Risk Attitudes and Conflict in the Household*

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Abstract

Risk attitudes determine decision-making by individuals. Theoretically, heterogeneity in risk attitudes can also affect household behavior, and increase or decrease marital instability, depending on whether households benefit primarily from sharing public goods or from sharing risk. Using a nationally representative sample with repeated measurements of risk attitudes, this paper shows that intrahousehold heterogeneity in risk attitudes is an economically and statistically significant predictor of future marital instability. Consistent with models of public good sharing, preference heterogeneity is associated with less public-good sharing. Further, risk attitudes converge within stable households over time. These findings highlight the empirical relevance of risk attitudes in explaining household behavior.

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1 Introduction

Risk attitudes play a fundamental role in individual decision-making. A growing body of evidence has shown that risk attitudes determine individual decisions with regard to health, migration, and financial investments, among others (e.g., Dohmen et al., 2011; Brown, Garino, and Taylor, 2013; Noussair, Trautmann, and van de Kuilen, 2014). Less is known empirically about how risk attitudes may explain household behavior. In economic theories of the household, risk attitudes influence who matches with whom in the marriage market, determine household decision-making, and affect household stability. Empirically, risk attitudes influence who matches with whom (Dohmen, Falk, Huffman and Sunde, 2012) and yet assortative matching is far from perfect. Once households are formed, do risk attitudes matter? In other words, do risk attitudes explain household decision-making and stability? This paper provides novel theory and evidence, based on a longitudinal analysis of household behavior and repeated measurement of risk attitudes, that sheds light on these fundamental questions.

Theoretically, whether heterogeneity in risk attitudes is a source of household instability is ex-ante unclear. Two widely studied economic gains from marriage, risk sharing and public good sharing, have opposite implications for the optimality of heterogeneity in risk attitudes. Focusing on assortative matching, existing work has shown that heterogeneity in risk attitudes is optimal when households primarily share risk (Chiappori and Reny, 2016; Legros and Newman, 2007).[1] By contrast, homogeneity in risk attitudes is optimal when households share collective goods, such as children or housing (Becker, 1991; Lam, 1988).

This paper develops a stylized theoretical framework to study the decision to divorce, in which households share risk and public good consumption, and spouses may exhibit heterogeneous risk attitudes. The key tension is that since consumption is shared through a risky public good, when risk attitudes are homogeneous, the optimal level of consumption of the public good for one spouse coincides with that of the other. However, income is risky and the household pools income, hence the utility from risk-sharing increases with risk attitude heterogeneity. The main prediction is that when the risk-adjusted return from the public

[1] This result may break down if there is limited commitment (Gierlinger and Lazcó, 2018), but efficient risk sharing may still arise even if preferences are heterogeneous (e.g., Mazzocco, 2004).

good is large, heterogeneity in risk attitudes increases household instability. By contrast, when household income variance is high and achieving further gains from risk sharing is important, heterogeneity in risk attitudes decreases household instability.

Using a representative sample of the German population ($N = 5,336$ households) and experimentally validated measures of risk attitudes that were elicited repeatedly over time, this paper examines the relationship between risk attitude heterogeneity and household instability. The first finding is that intrahousehold heterogeneity in risk attitudes is a significant and robust predictor of future household instability. A one-standard-deviation increase in heterogeneity in risk attitudes between a married or cohabiting man and woman predicts a nearly 10% increase in the likelihood of separation during the next thirteen years, where the rate of separation is close to 10 percent.

The predictive power of risk attitudes for future separation indicates that utility from public good sharing may be a centrally important source of the surplus in marriage. To more directly test whether this is the case, we examine whether households that are more heterogeneous in risk attitudes are less likely to share household public goods. Indeed, we find that households that exhibit greater heterogeneity in risk attitudes are significantly less likely to own the house they live in, and their house is more likely to need at least partial renovation. The returns from public good sharing thus appear to be high, since households that exhibit greater heterogeneity in risk attitudes display lower stability and less public good sharing.

By contrast, the gains from risk sharing do not appear to be of central importance. Risk sharing—and especially risk attitude heterogeneity—could however play a more important role in households where the man and woman experience higher income variance. Theoretically and empirically, couples that exhibit higher (expected) income variance are more likely to divorce (Hess, 2004). A second prediction derived from the theoretical framework we develop is that this relationship should be weaker among households that exhibit greater heterogeneity in risk attitudes. Empirically, we find suggestive, though weak, evidence that this is the case. Taken together, these findings suggest that the composition of risk attitudes in the household is especially important for public good sharing and less so for risk sharing.

The empirical relationship between risk attitude heterogeneity and future household instability suggests that preference heterogeneity could be costly. One channel through which such costs may be reduced is preference assimilation. A growing body of evidence suggests that preferences are affected by the society an individual lives in (e.g., Bursztyn et al., 2014; Lahno and Serra-Garcia, 2015). We study convergence in risk attitudes within the household. Newly formed households are initially less homogeneous than established households. Importantly, newly formed households that remain stable throughout the sample period exhibit stronger convergence in risk attitudes over time than established households. This reveals that, in addition to selection through divorce, preference assimilation could explain the positive correlation of risk attitudes within the household.

This paper provides, to the best of our knowledge, the first empirical test linking heterogeneity in a fundamental economic preference, namely risk attitudes, to household stability. A large literature has shown that households exhibit extensive positive assortative matching in a variety of preferences and individual characteristics, as well as a variety of sociodemographic and anthropometric characteristics (e.g., Vandenberg, 1972; Becker, 1991; Fernandez, Guner, and Knowles, 2005; Chiappori, Oreffice, and Quintana-Domeque, 2012; Dohmen et al., 2012; Banerjee et al., 2013; Dupuy and Galichon, 2014; Low, 2017; Chiappori, Oreffice, and Quintana-Domeque, 2017). At the same time, assortative matching is far from perfect, and this may lead to inefficient household decision-making (e.g., Lundberg and Pollak, 1993; Ashraf, 2009; Schaner, 2015).

Whether heterogeneity in economic preferences predicts household instability has thus far remained an open question, which is addressed here. Existing work on divorce has shown that heterogeneity in sociodemographic characteristics predicts household instability (Becker, Landes and Michael, 1977; Weiss and Willis, 1997; Frimmel, Halla and Winter-Ebmer, 2013), and more recent work has related *one* spouse's preferences and personality traits to the decision to exit marriage (e.g., Spivey, 2008; Lundberg, 2012; de Paola and Gioia, 2017).[2] This paper shows that heterogeneity within the couple can explain household separation and public good provision, above and beyond each spouse's risk attitudes. Because of the costs

[2]A large body of literature has studied institutional factors, such as divorce laws, on the likelihood of divorce and the outcomes for spouses (see Stevenson and Wolfers, 2007, for a review, and Voena, 2015, and Olafsson and Steingrimsdottir, 2019, for recent contributions).

of divorce, both on the children and the spouses (e.g., Gruber, 2004; Biehl et al., 2014), a better understanding of the conditions under which couples separate could be helpful for policies that affect, for example, public good provision within the household.

A growing literature has documented that risk attitudes determine individual behaviors in a variety of domains: savings and investment decisions (Dohmen et al., 2011; Noussair, Trautmann, and van de Kuilen, 2014), career choices (Bonin et al., 2007; Caliendo, Fossen, and Kritikos, 2009), migration decisions (Jaeger et al., 2010), technology adoption (Liu, 2013), and many other behaviors. This paper studies risk attitudes within the household, and it shows that, in addition to the individuals' willingness to take risks, the composition of risk attitudes in the household is of relevance. Within a household, however, attitudes are not fixed: We provide evidence that there is significant convergence in risk attitudes over time, especially among newly formed households. Hence, preference assimilation could be a mechanism for resolving conflict within the household.

Naturally, individuals choose whom to marry and when to divorce. This implies that identifying a causal relationship between risk attitudes and marital instability is challenged by concerns of unobserved heterogeneity. The dataset we use includes a variety of other individual preferences, such as trust attitudes, patience, and personality traits, of the households, which are included in the analysis. We use a variety of approaches to alleviate concerns of unobserved heterogeneity. Consistent with existing evidence on the impact of macroeconomic shocks on risk attitudes (e.g., Malmendier and Nagel, 2011), we find that men and women become significantly less willing to take risk in the aftermath of the 2008 financial crisis while the crisis does not affect household stability or household composition (compared to previous and posterior waves of the survey). This generates plausibly exogenous changes in the composition of risk attitudes within the household. Using this temporal variation, we find that one-standard-deviation increase in intrahousehold heterogeneity in risk attitudes significantly increases the likelihood of separation. Further, we examine the mechanisms through which such a relationship may emerge, using the rich information available on the household's collective good sharing and household income. These features provide an additional means of evaluating the plausibility of the results.

The remainder of the paper proceeds as follows. In Section 2, we outline the predic-

tions of a stylized framework of household decision-making in which households share risk and public goods, and spouses may have heterogeneous risk preferences. Section 3 describes the data and provides the descriptive evidence that motivates the analysis in Section 4. In Section 5 we examine the robustness of the results and the role of differences in domain-specific risk attitudes. Section 6 presents evidence of mechanisms that could drive the relationship between divorce and intrahousehold heterogeneity in willingness to take risks, by studying public good sharing and the role of household income variance. Section 7 examines convergence in risk attitudes within households. Section 8 concludes.

2 Theoretical Framework

Risk attitudes are centrally important in models of risk sharing as well as models of public good sharing within the household. To study how risk attitude heterogeneity affects household stability and decision-making, we present a stylized theoretical framework that takes both economic reasons for marriage into account, and allows for intrahousehold heterogeneity in risk attitudes. The framework we present is closely related to that in Voena (2015).

We study household stability and decision-making by two individuals, denoted by H (husband) and W (wife), who are married. We assume that matching is not perfectly efficient, potentially on account of search costs, such that a household may form even if its degree of heterogeneity is not optimal.[3] In this model, households share risk and invest in a risky public good. Examples of such investment are expenditures on home improvements, investments in the education of children, and money spent on family vacations, the returns on which are uncertain (e.g., Browning et al., 2014). We ask, when does risk attitude heterogeneity increase or decrease the likelihood of separation? We set up a very stylized three-period model, and we refer to the periods as 0, 1, and 2. In each period, the following decisions take place:

- In period 0, individuals learn about their taste for marriage and decide whether to stay married or to divorce. Specifically, their utility from marriage is ϕV^M, where $\phi \leq 1$ is

[3]For models of multidimensional matching, see Chiappori, Oreffice, and Quintana-Domeque (2017), Low (2017), and Lindenlaub (2017).

a multiplicative shock. Individuals observe ϕ and then decide whether to stay married.

- In period 1, income shocks are realized and the couple—or the individual, if divorced—learn how much income they have available to allocate toward the public good. If they are married, they make joint decisions.

- In period 2, the return on the public good is realized and all consumption takes place.[4]

If the couple separates, each individual allocates his or her income individually between private consumption and the public good in period 1, and consumes in period 2.

Preferences: Husband and wife engage in both private consumption (x) and consumption of the public good (g). They share consumption through the public good. For example, the public good consumption of the household could involve financial investments such as investing in a jointly owned house, or leisure decisions such as decisions on vacationing and other activities that take place when spending time together. If g units are invested by the household in the public good in period 1, then consumption of that public good in period 2 is rg, where $r \sim N(\mu_g, \sigma_g^2)$, and $\mu_g > 1$. We assume that returns are i.i.d. In this model, private consumption is deterministic. This assumption is made to simplify the exposition, but the results would be qualitatively similar if private consumption is risky. The reason is that "externalities" from consumption arise only from the public good, since the return on such consumption is doubled in marriage, making marriage valuable. When spouses' risk attitudes differ, however, these gains are reduced. Such "externalities" do not exist in the case of private consumption.

The preferences of husband and wife with respect to risk, that is, their risk aversion, may differ. For $i \in \{H, W\}$, the utility of total consumption of i is given by

$$u(g, x_i; \tau_i) = -e^{(rg+x_i)/\tau_i},$$

where τ_i is individual i's risk tolerance, or the reciprocal of the constant absolute risk aversion

[4]We assume that there is no discounting between periods, because these periods are short and their main purpose is to separate the time at which uncertainty is realized from the time at which decisions are made. Allowing for discounting would not affect the results qualitatively, but would add one more parameter to the utility of public good sharing within the household.

parameter of i. The risk tolerance of the wife, τ_W, may differ from that of the husband, τ_H. The tolerance of the husband and wife could also differ by domain, for example, for financial matters and for health-related behaviors. The predictions would be qualitatively the same, but for simplicity of exposition, we consider a single risk tolerance in our framework.[5]

Budget Constraint: The incomes of the wife and husband are y_W and y_H, respectively. If the couple is married in period 1, their incomes are pooled, $Y = y_W + y_H$, and are then either distributed between them for private consumption or destined to the household public good. Their income, which is subject to shocks, is distributed normally, with $Y \sim N(\mu_Y, \sigma_Y^2)$, where σ_Y^2 is the variance of household income.[6] Thus, by pooling income the couple can share risk in addition to sharing public goods. The income of a divorcee is $y_i \sim N(\mu_{y_i}, \sigma_{y_i}^2)$. The household's budget constraint is

$$g + x_W + x_H = Y, \tag{1}$$

where x_W and x_H denote the private consumption of the wife and the husband, respectively. If a couple separates, the budget constraint of (the now divorced) individual i is

$$g + x_i = y_i. \tag{2}$$

The divorcee's problem: We solve the divorcee's problem by backwards induction. After the income shock is realized at the beginning of period 1, the divorcee decides how to allocate her income between the public good, which is now enjoyed only individually, and private consumption. She maximizes her expected utility from consumption,

$$\max_{x_i, g} - \int_{-\infty}^{\infty} e^{-(rg + x_i)/\tau_i} f(r) dr = -e^{-(\mu_g g + x_i - \frac{g^2 \sigma_g^2}{2\tau_i})/\tau_i},$$

[5]Detailed notes on a model that allows for domain-specific preferences can be obtained from the author.

[6]The variance of household income can be decomposed as $\sigma_Y^2 = \sigma_W^2 + \sigma_H^2 + \rho \sigma_W \sigma_H$, where σ_W^2 is the variance in the wife's income shocks, σ_H^2 is the variance in the husband's income shocks, and ρ is the correlation of their income shocks. Because of the better availability of data for household income than for individual income, we focus on the total variance of household income in our predictions and empirical testing.

subject to (2). Thus the divorcee's optimal public good investment is

$$g^D = \frac{(\mu_g - 1)\tau_i}{\sigma_g^2}. \tag{3}$$

This shows that the more risk tolerant the divorcee is, the more she invests in public good consumption. From the perspective of period 0, which is before income shocks are realized, the expected utility from consumption of the divorcee (detailed calculations in Online Appendix A.1) is

$$V^{iD} = -e^{-\left(\frac{\mu_{y_i}}{\tau_i}(1-\frac{\sigma_{y_i}^2}{2\tau_i})+\frac{(\mu_g-1)^2}{2\sigma_g^2}\right)}.$$

The household's problem: The household maximizes its utility from consumption of the public good as well as from private consumption of its members, subject to budget constraint (1) and to the constraints that both spouses must prefer being married to being divorced. After the income shocks of the spouses are realized in period 1, the household faces the following maximization problem

$$\max_{g,x_W^M,x_H^M} Eu(x_W^M, g) + Eu(x_H^M, g) = -\int_{-\infty}^{\infty} e^{-(x_W+rg)/\tau_W} f(r)dr - \int_{-\infty}^{\infty} e^{-(x_H+rg)/\tau_H} f(r)dr$$

subject to

$$Eu(x^W, g) \geq V_W^D,$$
$$Eu(x^H, g) \geq V_H^D,$$

and budget constraint (1). The household's optimal public good investment is

$$g^M = \frac{2\mu_g - 1}{\sigma_g^2(\frac{1}{\tau_W} + \frac{1}{\tau_H})}.$$

The investment is determined by the risk tolerances of the spouses: The more risk tolerant they are, the more the household invests in the public good. Also, since investments are consumed by both spouses, the returns on investment in the public good are "doubled" (the

numerator of g^M includes $2\mu_g$ instead of μ_g), which allows for increased private consumption. The optimal private consumption of the wife is given by

$$x_W^M = \frac{\tau_W}{\tau_W + \tau_H}(Y - g) - \omega + (\tau_W - \tau_H)\left(\frac{\mu_g g}{\tau_W + \tau_H} - \frac{(\sigma_g g)^2}{2\tau_W \tau_H}\right),$$

where $\omega = \frac{\tau_W \tau_H}{\tau_W + \tau_H} \ln(\frac{\tau_W}{\tau_H})$. After investment in the public good has been determined, the wife's allocation of the household income depends on her risk tolerance relative to that of her husband, $\frac{\tau_W}{\tau_W + \tau_H}$. Thus we obtain a prediction that is common to risk-sharing models: Household income sharing depends on the spouses' relative risk tolerances (e.g., Borch, 1962, and Wilson, 1968).

Using g, x_H, and x^W, we can obtain the expected utility of marriage for the wife. We focus on her, assuming that her constraints are (more) binding in the case of divorce. The value of marriage for the wife is

$$V_W^M = -e^{-\left(\frac{\mu_Y \tau_W}{\tau_W + \tau_H} - \frac{\tau_W \sigma_Y^2}{2(\tau_W + \tau_H)^2} - \omega + \frac{(2\mu_g - 1)^2}{2\sigma_g^2} \frac{\tau_W^2 \tau_H}{(\tau_W + \tau_H)^2}\right)/\tau_W}. \tag{4}$$

In period 0, the wife suffers a multiplicative shock to the utility from marriage, ϕV_W^M. Given her expected utility from marriage, will the wife stay married? She compares the utility from being married with the utility from being divorced, and she will stay married if

$$\phi V_W^M > V_W^D$$

Using the solutions for V_W^D and V_W^M and log-linearizing, that is, $\phi' \equiv -\tau_W \ln(\phi)$, we obtain that the largest shock to the wife's utility from marriage for which being married is still

preferred is

$$\phi' = \underbrace{\left(\frac{\mu_Y \tau_W}{\tau_W + \tau_H} - \frac{\tau_W \sigma_Y^2}{2(\tau_W + \tau_H)^2} - \omega - (\mu_{y_i} - \frac{\sigma_W^2}{2\tau_W}) \right)}_{\text{gains from risk sharing } (\phi'(s))} + \underbrace{\left(\frac{(2\mu_g - 1)^2}{2\sigma_g^2} \frac{\tau_W^2 \tau_H}{(\tau_W + \tau_H)^2} - \frac{(\mu_g - 1)^2 \tau_W}{2\sigma_g^2} \right)}_{\text{gains from public good sharing } (\phi'(g))} \tag{5}$$

In (5) we can clearly see the two sources of gains from marriage: public good sharing and risk sharing.

