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## SOME FACTS ABOUT RISK ATTITUDES: EVIDENCE FROM A LARGE, REPRESENTATIVE, EXPERIMENTALLY-VALIDATED SURVEY

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### **Abstract**

Most economic decisions are made under uncertainty and yet little is known about risk attitudes. This paper marks an important step forward in the study of individual risk attitudes. We use a novel set of survey measures, and a much larger sample than previous studies (roughly 22,000 individuals), to provide a representative picture of the determinants of risk attitudes. Our new survey measures also make possible the test of fundamental assumptions about the stability of risk preferences across different domains of life, and an exploration of how question-framing, from abstract to more concrete, affects stated risk attitudes. The paper contributes an additional, methodological innovation by conducting a complementary laboratory experiment, and testing the ability of our survey measures to predict real behavior under real incentives. Ultimately, the analysis in the paper generates several robust facts about risk attitudes: (1) women are more risk averse than men, across various domains of life, independent of question-framing, and at all ages during adulthood; (2) risk aversion increases with age; (3) individuals with highly-educated parents are less risk averse in most domains of life; (4) the assumption of a single risk preference, stable across life domains, is a reasonable approximation, differences in attitudes in different domains of life likely reflect different beliefs about the risk in these domains; (5) the survey measures we use are valid predictors of actual behavior under uncertainty; Each of these findings has powerful implications for economic theory and policy.

Keywords: Risk Attitudes, Preference Stability, Experimental Validation, SOEP

JEL codes:

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# 1 Introduction

Wars are fought, fortunes are gained (or lost), and true love is pursued, depending on attitudes towards risk. Risk is also pervasive in economic life. Uncertainty is the rule rather than the exception when it comes to important economic decisions. As a result, individual and household attitudes towards risk are of fundamental importance in economics. Despite the importance of attitudes towards risk, there is surprisingly limited evidence on what determines risk attitudes, how risk attitudes are distributed in the population, and how risk attitudes should be measured.<sup>1</sup>

This paper makes a number of methodological contributions to the study of risk attitudes. Survey studies have typically measured risk attitudes by eliciting an individual's certainty equivalent for a hypothetical lottery (Hartog *et al.* 2000; Guiso and Paiella, 2001; Guiso *et al.* 2002; Serrano and O'Neill, 2004). Often, these studies have been limited by small sample sizes, or samples that include only special groups of people. Experimental studies have typically used small, real-stakes lottery choices, but have mainly studied the risk attitudes of college students (e.g. Holt and Laury, 2002). The most comparable contribution in the literature is the paper by Barsky *et al.* (1997), who analyze individual answers to a hypothetical lottery in a large survey. This paper presents the first analysis of a novel set of survey measures, collected for a much larger sample than in previous studies: the data include roughly 22,000 adults living in Germany. The sample is the 2004 wave of the German Socio-Economic Panel (SOEP), which is carefully constructed to be representative of the population as a whole (Wagner *et al.* 1993, Schupp and Wagner 2002). With these data we are in a uniquely strong position to study the basic determinants of risk attitudes.

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<sup>1</sup> In a recent contribution on risk, Gollier (2001) laments the lack of research on risk attitudes: "It is vital that we put more effort on research aimed at refining our knowledge about risk aversion. For unclear reasons, this line of research is not in fashion these days, and it is a shame."

The SOEP data are also attractive because they include a variety of risk measures, which makes it possible to explore the stability of risk attitudes across domains, and study the response of risk attitudes to changes in framing, from abstract to more concrete. Respondents rate their attitude towards risk in general, as well as their risk attitudes in the context of six specific domains of life: driving, financial matters, sports, career, health, and trusting others. Respondents also indicate how much they would choose to invest in a specific, hypothetical investment scenario.

The paper contributes an additional methodological innovation. We conduct laboratory experiments in which subjects face uncertainty and real monetary incentives, in order to test whether the SOEP survey questions predict actual behavior in risky situations.

The paper generates six facts about risk attitudes. The first fact is a robust gender difference. Women are significantly more risk averse than men, as measured by self-reported willingness to take risks. This difference is robust to controlling for observable characteristics in a multivariate regression. The gender difference is present at all ages, from early adulthood until old age, although there is some evidence that the gap closes among the elderly. Women are also more risk averse in the context of all six domains of life asked about in the SOEP, as well as in the more concrete context of the hypothetical investment scenario. Schubert et al. (1999) argue that gender differences are likely to disappear with the addition of context. But, consistent with Fehr-Duda *et al.* (2004), we find that gender differences persist even when context is added. Weber *et al.* (2002) conclude that greater female pessimism explains gender differences in risk attitudes. However, the gender gap we observe for the investment scenario is not consistent with this interpretation because the investment scenario gives explicit stakes and probabilities, minimizing the scope for gender differences in pessimism or optimism. The gender difference we observe could reflect a difference in

the way that women and men weigh probabilities in decisions, as argued by Fehr-Duda *et al.* (2004), or could possibly reflect a difference in attitudes towards risk per se.

The second fact is an age profile in willingness to take risks. Increasing age is associated with increasing risk aversion. The age profile persists after controlling for observable characteristics, and is evident for all six domains of life considered in the SOEP. Age also has a negative impact on willingness to invest, in the hypothetical investment question. Previous survey studies have either found that age increases risk aversion, or has no significant effect. There are relatively few experimental studies that allow a study of age effects; exceptions include Kovalchik *et al.* (forthcoming), who find no significant age difference, and Harbaugh *et al.* (2002) who find evidence of an age difference in probability weighting. Our results are arguably more conclusive than previous studies, due to the advantages of our data. However, one caveat that applies to all studies on risk and age is that, although age is plausibly exogenous with respect to risk attitudes, a tendency for people who are more risk averse to live longer could possibly explain part of the positive relationship between age and risk aversion.

A third fact concerns the impact of family background on risk attitudes. We are able to study family background by using information on parental education included in the SOEP. The main result is that parents with higher levels of education tend to have children who are less risk averse, in most domains of life. This evidence is consistent with Hartog *et al.* (2000), who find a similar significant effect of mother's education, in a survey limited to professional accountants in the Netherlands.

A fourth fact is relevant for the debate over whether risk attitude is in fact a single trait, stable across different life situations and contexts, as is typically assumed by economists, or whether risk attitudes are instead fundamentally context-dependent, as argued by Slovic (1964), Eckel and

Grossman (forthcoming), and others. Based on a factor analysis, we find that most of the variation in risk attitudes is explained by a single underlying factor, which suggests the standard economic assumption is not unreasonable. On the other hand, each of the other six factors explains a non-trivial proportion of this variation and therefore contains valuable information about risk attitudes, suggesting that none of the seven domains is completely superfluous.

A fifth fact is that the risk measures we use do in fact have predictive power when it comes to real behavior. We report the results of a laboratory experiment, in which subjects make decisions facing real financial incentives, and also answer the exact same questions asked in the SOEP survey. Reassuringly, we find that the general risk question, the question about risk in the domain of financial matters, and the hypothetical investment scenario are all significant predictors of choices over real-stakes lotteries in the experiment.

