generally less wealthy than their husbands (Sierminska, Frick & Grabka 2010), and hence are on average not much wealthier than single women, a single female might actually be less risk-tolerant than an equally wealthy married woman because the latter has an additional safety net in the form of her husband's income and assets.

To gain clarity about whether our results apply to single persons as well, we analyze the gender

differences in the behavior of single people. All in all, it turns out that gender differences with respect to the ownership and the allocation decision are even less pronounced among singles than in the population at large.[14]

7.3 The role of gender in couples' decision making

The role of gender in couples' financial risk-taking, is *a priori* not clear. Most likely, it depends on the organization of financial administration within a household. If each partner manages own earnings separately or one partner controls the entire household's finances, we can with certainty link the decisions to a particular person and investigate the effect of this person's gender on financial risk-taking. However, financial risk-taking is probably influenced by both partners if the couple manages the money jointly and both partners have more or less equal influence on the financial decisions. Hence, the gender of one of the partners cannot determine the behavior of the entire couple.

For one of the countries in our data set, we are able to investigate the role of gender in couples with different organization of financial management. The Dutch survey asks two additional questions to the surveyed households that can be used for this kind of analysis (see Table 8 in the Appendix). Based on the responses to these questions, we identify two types of couples.

Type 1 Couples: There is a clear division of decision-making on financial matters. Either each member manages the own money individually or all the money is pooled together, but only one member decides or has the most influence on the decision. For the former, each partner is considered to be the decision-maker. For the latter, we identify which household member is the (main) decision-maker. The expectation is that gender and risk preferences of the decision-makers determine the riskiness of the managed financial portfolios.

Type 2 Couples: These are couples with no clear division of resources or decision-making. All money is completely or to a large extent pooled together and both partners decide together how the money is invested. Therefore, it is more likely that the degree of risk-taking is affected by the risk preferences of both spouses. The number of Type 2 couples is 557, which comprises approximately

[14] We do not present the detailed estimation results. The interested reader is referred to the discussion paper Barasinska & Schäfer (2013).

2/3 of all couples in the sample.

We firstly estimate the effect of gender for couples of Type 1. All the results with respect to the effect of gender on the degree of risk-taking are the same as the results obtained earlier for the entire Dutch sample. Then, we estimate the effect of gender for the couples of Type 2. We have some additional information about the partners that can help us to identify the division of roles in a couple despite the fact that the finances are managed together. Firstly, we have information about which partner is the (self-declared) household head and which is the main earner. Although being simultaneously the household head and the main earner is highly correlated, there is not a one-to-one correspondence. The proportion of couples with a female household head among the Type-2 couples is 6.5 %. The proportion of couples having a female main earner is 7.1 %. Secondly, we have information about the risk preferences of both couple members.[15] Since the spouse is also involved in the decision-making, the individual risk preferences can also have an impact on the riskiness of the entire household's portfolio.

Thus, we can investigate the role of the gender of the reference person (household head or the main earner), and the role of the risk attitudes of both household members. For this purpose, we estimate our regression model for the participation decision twice.[16] In the first estimation, the reference person is the household head and we control for the gender of the household head. In the second estimation, the reference person is the main earner and we control for the gender of the main earner. In both estimations, we also control for the risk preferences of both partners. Since the risk preferences of the partners in a couple are likely to be correlated, simply including indicators of the level of risk tolerance of the partners may lead to multicollinearity problems.[17] To avoid this problem, we include a set of dummies indicating the level of risk tolerance of the reference person, and the variable *Diff. Risk Preference* which is defined as the difference in the level of risk tolerance between the reference partner and his/her spouse. Higher values of this variable mean that the spouse is more risk averse than the reference person.

[15] Unfortunately, not all couples provide information about both partners. Due to the missing information, our sample of couples of Type 2 consists only of 207 observations.

[16] The small number of observations prevents us from conducting a regression analysis of the allocation decision.

[17] The coefficient of correlation between the risk preferences of spouses in our sample is 30% and is statistically significant.