2.1 Heterogeneity in Risk Attitudes and Divorce

How does heterogeneity in risk attitudes between the spouses affect the gains from marriage and in turn the probability of divorce? Assume that $\tau_H = \gamma \tau_W$, where $\gamma > 1$, such that the husband is more risk tolerant, and an increase in γ implies that the difference in risk attitudes increases. The effect of an increase in risk attitude heterogeneity depends on the returns from public good sharing and risk sharing. If the returns from investing jointly are sufficiently high, an increase in heterogeneity will decrease the value of marriage. By contrast, if the variance of household income is high, an increase in heterogeneity in risk attitudes increases the value of marriage and reduces the likelihood that the couple will separate. The impact of heterogeneity in risk attitudes is summarized in Proposition 1.

Proposition 1. *An increase in the heterogeneity in risk attitude of the couple (γ) will increase, decrease, or have no effect on the likelihood of divorce if the risk-adjusted return on the public good, $(2\mu_g - 1)/\sigma_g$, is greater than Ω, less than Ω or equal to Ω, where*

$$\Omega(\sigma_Y, \tau_W, \gamma) \equiv \sqrt{\frac{2}{\gamma^2 - 1} \left(\frac{\sigma_Y - \mu_Y}{\tau_W^2} - \hat{\omega} \right)},$$

where $\hat{\omega} = (1 + \gamma)[\ln(\frac{1}{\gamma}) + \gamma^2(1 + \gamma)]$.

The variable Ω captures the way in which heterogeneity increases or decreases the

value of marriage. If the variance of household income (σ_Y^2) is high, heterogeneity in risk attitudes will decrease the value of marriage only if the risk-adjusted return on the public good ($(2\mu_g - 1)/\sigma_g$), is high enough. If household income (μ_Y) is high, risk sharing is relatively less important for the value of marriage. The more heterogeneous the household (as measured by γ) is the lower the return on the public good has to be for heterogeneity in risk attitudes to decrease the value of marriage.

2.2 The Differential Impact of Income Variance on Divorce

Since the spouses share risk, the variance of income plays an important role in the value of marriage. Intuitively, households in which pooled income is highly variable are less likely to stay married, as they benefit less from the gains from risk sharing. Our theoretical framework provides a new prediction: Heterogeneity in risk attitudes weakens the relationship between income variance and marital instability. The reason is that heterogeneity in risk attitudes helps achieve higher gains from risk sharing and hence an increase in income variance is less costly in heterogeneous households, as summarized in Proposition 2.

Proposition 2. *Ceteris paribus, an increase in income correlation of the spouses or an increase in the husband's income variance increases the likelihood of divorce. This effect is weakened in couples that exhibit greater heterogeneity in risk attitudes.*

2.3 Convergence in Risk Attitudes

Existing research suggests that risk attitudes may be shaped by the economic and social environment in which an individual lives. Dohmen et al. (2012), for example, demonstrate that the risk attitudes of an individual are related to those of people living in the same geographic area. Bursztyn et al. (2014) show that investment decisions are affected by friends' choices, and Lahno and Serra-Garcia (2015) find that lottery choices are also influenced by the choices of peers. Thus, if heterogeneity in risk attitudes decreases the value of marriage and risk attitudes are malleable, the spouses can have an incentive to reduce this heterogeneity by adjusting their own risk attitudes and achieving convergence in their risk attitudes.

We examine incentives for convergence within the household. We focus on whether

the wife has an incentive to change her risk attitude so that it becomes more similar to that of her husband. Given the assumption that $\gamma > 1$, this would require her to become more risk tolerant. Specifically, suppose that in period 0 the wife can increase her risk tolerance to $\tau'_W > \tau_W$ where $\tau'_W = \tau_H$. This adjustment is costly, with cost $c_a > 0$. Initially, the utility from marriage is V_W^M as defined in (4). The wife can adjust her risk attitude, and her utility from marriage, after converging to her husband's risk attitude, $V_W^M(\tau'_W)$ is

$$V_W^M(\tau'_W) = -e^{-\left(\frac{\mu_Y}{2} - \frac{(\sigma_Y^2)}{2(4\tau_H)} + \frac{(2\mu-1)^2}{2\sigma^2}\frac{\tau_H}{4} - c_a\right)/\tau_H}.$$

The question we ask is: If changing risk attitudes is possible for the wife, under what conditions would she prefer to converge the husband's risk attitude?

Proposition 3. *The wife has an incentive to change her risk attitude to become as risk tolerant as the husband if the risk-adjusted return on the public good,* $(2\mu - 1)/\sigma$*, is larger than*

$$Z \equiv \sqrt{\tilde{c}_a + \frac{\mu_Y(\tau_W + \tau_H)\tau_H - (\sigma_Y^2/4)(\tau_W + 3\tau_H)}{\tau_H^2(\tau_H - \tau_W)}} - \tilde{\omega},$$

where $\tilde{c}_a = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2}c_a$ and $\tilde{\omega} = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2}\omega$.

Proposition 3 reveals that if the difference in risk attitudes $(\tau_H - \tau_W)$ is large, a lower return on the public good is needed for convergence to be preferred, since the household could already be benefiting substantially from converging in preferences. By converging, the wife becomes less risk averse, which reduces the value of risk sharing. When the variance of income (σ_Y^2) is high, this reduces the return on investment in the public good which is needed to make convergence desirable.

To summarize, this stylized theoretical framework provides three key predictions in regard to the role of risk attitude heterogeneity. First, whether heterogeneity in risk attitudes increases or decreases the likelihood of separation depends on the returns from public good sharing and the importance of risk sharing. If the returns from public good sharing are high relative to the gains from risk sharing, heterogeneity in risk attitudes increases marital

instability. Second, when households share risk, heterogeneity in risk attitudes weakens the negative impact of income variance on marital stability. Third, spouses can have an incentive to converge, especially if they are far apart initially.

3 Data and Descriptive Evidence

3.1 Data on Risk Attitudes and Household Stability

Exploring the three key predictions of the framework requires a dataset that contains (a) family composition histories and (b) measures of risk attitudes, collected repeatedly over time. The German Socio-Economic Panel (SOEP), a representative panel of the adult population in Germany,[7] contains this information and has been widely used to study risk attitudes. Our empirical analysis is based on the 5,336 cohabiting and married heterosexual couples in the SOEP with complete information on willingness to take risks in 2004, the first year in which these attitudes were measured.

Descriptive Statistics of the Sample. The individual characteristics of the spouses, including age, educational level, and characteristics of the relationship, are shown in Table 1. The average age of the women is almost 46, while that of the men is between 48 and 49. A majority of the individuals graduated from high school, while 24% of the women and 32% of the men have pursued higher education, such as college. Most of the individuals who report a religious affiliation are either Catholic or Protestant, while 28% of the women and 34% of the men declare no confession. Almost all individuals are of German nationality (92%). In the analysis, we control for individuals' place of residence in 1989, as a measure of cultural background. The similarity of upbringing in a communist versus a capitalist society could have an important impact on the views of an individual and could affect the relationship negatively should this view differ. We find that a majority lived in West Germany in 1989. In the sample a majority of the women have a weight and height that situates them as being of normal weight according to their BMI, while a majority of the men are overweight. Among

[7]Details regarding the SOEP are provided in Wagner, Burkhauser and Behringer (1998) and Schupp and Wagner (2002). Detailed information on how family histories are used to track separation is provided in Online Appendix B.1.

the men, 76% are employed, while 62% of the women are employed.

Table 1: Descriptive Statistics of the Sample

		Women	Men	Couples
Age	Mean	45.83	48.47	
	SD	13.09	13.20	
Education				
Number of years	*Mean*	11.95	12.38	
	SD	3.10	3.30	
Did not graduate from high school	Share	0.16	0.09	
Graduated from high school	Share	0.60	0.59	
Pursued education beyond high school	Share	0.24	0.32	
Religion				
Catholic	Share	0.31	0.29	
Protestant	Share	0.35	0.30	
Other Christian	Share	0.02	0.02	
Other religion	Share	0.04	0.05	
No confession	Share	0.28	0.34	
Cultural background				
German nationality	Share	0.92	0.92	
Lived in East Germany in 1989	Share	0.26	0.25	
Lived in West Germany in 1989	Share	0.69	0.71	
Lived abroad in 1989	Share	0.05	0.04	
BMI				
Underweight	Share	0.03	0.00	
Normal weight	Share	0.55	0.35	
Overweight	Share	0.41	0.65	
Income and Employment				
Employed (= 1)	Share	0.62	0.76	
Log of household income	Mean			10.54
	SD			0.51
Relationship characteristics				
Married	Share			0.88
Husband previously married	Share			0.02
Husband has children from prev. marriage	Share			0.01
Cohabited before marriage	Share			0.17
Couple has no children	Share			0.17
Couple has 1 or 2 children	Share			0.63
Couple has 3–5 children	Share			0.19
Couple has 6 or more children	Share			0.01

Notes: This table presents summary statistics of the sample ($N = 5,336$ couples). All variables presented are measured in 2004.

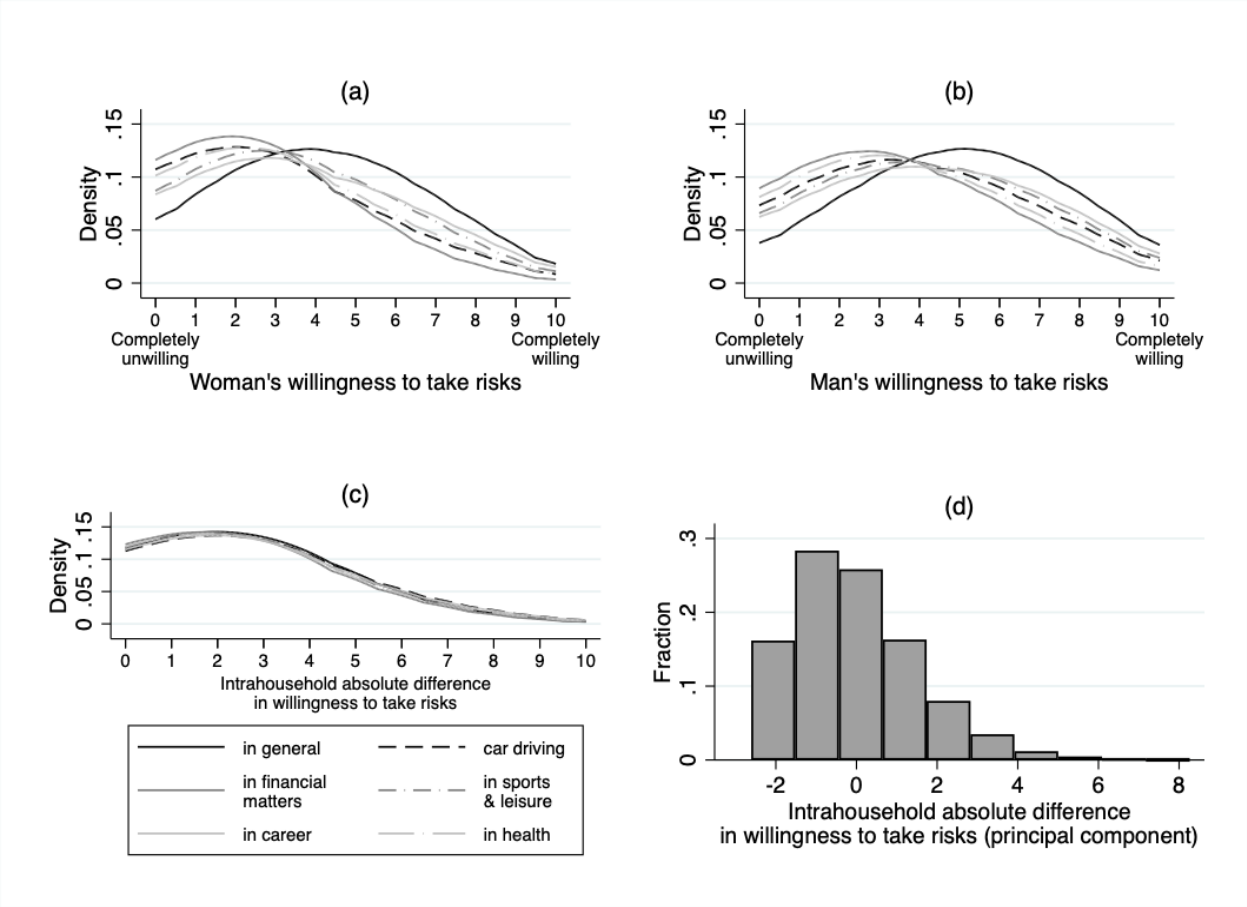
Risk Attitudes. Risk attitudes are measured in the SOEP by asking the individual "how willing she is to take risks," and they range from 0 (completely unwilling) to 10 (completely willing). There are six questions, which ask about the willingness to take risks in general, while driving, in financial matters, in sports and leisure, in career matters, and in health

(see also Weber, Blais, and Betz, 2002). Risk attitudes are elicited repeatedly over time. Willingness to take risks in general was first measured in 2004, subsequently in 2006, and yearly from 2008 onwards. The remaining five questions measuring willingness to take risks while driving, in financial matters, in sports and leisure, in career matters and in health, were measured every five years, starting in 2004, including 2009 and 2014. An additional measure of risk attitudes was elicited in 2004 and 2009, through a question that asks respondents how much of 100,000 euros they would invest in a hypothetical lottery in which they can either double their investment or get only half of it back, with equal probability. The possible responses are 0, 20,000, 40,000, 60,000, 80,000, and 100,000 euros.

The survey measures of risk attitudes collected in the SOEP have been shown to be reliable measures of underlying risk attitudes. Using an incentivized lottery experiment, Dohmen et al. (2011) confirm significant correlations between survey measures of willingness to take risks and the number of lottery choices, relative to a sure payoff, made by individuals. These measures are also strongly correlated with the riskiness displayed in individual behaviors, such as occupational sorting (e.g., Bonin et al., 2007) and health-related behaviors (Dohmen et al., 2011), among others. Dohmen et al. (2012) also find that these attitudes are transmitted from parents to children. It is important to note, however, that as highlighted by Gillen, Snowberg, and Yariv (2019), there can be measurement error in any measure of risk attitudes. For this paper, this would imply an attenuated relationship between risk attitudes and household stability.

Households exhibit similar risk attitudes in all domains. There is a strong and significant correlation in willingness to take risks in general, where the Spearman correlation coefficient ρ is 0.3076 ($p < 0.01$), as shown in Dohmen et al. (2012). There is also a strong correlation in willingness to take risks while driving ($\rho = 0.3847$), in financial matters ($\rho = 0.3974$), in sports and leisure ($\rho = 0.4412$), in career matters ($\rho = 0.4258$), and in health ($\rho = 0.3966$), where the significance of Spearman's correlation coefficient is below 0.01 in all cases. Figure 1 displays the distribution of willingness of women (panel (a)) and men (panel (b)) to take risks, and the distribution of the absolute difference in willingness of spouses (panel (c)) to take risks, in all six domains. The distribution in panel (c) is right skewed, with most households exhibiting a difference of less than 3 points out of 10 in most

domains.[8]



Note: Panel (a) shows the density functions of women's willingness to take risks in general, in car driving, in financial matters, in sports and leisure, in career matters, and in health ($N = 5,336$). Panel (b) shows the density functions of men's willingness to take risks in each domain. Panel (c) plots the density functions of the intrahousehold absolute difference in willingness to take risks in each domain. Panel (d) plots the distribution of the standardized principal component of the intrahousehold absolute difference in willingness to take risks, including the six measures displayed in panel 1(c).

Figure 1: Distribution of Risk Attitudes within the Household

In this paper, the heterogeneity in risk attitudes within a household is measured as the principal component of the absolute difference in willingness to take risks across the aforementioned six questions eliciting risk attitudes.[9,10] This summary statistic of hetero-

[8]Households also exhibit strong similarity in a wide range of sociodemographic characteristics (age, religion, and education, among others), and in other attitudes such as trust and personality traits, as shown in Online Appendix B.2. These analyses confirm that our data are largely consistent with the previous literature on assortative matching in the household.

[9]The analysis of the principal components reveals that only one factor has an eigenvalue larger than one, which supports the use of a single component in the analysis. The principal component is standardized to have a mean of zero and a standard deviation of one.

[10]To be specific, let us denote a woman's willingness to take risks in domain i as r_w^i, and that of a man as r_m^i. The absolute difference is $\Delta_i^r = |r_w^i - r_m^i|$. The principal component of the difference in the six

geneity in risk attitudes within the household takes into account the fact that couples may differ in their degree of similarity in risk attitudes from one domain of risk taking to another. Domain-specific measures have the highest correlation with actual behavior (Dohmen et al., 2011). They thus reflect most closely an individual's risk attitude within a specific domain. Further, the principal component analysis allows the data to inform us about the most important explanatory factors of heterogeneity in risk attitudes within households. The results are nevertheless robust to using other measures of heterogeneity, as shown in Section 5.[11] Figure 1(d) displays the distribution of the principal component of the intrahousehold difference in risk attitudes.

Principal component analysis of heterogeneity in risk attitudes implicitly assumes that households dislike heterogeneity in each domain of risk. Empirically, one may ask whether households instead find it optimal to trade off similarity across domains of risk. To test whether this is the case, we examine the correlation in risk attitudes in a given domain among households that had the same risk attitude in all other domains (Chiappori, Oreffice, and Quintana-Domeque, 2017). The results are shown in Online Appendix B.2. Households that exhibit the same risk attitude in all but one domain, also exhibit a high correlation in the remaining domain. We thus find evidence suggesting that homogeneity in each domain is desirable. This result suggests that to address our main question, whether heterogeneous households exhibit a higher likelihood to dissolve, it is adequate to use a single measure of intrahousehold heterogeneity that "summarizes" the extent of heterogeneity across all domains.

domains of risk attitudes is calculated to obtain the intrahousehold difference in willingness to take risks. An alternative approach could be to first calculate an individual measure of risk attitudes across all domains and then use the absolute difference in this measure for the couple as a measure of intrahousehold heterogeneity. This measure has the drawback that differences in specific domains are obscured. Consider, for example, a woman who is very willing to take risks in financial matters ($r_w^i = 10$) and whose husband is not ($r_m^i = 0$), whie at the same time she is not willing to take risks in health ($r_w^j = 0$) but her husband is willing to do so ($r_m^j = 10$). In this case, if one were to construct the average willingness to take risks of the woman and her husband separately (and there were only these two domains) and then compute the absolute difference, one would find a difference of zero. Clearly, the differences in the couple are substantial and should be reflected in a measure of heterogeneity such as the one we use.