After presenting the main results on risk attitudes, the paper reports correlations between risk attitudes and other important personal characteristics, such as net income, occupation, education, marital status, employment status, etc.. These characteristics are likely to be at least partly endogenous to risk attitudes, so we refrain from making any type of causal inferences in this section. However, the correlations are potentially useful in terms of raising questions for future research on the determinants, and also the economic consequences, of individual risk attitudes.

The rest of the paper is organized as follows. Section 2 describes the SOEP and the risk measures. Section 3 presents our six main results. Section 4 reports additional correlations, between risk attitudes and personal characteristics that may be endogenous to risk attitudes. The paper ends with a discussion of the implications of our findings and topics for future research.

## 2 Data Description

The SOEP is a representative panel survey of the German population, with the initial wave in 1984.<sup>2</sup> The SOEP surveys the head of each household in the sample, but also gives the full survey to all other household members over the age of 17. The SOEP survey collects information on a wide range of personal and household characteristics. The SOEP also asks about individuals' attitudes on various topics, including political and social issues, and includes various subjective measures (e.g. on life satisfaction) which are widely used and recognized for their quality (see, e.g., Ferrer-i-Carbonell and Frijters 2004, Frijters *et al.* 2004a and 2004b, van Praag and Ferrer-i-Carbonell 2004). This paper is the first one to use the risk questions which were asked for the first time in 2004. Accordingly, we use the 2004 wave of the SOEP, which includes 22,019 individuals, in 11,803 different households.

The SOEP asks eight different questions about risk attitudes. The first question asks for attitude towards risk in general, allowing respondents to indicate their willingness to take risks on an eleven-point scale, with zero indicating complete unwillingness to take risks, and ten indicating complete willingness to take risks.<sup>3</sup> The next six questions all use the same scale, and similar wording, but refer to risk attitudes in different domains of life: "car driving," "financial matters," "leisure and sports," "career," and "health". All of these measures are characterized by ambiguity, rather than uncertainty, in the sense that they leave it up to the respondent to infer the typical probabilities, and stakes, involved in a given risk domain.

The last risk question is different, because it poses respondents with a

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<sup>2</sup> The panel was extended to include East Germany in 1990, after reunification. For more details on the SOEP, see [www.diw.de/english/](http://www.diw.de/english/).

<sup>3</sup> The exact wording of the question (in translation from German) is as follows: How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means: "risk averse" and the value 10 means: "fully prepared to take risk." German versions of all risk questions are available online, at [www.diw.de/deutsch/sop/service/fragen/personen/2004.pdf](http://www.diw.de/deutsch/sop/service/fragen/personen/2004.pdf).

concrete, albeit hypothetical, investment choice, with explicit stakes and probabilities:

Imagine you had won 100,000 Euros in a lottery. Almost immediately after you collect, you receive the following financial offer from a reputable bank, the conditions of which are as follows: There is the chance to double the money within two years. It is equally possible that you could lose half of the amount invested.

Respondents are then asked what fraction of the 100,000 Euros they would choose to invest, and are allowed six possible responses: 0, 20,000, 40,000, 60,000 80,000, or 100,000.<sup>4</sup> Whereas the first seven risk measures are useful for exploring risk attitudes across various domains of life, this more-narrow investment question is useful because it is explicit in terms of the probabilities and stakes, and incorporates even stronger context by describing a concrete investment decision.

### 3 Determinants of Risk Attitudes

#### 3.1 Risk attitudes in a representative sample

Figure 1 describes the distribution of general risk attitudes in our sample.<sup>5</sup> Each bar in the histogram indicates the fraction of individuals choosing a given number on the eleven point risk scale. The modal response is 5, but a substantial fraction of individuals answer anywhere in the range between 2 and 8. There is also a notable mass, roughly 7 percent of all individuals, who choose the extreme of 0, indicating a complete unwillingness to take risks, whereas only a very small fraction choose the other extreme. Cutting the scale between 5 and 6, as a reasonable classification of individuals into

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<sup>4</sup> The exact wording is as follows: What share of your lottery winnings would you be prepared to invest in this financially risky, yet lucrative investment?

<sup>5</sup> In this draft we present results for the unweighted sample

categories of risk averse and risk tolerant, we find that approximately 70 percent of individuals in the sample are risk averse. This is roughly consistent with the survey studies from other countries, cited above, which typically measure risk attitudes using certainty equivalents to hypothetical lotteries.

INSERT FIGURE 1 ABOUT HERE!

### 3.2 Exogenous factors: gender, age, and parental education

In searching for determinants of individual risk attitudes, it is only possible to make causal statements about individual or background characteristics that are themselves exogenous to risk attitudes. There are at least three characteristics that plausibly fall into this category: gender, parental background, and age.<sup>6</sup>

As a first look at potential determinants of risk attitudes, the lower panel of Figure 1 shows the difference between the fraction of women, and the fraction of men, choosing each point on the risk scale. This difference is positive for low numbers, and negative for high numbers, giving a first indication that women, as a group, are relatively more likely to report a reluctance to take risks.

Figure 2 shows the relationship between age and risk attitudes, separately for each gender. The shading in the two panels represents the proportions of respondents choosing each number on the eleven point risk scale, for each age. Clearly, the proportion of individuals who are risk averse, i.e. choose low numbers on the scale, increases strongly with age. For men, age appears to cause a steady increase in risk aversion. For women, there is some indication that risk aversion increases more rapidly from the late teens to age thirty, and then remains flat, until it begins to increase again, from the mid-fifties until the end of life. Comparing the panels for men and women,

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<sup>6</sup> Note, however, the caveat regarding potential endogeneity of risk attitudes and age mentioned in the introduction.



it is also apparent that women are more risk averse than men throughout the entire age range, although the gap may narrow somewhat among the elderly.

INSERT FIGURE 2 ABOUT HERE!

Another noteworthy feature of Figure 2 is that the different shaded bands track each other quite closely over the entire age range. This suggests that aggregating the risk measure from ten categories to a smaller number of categories is likely to preserve most of the information in the risk measure. Indeed, the risk measure with ten categories is strongly correlated with a binary risk measure ( $\text{corr} = 0.77$ ), in which answers 0 through 5 are classified as risk averse and 6 through 10 are classified as relatively risk tolerant. This observation will lead us to adopt this simple, binary classification of risk attitudes in parts of the analysis later on.

Figure 3 presents histograms of general risk attitudes by parental education. Other aspects of family background could be relevant for risk attitudes, e.g., parental income, but only parental education is available in the data. We use information on whether or not a parent passed the “*Abitur*”, an exam that comes at the end of university-track high school in Germany and is a prerequisite for attending university.<sup>7</sup> The histograms in Figure 3 give some indication that family background does play a role in determining risk attitudes. In particular, the mass in the histogram for individuals with a more highly-educated mother, as measured by completion of the *Abitur*, is clearly shifted to the right, indicating a greater willingness to take risks. There is also some evidence that father’s education has a similar impact on risk attitudes, although the difference is less pronounced.

INSERT FIGURE 3 ABOUT HERE!

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<sup>7</sup> There are two types of high school in Germany, vocational and college-track. Only about 30 percent of students attend college-track high schools, and pass their *Abitur*, allowing them to attend college. Thus, completion of an *Abitur* exam is an indicator of relatively high academic achievement.