The estimation results are reported in Table 9. For brevity, we report only the effects of gender and individual risk attitude. As expected, gender has no effect regardless of whether risk preferences are taken into account or not, and regardless of the definition of the reference person. The second important result regards the effect of variables capturing the risk preferences of the reference person and the distance to the risk preferences of the spouse (*Diff. Risk Preference*). Specifically, higher risk tolerance of the reference person is associated with a higher probability of holding risky assets, *Diff. Risk Preference* has a negative and statistically significant coefficient in both regressions. This means, firstly, that both the risk preference of the reference person and the risk preference of the spouse have a significant effect on the risk-taking of the couple. Secondly, if the risk preferences of the partners diverge, this results in a compromise with respect to risk-taking. In particular, at any given level of risk tolerance of the reference person, having a more risk-averse spouse reduces the probability that the couple holds risky assets. Therefore, any prediction with respect to financial risk-taking by couples with mutual decision-making must take into account the preferences of both partners. In contrast, neither the gender of the main earner nor of the household head provides any information about the risk-taking propensity of such couples.

8 Conclusions

This study investigates the propensity of risk-taking of men and women in four European societies with distinct social norms. Using the national surveys of household finances we find the effect of gender is associated with the gender equality level of the countries. The difference between men and women in actual risk-taking is most pronounced in Italy – the country with the greatest gender inequality compared to the other three countries. In particular, in Italy women are less likely to invest in risky assets than men, even if they report equal risk tolerance. In contrast, in Austria, the Netherlands and Spain, men and women with equal risk tolerance levels are equally likely to hold risky financial assets in their portfolios. The results for Austria, the Netherlands and Spain, imply that in countries with relatively high degrees of gender equality only self-reported risk tolerance is a good predictor for the readiness of individuals to take investment risk. In none of the four countries does gender play a role in the decision about what portfolio share is allocated to risky assets, once

individuals have decided to acquire such assets and self-reported risk tolerance is controlled for. In sum, the popular belief that the readiness to be exposed to asset risk is a sex-linked trait fails once self-selection is taken into account.

These findings are robust and have important implications for scholars and practitioners. In particular, the results speak against the simplistic approach of using an individual's gender as a predictor for the propensity of risk-taking and thus providing gender-specific financial advice. Instead, financial advice should be adjusted to individual risk preferences and abstain from stereotypical beliefs about a "typical" man or woman. The findings also imply that cultural background, and thus the gender equality regime in a country, is linked to the actual risk-taking of men and women. This link will be the avenue for our further research.

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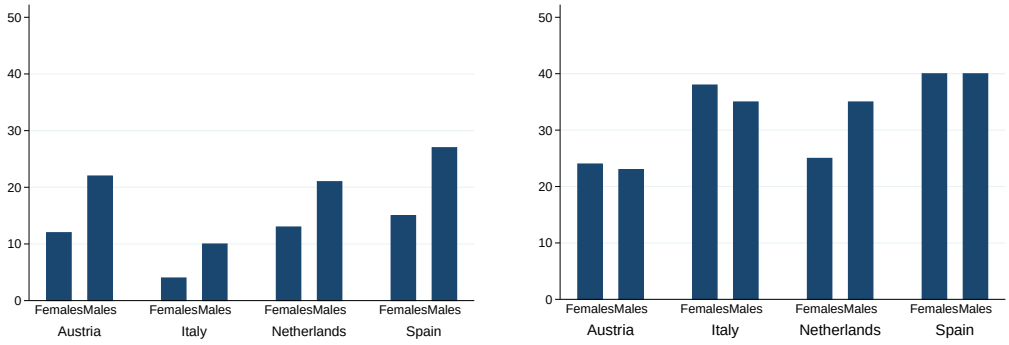
Appendix