[11] A further concern with this measure is that risk attitudes are not specifically elicited for joint risky decisions within the household, and risk attitudes for decisions in groups may differ. Since such direct measures are not available, our measure only indirectly measures potential conflict in risk attitudes within the household, and could be seen as a conservative estimate.

3.2 Descriptive Evidence

During the period 2004–2017, we observe that 9.6% of the couples separate. The likelihood of separation varies systematically with household heterogeneity in willingness to take risks and with the level of willingness to take risks. Figure 2(a) illustrates the relationship by displaying a polynomial regression of the average probability of separation by percentile of the principal component of the intrahousehold difference in risk attitudes, with 95% confidence intervals. The point-biserial correlation coefficient between separation and difference in risk attitudes is 0.0665 ($p < 0.01$).

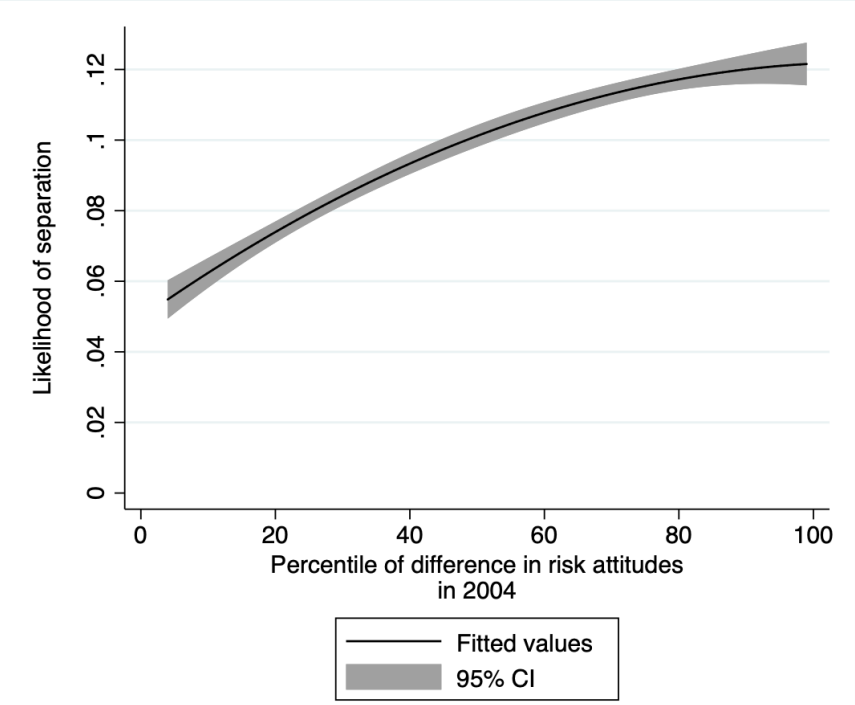
A similar pattern emerges when we examine the duration of marriage or cohabitation, starting in 2004 until 2017. Figure 2(b) displays the empirical CDF of separation, comparing the 10th, 25th, 75th and 90th percentiles of the distribution of the difference in risk attitudes. In all groups, the separation rate increases with time, as expected. The increase is, however, stronger for couples that exhibit a larger difference in risk attitudes (log-rank test of equality of survival functions, $p < 0.01$). These descriptive results provide the first suggestive evidence that heterogeneity in risk attitudes may be predictive of household instability, and suggest that the gains from public good sharing may be particularly important.

4 Risk Attitudes and Household Instability

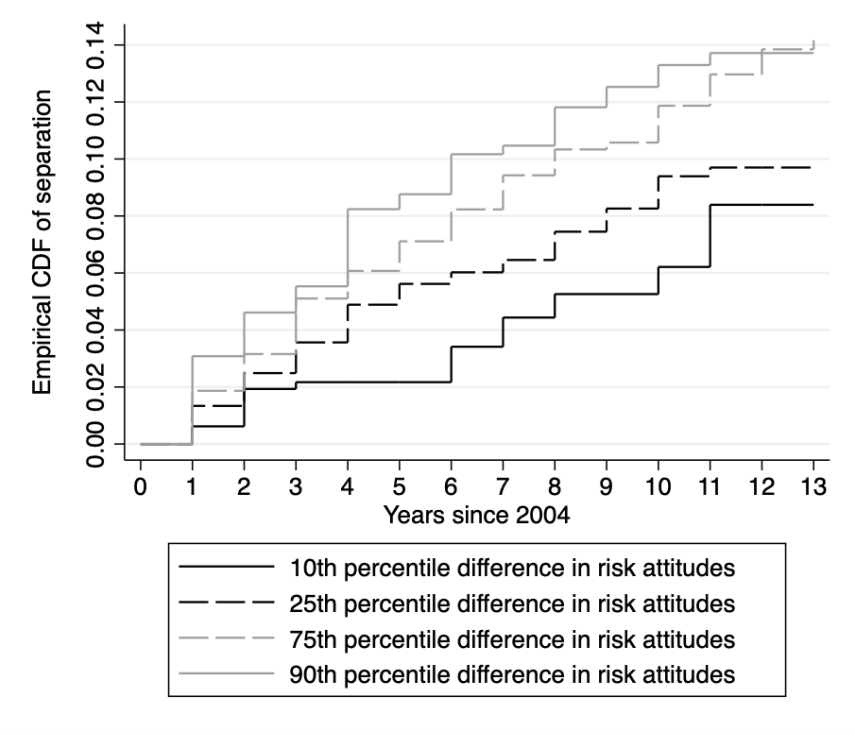
To examine our first prediction, whether heterogeneity in risk attitudes is predictive of household (in)stability, we use two approaches. The first approach predicts future instability using intrahousehold differences in willingness to take risk in 2004. By predicting future instability and controlling for an array of observable household characteristics, this approach aims to address concerns of reverse causality. However, an important concern is that unobserved heterogeneity, for example, unobserved match quality, could explain the relationship between risk attitudes and stability that we document. To address this concern, the second approach uses time variation in risk attitudes around the 2008 financial crisis in a fixed-effects framework.

We first estimate the relationship between the likelihood that a couple separates during the period 2004–2017, as a function of the difference in willingness to take risk of

(a)



(b)



Notes: Panel (a) displays a polynomial fitted regression for the average probability of separation by percentile of the intrahousehold difference in risk attitudes with 95% confidence intervals. Panel (b) displays the empirical CDF of separation during the period 2004–2017, obtained by estimating the Kaplan–Meier failure function without covariates, for couples below the 10th and 25th percentiles and above the 75th and 90th percentiles of the distribution of the intrahousehold difference in risk attitudes.

Figure 2: Heterogeneity in Risk Attitudes and Separation Rates, 2004-2017

the spouses in 2004, including year and region fixed effects. For $t \in \{2004, \ldots, 2017\}$, $D_{k,t}$ indicates whether a couple k separates in period t ($D_{k,t} = 1$ if they separated, and 0 otherwise), and we define $\Lambda^s_{k,2004}$ as the difference in their willingness to take risks in 2004. The estimated model is

$$Pr(D_{k,t} = 1) = \alpha + \beta_s \Lambda^s_{k,2004} + \beta_W s^W_{k,2004} + \beta_H s^H_{k,2004} + \Gamma \boldsymbol{Z}_k + \delta_t + r_k + u_{k,t} \tag{6}$$

The variables $s^W_{k,2004}$ and $s^H_{k,2004}$ are the wife's and the husband's risk attitudes (their quartiles to avoid multicollinearity with the difference in risk attitudes), δ_t and r_k denote year and region (Bundesland) fixed effects, respectively. The error term $u_{k,t} = \alpha_k + \varepsilon_{k,t}$ includes a household-specific time-invariant component (α_k) and a remainder component ($\varepsilon_{k,t}$) that is uncorrelated over time. The term $\boldsymbol{Z}_k$ includes a set of controls of the wife's and the husband's characteristics, as well as household characteristics, guided by the covariates used in Becker et al. (1977) and Weiss and Willis (1997) (see also, Frimmel, Halla, and Winter-Ebmer, 2013). Specifically, this set includes the demographic characteristics of the household (the levels and differences in educational attainment, differences in religion, age and nationality), differences in body mass index, measures of other preferences (trust attitudes), and personality traits. Characteristics of the relationship (the length of the relationship, whether the couple is married, whether the woman's husband was previously married, whether he had children from a previous marriage, household income pooling,[12] number of children) and the time-varying household income and the employment status of both spouses are also included.

Column (1) of Table 2 presents estimates of the model without controls. A one-standard-deviation increase in heterogeneity in risk attitudes is associated with an increase in the likelihood of separation of 1.45 percentage points during the period 2004–2017. Column (2) of Table 2 adds estimates of the model with controls; the full regression results

[12]The SOEP asked households how they manage their income. The question asked is "How do you and your partner (or spouse) decide what to do with the income that either you or he/she or both of you receive?" The available replies are "everyone looks after their own money," "I look after the money and provide my partner a share of it," "my partner looks after the money and provides me with a share of it," "we put the money together and both of us take what we need" and "we put a share of the money in together, and both of us keep a share of it for ourselves." A couple is classified as pooling their income if they exhibit at least some sharing, that is, if they do not reply that each of them looks after their own money. By this definition, 86% of the couples in the sample pool their income.

are presented in Online Appendix B.3. Column (2) shows that a one-standard-deviation increase in heterogeneity in risk attitudes is still associated with a 0.097 percentage point increase in the likelihood of separation. Out of a rate of separation in this time period of 9.6%, this implies a 10% increase in the likelihood of separation. These results can also be expressed as differences in risk aversion coefficients. Using the answers to the hypothetical investment questions elicited in 2004, we find that a 1% increase in the intrahousehold difference in CARA coefficients is associated with a 0.5 percentage point increase in the likelihood of separation, as shown in Online Appendix C. Hence, households that exhibit greater heterogeneity in risk attitudes are more likely to separate. From the lens of the theoretical framework, this result suggests that the returns from public good sharing are high, and a significant component of household utility.

Other intrahousehold differences are not associated with household instability, except for religion. In line with previous results in Becker et al. (1977) and Weiss and Willis (1997), we find that when spouses indicated the same religion, the likelihood of separation decreases by close to 2 percentage points.[13] Cohabiting instead of being married, and being in a newer relationship, are associated with separation, in line with the existing literature.

The results are robust to a variety of specification and sample changes. First, while our preferred specification is that of columns (1) and (2), which is a random-effects linear probability model of separation in the years 2004–2017, the results are robust to alternative specifications, such as using a cross-sectional regression focusing on whether a couple separates by 2017, hazard models that assume a constant hazard function over time, and a random-effects probit model, as shown in Online Appendix B.4.[14]

Second, it is important to acknowledge that risk attitudes were measured as early as

[13]Becker et al. (1977) report that for women in the Terman survey the probability of divorce within the first four years of marriage is more than 20 percentage points lower when the spouses have the same religion, compared to when they differ. Weiss and Willis (1997) find that for participants in the National Longitudinal Study of the High School Class of 1972 the probability of divorce decreases by 6% to 11%, depending on the specification, for couples who share the same religion. For a recent review, see Amato (2010).

[14]A random-effects linear probability model offers more flexibility in its specification of the likelihood of separation over time than a hazard model, and thus the former is presented in the main text. We present the results from linear probability models in the body of the paper, as these allow a coherent presentation of random and fixed effects models. In Online Appendix B.4 we present average partial effects of the random effects probit model, computed as indicated in Wooldridge (2001, p. 485), as well as the results of hazard models and cross-sectional models.

Table 2: Intrahousehold heterogeneity and separation

	(1)	(2)	(3)	(4)
	Likelihood of separation			
	in 2004-2017		in 2004, 2009, 2014	
	RE	RE	FE	FE
Intrahousehold difference in willingness to take risks	0.0141***	0.0094***	0.0071**	0.0087***
	(0.0030)	(0.0033)	(0.0032)	(0.0033)
Woman's willingness to take risks in 1st quartile		-0.0376***		-0.0191**
		(0.0089)		(0.0093)
Woman's willingness to take risks in 2nd quartile		-0.0217**		-0.0200**
		(0.0088)		(0.0083)
Woman's willingness to take risks in 3rd quartile		-0.0003		-0.0134*
		(0.0088)		(0.0076)
Man's willingness to take risks in 1st quartile		-0.0277***		0.0166
		(0.0104)		(0.0102)
Man's willingness to take risks in 2nd quartile		-0.0154*		0.0078
		(0.0092)		(0.0088)
Man's willingness to take risks in 3rd quartile		-0.0016		-0.0058
		(0.0089)		(0.0079)
Region and year fixed effects	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes
Observations	48,164	48,164	10,080	10,080
Number of households	5,336	5,336	5,336	5,336
R^2	0.0192	0.170	0.0188	0.0471

Notes: This table presents results of a random-effects linear probability model on separation in the years 2004–2017, in columns (1) and (2). The difference in willingness to take risks is the principal component of the intrahousehold absolute difference in risk attitudes (in 2004, for columns (1) and (2), and each year, 2004, 2009 and 2014 in columns (3) and (4)), and it is standardized. Other controls include controls for the level of women's and men's willingness to take risks, several demographic variables (differences in age, differences and levels in educational attainment, differences in religion, nationality, location in Germany in 1989), other socio-demographic characteristics (differences and levels of trust attitudes, differences in personality traits, differences and levels in BMI, the log of household income, employment status of the spouses, and income pooling within the household), and relationship characteristics (whether the couple is married, relationship length, previous marriage and children from previous marriage, as well as children from current marriage). All variables are measured in 2004, except for income and employment status, which are measured on a yearly basis and are time-varying. Due to the substantial number of missings in household incomes, we proceed as in Dohmen et al. (2012) and include a dummy for missing values in household income, and correspondingly for all other variables with missing values (education, religion, location in 1989, BMI and personality). Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

2004 and households may have formed and dissolved earlier. Thus, the remaining heterogeneous households in the sample may have higher unobserved match quality. This would imply that we obtain a lower bound on the relationship between household stability and heterogeneity in risk attitudes, and that controlling for relationship length is important, which we do in our analysis. In Online Appendix B.5, we examine the subsample of married couples, and further explore whether the length of the relationship matters, and find qualitatively similar results.

Third, since the data are based on a panel dataset, another concern is attrition.

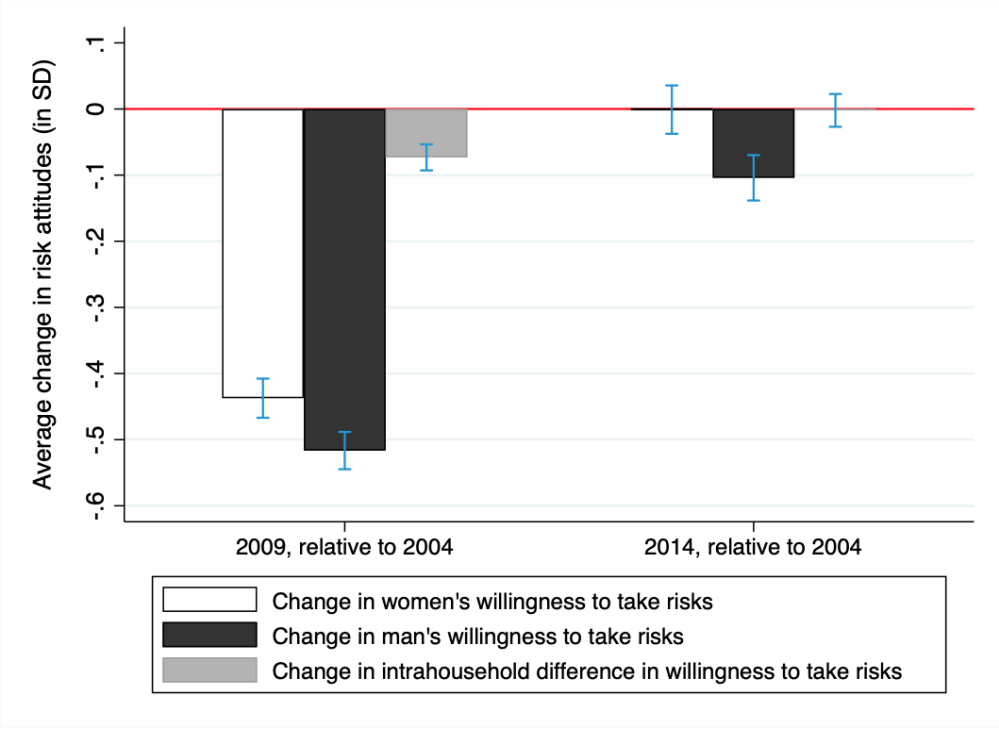
Households that separate may be more likely to leave the panel. This would also imply that we obtain a lower bound on the relationship between household stabilty and heterogeneity in risk attitudes in our analysis. As shown in Online Appendix B.6, to address the concern of differential attrition, we estimate our models on the balanced subpanel (Verbeek and Nijman, 1996) and obtain even stronger results.

We also show in Online Appendix B.7 that our results are robust to the inclusion of heterogeneity in time preferences within the household (Schaner, 2015), which were measured in 2008, and the spousal happiness with family life (a proxy for match quality), which was measured in 2006. The results do not change if we include two measures of gender asymmetry: whether the woman is more willing to take risks, and perhaps breaking gender roles (e.g., Bertrand, Kamenica, and Pan, 2015), and differences in income between the wife and the husband.

Despite adding multiple individual and household characteristics, other (unobserved) dimensions of match quality could possibly explain the relationship between heterogeneity in risk attitudes and household stability. If match quality is time-invariant, we can leverage plausibly exogeneous changes in risk attitudes over time to assess whether the relationship between heterogeneity in risk attitudes and household stability remains qualitatively similar. Severe downturns in the global economy can cause exogenous changes to risk attitudes, as documented by Malmendier and Nagel (2011), who examine the effects of the Great Depression on risk taking (see also Bucciol and Miniacci, 2018). In the SOEP, risk attitudes were elicited repeatedly, on a five-year basis, since 2004. Importantly, one measurement of risk attitudes occurred in 2009, in the aftermath of the 2008 financial crisis.