To determine whether the relationships observed in the raw data are robust once we control simultaneously for different observable characteristics, we now turn to regression analysis. We estimate simple probit regressions, for which the dependent variable is the probability that an individual is risk averse, in the sense of having chosen a number less than 6 on the risk scale.<sup>8</sup> In these regressions, and all subsequent regressions, our significance tests use robust standard errors, corrected for possible correlation of the error term between individuals from the same household. The only sample restriction in the analysis is the omission of individuals who have missing values for any of the variables in the regression.

Table 1 summarizes the baseline regressions on determinants of risk attitudes, which use the most general risk measure as the dependent variable. In our most parsimonious specification, presented in the first column, females are significantly more likely to be risk averse, and the probability of being risk averse increases significantly with age. Having a mother or father who is relatively highly educated, in the sense of having completed the *Abitur*, significantly reduces the likelihood of being risk averse.<sup>9</sup>

INSERT TABLE 1 ABOUT HERE!

Thus far our specifications included only plausibly exogenous variables. The only way to test whether the results are robust to a richer specification is to include a set of potentially endogenous personal and household characteristics: marital status, presence of children, employment status, nationality, occupation, education, and subjective health status. The second column of

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<sup>8</sup> An alternative is to use the full, eleven point scale as the dependent variable, and use an estimation procedure that corrects for censoring in interval data. We have tried this approach for all of our regressions, but find that it makes little difference for the qualitative results, and thus we report the simpler, probit results.

<sup>9</sup> A likelihood-ratio test reveals that adding interaction terms between all independent variables improves the fit. The coefficients of interest in the unrestricted specification, however, are very similar to those from the restricted model, both qualitatively and quantitatively. We prefer the model reported in column 1 of Table 1 for ease of presentation and interpretation, e.g., the coefficient on the interaction term between age and parental education might be driven by trends in educational achievement.

Table 1 documents the robustness of the coefficient estimates for the variables of interest.<sup>10</sup> The qualitative and quantitative results for gender, age, and mother’s education are very similar to the results in column (1). The coefficient on father’s education becomes smaller and statistically insignificant, but this is probably due to the strong correlation between father’s education (and occupation) and children’s occupational choice.

The third column adds net household income as an additional control.<sup>11</sup> Again, we see the same significant gender and age effects. Coefficient estimates on parental education are not significant, presumably as a result of multicollinearity with household income, for which the coefficient (not reported in the Table) is also not significant. Further analysis, using standard Oaxaca-Blinder decomposition techniques, shows that women are more risk averse than men even if they have the same observable characteristics.<sup>12</sup>

In summary, women are more likely to be risk averse, and increasing age leads to an increasing probability of risk aversion, in all specifications. Having a mother who completed the *Abitur* seems to make risk tolerance more likely. The impact of father’s education is less consistent, with a negative impact on the likelihood of risk aversion in some specifications but a positive impact in the most complete specification.

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<sup>10</sup> Coefficients for all demographic controls are shown in full in Section 4.

<sup>11</sup> Household income is constructed by summing the net incomes of all household members. Adding household income reduces the number of observations considerably, due to a relatively large fraction of missing values for the personal income variable. Accordingly, we present results with and without household income.

<sup>12</sup> This technique is more flexible than regression analysis by allowing gender to interact with all observable characteristics. It decomposes the difference in risk attitudes across gender into two different components, one due to differences in observable characteristics and the other due to differences regression coefficients. The results of the decomposition, which are not reported here, show that roughly 90 percent of the gender gap is explained by differences in coefficients rather than characteristics, regardless of the reference group chosen.

### 3.3 Risk attitudes across different domains of life

The first section of Table 2 reports means and medians of individual risk attitudes, across different domains of life. Judging by these statistics, there is some variation in risk attitudes, indicating that it is meaningful to ask about risk separately for different domains. Individuals are more risk averse in the domains of financial matters, driving, and health than in other domains. Interestingly, risk aversion is weakest for the general risk measure, which includes the least context, possibly because the lack of context makes risks less salient. In terms of the variation across the six domains that include more-concrete context, there are at least two possible explanations: people may truly have different preferences, in different contexts, when it comes to taking a gamble that is otherwise identical in utility terms; alternatively, it could be that individuals indicate differences in their willingness to take risks, simply because they believe that the typical probabilities and stakes involved in taking risks differ across domains.

INSERT TABLE 2 ABOUT HERE!

Turning to the gender comparison, it appears that women are more risk averse than men, in all six life-contexts. As noted in the introduction, this result contrasts to some extent with Schubert *et al.* (1999), who find that adding economic context eliminates gender differences in risk attitudes. A stronger test in this regard will come later, when we look at our measure with the most concrete framing, the hypothetical investment question.

The second section of Table 2 shows simple correlations between individuals' risk attitudes in different domains of life. Risk attitudes are far from perfectly correlated across domains, but the correlations are still substantial, typically in the neighborhood of 0.5, and all are highly significant. Overall, the substantial correlation in risk attitudes across domains lends some support to the notion of risk attitude as an underlying, stable trait of an in-

dividual.<sup>13</sup> A factor analysis of the seven dimensions of risk attitudes shows that 57 percent of the variation in individual risk attitudes is explained by a single factor captured by general risk attitudes. This clearly points to the existence of a single, underlying trait. Nevertheless, each of the other five factors explains at least five percent of the variation, suggesting that there is still some additional benefit from asking about the willingness to take risk in different domains separately.

In order to explore the determinants of risk attitudes in each of the seven domains, Table 3 presents results from probit regressions, with a binary variable reflecting whether an individual is risk averse or not as the dependent variable.<sup>14</sup> A first observation from Table 3 is that the gender difference is robust across all domains, as is the positive impact of age on the probability of being risk averse. The interaction between age and gender is negative in all domains besides general, indicating that in these domains, the gender difference decreases, but does not disappear, as age increases.

The relationship between parental education and risk attitudes is less consistent across domains. For the most part, having a parent who has completed the *Abitur* reduces the probability of being risk averse. A more highly-educated mother makes individuals less risk averse in all domains, except for general risk attitudes, financial matters, and health. A more highly-educated father reduces the likelihood that daughters are risk averse, in career and health, although the effect on risk aversion is positive, for both genders, in the general domain. The interaction between parental education and age suggests that a highly-educated mother reduces the impact of age on risk aversion in the financial domain, but increases the impact of age in

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<sup>13</sup> Another way of assessing the stability of risk attitudes is to check what fraction of individuals is consistently risk averse in all, or most, of the seven different domains. It turns out that almost 40 percent of individuals who are risk averse, i.e. choose a number lower than 6, are risk averse in all seven domains, and 75 percent are risk averse across five or more domains.

<sup>14</sup> For these regressions, we simplify by focusing on the linear approximation to the age profile.

the career domain. A more highly-educated father reduces the impact of age in the general domain.

INSERT TABLE 3 ABOUT HERE!

### **3.4 Alternative Measure of Risk Attitude: Hypothetical Investment Decision**

Section 2 described the hypothetical investment scenario in the SOEP, which allows respondents to choose how much of 100,000 Euros in lottery winnings they wish to invest in a hypothetical asset. This asset returns double the money invested, or one half of the money invested, in two years time, with equal probability. Respondents can choose from six responses: 0, 20,000, 40,000, 60,000, 80,000, or 100,000.