Figures

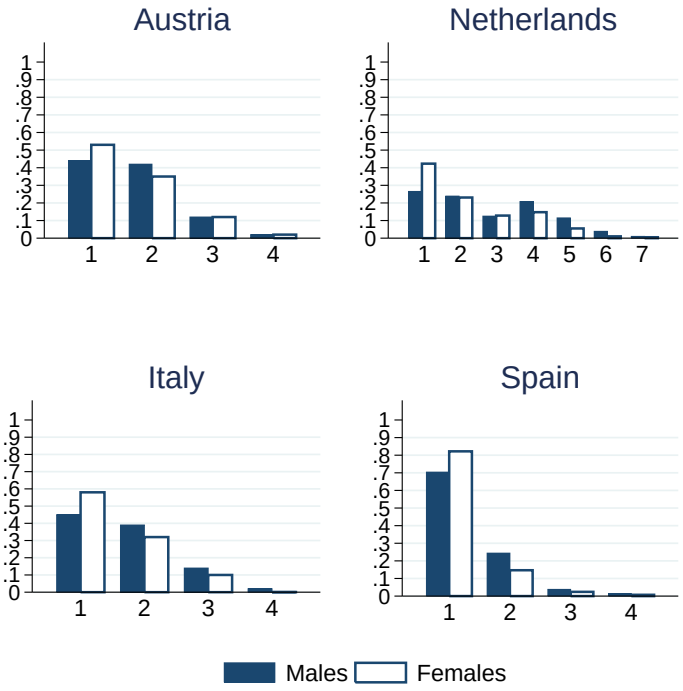
Figure 1: Participation rates and portfolio shares of stocks



a) Participation rate

b) Average portfolio share

Figure 2: Distribution of individuals by the self-reported willingness to take financial risk (subjective risk tolerance)



Note: Each histogram shows country-specific distributions of men and women according to the self-reported risk tolerance. The degree of risk tolerance is measured on an ordinal scale with higher numbers corresponding to higher risk tolerance.

Tables

Table 1: Model specifications

	Naive **model**	*Advanced* **model**
Model I: Probit (Participation decision)	Gender + control variables	Gender + risk preferences + control variables
Model II: Heckman (Allocation decision)	Gender + control variables	Gender + risk preferences + control variables

Table 2: Descriptive statistics by gender

	Austria		Netherlands		Italy		Spain	
	Women	Men	Women	Men	Women	Men	Women	Men
Income, in euro	25,256	33,966	25,605	31,165	19,838	27,346	23,313	35,797
	(13,024)	(13,680)	(21,712)	(26,717)	(15,873)	(28,211)	(32,066)	(50,268)
Financial Wealth, in euro	29,576	56,866	8,506	20,775	15,728	25,404	44,506	140,844
	(53,172)	(120,099)	(23,265)	(66,288)	(55,712)	(72,627)	(176,192)	(681,195)
Real Property	0.53	0.65	0.70	0.71	0.67	0.72	0.41	0.65
	(0.50)	(0.48)	(0.46)	(0.45)	(0.47)	(0.45)	(0.49)	(0.48)
Self-Employed	0.05	0.08	0.03	0.05	0.05	0.14	0.06	0.18
	(0.23)	(0.27)	(0.17)	(0.21)	(0.22)	(0.35)	(0.23)	(0.38)
Education	0.43	0.39	0.23	0.24	0.32	0.41	0.20	0.29
	(0.50)	(0.49)	(0.42)	(0.42)	(0.47)	(0.49)	(0.40)	(0.45)
Age ≤ 30	0.08	0.05	0.08	0.04	0.04	0.03	0.05	0.03
	(0.27)	(0.22)	(0.26)	(0.20)	(0.19)	(0.17)	(0.22)	(0.18)
Age 30-39	0.20	0.14	0.24	0.19	0.13	0.13	0.14	0.11
	(0.40)	(0.35)	(0.43)	(0.39)	(0.34)	(0.33)	(0.35)	(0.31)
Age 40-49	0.21	0.25	0.25	0.23	0.18	0.19	0.20	0.17
	(0.40)	(0.43)	(0.43)	(0.42)	(0.39)	(0.39)	(0.40)	(0.38)
Age 50-59	0.18	0.19	0.22	0.23	0.18	0.24	0.17	0.20
	(0.38)	(0.40)	(0.41)	(0.42)	(0.38)	(0.42)	(0.38)	(0.40)
Age 60-69	0.20	0.24	0.14	0.17	0.16	0.21	0.18	0.24
	(0.40)	(0.43)	(0.34)	(0.37)	(0.37)	(0.41)	(0.38)	(0.43)
Age $\geq$70	0.13	0.12	0.08	0.15	0.31	0.21	0.26	0.25
	(0.34)	(0.32)	(0.27)	(0.35)	(0.46)	(0.41)	(0.44)	(0.44)
Single	0.69	0.21	0.36	0.30	0.62	0.19	0.49	0.19
	(0.46)	(0.41)	(0.48)	(0.46)	(0.49)	(0.40)	(0.50)	(0.39)
Children	0.40	0.50	0.83	0.72	0.32	0.41	0.77	0.79
	(0.84)	(0.92)	(1.11)	(1.11)	(0.70)	(0.77)	(0.94)	(0.95)