Consistent with previous findings, both men and women in the representative sample of German households became significantly less willing to take risks in 2009 than in 2004. Figure 3 shows that the willingness of women to take risks dropped by 0.44 standard deviations (SD) in 2009, where risk attitudes are standardized by gender and over the entire sample period. The willingness of men to take risks dropped by 0.52 SD, significantly more than that of women ($p = 0.005$). This led to a significant drop (0.07 SD) in the intrahousehold difference in willingness to take risks. By 2014, these changes were mostly undone. Risk attitudes returned to levels that are not significantly different from those of 2004 for women

and much smaller for men (0.11 SD).[15]



Notes: This figure shows the average change in willingness of men and women to take risk in 2009 and 2014, relative to 2004. Willingness to take risk is standardized within each gender and for the entire sample period. The figure also shows the change in the intrahousehold absolute difference in willingness to take risks, again standardized. The capped spikes show ± 1 standard errors from the mean (S.E.).

Figure 3: Changes in Risk Attitudes in 2009 and 2014, relative to 2004

The change in individual risk attitudes in 2009 provides a plausibly exogenous change in the composition of risk attitudes within the household. To leverage the effect of the financial crisis, we estimate a fixed-effects regression model of the likelihood of separation in the years $t = \{2004, 2009, 2014\}$ ($N = 10,080$ for these three waves) as a function of the intrahousehold difference in risk attitudes in the same year, controlling for the level of risk attitudes, time-varying covariates (income and employment status), and time fixed effects.

[15]Overall, at the individual level across these five-year periods, the correlation between the measures of women's and men's willingness to take risks are strong and significant, in line with previous studies (e.g., Andersen et al., 2008). In addition to the financial crisis, there are other reasons why risk attitudes may change over time. As shown by Dohmen et al. (2017), risk attitudes change with age, with older individuals becoming significantly less willing to take risks. Further, men display a significantly stronger decrease in willingness to take risks over time than women, which could explain the difference between 2014 and 2004 for men but not for women. A concern may be that intertemporal variation in risk attitudes is a measure of general noisiness or instability of the household. In such a case, this would reduce the likelihood that a systematic relationship between increases in the intrahousehold difference in risk attitudes and separation is found.

The estimated equation, building on (6), is the following:

$$Pr(D_{k,t} = 1) = \alpha + \beta_s \Lambda^s_{k,t} + \beta_W s^W_{k,t} + \beta_H s^H_{k,t} + \Gamma \boldsymbol{Z}_{k,t} + \delta_t + r_k + u_{k,t} \tag{7}$$

One concern is that the financial crises could affect household stability or household compositions directly. We do not find evidence that there was a differential change in household stability in 2009. Separations in 2009 were not more frequent than in 2008 or 2010 ($p > 0.10$). Despite attrition that takes places in the panel over time, household composition did not change significantly: We do not find evidence of a significant change in the similarity in religion, nationality, cultural background, age, or education of households in 2009 compared to 2004.[16] Hence the crisis did not significantly alter separation rates or household composition but did induce changes in risk attitude heterogeneity within the household.

Column (3) of Table 2 shows that changes in risk attitudes are associated with a 0.7-percentage-point increase in the likelihood of separation. Controlling for changes in income and employment, which may affect risk attitudes, a one-standard-deviation increase in the intrahousehold difference in risk attitudes is associated with a 0.87-percentage-point increase in the likelihood of separation, as shown in column (4) of Table 2. This coefficient is close in magnitude to that found in column (2), which indicated that a one-standard-deviation increase in the intrahousehold difference in risk attitudes is associated with a 0.94-percentage-point increase in the likelihood of separation. This fixed-effects approach thus suggests that (plausibly exogenous) changes intrahousehold heterogeneity in risk attitudes change the likelihood of separation.[17] The results also reveal that the relationship between heterogeneity in risk attitudes and household stability remains robust and of similar magnitude, when time-invariant unobservables (such as match quality) no longer play a role.

[16] Tests of differences in these traits between 2009 and 2004 do not reveal a significant difference in any of them, except for a marginally significant decrease in age differences ($p = 0.095$).

[17] In additional analyses presented in Online Appendix B.4, we also show that the change in risk attitude heterogeneity between 2004 and 2009 is also predictive of the future likelihood of separation (for years 2010–2017).

5 Additional Results

In what follows, we first discuss whether the relationship between risk attitudes and separation may be non-linear, and whether it remains stable using other measures of intrahousehold heterogeneity in risk attitudes. We then discuss whether differences in certain domains of risk (e.g., willingness to take risk in financial matters) are predictive of separation.

5.1 Alternative Specifications and Measures

Table 3 presents the results of regressions for four alternative specifications of the relationship between intrahousehold heterogeneity in risk attitudes and separation. Panel (a) examines whether the relationship between intrahousehold heterogeneity and separation is non-linear. Adding a quadratic term, we find that the main coefficient increases to 0.0112 (compared to 0.0094 in column (2) of Table 2), but the quadratic term is not significant. Panel (b) of Table 3 presents an alternative specification which does not use the principal component of the household's difference in willingness to take risks across all domains elicited; rather it uses the average $z-$score of the difference along all domains. As shown in columns (2) and (3), the results remain qualitatively the same.

The specification in panel (c) uses a different measure of heterogeneity within the household, based on the number of domains in which the husband and wife exhibit the same willingness to take risks. The more domains in which the husband and wife has the same risk attitude, the lower the likelihood of separation; this result is statistically significant at the 1% level. The specification in panel (d) uses the households similarity in CARA coefficients as measured by their willingness to invest in a hypothetical lottery. Couples that choose the same investment level are less likely to separate. Further analyses based on this measure are shown in Online Appendix C.

5.2 Domain-Specific Differences in Risk Attitudes

Risk attitudes may vary substantially across domains (e.g., Weber, Blais, and Betz, 2002), and differences that households exhibit in some domains could be particularly important for household utility and public good sharing. We examine the importance of domain-

Table 3: Alternative Specifications and Measures

	(1)	(2)	(3)	(4)	(5)
	Likelihood of separation from 2004-2017				
(a) Nonlinear relationship					
Intrahousehold difference in willingness to take risks	0.0112***				
	(0.0035)				
Squared difference in willingness to take risks	-0.0021				
	(0.0018)				
(b) z-score difference in willingness to take risks					
Average difference in willingness to take risks		0.0094***	0.0111***		
		(0.0033)	(0.0035)		
Squared average difference in willingness to take risks			-0.0020		
			(0.0018)		
(c) Similarity by dimensions					
Number of dimensions with same willingness to take risks				-0.0067***	
				(0.0020)	
(d) Similarity in CARA coefficient					
Same CARA coefficient					-0.0192***
					(0.0065)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	48,164	48,164	48,164	48,164	47,974
Nr. of households	5,336	5,336	5,336	5,336	5,310
R^2	0.170	0.170	0.170	0.170	0.162

Note: The specification in panel (a) of this table is the same as in column (2) of Table 2, including a squared term for the difference in risk attitudes within the household. The specification in (b) uses the z-score of the intrahousehold absolute average difference in willingness to take risks (across all domains) as dependent variable. In (c) the measure of similarity within the household is the number of domains in which the couple indicated the same willingness to take risks. This variable ranges from 0 to 6. The specification in (d) uses the difference in willingness to invest in a hypothetical lottery. This variable is 1 if both spouses report the same willingness to invest in a lottery that can either double their investment or get only half of it back, with equal probability. All regressions include the same controls as in column (2) of Table 2, and region and year fixed effects. Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

specific differences, by estimating the relationship between the intrahousehold difference in willingness to take risks in several domains (rather than using the principal component): in general, while driving, in financial matters, in sports and leisure, in career matters, and in health.

Table 4 shows that a one-standard-deviation increase in the difference in willingness to take risks in general is associated with a 0.2 percentage point increase in the likelihood of separation. The domain-specific difference in willingness to take risks that is most predictive of separation is the difference in willingness to take risks in financial matters. If we allow the relationship to be non-linear, we find that differences in sports and leisure, and in health, are also associated with a higher likelihood of separation. As the degree of heterogeneity decreases, these relationships weaken.

Table 4: Domain-Specific Differences in Risk Attitudes

	(1)	(2)
	Likelihood of separation	
Difference in willingness to take risks in general	0.0019**	0.0015
	(0.0010)	(0.0010)
Squared difference		0.0006
		(0.0008)
Difference in willingness to take risks while car driving	0.0027	0.0051
	(0.0033)	(0.0035)
Squared difference		-0.0031
		(0.0025)
Difference in willingness to take risks in financial matters	0.0070**	0.0113***
	(0.0028)	(0.0036)
Squared difference		-0.0039**
		(0.0017)
Difference in willingness to take risks in sports and leisure	0.0038	0.0079***
	(0.0029)	(0.0029)
Squared difference		-0.0044**
		(0.0021)
Difference in willingness to take risks in career matters	0.0049	0.0046
	(0.0030)	(0.0034)
Squared difference		0.0003
		(0.0022)
Difference in willingness to take risks in health	0.0033	0.0072**
	(0.0027)	(0.0031)
Squared difference		-0.0039*
		(0.0022)

Notes: This table presents fixed-effects regression results on the relationship between the likelihood of separation and the intrahousehold difference in willingness to take risks in general, while car driving, in financial matters, in sports and leisure, in career, in health and in a hypothetical lottery choice. Each coefficient in column (1) is estimated from a separate regression as is each pair of coefficients (difference and squared difference) in column (2). Willingness to take risks in general was measured in 2004, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, and 2017. A total of 36,425 observations for this measure are obtained. Willingness to take risks in car driving, in financial matters, in sports and leisure, in career matters, and in health was measured in 2004, 2009, and 2014. This yields 10,080 observations for each measure. All regressions include controls for the husband's and wife's willingness to take risks, time-varying sociodemographic characteristics of the household (household income and employment status). Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

In summary, across the different estimation strategies and in several robustness checks, we find that households that exhibit greater heterogeneity in risk attitudes are significantly more likely to separate. Given the nature of the research question, it is difficult to imagine a plausible experiment that would cleanly identify causality. However, the consistency of the evidence provides suggestive evidence that the relationship is not driven by unobserved match quality. According to the theoretical framework, the higher likelihood of separation

among households that exhibit more heterogeneity in risk attitudes reveals that public good sharing is important, and that households may have incentives to converge in their risk attitudes. We address these predictions in Sections 6 and 7.

6 Mechanisms: Public Goods and Income Variance

6.1 Sharing household public goods

We first examine whether, consistent with the first prediction of the theoretical framework and our first result, heterogeneity in risk attitudes explains public good sharing. One example of a household public good that is discussed in the literature is housing. If couples that exhibit more heterogeneity in risk attitudes are less likely to agree on shared public goods that are potentially risky, we may expect these couples to be less likely to own the dwelling they live in and to make fewer investments in renovating the dwelling. We focus on the couples' home ownership and the condition of their house in 2004 to alleviate concerns that reductions in public good sharing could have take place as a result of divorce.

Panel (a) in Table 5 reveals that there is a negative relationship between home ownership and heterogeneity in risk attitudes within the household. Next, we consider the condition of the dwelling, using a survey-elicited need for renovation. The survey asked households to report whether the household is in a good condition, needs partial renovation, needs major renovation or is dilapidated. We create an indicator variable that takes a value of 1 if the household states that the house they live in needs at least partial renovation. As shown in Panel B, there is a positive relationship between heterogeneity in risk attitudes and the need for renovations. This suggests that households that exhibit more heterogeneity in risk attitudes are less likely to invest in the house they live in.

Another widely discussed household public good is children. Though fertility decisions are affected by many factors, and hence any analysis should be interpreted with care, we examine the relationship between heterogeneity in risk attitudes and the likelihood that the couple has children. Since previous children could potentially affect risk attitudes, we focus on whether children are born in the period 2005–2017 to households that did not have any

Table 5: Household Outcomes and Heterogeneity in Risk Attitudes

	(1)	(2)
(a) Dependent variable: Home ownership		
Difference in willingness to take risks	-0.0184**	-0.0210**
	(0.0074)	(0.0085)
Squared difference in willingness to take risks		0.0030
		(0.0044)
Observations	5,254	5,254
R-squared	0.1918	0.1919
(b) Dependent variable: House needs renovations		
Difference in willingness to take risks	0.0133**	0.0144**
	(0.0063)	(0.0071)
Squared difference in willingness to take risks		-0.0013
		(0.0039)
Observations	5,244	5,244
R-squared	0.0301	0.0301
(c) Dependent variable: Have children, for couples without children in 2004		
Difference in willingness to take risks	-0.0284	-0.0559*
	(0.0208)	(0.0304)
Squared difference in willingness to take risks		0.0196
		(0.0143)
Observations	3,511	3,511
Nr. of households	470	470
R-squared	0.191	0.194

Note: This table presents results of regressions on the relationships between the three household outcomes and intrahousehold heterogeneity in risk attitudes. Panel (a) addresses the likelihood that the couple owns the dwelling they were living in, using probit regressions (marginal effects presented). The controls included in column (1) are the level of the men's and women's willingness to take risks, as in column (2) of Table 2. The controls included in column (2) add the demographic characteristics of the household as in column (3) of Table 2. Each coefficient stems from a different regression, run on the survey responses provided in 2004. Panel (b) examines the likelihood that the house the couple lives in needs renovations, using probit regressions (marginal effects presented). This variable takes value 1 if the couple reports that the house needs some or full renovations, or is a dilapidated state, and 0 if the couple reports that the house is in good condition. Panel (c) examines whether married and cohabiting couples that had no children in 2004 did have children in the period from 2005–2017. Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

children in 2004. This relationship is not significant in the linear model and weakly significant in the quadratic specification. It is stronger and statistically significant for married couples.[18]

6.2 Income Variance

The theoretical framework predicts that households that exhibit higher income variance have lower gains from marriage through risk sharing (as in Hess, 2004). The second, new pre-

[18]The evidence presented thus far suggests that households that are heterogeneous in risk attitudes experience lower gains from marriage. A proxy measure of individual utility is his or her well-being. The survey elicits several measures of emotional well-being. It elicits individual life satisfaction, and also elicits feelings of depression as well as anxiety. As reported in Online Appendix B.8, we find evidence that individuals exhibit feelings of depression and anxiety more often in households with heterogeneous risk attitudes.

diction is that heterogeneity in risk attitudes weakens this relationship, since heterogeneous households reap higher benefits from risk sharing. In this section, we analyze whether there is a relationship between heterogeneity and (predicted) income variance, and focus on whether risk attitude heterogeneity weakens it. Our analysis first uses realized income variance during the period 2004–2017. As shown in columns (1) and (2) of Table 6, the results are consistent with the risk sharing taking place within the household: A higher variance is related to a higher likelihood of separation. This relationship is directionally weaker in households that exhibit more heterogeneity in risk attitudes. These results need to be interpreted with caution, however, because income variance is occurring simultaneously with separation. To address this concern, we next examine the predicted income variance.

Table 6: Heterogeneous Effects of Intrahousehold Heterogeneity in Risk Attitudes by Income Variance

	(1)	(2)	(3)	(4)
	Likelihood of separation, 2004–2017			
Difference in willingness to take risks	0.0090***	0.0097***	0.0081**	0.0091**
	(0.0033)	(0.0036)	(0.0034)	(0.0038)
Squared difference in willingness to take risks		-0.0016		-0.0018
		(0.0019)		(0.0018)
SD income	0.0243**	0.0227**		
	(0.0110)	(0.0109)		
SD income X Difference in willingness to take risks	-0.0048	-0.0129*		
	(0.0046)	(0.0071)		
SD income X Squared difference in willingness to take risks		0.0051		
		(0.0034)		
Predicted SD income			0.0819***	0.0747***
			(0.0190)	(0.0205)
Predicted SD income X Difference in willingness to take risks			-0.0012	-0.0064
			(0.0102)	(0.0114)
Predicted SD income X Squared difference in willingness to take risks				0.0064
				(0.0076)
Observations	48,144	48,144	48,164	48,164
Nr. of households	5,316	5,316	5,336	5,336
R^2	0.181	0.182	0.174	0.174

Notes: This table presents random-effects linear probability models of the likelihood of separation, including the (predicted) standard deviation of household income and its interaction with the difference in risk attitudes within the household. The intrahousehold difference in willingness to take risks is measured as the principal component of the absolute difference in willingness to take risks across the six questions on willingness to take risks elicited in the SOEP in 2004. Columns (1)-(2) include the realized standard deviation of household income during the period 2004–2017. Columns (3) and (4) follow a two-step approach. First, the standard deviation of income is predicted from a regression that includes all of the controls in column (2) of Table 2, as well as the interaction of all occupational dummies of the woman and the man in the household. This regression is used to predict the variance in household income, which is then included as a regressor (predicted SD income) in the equation estimating the likelihood of separation. Since this regressor is itself the result of an estimation, we bootstrap the standard errors (500 replications). All regressions include the same controls as in columns (4) and (5) of Table 2. Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

The regressions in columns (3) and (4) use a two-stage procedure to examine whether

the results using predicted income variance rather than realized income variance are qualitatively similar. Similar to Hess (2004), we first predict the income variance of each household, using all characteristics of the household in our main specification and adding a new set of regressors based on the interaction between the husband's and the wife's occupational sectors as well as their individual occupations. Specifically, we use the ISCO-88 occupational codes to create ten different occupational categories. The main assumption is that these occupational interactions predict the household's income variance but do not directly affect the likelihood of separation. The main specification explaining separation already includes a large number of individual and household characteristics, among them household income and whether each spouse is employed, which reduces the concern that these occupational characteristics directly explain household stability.[19] An alternative approach would be to include only the interaction effects as additional regressors, and to control for individual occupations in all regression models. Consistent with the theoretical framework, columns (3) and (4) of Table 6 show that households with a higher predicted income variance exhibit a higher likelihood of separation. Heterogeneity in risk attitudes does not weaken this relationship significantly.

These findings indicate that risk sharing in the household is important, and yet, the role of risk attitude heterogeneity in risk sharing appears to be weak. Consistent with our main findings, this underlines that the composition of risk attitudes within the household appears to be most important for public good sharing.