The top panel of Figure 4 shows the distribution of responses to the investment question in the sample. The histogram indicates that 50 percent of the survey respondents would choose to invest nothing in the hypothetical asset, but the remaining 50 percent would choose to invest some positive amount. The frequency of individuals investing declines steadily with the investment amount.

INSERT FIGURE 4 ABOUT HERE!

The bottom panel of Figure 4 shows a clear gender difference. Consistent with evidence from the other risk measures, women are more risk averse than men in their investment choices. Given that the investment question presents respondents with objective stakes and probabilities, this gender difference provides some evidence that systematically different beliefs, i.e. optimism on the part of men, do not explain the gender difference in risk attitudes.

We explore the determinants of the hypothetical investment choice using interval regression analysis on the chosen amount as the dependent vari-

able.<sup>15</sup> Thus, a negative coefficient indicates a lower willingness to invest and a higher degree of risk aversion. Our estimation procedure accounts for the fact that the dependent variable is measured in intervals, and hence is left and right censored.

Table 4 presents different specifications for the investment regression, with each column adding progressively more controls, in exactly the same manner as for the baseline regressions in Table 1. The salient feature of the results is again the same: robust gender and age effects, in the direction of increasing risk aversion. Parental education also has a positive effect on risk taking, although this is mainly due to father’s education; mother’s education is insignificant in all specifications.

INSERT TABLE 4 ABOUT HERE!

As discussed previously, these results strengthen the evidence that the gender effect is robust to strong, contextual framing. The gender difference for this question is also harder to explain by differences in pessimism or optimism about probabilities and stakes, as these are given explicitly in the question. Potential explanations include differences in probability weighting across gender, or differences in risk preferences.

### **3.5 Validation of Survey Measures**

A serious concern with the use of hypothetical questions is that they might not predict actual behavior. The standard argument is that these questions are not incentive compatible, and thus respondents may give inaccurate answers, perhaps due to strategic considerations, self-serving biases, or a lack of attention. The evidence on this issue, however, is less than conclusive, and there continues to be considerable debate over how accurate hypothetical

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<sup>15</sup> In this case we do not adopt a binary measure, as it is more difficult to choose a sensible division of the scale.

questions really are, and in what circumstances they are likely to perform reasonably well (Camerer and Hogarth, 1999).

In order to test the performance of the SOEP risk measures as predictors of actual behavior, we conducted a laboratory experiment. The experiment was computerized, and was conducted with 160 University of Bonn students as subjects. In the experiment, subjects answered all of the risk questions asked in the SOEP.<sup>16</sup> They were also given a number of different risky choices, for real stakes. In each choice situation they could either pick a sure payment, or the following lottery: win 400 points with probability 0.5, or win nothing with probability 0.5 (the exchange rate in the experiment was 10 points = 17 cents, implying a winning prize of 6.80 Euros). Subjects made fifteen choices, with the sure payment varying from 25 to 375 points. Subjects were informed that one of their choices would be randomly selected, and implemented, for real money, ensuring incentive compatible responses. By observing the point at which subjects switched from choosing the smaller, safe option to the lottery, it was possible to infer their certainty equivalent for the lottery, and thus their individual degree of risk aversion or risk lovingness.

Using these data we can test the validity of our risk measures, at least for university students, by looking at whether they predict the outcome of the behavioral measure of risk aversion in the experiment. Reassuringly, Table 5 shows that the questions about general risk attitudes, risk in financial matters, and the hypothetical investment question, are all significant predictors of the degree of risk lovingness exhibited in the experimental lottery choices. This performance is quite good, considering the difference in framing between the survey and experimental measure, and in the case of the hypothetical investment, the large difference in stakes. As expected, questions for risk attitudes in other domains of life, which are less closely

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<sup>16</sup> It is noteworthy that participants in our experiments turned out to have a very similar distribution of answers to the risk questions as students surveyed in the SOEP.



related to financial risks, are also weaker predictors of behavior in the experiment. Importantly, we also find corroborating evidence on the gender difference in risk attitudes: female subjects in the experiment are less likely to report a willingness to take risks in the SOEP questions, and are significantly more risk averse (p-value = 0.008) as measured by their behavior in the experimental lottery choices.

INSERT TABLE 5 ABOUT HERE!

## 4 Risk attitudes and Potentially Endogenous Personal Characteristics

In this section we discuss the results of regressing risk attitudes on personal characteristics, focusing on important economic variables, such as income, occupation, education, and employment status. These are the same variables included as controls in previous specifications, but now we report the coefficients in full. In interpreting these coefficients, we resist any temptation to make causal statements, due to the clear endogeneity concerns. To take the most obvious example, high income could be the cause of risk tolerance as it cushions the individual from potential losses. Alternatively, risk tolerance in these domains could lead to financial success and high income. Despite the difficulties of reverse causality, we investigate these correlations, because they provide at least a starting point for thinking about future research on the causes and consequences of risk attitudes.

Accordingly, Table 6 presents regressions of risk attitudes on our full set of observables, focusing on the most economically relevant domains for risk attitudes: general, financial, and career. As before, the regressions are probits, with the probability of being risk averse as the dependent variable.

The results in Table 6 include a variety of intriguing correlations, but particularly interesting are those for traditionally central economic variables.

Beginning with marital status, people who are married are more likely to be risk averse, in all domains, although this is slightly weaker in the financial domain. In terms of occupation, blue collar workers are significantly more risk averse than white collar workers (the reference group in the regression), and self-employed are significantly less likely to be risk averse than white collar workers, in all domains. Civil servants are no different from white collar workers in terms of risk attitudes. Educational attainment, as measured by completion of the high school abitur (a substantial academic achievement), is associated with a lower likelihood of being risk averse, in all domains. Interestingly, net household income is associated with a lower probability of being risk averse in general, and financial matters, but is not significantly correlated with risk attitudes in career.

INSERT TABLE 6 ABOUT HERE!

## 5 Conclusion

This paper set out with the goal of creating a snapshot of individual risk attitudes across a large representative sample. In so doing, we have generated six stylized facts. In terms of determinants of risk attitudes, we find an impact of three plausibly exogenous factors: a difference in willingness to take risks by gender, with women being significantly more likely to report that they are risk averse; an age profile for risk attitudes, in which the probability of being risk averse increases with age; and an impact of parental education, with the most clear-cut effect being a tendency for more-educated mothers to have less risk averse children. In terms of measurement, we find that risk attitudes vary across domains of life, but also find that a single underlying trait explains most of this variation, indicating that the typical assumption of cross-situational stability in risk attitudes is a reasonable approximation. We also conclude, based on a laboratory experiment, that the survey ques-

tions we use to measure risk attitudes have significant predictive power when it comes to predicting real behavior under uncertainty. Moreover, we find differences between risk attitudes, which suggests that heterogeneity in beliefs are important determinants of attitudes towards risk, in addition to risk preferences.

The evidence we find on the determinants of risk attitudes has potentially important economic implications. A robust and pervasive gender difference could play some role in explaining different labor market outcomes, and investment behavior, observed for men and women. An age profile for risk attitudes is likely to have substantial macroeconomic implications. For example, the demographic changes leading to a large population of elderly, and thus a more conservative pool of investors, could heavily influence macroeconomic performance and political outcomes, increase the resistance to reforms, and delay necessary policy adjustments with uncertain outcomes. Although we find that risk preferences are relatively stable across situations, an age profile also raises questions about the stability of risk preferences over time. A role for parental education in shaping the risk attitudes of children also highlights a potentially important role of education policy.