Note: The table reports country-specific sample means and standard deviations (in parentheses).

Table 3: Survey questions about the attitude toward financial risks

Country	**Survey question**
Austria	"*For savings I prefer secure investment instruments and avoid risk*" 1=completely applicable; 2=rather applicable; 3=rather not applicable; 4=completely inapplicable.
Netherlands	*Please indicate on a scale from 1 to 7 to what extent you agree with the "I am prepared to take the risk to lose money, when there is also a chance to gain money", where 1 indicates 'totally disagree' and 7 indicates 'totally agree'.*
Spain	"*Which of the following statements do you feel best describes your household in terms of the amount of financial risk you are willing to run when you make an investment?*" 1=Take on a lot of risk in the expectation of obtaining a lot of profit; 2=Take on a reasonable amount of risk in the expectation of obtaining an above-normal profit; 3=Take on a medium level of risk in the expectation of obtaining an average profit; 4=You are not willing to take on financial risk.
Italy	"*Which of the statements on this page comes closest to the amount of financial risk that you are willing to take when you save or make investments?*" 1=low returns, without any risk of losing your capital; 2=a reasonable return, with a good degree of security for your invested capital; 3=a good return, with reasonable security for your invested capital; 4=very high returns, regardless of a high risk of losing part of your capital.

Table 4: Effect of gender on the probability of owning risky assets (participation decision)

This table shows the results from estimating the likelihood of holding risky assets using a probit regression model (*Model I*). The dependent variable is a binary variable equal to 1 if some *risky financial assets* are held and 0 otherwise. Columns denoted as (1) report estimation results for the basic specification without risk tolerance dummies (naive model). Columns denoted as (2) extend the specification by including variables capturing risk tolerance levels. Marginal effects of the explanatory variables are reported with the robust standard errors in parentheses. Marginal effects are estimated at country-specific mean values of explanatory variables. *, ** and *** correspond to the 10%, 5% and 1% significance levels, respectively. AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion.