7 Do Risk Attitudes Converge within the Household?

The body of evidence presented up to this point shows that intrahousehold heterogeneity in risk attitudes can increase household instability. Do risk attitudes converge within the household in stable marriages? The theoretical framework predicts that if risk attitudes are malleable spouses can have an incentive to converge, especially when the returns from public

[19]The interaction between occupational codes and the individuals' occupations is jointly significant in the first-stage regression predicting income variance (F-test, $p = 0.0185$). Occupational codes are based on individuals' reported occupational code using the ISCO-88 classification and reducing the 4-digit codes to the first digit. This effectively creates ten occupational categories. Out of the 10×10 possible combinations of the husband's and wife's occupational codes, 97 are observed in the sample.

good sharing are high and when they are initially more different. We examine whether individuals who form a new relationship exhibit convergence in their risk attitudes over time, and we compare that to established households. We focus on the sample of couples that remains married during the period 2004–2017.[20]

Table 7: Convergence of risk attitudes among newly formed couples

Dependent variable: Woman's willingness to take risks	(1) *Newly formed couples*	(2) *Established couples*
Man's willingness to take risks	0.1760**	0.3357***
	(0.0735)	(0.0220)
Man's willingness to take risks X $I_{(year=2009)}$	0.1411*	-0.0092
	(0.0806)	(0.0181)
Man's willingness to take risks X $I_{(year=2014)}$	0.2154**	0.0082
	(0.0997)	(0.0223)
Constant	0.9828	-1.0224
	(2.7584)	(0.9425)
Observations	704	9,013
Nr. of individuals	392	4,863
R-squared	0.1683	0.1117

Notes: This table reports the estimates of fixed-effects regressions on the woman's willingness to take risks (principal component). Column (1) includes couples that have been in a cohabiting relationship for less than two years (newly formed couples). Column (2) includes couples that have been in a cohabiting relationship for two or more years (established couples). All regressions include year fixed effects and controls for time-varying characteristics. $I_{(year=2009)}$ and $I_{(year=2014)}$ are indicator variables for the years 2009 and 2014, respectively. The sample included in this table is restricted to those couples that did not separate during the sample period. Robust standard errors clustered at the household level are shown in parentheses. ***,**, and * indicate significance at the 1%, 5% and 10% levels, respectively.

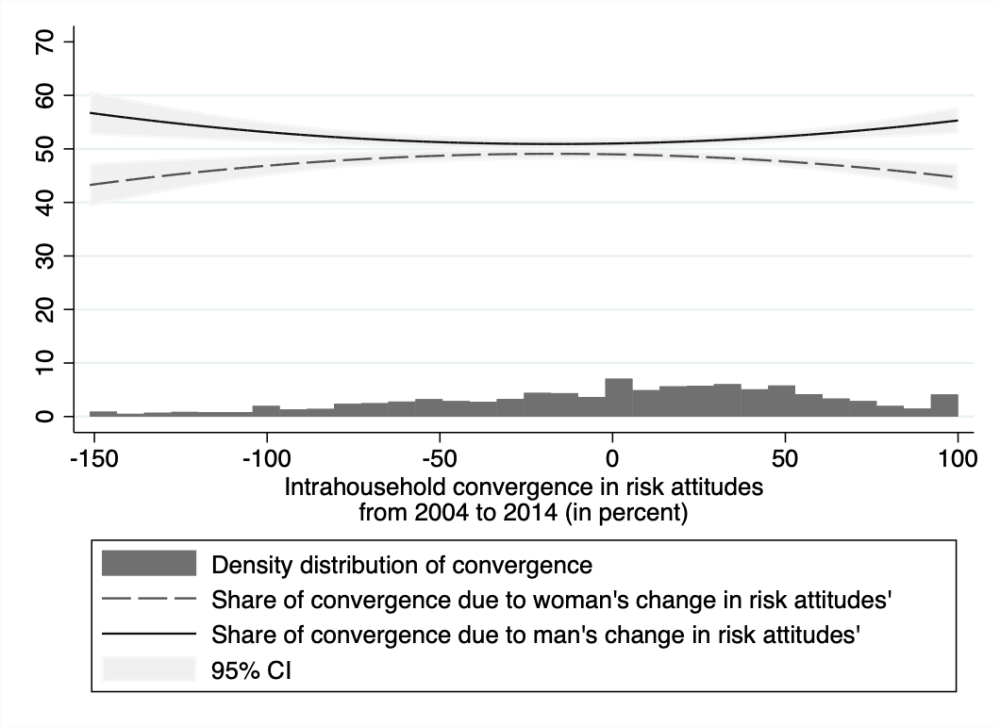
Column (1) in Table 7 presents the average correlation between the woman's and the man's willingness to take risks within a household, among newly formed couples. Such couples are defined as being in a relationship for less than two years. The results reveal that, among couples that have been in a relationship for less than 2 years in 2004, a one-standard-deviation increase in the man's willingness to take risks is associated with a 0.18 increase in the woman's willingness to take risks. The same correlation is presented for established couples in column (2) of Table 7. This correlation is 0.34, and hence much stronger.

Importantly, we test whether there is stronger convergence among newly formed couples over time. As shown in Table 7, between 2004 and 2009 the change in the correlation between the man's and the woman's risk attitudes remains close to zero for established couples. By contrast, this relationship increases significantly among newly formed couples.

[20]Couples that separate exhibit higher attrition rates and the evolution of their risk attitudes cannot be reliably followed.

Similar results are obtained for 2014. These results suggest that initial differences in risk attitudes that may reduce the gains from marriage may be overcome by convergence within the household.

One question motivated by the theoretical framework and the evidence on convergence is whether women or men exhibit a greater likelihood of converging toward their spouse. We study this question by computing the share of the change in intrahousehold heterogeneity in risk attitudes from 2004 to 2014 which stems from changes in the woman's risk attitude and the share that stemmed from changes in the man's risk attitude. The median household converges in risk attitudes, decreasing their difference in each dimension of willingness to take risks by 3% on average. We find that 52.3% of the change in risk attitudes is due to the man and 47.7% is due to the woman.



Notes: This figure shows the relative change in intrahousehold heterogeneity during the period 2004–2014 and the average contributions of men and women to the change. On the bottom of the figure, the distribution of the average percentage change in heterogeneity within the household (convergence) is shown, aggregating across each dimension of willingness to take risks. Positive percentage changes indicate convergence and are at most 100%. Negative changes indicate divergence. The bottom 5% of outliers in the distribution of convergence are excluded from the figure. The top of the figure shows polynomial fitted regressions for the average share of the change in risk attitudes that is due to changes in women's risk attitudes (dashed curve) and men's risk attitudes (solid curve) during the period 2004–2014, by the rate of intrahousehold convergence during this period. The sample includes all households that remain stable until 2014 and do not exhibit the same willingness to take risks in 2004.

Figure 4: Man's and Woman's Contributions To Convergence in Risk Attitudes over Time

In Figure 4, we explore whether the man's "contribution" to changes in heterogeneity in

risk attitudes within the household depends on the extent of convergence that the household exhibits during the period 2004–2014. The horizontal axis of Figure 4 shows the extent of convergence in relative terms. Positive values indicate that spouses converge in their risk attitudes, while negative values indicate that they diverge. We find that both when there is convergence and when there is divergence, these changes are in larger part due to the man, than to the woman. That is, it appears that, overall, the man's risk attitudes are more "elastic."

8 Conclusion

Risk attitudes are critical to decisions made by individuals and groups. While a large body of literature has studied the explanatory power of risk attitudes for individual behavior, there is little evidence on the importance of risk attitudes in group decision-making and the outcomes of households. This paper contributes to our understanding of what makes households stable, by proposing a stylized theoretical framework and using experimentally validated measures of risk preferences to study their importance for the household's instability over time.

The theoretical framework shows that heterogeneity in risk attitudes can increase or decrease household stability, depending on the returns from public good sharing relative to those of risk sharing. Across a number of estimation approaches, we find that intrahousehold heterogeneity in risk attitudes is predictive of household *in*stability. These findings suggest that the returns from sharing public goods are high, and make them a significant source of gains from marriage. Consistent with this, intrahousehold heterogeneity in risk attitudes is associated with less public good sharing within the household, such as investments in housing.

The present findings could potentially have implications for online marriage markets in the form of dating websites that also provide suggested matches. Over one third of couples in the US meet online (Cacciopo et al., 2013), where individuals are able to learn about an individual's characteristics before the dating process begins. Importantly, online dating websites often design algorithms that attempt to find the optimal match between participants on the dating platform and suggest partners to participants. A new implication

of our study is that if such websites suggested matches between individuals who are similar in their risk attitudes, that could decrease the likelihood that if a couple forms, it will dissolve in the future.

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Online Appendix

Appendix A

A.1. Theoretical Framework: Details and Proofs

The problem of the divorcee: The divorcee's problem is

$$\max_{x_i,g} -\int_{-\infty}^{\infty} e^{-(rg+x_i)/\tau_i} f(r)dr = -e^{-(\mu_g g + x_i - \frac{g^2\sigma_g^2}{2\tau_i})/\tau_i}$$

subject to (2). The FOC is:

$$\frac{\partial U}{\partial g} = e^{-(\mu_g g + x_i - \frac{g^2\sigma_g^2}{2\tau_i})/\tau_i} \frac{1}{\tau_i}(\mu_g - 1 - \frac{g\sigma_g^2}{\tau_i}) = 0,$$

which yields:

$$\mu_g - 1 = \frac{g\sigma_g^2}{\tau_i}.$$

Thus, the divorcee's optimal public good investment is:

$$g^D = \frac{(\mu_g - 1)\tau_i}{\sigma_g^2}. \tag{8}$$

The divorce's expected consumption for a given income realization y is $z^D = \mu_g g^D + y_i - g^D - \frac{(g^D)^2\sigma_g^2}{2\tau_i}$. Using the solution for g^D, this can be written as:

$$z^D = y_i + \frac{(\mu_g - 1)^2\tau_i}{2\sigma_g^2}.$$

From the perspective of period 0, before income shocks are realized, the expected utility from consumption when choosing to divorce is:

$$V^{iD} = -e^{-(\frac{(\mu_g-1)^2\tau_i}{2\sigma_g^2})/\tau_i} \int_{-\infty}^{\infty} e^{-y/\tau_i} f(y)dy$$

Assuming income is normally distributed, $y \sim N(\mu_{y_i}, \sigma_i^2)$:

$$V^{iD} = -e^{-\left(\frac{\mu_{y_i}}{\tau_i}(1-\frac{\sigma_i^2}{2\tau_i})+\frac{(\mu_g-1)^2}{2\sigma_g^2}\right)}.$$

The household's problem: The household maximizes its utility from consumption of the public good as well as private consumption of its members, subject to the budget constraint (1). After the income shocks of the spouses realize in period 1, the household faces the following maximization problem:

$$\max_{g,x_W^M,x_H^M} Eu(x_W^M, g) + Eu(x_H^M, g)$$

subject to the budget constraint (1). This can be written as:

$$\begin{aligned} Eu(x_W^M, g) + Eu(x_H^M, g) &= -\int_{-\infty}^{\infty} e^{-(x_W+rg)/\tau_W} f(r)dr - \int_{-\infty}^{\infty} e^{-(x_H+rg)/\tau_H} f(r)dr \\ &= -e^{-(x_W+\mu_g g-\frac{g^2\sigma_g^2}{2\tau_W})/\tau_W} - e^{-(x_H+\mu_g g-\frac{g^2\sigma_g^2}{2\tau_H})/\tau_H} \end{aligned}$$

where the budget constraint is $g + x_W + x_H = Y$. At the optimum, the following three conditions must hold:

$$\lambda = \frac{1}{\tau_W} e^{-z_W} \tag{9}$$

$$\lambda = \frac{1}{\tau_H} e^{-z_H} \tag{10}$$

$$\lambda = [\frac{1}{\tau_W} e^{-z_W}(\mu_g - \frac{g\sigma_g^2}{\tau_W}) + \frac{1}{\tau_H} e^{-z_H}(\mu_g - \frac{g\sigma_g^2}{\tau_H})] \tag{11}$$

Using (9) and (10) in (11), we obtain:

$$1 = (\mu_g - \frac{g\sigma_g^2}{\tau_W}) + (\mu_g - \frac{g\sigma_g^2}{\tau_H}).$$

This yields that the optimal public good consumption is:

$$g = \frac{2\mu_g - 1}{\sigma_g^2(\frac{1}{\tau_W} + \frac{1}{\tau_H})}.$$

This can also be written as:

$$g = \frac{2\mu_g - 1}{\sigma_g^2} \frac{\tau_W \tau_H}{\tau_W + \tau_H}.$$

The optimal private consumption of each spouse is given by:

$$\frac{1}{\tau_W} e^{-z_W} = \frac{1}{\tau_H} e^{-z_H}$$
$$z_W = z_H - \ln(\frac{\tau_W}{\tau_H})$$

where $z_i = (x_i + \mu_g g - \frac{g^2\sigma_g^2}{2\tau_i})/\tau_i$, and $i \in \{W, H\}$. Therefore:

$$(x_W + \mu_g g - \frac{g^2\sigma_g^2}{2\tau_W})/\tau_W = (x_H + \mu_g g - \frac{g^2\sigma_g^2}{2\tau_H})/\tau_H - \ln(\frac{\tau_W}{\tau_H}).$$

This yields the following optimal private consumption for the wife:

$$x_W = \frac{\tau_W}{\tau_W + \tau_H}(y_T - g) + \frac{\tau_W}{\tau_W + \tau_H}(\mu_g g - \frac{g^2\sigma_g^2}{2\tau_H}) - \frac{\tau_H}{\tau_W + \tau_H}(\mu_g g - \frac{g^2\sigma_g^2}{2\tau_W}) - \frac{\tau_W \tau_H}{\tau_W + \tau_H} \ln(\frac{\tau_W}{\tau_H})$$

which can be simplified to

$$x_W^M = \frac{\tau_W}{\tau_W + \tau_H}(y_T - g) - \omega + (\tau_W - \tau_H)\left(\frac{\mu_g g}{\tau_W + \tau_H} - \frac{(\sigma_g g)^2}{2\tau_W \tau_H}\right)$$

where $\omega = \frac{\tau_W \tau_H}{\tau_W + \tau_H} \ln(\frac{\tau_W}{\tau_H})$. This implies that the wife's expected total consumption, $z_W =$

$x_W + \mu_g g - \frac{g^2\sigma_g^2}{2\tau_W}$, is:

$$z_W = \frac{\tau_W}{\tau_W+\tau_H}(y_T - g) + \frac{\tau_W}{\tau_W+\tau_H}(\mu_g g - \frac{g^2\sigma_g^2}{2\tau_H}) - \frac{\tau_H}{\tau_W+\tau_H}(\mu_g g - \frac{g^2\sigma_g^2}{2\tau_W}) + \mu_g g - \frac{g^2\sigma_g^2}{2\tau_W} - \omega$$

Using the solution for g, the wife's expected total consumption can be written as:

$$\begin{aligned} z_W &= \frac{\tau_W}{\tau_W+\tau_H}y_T - \omega + \frac{\tau_W}{\tau_W+\tau_H}\frac{2\mu_g-1}{\sigma_g^2}\frac{\tau_W\tau_H}{\tau_W+\tau_H}(2\mu_g-1) - (\frac{2\mu_g-1}{\sigma_g^2}\frac{\tau_W\tau_H}{\tau_W+\tau_H})^2\frac{\sigma_g^2}{2\tau_H} \\ &= \frac{\tau_W}{\tau_W+\tau_H}y_T - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W^2\tau_H}{(\tau_W+\tau_H)^2} \end{aligned}$$

Given the consumption and investment decisions made in period 1 after shocks to income are realized, the expected utility in period 0 from staying married is:

$$V_W^M = -e^{-\left(\frac{\mu_Y\tau_W}{\tau_W+\tau_H} - \frac{\tau_W(\sigma_W^2+\sigma_H^2+\rho\sigma_W\sigma_H)}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W^2\tau_H}{(\tau_W+\tau_H)^2}\right)/\tau_W}$$

In period 0, the wife compares the utility from being married (after the shock is realized) with the utility from being divorced and prefers to divorce if

$$\phi V_i^M < V_i^D$$

This is equivalent to:

$$\phi < e^{-(\mu_{y_i} - \frac{\sigma_i^2}{2\tau_W} + \frac{(\mu_g-1)^2\tau_W}{2\sigma_g^2})/\tau_W} \Big/ e^{-\left(\frac{\mu_Y\tau_W}{\tau_W+\tau_H} - \frac{\tau_W(\sigma_W^2+\sigma_H^2+\rho\sigma_W\sigma_H)}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W^2\tau_H}{(\tau_W+\tau_H)^2}\right)/\tau_W}$$

This can be log-linearized to

$$\begin{aligned} \tau_W \ln(\phi) < &\Big(\frac{\mu_Y\tau_W}{\tau_W+\tau_H} - \frac{\tau_W(\sigma_W^2+\sigma_H^2+\rho\sigma_W\sigma_H)}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W^2\tau_H}{(\tau_W+\tau_H)^2}\Big) \\ &- \big(\mu_{y_i} - \frac{\sigma_i^2}{2\tau_W} + \frac{(\mu_g-1)^2\tau_W}{2\sigma_g^2}\big) \end{aligned}$$

Define $\phi' \equiv -\tau_W \ln(\phi)$ as the largest shock to marriage utility such that being married is

still preferred. Rearranging, we can see where the gains from marriage come from:

$$\phi' = \underbrace{\left(\frac{\mu_Y \tau_W}{\tau_W + \tau_H} - \frac{\tau_W(\sigma_W^2 + \sigma_H^2 + \rho\sigma_W\sigma_H)}{2(\tau_W + \tau_H)^2} - \omega - (\mu_{y_i} - \frac{\sigma_W^2}{2\tau_W}) \right)}_{\text{gains from risk sharing } (\phi'(s))}$$
$$+ \underbrace{\left(\frac{(2\mu_g - 1)^2}{2\sigma_g^2} \frac{\tau_W^2 \tau_H}{(\tau_W + \tau_H)^2} - \frac{(\mu_g - 1)^2 \tau_W}{2\sigma_g^2} \right)}_{\text{gains from public good sharing } (\phi'(g))}$$