Another intriguing question raised by our findings is what are the mechanisms behind these determinants of risk attitudes? One possible mechanism is socialization. The impact of gender and parental education could reflect different approaches towards child rearing or different norms to which the individual is exposed. Differences in risk attitudes over the life cycle could also be socially constructed, e.g. risky behavior in driving, sports, and health could be condoned at an early age but frowned upon later in life. A second possibility is that the mechanism is biological or evolutionary. Risk attitudes, like many traits, may be partially determined by genetics. Even changes in risk attitudes with age could have a biological or developmental explanation. Further research is needed to distinguish between the different

possible mechanisms.

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## A Tables

**Table 1:** Primary Determinants of General Risk Attitudes

	Dependent Variable: General Risk Attitude						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	0.111*** [0.009]	0.104*** [0.012]	0.110*** [0.012]	0.086*** [0.011]	0.108*** [0.011]	0.075*** [0.012]	0.107*** [0.011]
Age	0.005*** [0.000]	0.002*** [0.001]	0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]	0.002*** [0.000]
<i>Abitur</i> Mother	-0.062*** [0.017]	-0.059*** [0.021]	-0.038* [0.020]	-0.033* [0.019]	-0.030* [0.018]	-0.028 [0.019]	-0.026 [0.018]
<i>Abitur</i> Father	-0.040*** [0.012]	-0.002 [0.015]	-0.001 [0.014]	0.011 [0.014]	0.004 [0.013]	0.002 [0.014]	-0.002 [0.013]
Height (in cm)	-0.004*** [0.001]	-0.002*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]	-0.003*** [0.001]
Demographic Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Individual Wealth in 2002	No	Yes	No	No	No	No	No
Household Wealth in 2002	No	No	Yes	No	No	No	No
Individual Income 2003	No	No	No	Yes	No	No	No
Household Income 2003	No	No	No	No	Yes	No	No
Individual Income 2004	No	No	No	No	No	Yes	No
Household Income 2004	No	No	No	No	No	No	Yes
Pseudo-R <sup>2</sup>	0.063	0.078	0.080	0.084	0.083	0.082	0.085
log Pseudo-Likelihood	-11,021.01	-7,043.76	-8,052.90	-8,695.36	-9,576.06	-9,453.57	-8,484.40
Obs.	18,749	12,341	14,034	15,193	16,790	16,559	14,796

Probit marginal effects estimates. Dependent variable is a binary measure for general risk attitudes, where “1” indicates risk aversion (answers 0-5 in the original data) and “0” indicates risk tolerance (answers 6-10 in the original data). *Abitur* (high school degree) includes Fachabitur (topic related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. The demographic controls in columns (2) to (7) include marital status, residence in 1989, German nationality, employment status, occupation, school and high-school degree, subjective health status, smoker and weight. Income data for 2003 reflect annual net income. Income data 2004 are answers to *current monthly gross income* at the stage of the interview. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.



**Table 2:** Correlations Between Risk Attitudes in Different Domains of Life (Binary Variables)

	General	Car Driving	Financial Matters	Sports	Career	Health	in Others
Mean	0.679	0.823	0.902	0.773	0.747	0.846	
Mean (Men)	0.595	0.761	0.852	0.705	0.686	0.806	
Mean (Women)	0.757	0.884	0.949	0.836	0.806	0.884	
General	1.0000						
Car Driving	0.3226	1.0000					
Financial Matters	0.3148	0.2950	1.0000				
Sports	0.3939	0.3493	0.2654	1.0000			
Career	0.4706	0.3035	0.2892	0.4146	1.0000		
Health	0.2970	0.3109	0.2347	0.3456	0.3400	1.0000	

Correlations are based on the original measures with 11 response alternatives (entries 0-10). Risk-aversion (with indicator variable equal to 1) is then defined as original entries being 0-5, and no risk aversion (indicator equal to 0) with entries 6-10.

**Table 3:** Primary Determinants of Risk Attitudes in Different Domains of Life

	Dependent Variable: Risk Attitude in the domain of:					
	General (1)	Car Driving (2)	Financial Matters (3)	Sports (4)	Career (5)	Health (6)
Female	0.111*** [0.009]	0.094*** [0.008]	0.080*** [0.006]	0.093*** [0.008]	0.085*** [0.009]	0.063*** [0.007]
Age	0.005*** [0.000]	0.004*** [0.000]	0.001*** [0.000]	0.006*** [0.000]	0.005*** [0.000]	0.003*** [0.000]
<i>Abitur</i> Mother	-0.062*** [0.017]	-0.02 [0.013]	-0.033*** [0.010]	-0.044*** [0.014]	-0.053*** [0.016]	-0.014 [0.012]
<i>Abitur</i> Father	-0.040*** [0.012]	0.002 [0.009]	-0.013* [0.007]	-0.064*** [0.011]	-0.033*** [0.012]	-0.016* [0.009]
Height (in cm)	-0.004*** [0.001]	-0.002*** [0.000]	-0.001*** [0.000]	-0.003*** [0.000]	-0.003*** [0.001]	-0.001*** [0.000]
Pseudo-R <sup>2</sup>	0.063	0.077	0.063	0.110	0.061	0.041
log Pseudo-Likelihood	-11,021.01	-7,636.57	-5,569.57	-8,747.80	-9,076.28	-7,618.21
Obs.	18,749	17743	18627	18499	17062	18745

Probit marginal effects estimates. Dependent variables are binary measures of risk attitudes in different domains, where “1” indicates risk aversion (answers 0-5 in the original data) and “0” indicates risk tolerance (answers 6-10 in the original data). *Abitur* (high school degree) includes Fachabitur (topic related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.

**Table 4:** Primary Determinants of Investment in the Hypothetical Investment Scenario

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable: Amount Invested in the Hypothetical Asset							
Female	-6,305.86*** [828.87]	-6,777.03*** [1,077.01]	-6,987.82*** [1,018.14]	-5,192.17*** [993.74]	-6,837.60*** [935.08]	-5,509.26*** [1,027.75]	-6,895.33*** [939.22]
Age	-367.43*** [21.30]	-244.52*** [47.76]	-194.10*** [44.58]	-239.05*** [42.71]	-204.16*** [41.32]	-254.39*** [43.43]	-214.35*** [41.06]
<i>Abitur</i> Mother	1,931.96 [1,328.04]	219.58 [1,758.31]	72.51 [1,597.12]	593.76 [1,543.26]	86.06 [1,458.27]	700.72 [1,554.45]	-118.9 [1,460.97]
<i>Abitur</i> Father	6,434.35*** [1,008.12]	2,064.83 [1,270.95]	2,481.65** [1,167.99]	2,896.49** [1,155.60]	2,805.19** [1,106.73]	3,433.58*** [1,168.62]	3,057.67*** [1,108.80]
Height (in cm)	188.95*** [49.95]	109.23 [67.18]	109.95* [63.31]	134.79** [60.04]	110.11* [58.28]	116.30* [60.73]	99.13* [58.53]
Demographic Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Individual Wealth in 2002	No	Yes	No	No	No	No	No
Household Wealth in 2002	No	No	Yes	No	No	No	No
Individual Income 2003	No	No	No	Yes	No	No	No
Household Income 2003	No	No	No	No	Yes	No	No
Individual Income 2004	No	No	No	No	No	Yes	No
Household Income 2004	No	No	No	No	No	No	Yes
log sigma	10.49*** (0.011)	10.46*** (0.014)	10.46*** (0.013)	10.47*** (0.012)	10.48*** (0.012)	10.46*** (0.013)	10.46*** (0.012)
log Pseudo-Likelihood	-20,993.69	-13,708.57	-15,596.33	-18,230.93	-18,517.96	-16,385.04	-16,824.95
Obs.	18,734	12,325	14,017	16,546	16,780	14,793	15,192