	Austria		Netherlands		Italy		Spain	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Male	0.041***	0.023	0.071***	0.031	0.086***	0.074***	0.020*	0.011
	(0.014)	(0.015)	(0.023)	(0.027)	(0.016)	(0.016)	(0.010)	(0.010)
ln(Income)	0.077***	0.070***	-0.003	-0.006*	0.091***	0.081***	0.007***	0.005**
	(0.017)	(0.017)	(0.003)	(0.003)	(0.014)	(0.013)	(0.002)	(0.002)
II Wealth quartile	0.109***	0.142***	0.012	-0.034	0.157	0.230*	0.147***	0.154***
	(0.033)	(0.38)	(0.045)	(0.046)	(0.127)	(0.124)	(0.030)	(0.032)
III Wealth quartile	0.225***	0.265***	0.112***	0.140***	0.215*	0.251**	0.408***	0.407***
	(0.038)	(0.043)	(0.031)	(0.039)	(0.113)	(0.103)	(0.032)	(0.034)
IV Wealth quartile	0.478***	0.499***	0.263***	0.321***	0.224***	0.234***	0.650***	0.613***
	(0.045)	(0.048)	(0.041)	(0.050)	(0.069)	(0.060)	(0.027)	(0.030)
Real Property	0.034***	0.035***	0.042***	0.030	0.017	0.010	-0.015	-0.008
	(0.011)	(0.011)	(0.017)	(0.021)	(0.015)	(0.015)	(0.012)	(0.013)
Self-Employed	-0.005	-0.019	-0.006	-0.042	-0.006	-0.015	0.035***	0.017
	(0.019)	(0.017)	(0.039)	(0.043)	(0.017)	(0.015)	(0.014)	(0.013)
Education	0.041***	0.042***	0.035*	0.018	0.089***	0.068***	0.100***	0.077***
	(0.012)	(0.013)	(0.020)	(0.022)	(0.022)	(0.021)	(0.013)	(0.012)
Age 30-39	-0.044**	-0.035	0.067	0.111*	0.168*	0.110	-0.022	-0.025
	(0.011)	(0.022)	(0.061)	(0.075)	(0.092)	(0.086)	(0.032)	(0.032)
Age 40-49	-0.076***	-0.066***	0.041	0.098	0.156*	0.111	-0.000	-0.004
	(0.018)	(0.020)	(0.056)	(0.073)	(0.085)	(0.082)	(0.034)	(0.034)
Age 50-59	-0.083***	-0.068***	0.042	0.110*	0.119	0.089	0.039	0.042
	(0.016)	(0.018)	(0.054)	(0.072)	(0.077)	(0.75)	(0.038)	(0.040)
Age 60-69	-0.076***	-0.052**	- 0.003	0.057	0.106	0.082	0.049	0.062*
	(0.017)	(0.021)	(0.047)	(0.069)	(0.077)	(0.076)	(0.039)	(0.041)
Age 70-79	-0.090***	-0.076***	0.037	0.111	0.079	0.070	0.050	0.082**
	(0.013)	(0.015)	(0.058)	(0.082)	(0.072)	(0.076)	(0.038)	(0.042)
Single	0.037**	0.028*	0.008	-0.001	0.017	0.021	-0.036**	-0.029**
	(0.015)	(0.016)	(0.017)	(0.022)	(0.016)	(0.016)	(0.014)	(0.014)
Children	-0.007	-0.005	0.009	0.012	0.015	0.015	0.006	0.007
	(0.007)	(0.007)	(0.008)	(0.011)	(0.010)	(0.010)	(0.005)	(0.005)
Risk Tolerance 2		0.068***		0.043**		0.090***		0.185***
		(0.013)		(0.021)		(0.014)		(0.016)
Risk Tolerance 3		0.203***		0.069***		0.198***		0.206***
		(0.033)		(0.032)		(0.026)		(0.034)
Risk Tolerance 4		0.209***		0.139***		0.460***		0.127***
		(0.061)		(0.035)		(0.114)		(0.051)
Risk Tolerance 5				0.211***				
				(0.049)				
Risk Tolerance 6				0.339***				
				(0.098)				
Risk Tolerance 7				0.274***				
				(0.128)				
Pseudo-R^2	0.26	0.30	0.13	0.20	0.13	0.17	0.33	0.36
AIC	1827	1731	1056	902	2557	2427	4328	4093
BIC	1920	1842	1138	922	2652	2539	4435	4220
Number of obs.	2,556	2,556	1,239	1013	2,806	2,806	5,962	5,962

Table 5: Effect of gender on the portfolio share of risky assets (allocation decision)

This table summarizes the results of the estimation of *Model II* by means of the Heckman two-step procedure. The dependent variable is the portfolio share invested in *risky financial assets*. The first-stage selection equation (not reported) corresponds to *Model I*. Columns denoted as (1) report estimation results for the basic specification without the risk tolerance dummies of the first and the second-stage equation. Columns denoted as (2) extend both equations by including variables capturing risk tolerance levels. *, ** and *** correspond to the 10%, 5% and 1% significance levels, respectively.