The Impact of Heterogeneity in Risk Attitudes on Divorce

Proposition 1. *An increase in the heterogeneity in risk attitude of the couple (γ) will increase, decrease or have no effect on the likelihood of divorce if the risk-adjusted return of the public good, $(2\mu_g - 1)/\sigma_g$, is larger than Ω, smaller than Ω or the same as Ω, where*

$$\Omega(\sigma_Y, \tau_W, \gamma) = \sqrt{\frac{2}{\gamma^2 - 1}\left(\frac{\sigma_Y - \mu_Y}{\tau_W^2} - \hat{\omega}\right)}.$$

Proof. How does a change in γ affect utility from marriage?

$$\frac{\partial \phi'}{\partial \gamma} = -\frac{\mu_Y}{\tau_W(1+\gamma)^2} + \frac{\sigma_Y}{\tau_W(1+\gamma)^3} - \frac{\partial \omega'}{\partial \gamma} - \frac{\gamma^2 - 1}{(1+\gamma)^3} \frac{\tau_W(2\mu_g - 1)^2}{2\sigma_g^2}$$

where

$$\begin{aligned} \frac{\partial \omega'}{\partial \gamma} &= \tau_W \left(\frac{1 + \gamma - \gamma}{(1+\gamma)^2} \ln(\frac{1}{\gamma}) + \frac{\gamma}{1+\gamma}\gamma \right) \\ &= \tau_W \left(\frac{1}{(1+\gamma)^2} \ln(\frac{1}{\gamma}) + \frac{\gamma^2}{1+\gamma} \right) \end{aligned}$$

This can be written as:

$$\frac{\partial \phi'}{\partial \gamma} = \frac{\sigma_Y}{\tau_W(1+\gamma)^3} - \frac{\mu_Y}{\tau_W(1+\gamma)^2} - \tau_W \left(\frac{1}{(1+\gamma)^2} \ln(\frac{1}{\gamma}) + \frac{\gamma^2}{1+\gamma} \right) - \frac{\gamma^2 - 1}{(1+\gamma)^3} \frac{\tau_W(2\mu_g - 1)^2}{2\sigma_g^2}$$

Rearranging:

$$\frac{\partial \phi'}{\partial \gamma} = \frac{\tau_W}{(1+\gamma)^2}\left(\frac{\sigma_Y}{\tau_W^2(1+\gamma)} - \frac{\mu_Y}{\tau_W^2} - \ln(\frac{1}{\gamma}) - \gamma^2(1+\gamma) - \frac{\gamma^2-1}{(1+\gamma)}\frac{(2\mu_g-1)^2}{2\sigma_g^2}\right)$$

Define $\hat{\omega} = (1+\gamma)[\ln(\frac{1}{\gamma}) + \gamma^2(1+\gamma)]$. Then, we obtain the following:

$$\frac{\partial \phi'}{\partial \gamma} = \frac{\tau_W}{(1+\gamma)^3}\left(\frac{\sigma_Y - \mu_Y}{\tau_W^2} - \hat{\omega} - (\gamma^2-1)\frac{(2\mu_g-1)^2}{2\sigma_g^2}\right)$$

Hence, $\frac{\partial \phi'}{\partial \gamma} < 0$ iff

$$\frac{\sigma_Y - \mu_Y}{\tau_W^2} - \hat{\omega} - (\gamma^2-1)\frac{(2\mu_g-1)^2}{2\sigma_g^2} < 0$$

$$\frac{(2\mu_g-1)}{\sigma_g} > \sqrt{\frac{2}{\gamma^2-1}\left(\frac{\sigma_Y-\mu_Y}{\tau_W^2} - \hat{\omega}\right)}$$

Next, define $\Omega(\sigma_Y, \tau_W, \gamma) = \sqrt{\frac{2}{\gamma^2-1}\left(\frac{\sigma_Y-\mu_Y}{\tau_W^2} - \hat{\omega}\right)}$. If $(2\mu_g-1)/\sigma_g > \Omega$, as γ increases, the gains from marriage decrease. That is, as heterogeneity increases the likelihood of divorce increases.

The Differential Impact of Household Income Variance on Divorce

Proposition 2. *An increase in income correlation of the spouses, or an increase in the husband's income variance, all else equal, increases the likelihood of divorce. This effect is weakened in couples that exhibit more heterogeneity in risk attitudes.*

Proof. Holding fixed the variance of the wife's income, how does the utility of marriage change when income becomes more correlated? Recall that $\sigma_Y = \sigma_W^2 + \sigma_H^2 + \rho\sigma_W\sigma_H$. The more correlated incomes are, the lower the gains from marriage,

$$\frac{\partial \phi'(s)}{\partial \rho} = -\frac{\sigma_W\sigma_H}{2\tau_W(1+\gamma)^2} < 0$$

As heterogeneity increases, how does this change?

$$\frac{\partial^2 \phi'(s)}{\partial \rho \partial \gamma} = \frac{\sigma_W \sigma_H}{\tau_W (1+\gamma)^3} > 0$$

The more heterogeneous the couple is, the less damaging it is that income is correlated. Similarly, the higher the variance of the husband's income, all else equal, lowers the gains from marriage. This decrease is less damaging for households that are more heterogeneous.

Convergence in Risk Attitudes

Suppose that the wife can increase her risk tolerance, to $\tau'_W > \tau_W$, such that $\tau'_W = \tau_H$. This adjustment is costly, with a specific cost $c_a > 0$. Initially, utility from marriage is V_W^M as defined in (4). She can adjust her risk attitude, and the question we ask is, under what conditions her utility from marriage after converging to her husband, $V_W^M(\tau'_W)$, is higher.

To start, note that

$$V_W^M(\tau'_W) = -e^{-\left(\frac{\mu_Y}{2} - \frac{\tau_H \sigma_Y^2}{2(\tau_H+\tau_H)^2} - \omega' + \frac{(2\mu-1)^2}{2\sigma_g^2}\frac{\tau_H^2 \tau_H}{(\tau_H+\tau_H)^2} - c_a\right)/\tau_H}$$

where $\omega' = \frac{\tau_H \tau_H}{\tau_H+\tau_H}\ln(\frac{\tau_H}{\tau_H}) = 0$. Rearranging:

$$V_W^M(\tau'_W) = -e^{-\left(\frac{\mu_Y}{2} - \frac{(\sigma_Y^2)}{2(4\tau_H)} + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_H}{4} - c_a\right)/\tau_H}$$

Compare it with:

$$V_W^M = -e^{-\left(\frac{\mu_Y \tau_W}{\tau_W+\tau_H} - \frac{\tau_W(\sigma_Y^2)}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma^2}\frac{\tau_W^2 \tau_H}{(\tau_W+\tau_H)^2}\right)/\tau_W}$$

Proposition 3. *The wife has an incentive to change her risk attitude if the risk-adjusted return of the public good, $(2\mu-1)/\sigma$, is larger than Z, where*

$$Z \equiv \sqrt{\tilde{c}_a + \frac{\mu_Y(\tau_W+\tau_H)\tau_H - (\sigma_Y^2/4)(\tau_W+3\tau_H)}{\tau_H^2(\tau_H-\tau_W)}} - \tilde{\omega}$$

where $\tilde{c}_a = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2} c_a$ and $\tilde{\omega} = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2}\omega$.

Proof. $V_W^M(\tau'_W) > V_W^M$ iff

$$-e^{-\left(\frac{\mu_Y}{2} - \frac{(\sigma_Y^2)}{2(4\tau_H)} + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_H}{4} - c_a\right)/\tau_H} > -e^{-\left(\frac{\mu_Y \tau_W}{\tau_W+\tau_H} - \frac{\tau_W \sigma_Y^2}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W^2 \tau_H}{(\tau_W+\tau_H)^2}\right)/\tau_W}$$

Or,

$$\frac{\mu_Y}{2\tau_H} - \frac{(\sigma_Y^2)}{2(4\tau_H^2)} + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{1}{4} - c_a > \frac{\mu_Y}{\tau_W+\tau_H} - \frac{\sigma_Y^2}{2(\tau_W+\tau_H)^2} - \omega + \frac{(2\mu_g-1)^2}{2\sigma_g^2}\frac{\tau_W\tau_H}{(\tau_W+\tau_H)^2}$$

Rearranging,

$$\frac{(2\mu_g-1)^2}{\sigma_g^2} > \frac{(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2} 2c_a + \frac{(4\mu_Y(\tau_W+\tau_H)\tau_H - \sigma_Y^2(\tau_W+3\tau_H))}{4\tau_H^2(\tau_H-\tau_W)} - 2\omega\frac{(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2}$$

Define $\tilde{c}_a = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2} c_a$. Define $\tilde{\omega} = \frac{2(\tau_W+\tau_H)^2}{(\tau_H-\tau_W)^2}\omega$, then

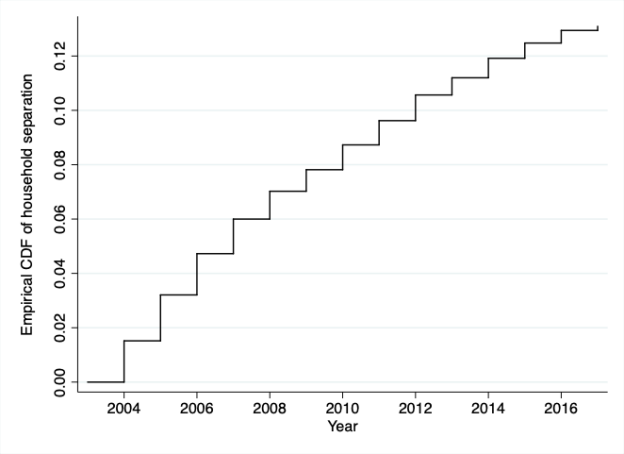
$$\frac{(2\mu_g-1)}{\sigma_g} > \sqrt{\tilde{c}_a + \frac{\mu_Y(\tau_W+\tau_H)\tau_H - (\sigma_Y^2/4)(\tau_W+3\tau_H)}{\tau_H^2(\tau_H-\tau_W)} - \tilde{\omega}}.$$

Appendix B

B.1. Descriptive Statistics of the Sample

B.1.1. Separations

Figure B.1. displays the empirical CDF of household separations by year. This figure plots the Kaplan-Meier failure function of our central dependent variable, household dissolution or separation. A year after intrahousehold heterogeneity in risk attitudes is measured, the rate of separations is 1.68%. Each year new households separate, and by 2017 12.6% of all households in the sample have separated.[21]



B.1. Empirical CDF of marriage dissolution

As described in the body of the paper, information on separation of the household is obtained from the relationship spell dataset collected in SOEP. In what follows we briefly provide more specific information on this dataset and the definition of separations. This dataset provides information, at the individual level, about all the relationship spells that an individual went through from the start of SOEP in 1984 until the last year the individual participates in the survey.[22] There are seven possible types of spell in the data: married living in the same household (HH), married not living in the same HH, partnership living in the

[21]Note that this measure differs from a measure often discussed in the media which measures the rate of households separating over the rate of new households that are formed. Such a measure leads to much larger failure rates, of over 50%.

[22]The information provided for each spell is the type of spell it is, the date the spell started and ended, as well as how the spell was censored, including the occurrence of partner death and divorce.

same HH, partnership not living in the same HH, single, separated, same-sex union living in the same HH, as well as unknown, unit nonresponse and answer improbable. Unfortunately, the "separated" spell does not correctly track separations, for three main reasons. First, some individuals transition from marriage to being single without having a spell in which they are separated. Second, in a large number of cases where partner death occurs, the individual is also classified as being separated. Third, the status "separated" is only attained after marriage, and thus does not identify partnerships living in the same household that separate, although such partnerships can be stable relationships that last more than 20 years.

Therefore, we examine every possible transition between spell types and establish the following criteria to determine a *separation*. We consider two types of separations, depending on whether the transition to a new spell marks a clear start of a new relationship or not. The first type are separations that are considered clear are the following transitions: from married (living or not in the same HH) to separated; from married living in the same HH to one of three statuses: (1) single, (2) in a relationship living in the same HH, or (3) in a relationship not living in the same HH; from married not living in the same HH to separated; from in a relationship living in the same HH to separated. The second type of separations, listed in what follows, are transitions that are "unclear", and thus we use yearly survey data to check whether there is a change in the identity of the partner. If so, then such a transition would be confirmed as a separation. We consider the following transitions under this category: from married living in the same HH to married not living in the same HH; from in a relationship living in the same HH to in a relationship not living in the same HH; from married living in the same HH or in a relationship living in the same HH to same-sex union.

B.1.2. Summary statistics for risk attitudes

The average willingness to take risks of women and men in the survey are presented in Table B.1. This table also presents the average absolute difference, which is between 1.8 and 2.2, out of a scale from 0 to 10.

Table B.2. presents the correlation matrix between the intrahousehold difference in willingness to take risks in each domain. The table shows, for example, that the correlation between the difference in willingness to take risks in general and the difference in willingness

B.1. Summary statistics of the willingness to take risks

Willingness to take risks:		Woman	Man	Intrahousehold Difference
in general	Average	3.92	4.91	2.13
	SD	2.25	2.28	1.83
in financial matters	Average	2.35	3.63	2.22
	SD	2.29	2.54	2.03
car driving	Average	2.04	2.97	1.85
	SD	1.94	2.35	1.84
in sports and leisure	Average	3.00	3.85	2.02
	SD	2.32	2.57	1.88
in career	Average	3.15	4.03	2.15
	SD	2.55	2.69	2.03
in health	Average	2.54	3.28	1.99
	SD	2.29	2.47	1.94

Note: This table presents average and standard deviation for the woman's and man's willingness to take risks in general, as well as in each domain, as well as the intrahousehold absolute difference (N=5,336 couples). All variables presented are measured in 2004.

to take risks while car driving is 0.277. As shown in the table, all correlation coefficients are between 0.2 and 0.4. In all cases, they are significantly larger than zero, but also significantly smaller than one.

B.2. Correlation matrix of intrahousehold difference in domain-specific willingness to take risks

Absolute difference in willingness to take risks:		Absolute difference in willingness to take risks in general	in financial matters	car driving	in sports and leisure	in career	in health
in general	ρ	1.000					
in financial matters	ρ	0.216	1.000				
	p	0.000					
car driving	ρ	0.277	0.301	1.000			
	p	0.000	0.000				
in sports and leisure	ρ	0.247	0.288	0.315	1.000		
	p	0.000	0.000	0.000			
in career	ρ	0.333	0.252	0.279	0.337	1.000	
	p	0.000	0.000	0.000	0.000		
in health	ρ	0.217	0.285	0.269	0.322	0.320	1.000
	p	0.000	0.000	0.000	0.000	0.000	

Note: This table presents the correlation matrix of the intrahousehold difference in willingness to take risks across the six domains of willingness to take risks elicited in the SOEP in 2004 (N=5,336 couples). ρ indicates the correlation coefficient. The p-value testing whether each correlation coefficient is positive is reported below each presentation of ρ.

B.2. Similarity in Individual Characteristics and Risk Attitudes

Significant intrahousehold similarity in risk and trust attitudes has been shown in Dohmen et al. (2012). In this section we reproduce their results and examine the degree of similarity in other individual characteristics, which allows us to examine the degree of correlation in risk attitudes as compared to that in other variables, such as age or years of education. The strong relationship between a woman and a man's risk and trust attitudes within a household is documented in the upper panels of Table B.3. This table presents the partial correlation coefficients between a man and woman's individual characteristic based on Zellner's seemingly unrelated regressions. The partial correlation coefficient in risk attitudes within the household ranges between 0.170 and 0.235, depending on the domain of risk attitudes. In line with previous literature (e.g., Oreffice and Quintana-Domeque, 2010; Chiappori et al., 2012; Lundberg, 2012, etc.), we find that household members exhibit a strong similarity in age, religion, years of education, cultural origins, BMI and personality traits. The correlation in age is the strongest, where an increase in the man's age of 1 year is related to a 0.9 increase in the woman's age. The results reveal that the correlation in BMI, years of education, and personality characteristics, among others, is as strong if not stronger than the correlation in risk attitudes. In this table we omit the correlation coefficients *across* domains, which are in some cases negative, in line with the findings in Chiappori et al. (2012). These results are available from the author upon request.

Table B.4 tests whether households that exhibit the same risk attitude in all domains except for one, also exhibit a high correlation in the remaining one. We find evidence suggesting that households exhibit homogeneity in each domain, rather than trading off homogeneity across domains.