Interval regression coefficient estimates. Dependent variable is the amount invested in the risky asset. Respondents can choose from 6 categories, ranging from 0 to 100,000. *Abitur* (high school degree) includes Fachabitur (topic related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. The demographic controls in columns (2) to (7) include marital status, residence in 1989, German nationality, employment status, occupation, school and high-school degree, subjective health status, smoker and weight. Income data for 2003 reflect annual net income. Income data 2004 are answers to *current monthly gross income* at the stage of the interview. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.

**Table 5:** Validation of Survey Risk Measures with Behavioral Measure of Risk Preferences

	Dependent Variable: Behavioral Measure of Risk Preferences							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
General	8.143** (1.909)							
Car Driving		0.239 (1.366)						
Financial Matters			5.106** (1.660)					
Sports/Leisure				1.672 (1.659)				
Career					3.750* (1.838)			
Health						1.228 (1.521)		
Trust							2.067 (1.559)	
Investment Choice								9.011** (2.931)
Constant	162.206** (10.920)	205.063** (6.137)	188.874** (6.765)	196.141** (10.458)	186.848** (10.136)	201.034** (7.216)	196.675** (8.011)	193.595** (5.586)
Observations	149	149	149	149	149	149	149	149
R-squared	0.11	0	0.06	0.01	0.03	0	0.01	0.06

OLS regression estimates. Estimations based on data of lottery choices and survey responses of 160 participants in an experiment. Only data for the 149 subjects with monotonous preferences are used. The dependent variable is the smallest value of the save option that was preferred to a lottery in which 0 or 400 points can be won with equal probability. The regressors in columns (1)-(7) measure reported risk attitudes in the respective domains on scale from 0 to 10. The regressor in column (8) measures the amount invested in a risky asset on a scale from 0 to 5, where category 0 corresponds to zero investment and category 5 to investment of 100.000 Euro. Standard errors in parentheses; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.

**Table 6:** Primary Determinants of General Risk Attitudes

	Dependent Variable: Risk Attitude in the domain of:		
	General	Financial	Career
Female	0.108*** [0.011]	0.083*** [0.006]	0.088*** [0.010]
Age	0.002*** [0.000]	0.001*** [0.000]	0.004*** [0.000]
<i>Abitur</i> Mother	-0.030* [0.018]	-0.025** [0.010]	-0.008 [0.016]
<i>Abitur</i> Father	0.004 [0.013]	0.004 [0.007]	0.007 [0.012]
Height (in cm)	-0.003*** [0.001]	-0.001** [0.000]	-0.001** [0.001]
Married	0.030** [0.012]	0.012* [0.007]	0.038*** [0.011]
Divorced	-0.019 [0.018]	0.013 [0.009]	-0.02 [0.017]
Widowed	0.036* [0.021]	0.007 [0.013]	0.055*** [0.021]
Lived in GDR in 1989	-0.044*** [0.009]	0.010** [0.005]	-0.045*** [0.009]
Lived abroad in 1989	-0.01 [0.023]	-0.017 [0.014]	-0.014 [0.021]
Residence in 1989 missing	-0.066 [0.129]	0.009 [0.106]	
German Nationality	-0.024 [0.016]	0.011 [0.010]	-0.027* [0.015]
Retired (Pension)	0.057*** [0.016]	0.021** [0.009]	0.058*** [0.016]
Unemployed	0.009 [0.018]	0.025*** [0.009]	0.008 [0.017]
School Student	-0.101 [0.067]	0.032 [0.028]	0.011 [0.052]
Currently enrolled in School	-0.02 [0.026]	0.032*** [0.009]	-0.023 [0.024]
Skilled Blue Collar	0.124*** [0.025]	0.011 [0.017]	0.081*** [0.024]
Unskilled Blue Collar	0.068*** [0.018]	0.022** [0.009]	0.090*** [0.015]
Skilled Worker (Craftsman)	0.043** [0.017]	0.01 [0.009]	0.078*** [0.014]
Foreman	0.024 [0.038]	0.011 [0.019]	-0.02 [0.036]
Master Craftsman	-0.047 [0.055]	0.019 [0.023]	-0.099* [0.054]
Farmer	0.061 [0.067]	0.059*** [0.020]	-0.186** [0.090]
Freelancer	-0.106*** [0.031]	-0.050** [0.020]	-0.204*** [0.033]

Other Self-Employed	-0.148*** [0.033]	-0.036* [0.020]	-0.172*** [0.033]
Apprentice (technical)	-0.086** [0.037]	0.018 [0.015]	0.027 [0.027]
Apprentice (clerical)	-0.021 [0.041]	0.027 [0.016]	0.004 [0.035]
Intern/Trainee	-0.159* [0.088]	-0.085 [0.062]	-0.101 [0.080]
White Collar Master	-0.058 [0.083]	-0.003 [0.041]	0.008 [0.067]
Skilled White Collar	0.018 [0.027]	0.023* [0.014]	0.063*** [0.022]
Unskilled White Collar	-0.013 [0.021]	0.011 [0.011]	0.030* [0.018]
White Collar Technician	0.02 [0.015]	-0.017* [0.010]	0.001 [0.014]
High-Skilled White Collar	-0.042** [0.018]	-0.034*** [0.012]	-0.067*** [0.018]
Clerical White Collar	-0.175*** [0.038]	-0.110*** [0.028]	-0.208*** [0.038]
Civil Servant	-0.276** [0.129]	0.004 [0.056]	-0.211 [0.128]
Civil Servant Intermediate	-0.001 [0.036]	0.011 [0.018]	-0.005 [0.032]
Civil Servant High	-0.028 [0.029]	-0.003 [0.015]	-0.01 [0.026]
Civil Servant Executive	-0.01 [0.032]	0.001 [0.016]	-0.048 [0.032]
School Degree	-0.021 [0.027]	-0.014 [0.015]	-0.056** [0.026]
Abitur	-0.043*** [0.011]	-0.029*** [0.006]	-0.039*** [0.010]
Subjective Health Status	0.037*** [0.004]	0.003 [0.002]	0.013*** [0.004]
Smoker	-0.064*** [0.009]	0.007 [0.005]	-0.038*** [0.008]
Weight (in kg)	0 [0.000]	0.000* [0.000]	0 [0.000]
Net Annual Household Income 2003	-0.020*** [0.005]	-0.008** [0.003]	-0.009* [0.005]
Pseudo-R <sup>2</sup>	0.056	0.060	0.039
log Pseudo-Likelihood	-7559.6	-4223.0	-7249.9
Obs.	12,256	12,256	12,256

Probit marginal effects estimates. Dependent variable are binary measures of risk attitudes in different domains, where “1” indicates risk aversion (answers 0-5 in the original data) and “0” indicates risk tolerance (answers 6-10 in the original data). *Abitur* (high school degree) includes Fachabitur (topic-related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.