	Austria		Netherlands		Italy		Spain	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Male	0.004	-0.006	0.082	0.053	0.090**	0.076	-0.003	-0.012
	(0.020)	(0.020)	(0.062)	(0.060)	(0.046)	(0.048)	(0.021)	(0.021)
ln(Income)	0.033	0.028	0.017**	0.017**	0.112**	0.099**	0.002	-0.006
	(0.029)	(0.028)	(0.007)	(0.007)	(0.047)	(0.050)	(0.008)	(0.008)
ln(Financial Wealth)	-0.004	-0.008	-0.013*	-0.014**	-0.011	-0.020	-0.001	-0.002
	(0.012)	(0.012)	(0.007)	(0.007)	(0.016)	(0.016)	(0.004)	(0.004)
Self-Employed	-0.004	-0.011	-0.086	-0.151	0.027	-0.006	0.026	0.019
	(0.029)	(0.029)	(0.105)	(0.120)	(0.039)	(0.041)	(0.023)	(0.022)
Education	-0.007	-0.006	-0.002	0.017	0.093**	0.071	0.070	0.063
	(0.041)	(0.017)	(0.043)	(0.041)	(0.046)	(0.046)	(0.021)	(0.020)
Age 30-39	-0.017	0.016	-0.097	-0.149	0.201	0.116	-0.072	-0.071
	(0.041)	(0.041)	(0.138)	(0.150)	(0.162)	(0.159)	(0.085)	(0.084)
Age 40-49	-0.008	-0.003	-0.037	-0.115	0.204	0.126	-0.030	-0.033
	(0.040)	(0.040)	(0.139)	(0.151)	(0.160)	(0.158)	(0.082)	(0.081)
Age 50-59	-0.022	-0.013	-0.072	-0.109	0.154	0.090	0.072	0.075
	(0.042)	(0.041)	(0.137)	(0.149)	(0.157)	(0.155)	(0.081)	(0.081)
Age 60-69	0.039	0.056	-0.027	-0.111	0.234	0.179	0.060	0.068
	(0.040)	(0.040)	(0.139)	(0.150)	(0.157)	(0.155)	(0.081)	(0.081)
Age $\geq$ 70	0.025	0.048	-0.109	-0.130	0.111	0.087	0.113	0.133
	(0.050)	(0.049)	(0.138)	(0.150)	(0.155)	(0.153)	(0.081)	(0.081)
Single	0.050**	0.044*	-0.017	-0.037	0.029	0.038	-0.022	-0.021
	(0.023)	(0.023)	(0.049)	(0.049)	(0.036)	(0.038)	(0.024)	(0.024)
Children	-0.013	-0.012	0.004	0.013	0.042*	0.0411*	-0.001	0.001
	(0.011)	(0.011)	(0.022)	(0.021)	(0.022)	(0.023)	(0.011)	(0.011)
Risk Tolerance 2		0.028		0.040		0.201***		0.067
		(0.024)		(0.071)		(0.065)		(0.026)
Risk Tolerance 3		0.054		-0.046		0.380***		0.165
		(0.034)		(0.081)		(0.100)		(0.039)
Risk Tolerance 4		0.137***		0.059		0.756***		0.178
		(0.049)		(0.075)		(0.173)		(0.065)
Risk Tolerance 5				0.094				
				(0.088)				
Risk Tolerance 6				-0.005				
				(0.113)				
Risk Tolerance 7				-0.100				
				(0.164)				
Constant	-0.132	-0.059	-2.189***	0.237	-1.524*	-1.432	0.279	0.331
	(0.373)	(0.369)	(0.320)	(0.262)	(0.801)	(0.889)	(0.170)	(0.174)
λ	0.038	0.039	-0.037	-0.003	0.434***	0.448***	0.057	0.058
	(0.034)	(0.035)	(0.084)	(0.080)	(0.116)	(0.140)	(0.036)	(0.039)
Total number of obs.	2,556	2,556	1,239	1,107	2,806	2,806	5,961	5,961
Number of Uncensored Obs.	463	463	224	208	592	592	1,343	1,343

Table 6: Effect of gender on the probability of owning risky asset in Italy, by degree of risk tolerance

This table reports the marginal effects of the dummy variable *Male* on the probability of owning risky financial assets obtained after estimating *Model I*. Each column reports the results for a sub-sample of households with the specified degree of risk tolerance.