B.3. Similarity in Individual Characteristics

	(1) Partial correlation coefficient	(2) Standard Error
Willingness to take risks		
in general	0.195***	(0.014)
car driving	0.170***	(0.014)
in financial matters	0.235***	(0.014)
in sports & leisure	0.205***	(0.013)
in career	0.209***	(0.014)
in health	0.226***	(0.014)
Trust attitudes		
Trust in general	0.327***	(0.014)
Reliance on other	0.348***	(0.014)
Towards strangers	0.327***	(0.014)
Socio-demographic characteristics		
Age	0.908***	(0.005)
Catholic		
Protestant	0.737***	(0.011)
Other religion	0.731***	(0.011)
No confession	0.779***	(0.009)
Years of education	0.423***	(0.011)
German	0.503***	(0.012)
Migrant	0.297***	(0.013)
In East Germany in 1989	0.649***	(0.012)
In West Germany in 1989	0.583***	(0.014)
Antrhopomorphic characteristics		
BMI	0.258***	(0.016)
Personality characteristics		
Conscientiousness	0.158***	(0.014)
Extraversion	0.159***	(0.013)
Agreeableness	0.140***	(0.014)
Neuroticism	0.182***	(0.014)
Openness to experience	0.225***	(0.015)

Note: This table presents coefficients from Zellner's seemingly unrelated regressions on individual characteristics. For each characteristic, column (1) displays the estimated partial correlation coefficient between the woman and the man's characteristic, controlling for other individual characteristics (N=4897). Column (2) presents the standard error of this coefficient. Willingness to take risks in general, car driving, financial matters, sports and leisure, career and health is the standardized reply to the question "How willing are you to take risks ...?", where 0 is completely unwilling and 10 is completely willing. Trust attitudes measure the agreement of the individual with the statements "in general, one can trust people", "these days you cannot rely on anybody else" and "when dealing with strangers, iti s better to be careful before you trust them". The answers could fall into strongly agree, agree somewhat, disagree somewhat, strongly disagree. These variables are standardized.The variables representing the socio-demographic characteristics are defined as in Table 2. BMI is the weight (in kg) divided by the height squared (in meters). Personality characteristics are measured using the Big-5 personality questionnaire. The answers to the questions corresponding to each domains (conscientiousnes, extraversion, agreeableness, neuroticism and opennens to experience) are averaged and standardized. Due to a large amount of missings in BMI and personality characteristics a dummy variable is included for missings in these variables, as well as education, religion and location in 1989 (see also Dohmen et al., 2012). Results remain qualitatively the same if missings are dropped. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Table B.4. Similarity in risk attitudes

	(1)	(2)	(3)	(4)	(5)	(6)
	Conditional on risk attitudes being equal in all other domains of risk, woman's willingness to take risk:					
	in general	car driving	in financial matters	in sports and leisure	in career	in health
Man's willingness to take risk:						
in general	0.652***					
	(0.064)					
car driving		0.645***				
		(0.107)				
in financial matters			1.142***			
			(0.064)			
in sports and leisure				1.030***		
				(0.040)		
in career					0.910***	
					(0.074)	
in health						0.946***
						(0.067)
Constant	-1.992**	0.899	0.041	0.378	-0.023	-0.203
	(0.787)	(0.777)	(0.470)	(0.240)	(0.459)	(0.352)
Observations	247	198	181	181	182	181
R-squared	0.632	0.687	0.828	0.934	0.877	0.876

Note: This table presents results from linear regression models on risk attitudes of the woman in each domain, measured in 2004, conditional on the couple exhibiting the same risk attitude in all other domains. The explanatory variables are the man's willingness to take risk, woman and man's years of education, woman and man's religious confession (catholic, protestant, other christian, other religion, no confession), woman and man's age, and cultural background (german nationality and whether they lived in East Germany, West Germany or abroad in 1989). All regressions include region fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

B.3. Extended Estimation Results

Table B.5. Extended Estimation Results for Columns (1)-(2) of Table 2

	(1)	(2)	(3)	(4)	(5)
	Likelihood of separation				
A. Intrahousehold risk and trust attitudes					
Difference in willingness to take risks	0.0141***	0.0102***	0.0084**	0.0094***	0.0112***
	(0.0030)	(0.0036)	(0.0036)	(0.0033)	(0.0035)
Squared difference in willingness to take risks					-0.0021
					(0.0018)
Woman's willingness to take risks in 1st quartile		-0.0390***	-0.0366***	-0.0376***	-0.0356***
		(0.0093)	(0.0094)	(0.0089)	(0.0091)
Woman's willingness to take risks in 2nd quartile		-0.0280***	-0.0226**	-0.0217**	-0.0212**
		(0.0094)	(0.0094)	(0.0088)	(0.0088)
Woman's willingness to take risks in 3rd quartile		-0.0050	-0.0008	-0.0003	-0.0004
		(0.0096)	(0.0095)	(0.0088)	(0.0088)
Man's willingness to take risks in 1st quartile		-0.0192*	-0.0223**	-0.0277***	-0.0277***
		(0.0109)	(0.0110)	(0.0104)	(0.0103)
Man's willingness to take risks in 2nd quartile		-0.0136	-0.0144	-0.0154*	-0.0168*
		(0.0099)	(0.0100)	(0.0092)	(0.0094)
Man's willingness to take risks in 3rd quartile		-0.0015	-0.0023	-0.0016	-0.0029
		(0.0097)	(0.0096)	(0.0089)	(0.0090)
B. Age difference					
Wife >5 yr older			0.0391	0.0125	0.0127
			(0.0239)	(0.0228)	(0.0228)
Wife 3-5 yr older			0.0210	0.0120	0.0122
			(0.0159)	(0.0148)	(0.0148)
Husband 0-2 yr older			-0.0008	0.0051	0.0053
			(0.0076)	(0.0071)	(0.0071)
Husband 2-4 yr older			0.0065	0.0055	0.0057
			(0.0081)	(0.0076)	(0.0075)
Husband >5yr older			0.0131	-0.0020	-0.0017
			(0.0089)	(0.0084)	(0.0084)
C. Educational achievement (Woman / Man)					
High school / High school			-0.0170	0.0045	0.0039
			(0.0147)	(0.0146)	(0.0146)
More than high school / more than high school			-0.0446***	0.0306*	0.0298*
			(0.0160)	(0.0172)	(0.0172)
High school / Less than high school			-0.0141	-0.0084	-0.0089
			(0.0161)	(0.0156)	(0.0155)
High school / More than high school			-0.0165	0.0205	0.0199
			(0.0190)	(0.0185)	(0.0185)
Less than high school / High school			-0.0016	0.0014	0.0008
			(0.0224)	(0.0208)	(0.0208)
Less than high school / More than high school			-0.0043	0.0112	0.0117
			(0.0485)	(0.0419)	(0.0419)
More than high school /High school			-0.0489***	0.0057	0.0048
			(0.0156)	(0.0161)	(0.0161)
More than high school / Less than high school			-0.0577***	-0.0167	-0.0175
			(0.0186)	(0.0197)	(0.0198)
D. Other differences in social background					

Different religion	0.0005	0.0060	0.0058
	(0.0247)	(0.0216)	(0.0216)
Different location in Germany in 1989	0.0351***	0.0245***	0.0243***
	(0.0074)	(0.0068)	(0.0068)
Different nationality	0.0227	0.0265*	0.0265*
	(0.0169)	(0.0156)	(0.0156)
E. Differences in trust attitudes			
Difference in trust attitudes		0.0026	0.0025
		(0.0027)	(0.0027)
Woman's trust attitude in 1st quartile		-0.0089	-0.0088
		(0.0091)	(0.0091)
Woman's trust attitude in 2nd quartile		-0.0122*	-0.0122*
		(0.0073)	(0.0073)
Woman's trust attitude in 3rd quartile		-0.0206**	-0.0206**
		(0.0085)	(0.0085)
Man's trust attitude in 1st quartile		-0.0031	-0.0032
		(0.0089)	(0.0090)
Man's trust attitude in 2nd quartile		-0.0028	-0.0028
		(0.0071)	(0.0071)
Man's trust attitude in 3rd quartile		0.0031	0.0030
		(0.0089)	(0.0089)
F. Differences in BMI (Woman / Man)			
Overweight / Normal weight		-0.0714	-0.0718
		(0.0759)	(0.0758)
Overweight / Underweight		-0.0445	-0.0449
		(0.0763)	(0.0762)
Normal weight / Overweight		-0.0518	-0.0522
		(0.0760)	(0.0759)
Normal weight / Normal weight		-0.0340	-0.0344
		(0.0763)	(0.0761)
Normal weight / Under weight		0.1228	0.1220
		(0.1092)	(0.1093)
Underweight / Overweight		0.0947***	0.0959***
		(0.0311)	(0.0313)
Underweight / Normal Weight		0.1443***	0.1455***
		(0.0352)	(0.0353)
Underweight / Underweight		-0.1170	-0.1181
		(0.0773)	(0.0772)
G. Difference in personality (Big 5)			
Difference in conscientiousness		0.0012	0.0012
		(0.0018)	(0.0018)
Difference in extraversion		-0.0002	-0.0002
		(0.0015)	(0.0015)
Difference in agreeableness		0.0012	0.0012
		(0.0016)	(0.0016)
Difference in neuroticism		0.0013	0.0013
		(0.0014)	(0.0014)
Difference in openness to experience		-0.0014	-0.0014
		(0.0011)	(0.0011)
H. Household income (in log), employment and income pooling			
Log of household income		-0.1132***	-0.1132***
		(0.0068)	(0.0068)
Wife employed		0.0406***	0.0406***
		(0.0039)	(0.0039)

Husband employed				-0.0460***	-0.0461***
				(0.0061)	(0.0061)
Household pools income				-0.0250**	-0.0250**
				(0.0102)	(0.0102)
I. Relationship characteristics					
Married couple				-0.0775***	-0.0776***
				(0.0141)	(0.0141)
Length of the relationship				-0.0024***	-0.0024***
				(0.0004)	(0.0004)
Husband previously married				0.0307	0.0302
				(0.0378)	(0.0378)
Husband has children from prev. marriage				-0.0247	-0.0243
				(0.0456)	(0.0456)
Couple has 1-2 kids				0.0132	0.0131
				(0.0092)	(0.0092)
Couple has 3-5 kids				0.0122	0.0122
				(0.0103)	(0.0103)
Couple has more than 6 kids				0.0465	0.0468
				(0.0362)	(0.0361)
Constant	0.0058	0.0291*	0.0297	1.3276***	1.3292***
	(0.0137)	(0.0159)	(0.0220)	(0.1082)	(0.1082)
Regional fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	0.0390**	0.0642***	0.0700***	1.3639***	1.3678***
Nr. of individuals	(0.0194)	(0.0208)	(0.0256)	(0.1047)	(0.1048)
R-squared	0.0192	0.0260	0.0422	0.170	0.170

Note: this table presents results from a random effects probability linear model on divorce in the years 2004 to 2017. Difference in willingness to take risks is the principal component of the intrahousehold absolute difference in risk attitudes, and is standardized. Woman's and man's willingness to take risks in 1st, 2nd and 3rd quartile are dummy variables for the willingness to take risks of men and women, respectively. In column (3) the following control variables are added: differences and levels in age, differences and levels in educational attainment, differences in religion, nationality, location in Germany in 1989. Column (4) additionally includes differences and levels of trust attitudes, differences in personality traits, differences and levels in BMI, the log of household income, employment status, income pooling, dummy variables for the wife and the husband's employment sector (based on the first two digits of ISCO 88 classification categories) and relationship characteristics. Relationship characteristics include a dummy variable for whether the couple is married, relationship length, previous marriage and children from previous marriage, as well as children from current marriage. Due to the substantial number of missings in household incomes, we proceed as in Dohmen et al. (2012) and include a dummy for missing values in household income, and correspondingly for all other variables with missings (education, religion, location in 1989, BMI and personality). All regressions include region and year fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

B.4. Alternative Specifications

Table B.6. presents a cross-sectional model of the likelihood of being divorced by 2017, instead of a random-effects linear probability model.

Table B.6. Cross-sectional Model of Likelihood of Separation: Estimation Results

	(1)	(2)	(3)	(4)	(5)
	Likelihood of separation				
Difference in willingness to take risks	0.0190***	0.0140***	0.0114**	0.0099**	0.0102**
	(0.0041)	(0.0050)	(0.0050)	(0.0049)	(0.0052)
Squared difference in willingness to take risks					-0.0004
					(0.0028)
Woman's willingness to take risks in 1st quartile		-0.0483***	-0.0450***	-0.0285**	-0.0281**
		(0.0128)	(0.0130)	(0.0131)	(0.0136)
Woman's willingness to take risks in 2nd quartile		-0.0337***	-0.0266**	-0.0142	-0.0141
		(0.0124)	(0.0124)	(0.0124)	(0.0124)
Woman's willingness to take risks in 3rd quartile		0.0019	0.0073	0.0154	0.0154
		(0.0128)	(0.0127)	(0.0125)	(0.0125)
Man's willingness to take risks in 1st quartile		-0.0252*	-0.0296*	-0.0166	-0.0166
		(0.0151)	(0.0152)	(0.0151)	(0.0151)
Man's willingness to take risks in 2nd quartile		-0.0130	-0.0140	-0.0083	-0.0086
		(0.0134)	(0.0134)	(0.0133)	(0.0136)
Man's willingness to take risks in 3rd quartile		-0.0015	-0.0027	0.0027	0.0024
		(0.0130)	(0.0128)	(0.0127)	(0.0129)
Controls					
Demographic characteristics	No	No	Yes	Yes	Yes
Economic, relationship and other characteristics	No	No	No	Yes	Yes
Nr. of individuals	5,336	5,336	5,336	5,336	5,336
R-squared	0.0123	0.0206	0.0403	0.0841	0.0841

Note: this table presents results from a cross-sectional model of household separation by 2017. Difference in willingness to take risks is the principal component of the intrahousehold absolute difference in risk attitudes, and is standardized. Woman's and man's willingness to take risks in 1st, 2nd and 3rd quartile are dummy variables for the willingness to take risks of men and women, respectively. In column (3) the following control variables are added: differences in age, differences and levels in educational attainment, differences in religion, nationality, location in Germany in 1989. In column (4) the following variables are added: differences and levels of trust attitudes, differences in personality traits, differences and levels in BMI, employment status of man and woman and the log of household income. Column (4) additionally includes several relationship characteristics: a dummy variable for whether the couple is married, relationship length, previous marriage and children from previous marriage, as well as children from current marriage. All variables are measured in 2004, except for income, employment and number of children which are measured on a yearly basis and time-varying covariates in column (4). All regressions include region fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Table B.7. presents a replication of Table 2 using a Cox hazard model. Table B.8. presents the average partial effect of heterogeneity from a random effects probit model.

Table B.7. Cox Hazard Model on Likelihood of Separation: Estimation Results

	(1)	(2)	(3)	(4)	(5)
	Likelihood of separation				
Difference in willingness to take risks	0.1761***	0.1584***	0.1388***	0.1171**	0.1302**
	(0.0388)	(0.0500)	(0.0501)	(0.0508)	(0.0625)
Squared difference in willingness to take risks					-0.0113
					(0.0291)
Woman's willingness to take risks in 1st quartile		-0.5771***	-0.5548***	-0.3855**	-0.3757**
		(0.1478)	(0.1506)	(0.1589)	(0.1631)
Woman's willingness to take risks in 2nd quartile		-0.3658***	-0.2764**	-0.1705	-0.1691
		(0.1267)	(0.1300)	(0.1347)	(0.1347)
Woman's willingness to take risks in 3rd quartile		-0.0029	0.0702	0.1375	0.1366
		(0.1102)	(0.1112)	(0.1138)	(0.1138)
Man's willingness to take risks in 1st quartile		-0.3413**	-0.3837**	-0.2756	-0.2733
		(0.1566)	(0.1593)	(0.1684)	(0.1685)
Man's willingness to take risks in 2nd quartile		-0.1011	-0.1169	-0.0315	-0.0365
		(0.1317)	(0.1327)	(0.1355)	(0.1366)
Man's willingness to take risks in 3rd quartile		0.0245	0.0064	0.0607	0.0554
		(0.1161)	(0.1166)	(0.1204)	(0.1213)
Controls					
Demographic characteristics	No	No	Yes	Yes	Yes
Economic, relationship and other characteristics	No	No	No	Yes	Yes
Observations	45440	45440	45440	45440	45440
Nr. of individuals	5,336	5,336	5,336	5,336	5,336
R-squared	0.00629	0.0117	0.0242	0.0531	0.0531

Note: this table presents results from a Cox hazard model of household duration in the years 2004 to 2017. Difference in willingness to take risks is the principal component of the intrahousehold absolute difference in risk attitudes, and is standardized. Woman's and man's willingness to take risks in 1st, 2nd and 3rd quartile are dummy variables for the willingness to take risks of men and women, respectively. In column (3) the following control variables are added: differences in age, differences and levels in educational attainment, differences in religion, nationality, location in Germany in 1989. In column (4) the following variables are added: differences and levels of trust attitudes, differences in personality traits, differences and levels in BMI, employment status of man and woman and the log of household income. Column (4) additionally includes several relationship characteristics: a dummy variable for whether the couple is married, relationship length, previous marriage and children from previous marriage, as well as children from current marriage. All variables are measured in 2004, except for income, employment and number of children which are measured on a yearly basis and time-varying covariates in column (4). All regressions include region fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

We also extend the analysis to explore whether changes in heterogeneity in risk attitudes within the household between 2009 and 2004 are associated with an increased likelihood of separation in the period that follows, from 2010 to 2017. The results are presented in Table B.9, where the main change is that the explanatory variable is the difference between the intrahousehold difference in risk attitudes in 2009 and that in 2004. We obtain qualitatively similar results to those in Table 2. A one standard deviation increase in heterogeneity in risk attitudes between 2004 and 2009 is associated with a 1.1 to 1.4 percentage point increase in the likelihood of separation in the period from 2010 to 2017.

Table B.8. Random Effects Probit Model

	(1)	(2)
	Likelihood of separation from 2004-2017	
Difference in willingness to take risks	0.00696***	0.00673***
	(0.00152)	(0.00244)
Demographic characteristics	No	Yes
Observations	44929	44929
Nr. of individuals	5370	5370

Note: This table presents the average partial effect of intrahousehold heterogeneity in risk attitude on the likelihood of separation. The bootstrapped standard error is presented in parentheses, where 500 replications were run. All regressions include controls for the risk attitudes of each member of the household, demographic controls and region fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Table B.9. Changes in intrahousehold heterogeneity (2009 - 2004) and separation for 2010-2017

	(1)	(2)	(3)	(4)
	Likelihood of separation from 2010-2017			
2009 Difference - 2004 Difference in risk attitudes	0.0142***	0.0117**	0.0121**	0.0113**
	(0.0055)	(0.0057)	(0.0056)	(0.0052)
Controls				
Demographic characteristics	No	No	Yes	Yes
Economic, relationship and other characteristics	No	No	No	Yes
Observations	17,198	17,198	17,198	17,198
Nr. of households	2,847	2,847	2,847	2,847
R-squared	0.00413	0.0106	0.0228	0.136

Note: This table presents results from a random effects probability linear model on separation in the years 2010 to 2017. The 2009 Difference - 2004 Difference in risk attitudes is calculated by comparing the difference in willingness to take risks within the household (principal component) in 2009 and that same measure in 2004. The regressions include indicators for the wife's and the husband's willingness to take risks in 2009 being in the 1st, 2nd and 3rd quartile of the distribution of willingness to take risks of men and women, respectively. The remainder of the control variables are the same as those in column (2) of Table 2. Robust standard errors shown in parentheses, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

B.5. Heterogeneous Effects: Only Married Couples and Relationship Length

Table B.10 presents the results of our main specification, Table 2, including only married couples in 2004. The results remain qualitatively the same.