**Table 7:** The Relevance of Heterogeneity in Risk Measures: Primary Determinants of Smoking Behavior

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Propensity to Smoke								
Risk Attitude in the domain of:								
General	-0.094*** [0.007]						-0.062*** [0.009]	-0.044*** [0.009]
Car		-0.082*** [0.009]					-0.029*** [0.010]	-0.002 [0.011]
Financial Matters			-0.024** [0.011]				0.064*** [0.011]	0.067*** [0.012]
Sports				-0.063*** [0.008]			0.013 [0.010]	-0.054*** [0.010]
Career					-0.075*** [0.008]		-0.014 [0.010]	-0.003 [0.010]
Health						-0.165*** [0.010]	-0.143*** [0.011]	-0.143*** [0.012]
Female								-0.081*** [0.010]
Age								-0.006*** [0.000]
<i>Abitur</i> Mother								-0.044*** [0.015]
<i>Abitur</i> Father								-0.049*** [0.012]
Height (in cm)								-0.001 [0.001]
Pseudo-R <sup>2</sup>	0.007	0.004	0.0003	0.003	0.004	0.013	0.017	0.051
log Pseudo-Likelihood	-13,172.96	-12,506.67	-13,158.61	-13,070.39	-12,232.71	-13,089.69	-11,536.50	-9,495.12
Obs.	21831	20561	21643	21527	19864	21821	19011	16372

Probit marginal effects estimates. Explanatory variables are binary measures of risk attitudes in different domains, where “1” indicates risk aversion (answers 0-5 in the original data) and “0” indicates risk tolerance (answers 6-10 in the original data). *Abitur* (high school degree) includes Fachabitur (topic related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.

**Table 8:** The Relevance of Heterogeneity in Risk Measures: Primary Determinants of Investment in Lottery

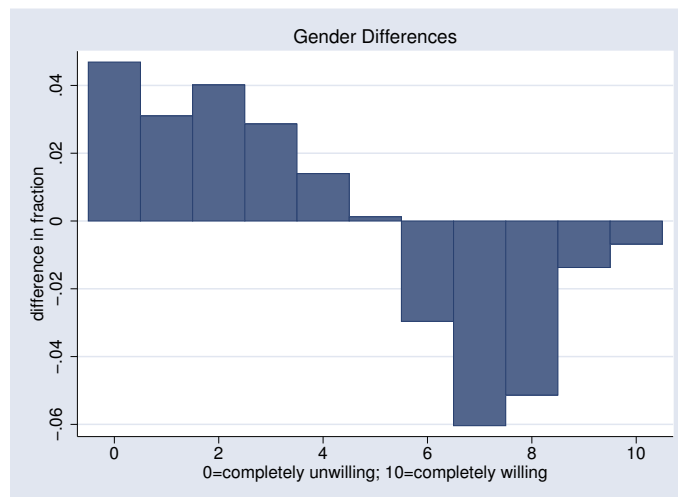
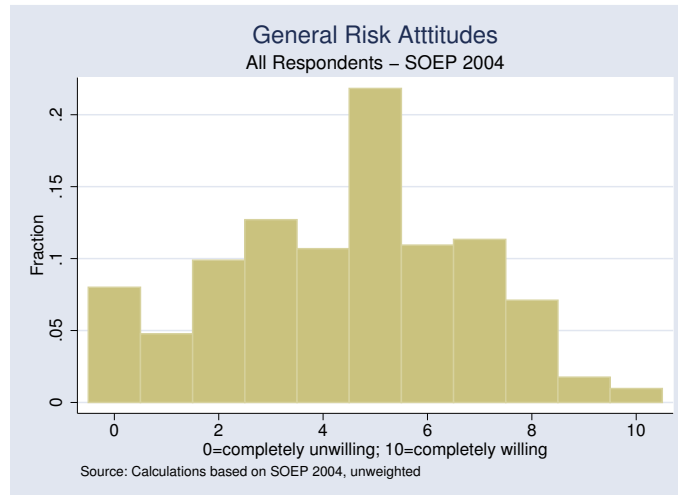
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Dependent Variable: Investment in Lottery (Euros)					
Risk Attitude in the domain of:								
General	-17,623.1*** [635.9]						-7,552.1*** [751.3]	-6,587.2*** [806.1]
Car		-15,754.0*** [777.6]					-2,717.4*** [842.3]	-2,287.3*** [907.6]
Financial Matters			-29,860.9*** [933.3]				-19,453.4*** [1,027.5]	-19,131.2*** [1,098.1]
Sports				-18,058.8*** [682.6]			-6,980.4*** [797.4]	-4,285.6*** [875.0]
Career					-15,966.6*** [684.5]		-3,571.9*** [796.5]	-2,442.8*** [852.5]
Health						-15,179.9*** [810.6]	-2,174.2** [889.6]	-2,005.1** [954.6]
Female								-2,647.9*** [839.4]
Age								-228.4*** [22.9]
<i>Abitur</i> Mother								147
<i>Abitur</i> Father								[1,304.7]
Height (in cm)								5,590.6*** [994.8]
								105.4** [49.7]
log Pseudo-Likelihood	-24,434.14	-23,320.38	-24,082.42	-24,232.51	-22,663.99	-24,661.40	-24,563.02	-21,200.76
Obs.	21,779	20,530	21,606	21,488	19,839	21,771	18,992	16,337

Probit marginal effects estimates. Explanatory variables are binary measures of risk attitudes in different domains, where “1” indicates risk aversion (answers 0-5 in the original data) and “0” indicates risk tolerance (answers 6-10 in the original data). *Abitur* (high school degree) includes Fachabitur (topic related high school degree). The *Abitur* exam is completed at the end of university-track high-schools in Germany; passing the exam is a pre-requisite for attending university. Standard errors in parentheses are robust and allow for clustering at the household level; \*\*\*, \*\*, \* indicate significance at 1-, 5-, and 10-percent level, respectively.