	Risk Tolerance = 1	Risk Tolerance = 2	Risk Tolerance = 3	Risk Tolerance ≥ 3
Marg. effect	0.051***	0.096***	0.083	0.091
St. dev.	(0.016)	(0.029)	(0.061)	(0.059)
N obs.	1378	1039	362	389

Table 7: Effect of gender on the probability of owning risky assets in Italy, by income level (for the sub-sample of households with low risk olerance)

This table reports the marginal effects of the dummy variable *Male* on the probability of owning risky financial assets obtained after estimating *Model I*. Each column reports the results for a sub-sample of households, whose income falls into the specified quartile of income distribution.

	1st quartile	2nd quartile	3rd quartile	4th quartile
Marg. effect	0.003	0.045***	0.086***	0.077**
St. dev.	(0.005)	(0.013)	(0.024)	(0.035)
N obs.	315	520	669	914

Table 8: Questions in the Dutch survey about the organization of financial management of couples

Which of the following four statements would best describe the way in which financial matters are decided in your household?
(1) I leave it to my partner to decide on financial matters.
(2) My partner has more influence than me on financial decisions.
(3) My partner and I have equal influence on financial decisions.
(4) I have more influence on financial decisions than my partner does.
(5) My partner leaves the financial decisions to me.
Now we would like to ask you how your household is organized and how financial decisions are taken. Which of the following statements represents the situation in your household most?
(1) All our money belongs to both of us, there is no distinction between mine and yours.
(2) Part of the money is considered to be someone's own, the other part is mutual money.
(3) The money we earn individually is one's own.
(4) I control the finances, my partner receives an allowance.
(5) My partner controls the finances, I receive an allowance.
(6) I get part of the household money, my partner controls the rest.
(7) My partner receives part of the household money, I control the rest.
(8) Another settlement.
(9) The above is not applicable for my situation/I do not have a partner.
(10) don't know.

Table 9: Effect of gender on the probability of owning risky assets: sub-sample of couples making the financial decisions jointly

This table shows the results from estimating the likelihood of holding risky assets using a probit regression model. The dependent variable is a binary variable equal to 1 if some directly held stocks are owned and 0 otherwise. Columns marked with (1) report results for a specification including *ln(Income)*, wealth quartiles, *Real Property*, *Self-Employed*, *Education*, age group dummies, and *Children*. Columns marked with (2) report results for the same specification plus dummy variables for risk tolerance.
The estimated coefficients are reported with the robust standard errors in parentheses. *, ** and *** correspond to the 10%, 5% and 1% significance levels, respectively.

	Reference person: Household head		Reference person: Main earner	
	(1)	(2)	(1)	(2)
Male	0.147	0.018	0.218	0.028
	(0.359)	(0.507)	(0.336)	(0.406)
Risk Tolerance 2		0.379		0.400
		(0.356)		(0.360)
Risk Tolerance 3		0.467		0.504
		(0.449)		(0.457)
Risk Tolerance 4		1.328***		1.330***
		(0.387)		(0.381)
Risk Tolerance 5		2.492***		2.383***
		(0.508)		(0.499)
Risk Tolerance 6		2.591***		3.271***
		(0.869)		(1.116)
Risk Tolerance 7		no obs.		no obs.
Diff. Risk Preference		-0.215***		-0.170**
		(0.082)		(0.081)
Number of obs.	429	207	421	207
Pseudo-R^2	0.12	0.30	0.13	0.31