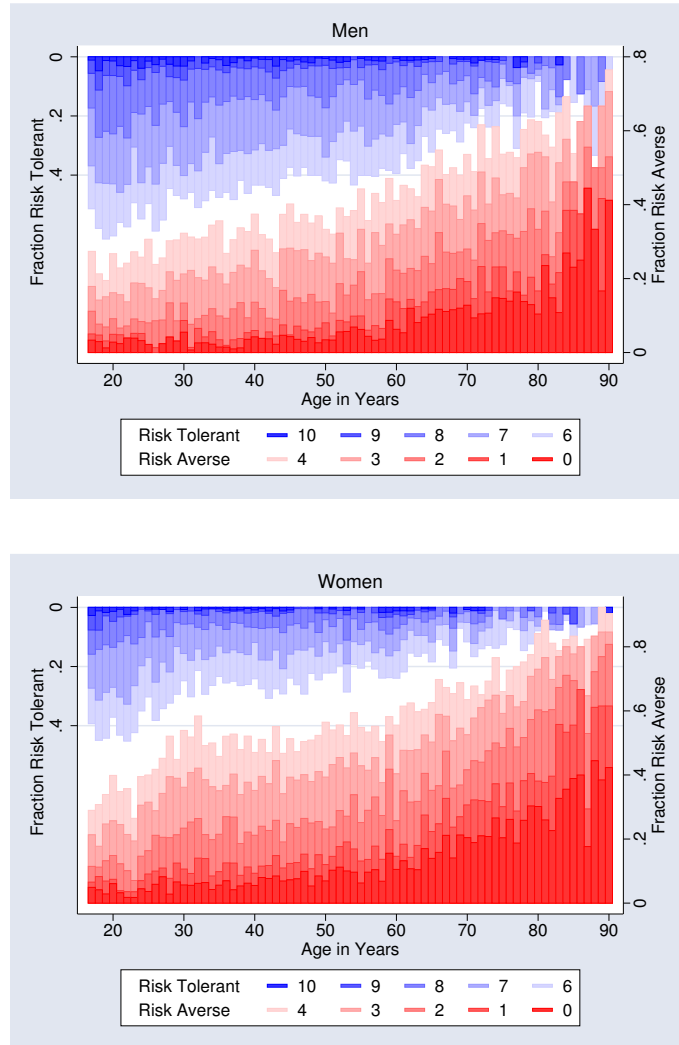
## B Figures

Figure 1: Willingness to Take Risks in General



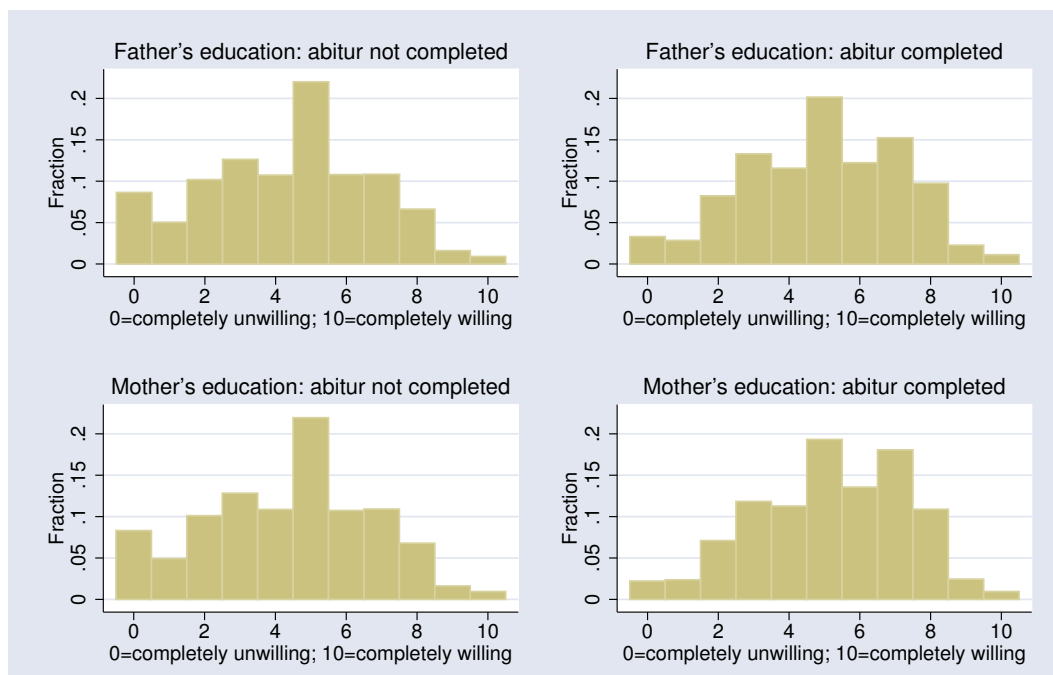
Notes: The top panel shows a histogram of responses to the question about general risk attitudes (measured on an eleven-point scale). The bottom panel shows the difference between the fraction of females and fraction of males choosing each response category, e.g. a positive difference for a given category indicates that relatively more females choose that category.

**Figure 2:** Willingness to Take Risks in General, by Age and Gender



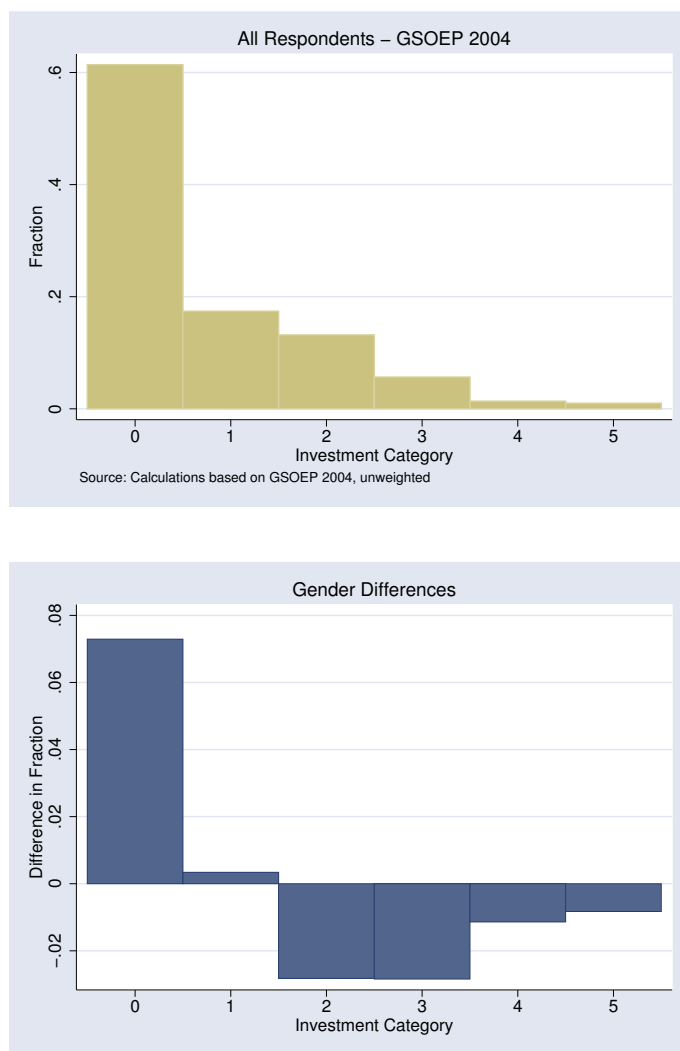
Notes: Each shaded band gives the fraction of individuals choosing a particular number on the eleven-point response scale for the question about general risk attitudes. The dark band at the bottom corresponds to a choice of zero, with progressively lighter shades indicating 1 through 4. The white band is the fraction choosing 5, and the progressively darker shades represent fractions choosing 6 through 10.

**Figure 3:** Willingness to Take Risks in General, by parental education



Notes: Each panel shows, for the indicated sub-sample, the histogram of responses to the question about general risk attitudes (measured on an eleven-point scale). Successful completion of the *Abitur* exam is a prerequisite for attending university.

**Figure 4:** Willingness to Invest in Hypothetical Asset



Notes: The top panel shows a histogram of choices regarding the fraction of a 100,000 Euro in lottery winnings, respondents are willing to invest in a hypothetical asset. The bottom panel shows the difference between the fraction of women and fraction of men choosing each response category, e.g. a positive difference for a given category indicates that relatively more females choose that category.