B.10. Intrahousehold heterogeneity in risk attitudes and Separation: Married couples

	(1)	(2)	(3)	(4)	(5)
	Likelihood of separation from 2004-2017				
Intrahousehold difference in willingness to take risks	0.0103***	0.0098***	0.0088***	0.0101***	0.0130***
	(0.0026)	(0.0034)	(0.0033)	(0.0032)	(0.0034)
Squared difference in willingness to take risks					-0.0037**
					(0.0016)
Woman's willingness to take risks in 1st quartile		-0.0365***	-0.0352***	-0.0427***	-0.0392***
		(0.0090)	(0.0091)	(0.0087)	(0.0089)
Woman's willingness to take risks in 2nd quartile		-0.0280***	-0.0241***	-0.0288***	-0.0282***
		(0.0091)	(0.0091)	(0.0087)	(0.0087)
Woman's willingness to take risks in 3rd quartile		-0.0056	-0.0026	-0.0056	-0.0059
		(0.0093)	(0.0092)	(0.0087)	(0.0087)
Man's willingness to take risks in 1st quartile		0.0016	0.0001	-0.0158	-0.0160
		(0.0107)	(0.0107)	(0.0103)	(0.0102)
Man's willingness to take risks in 2nd quartile		0.0011	0.0011	-0.0062	-0.0088
		(0.0095)	(0.0096)	(0.0091)	(0.0092)
Man's willingness to take risks in 3rd quartile		0.0101	0.0101	0.0046	0.0023
		(0.0091)	(0.0090)	(0.0086)	(0.0088)
Controls					
Demographic characteristics	No	No	Yes	Yes	Yes
Economic, relationship and other characteristics	No	No	No	Yes	Yes
Observations	42,740	42,740	42,740	42,740	42,740
Nr. of households	4,673	4,673	4,673	4,673	4,673
R-squared	0.0261	0.0326	0.0485	0.138	0.138

Note: this table presents results from a random effects probability linear model on divorce in the years 2004 to 2017 for married couples. The same control variables are included as in column (2) of Table 2. All regressions include region and year fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

Table B.11 includes an interaction term between differences in willingness to take risk and the length of time the couple has cohabited. The coefficient of the difference in willingness to take risk term is slightly larger, but the interaction with length of cohabitation is not significant.

B.11. Intrahousehold heterogeneity in risk attitudes and Separation: Relationship Length

	(1)	(2)	(3)	(4)
	Likelihood of separation from 2004-2017			
Intrahousehold difference in willingness to take risks	0.0170***	0.0146***	0.0117**	0.0104**
	(0.0052)	(0.0056)	(0.0055)	(0.0050)
Intrahousehold difference in willingness to take risks	-0.0004	-0.0006	-0.0004	-0.0001
X Years in a relationship	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Controls				
Demographic characteristics	No	No	Yes	Yes
Economic, relationship and other characteristics	No	No	No	Yes
Observations	48,164	48,164	48,164	48,164
Nr. of households	5,336	5,336	5,336	5,336
R-squared	0.0194	0.0264	0.0424	0.170

Note: this table presents results from a random effects probability linear model on divorce in the years 2004 to 2017. It adds an interaction term between intrahousehold difference in risk attitudes and an indicator for newly-formed households, which are defined as households living together for less than 2 years. The same control variables are included as in Table 2. All regressions include region and year fixed effects. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5%, and 10% level, respectively.

B.6. Attrition Analysis

A central concern in the analysis of panel data is nonrandom attrition from the survey. Indeed, as shown in Kroh (2014) households in which there is a separation are significantly more likely to leave the panel. Such attrition would nevertheless weaken the results obtained here, as it would mean that separation is not observed when it should be, and hence should not be a major confound in the analysis. However, the issue of attrition is one we study here to examine whether the results are robust. We start by documenting the extent of attrition in the sample in Table B.12. As shown in this table, there are 5,336 households with complete measures of willingness to take risks in the survey. The share of these households who continue to participate in the survey however decreases over time. By 2017, only 1,978 of the initial households remain.

B.12. Attrition from panel

Year	Number of households
2004	5336
2005	5034
2006	4687
2007	4407
2008	4103
2009	3795
2010	3517
2011	3269
2012	2869
2013	2693
2014	2514
2015	2321
2016	2158
2017	1978

We then reproduce our results focusing on increasing the required number of waves the household must be observed in the panel (Verbeek and Nijman, 1996). Table B.13. estimates the relationship between intrahousehold heterogeneity in risk attitudes and separation, imposing increasingly stricter concerns on the number of years the household must appear in the sample. In column (1) the full sample is included, reproducing the result presented in column (2) of Table 2. In column (2) the sample is restricted to households that are respondents to the survey for at least 3 years in the 2004-2017 period. Column (3) requires a mininum of 5 years, and this restriction increases through to column (7), where the re-

striction is that households must have been respondents to the survey for at least 13 years in the 2004-2017 period. As this restriction increases, the relationship between heterogeneity in risk attitudes and future separation is generally strengthened, in line with the argument that attrition weakens our results.

B.13. Regression Results by Years in Sample

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Likelihood of separation						
Sample restriction:	Minimum number of years in sample						
	1 (full sample)	3	5	7	9	11	13
Difference in willingness to take risks	0.0094***	0.0093***	0.0100**	0.0111***	0.0155***	0.0193***	0.0180***
	(0.0033)	(0.0036)	(0.0039)	(0.0043)	(0.0050)	(0.0052)	(0.0059)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48,164	47,169	45,162	41,989	37,104	33,789	29,762
Nr. of individuals	5,336	4,687	4,103	3,517	2,869	2,514	2,158
R-squared	0.170	0.172	0.173	0.174	0.181	0.179	0.172

B.7. Inclusion of Patience, Asymmetry in Gender and in Earnings

Recent evidence suggests that traditional gender roles can affect the marriage market and decision-making within the household (Bertrand, Kamenica and Pan, 2015). It is possible that women are expected to be less willing to take risks and, thus, that a higher willingness to take risks than their spouse could break a traditional gender role. We explore whether households in which the woman is generally more willing to take risks than the man exhibit higher marital stability. We add an interaction term to the main specification displayed in Table 2, which measures the number of domains in which the woman is more willing to take risks than the man. The results in Panel A of Table B.14 reveal that the coefficient of this interaction term is not significant, suggesting that the direction of heterogeneity is not a central factor in marital stability. Consistent with this result, the coefficient for the intrahousehold difference in risk attitudes remains unchanged. Relatedly, we also examine whether differences in risk aversion could implicitly measure differences in income within the household, and the latter could be the reason why individuals divorce. We do not find evidence that differences in income, measured as the ratio of the man's to the woman's income, increase the likelihood of divorce.

We also examine the strength of our results, when a measure of the households' match quality is included. This measure is based on the answer to the question "How satisfied are you with your family life", to which individuals could reply from 0 (totally unhappy) to 10 (totally happy). This measure was included as of 2006, and hence we examine the relationship between differences in risk attitudes and separation, including this additional control measure, in the period between 2006 and 2017. The results are presented in Table B.14.

The degree of impatience is an important individual preference, which can play a role in a variety of household behaviors, including wealth accumulation (e.g., Voena, 2015). Previous research has shown that heterogeneity in time preferences within households is associated with less efficient saving decisions (Schaner, 2015). We examine whether heterogeneity in patience predicts household instability, and whether the role of heterogeneity in risk attitudes remains robust to the inclusion of patience. The SOEP measured impatience

Table B.14. Additional Results: Inclusion of Patience, Asymmetry in Gender and in Earnings

	(1)	(2)	(3)
	Likelihood of separation		
Panel A. Gender and earnings asymmetry	**Years 2004-2017**		
Difference in willingness to take risks	0.0115***	0.0089***	0.0110***
	(0.0041)	(0.0033)	(0.0041)
Difference in willingness to take risks*Woman more willing to take risks	-0.0015		-0.0015
	(0.0019)		(0.0019)
Ratio of man to woman's earnings		-0.0061	-0.0061
		(0.0060)	(0.0060)
Observations	48,164	48,164	48,164
Nr. of households	5,336	5,336	5,336
R-squared	0.170	0.175	0.175
Panel B. Spouses' Happiness	**Years 2006-2017**		
Difference in willingness to take risks	0.0115**	0.0115**	0.0115**
	(0.0048)	(0.0048)	(0.0048)
Difference in willingness to take risks*Woman more willing to take risks		-0.0016	-0.0015
		(0.0024)	(0.0022)
Ratio of man to woman's earnings		-0.0066	-0.0060
		(0.0063)	(0.0063)
Woman's satisfaction with family life			-0.0086***
			(0.0027)
Man's satisfaction with family life			-0.0249***
			(0.0032)
Observations	37,879	37,879	37,879
Nr. of households	4,686	4,686	4,686
R-squared	0.179	0.183	0.259
Panel A. Intrahousehold heterogeneity in patience	**Years 2009-2017**		
Difference in willingness to take risks	0.0100**	0.0092**	0.0091*
	(0.0045)	(0.0046)	(0.0047)
Difference in willingness to take risks*Woman more willing to take risks		0.0005	0.0005
		(0.0020)	(0.0020)
Ratio of man to woman's earnings		-0.0024	-0.0011
		(0.0077)	(0.0078)
Woman's satisfaction with family life		-0.0008	-0.0009
		(0.0020)	(0.0020)
Man's satisfaction with family life		-0.0035	-0.0024
		(0.0023)	(0.0021)
Difference in patience			0.0018
			(0.0039)
Observations	19,006	19,006	18,698
Nr. of households	2,867	2,867	2,819
R-squared	0.0927	0.0968	0.0981

Note: Panel A of this table presents results from a random effects linear probability model on household separation from 2004 to 2017, including measures of gender asymmetry in willingness to take risks as well as income assymetry. Woman more willing to take risks is a variable that counts the number of questions, out of six, for which the woman in the household was more willing to take risks than the man. Ratio of man to woman's earnings is the earnings ratio of the spouses. Panel B of this table further includes a measure of match quality, proxied by each of the spouses' stated satisfaction with family life. Since this measure was included first in 2006 in the SOEP, Panel B presents results from a random effects linear probability model on household separation in the years 2006 to 2017. Panel C of this table presents results from a random effects linear probability model on household separation in the years 2009 to 2017, since patience was only measured in 2008. Intrahousehold difference in patience is the absolute difference in the response of spouses to the question "Are you generally an impatient person, or someone who always shows great patience?", where responses range from 0 (very impatient) to 10 (very patient). All three variables are standardized. Woman's and man's willingness to take risk, trust attitudes and patience in 1st, 2nd and 3rd quartile as dummy variables for the level of risk, trust and patience attitudes of men and women, respectively, are included in all specifications. All regressions include the same controls as included in column (2) of Table 2. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

in 2008, by asking individuals "Are you generally an impatient person, or someone who always shows great patience?". Individual responses ranged from 0, very impatient, to 10, very patient. Since it was only measured in the survey in 2008, it is not included in the main analysis. However, we add patience in robustness tests. The results in Panel C of Table B.14 show that heterogeneity in time preference, measured as the absolute difference in patience within the household, is not significantly related to separation, in line with Schaner (2015). At the same time, heterogeneity in risk attitudes continues to be predictive of divorce: a one standard deviation increase in the difference in risk attitudes is associated with a 0.9 percentage point increase in the likelihood of separation.

B.8. Emotional Well-Being

On a biyearly basis the SOEP elicits several measures of health, which include two questions on the emotional well-being of each household member. The survey asks respondents whether (a) they experienced feelings of depression or somberness (niedergeschlagen and truebsinnig, in German) and (b) whether they felt balanced and easy (ruhig and ausgeglichen, in German) in the last 4 weeks (preceding the timing of survey completion). The potential answers to these questions are "always", "often", "sometimes", "rarely", "never". We define an individual as feeling depressed or somber if he or she reported such feelings occurring often or always. We define an individual as feeling lack of balance if he or she reported never or rarely feeling balanced and easy. Table B.15 examines whether negative feelings such as depression and lack of balance are felt more often by men or women in households that exhibit a higher degree of heterogeneity in willingness to take risks. The evidence suggests that this is the case, which is consistent with such households reaching lower levels of household utility.

Table B.15. Emotional Well-Being and Intrahousehold Heterogeneity in Risk Attitudes

	(1)	(2)	(3)	(4)
Feelings of:	Depression		Uneasiness	
	Man	Woman	Man	Woman
Intrahousehold difference in willingness to take risks	0.0096***	0.0089**	0.0096**	0.0035
	(0.0037)	(0.0042)	(0.0038)	(0.0038)
Controls	Yes	Yes	Yes	Yes
Observations	22,764	23,081	22,756	23,072
Nr. of individuals	5,250	5,252	5,251	5,251
(Overall) R-squared	0.0383	0.0401	0.0330	0.0318

Note: This table presents estimates of a random effects ordinary least squares model of emotional well-being as a function of intrahousehold heterogeneity in risk attitudes. The dependent variable in columns (1)-(2), feelings of depression, somberness, takes value one if the individual indicated that in the last four weeks she often or always felt depressed and somber. The dependent variable in columns (3)-(4), feelings of uneasiness, lack of balance, takes value one if the individual indicated that in the last four weeks she almost never or never felt well-balanced and easy. These variables were collected biyearly in the SOEP. The waves included start in 2004 and end in 2016. The control variables included in all specifications are the same as those included in column (2) of Table 2. Region and year fixed effects are included in all specifications. The sample includes only couples who do not separate in the period from 2004 to 2016. Robust standard errors shown, clustered at the couple level. ***,**,* indicate significance at the 1%, 5% and 10% level, respectively.

Appendix C. Risk Aversion Coefficients and Household Instability

Our empirical analysis has been based on several measures of willingness to take risks, which have been shown to correlate with incentivized lottery choices as well as risky behaviors (Dohmen et al., 2011). A drawback of this approach is that such measures cannot be directly related to risk aversion coefficients, which are the primitives of our theoretical model. This section uses hypothetical investment choices made by survey respondents to calculate individual risk aversion coefficients. Using this approach, intrahousehold heterogeneity in risk attitude can be translated into a measure of the difference in risk aversion coefficients of its members. Such an exercise can provide potentially important results for future theoretical work examining the relationship between household behavior and risk attitude.[23]

In the 2004 and 2009 waves of the SOEP, respondents were asked to imagine that they had won $100,000 in a lottery, and that they were offered an investment opportunity by a well-known bank that would either double the amount invested or return only half of the investment, with equal chance. They were offered the opportunity to invest nothing, $20,000, $40,000, $60,000, $80,000 or the entire amount. This task resembles the task developed by Eckel and Grossman (2002), in which individuals choose one of six lotteries. Choices in the task have implications regarding the degree of risk aversion of each individual. If we assume that individual utility is CARA, $u(x) = -a^{-1}e^{-ax}$, each investment choice can be mapped into an interval in which the individual's CARA coefficient, a, must lie. The interval implied for each choice is displayed in Table C.1. For example, if the individual chose not to invest, her risk aversion coefficient must be larger than 0.0000485.

We use the midpoint of each interval presented in Table C.1. to calculate each individual's coefficient of absolute risk aversion in the years 2004 and 2009, and set the coefficient to be equal to the lower or upper bound for boundary choices.[24] The average CARA for

[23]The correlation between the intrahousehold absolute difference in risk aversion coefficients and the measure of heterogeneity based on the principal component of the absolute difference in willingness to take risks over the six measures elicited in the SOEP is significant. The Spearman correlation coefficient is $\rho = 0.2125$ between these measures in 2004.

[24]Due to the fact that individuals make a single choice in each of the two years the question was asked, among six possible investment options, and that a large majority of the individuals make the same choice in

C.1. Investment Choice and Implied CARA coefficients

Investment amount	Range of absolute risk aversion coefficient
$ 100,000	a<0.000005
$ 80,000	0.000005<a<0.000007
$ 60,000	0.000007<a<0.00001
$ 40,000	0.00001<a<0.00002
$ 20,000	0.00002<a<0.00005
$ 0	a>0.00005

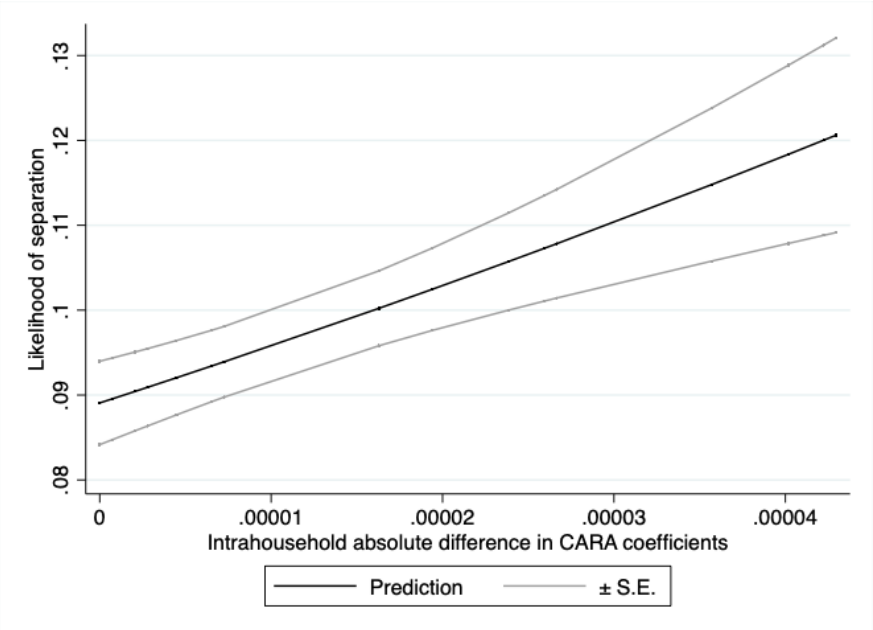
Note: This table displays the implied CARA coefficient for each possible investment choice. This hypothetical investment choice was elicited in 2004 and 2009. Each individual was asked to choose one of the investment amounts listed. The assumed utility function is $u(x) = -1/ae^{-ax}$, where a is the CARA coefficient.

women is .0000389 ($s.d.$ = .000014), while that for men is .0000358 ($s.d.$ = .0000159). The implied CARA coefficients are very small, a result that is typical when stakes are large, such as those in these lotteries, and in line with estimates in previous studies (e.g., Babcock, Choi and Feinerman, 1993).

In line with our previous results, the intrahousehold difference in CARA coefficients in 2004 is significantly related to the household's likelihood of separation from 2004 to 2017 (point-biserial correlation coefficient, ρ=0.0333, p = 0.0152). This result is illustrated in Figure C.1., which presents the estimated relationship between intrahousehold heterogeneity in CARA coefficients and separation. The standard errors in the estimation are bootstrapped to account for the fact that the difference in CARA coefficients is calculated as the midpoint of an interval, and thus noisy. Moving from complete homogeneity, a difference of 0, to a difference of 0.0004 in absolute risk aversion, the average likelihood of separation increases by more than 20 percent, from less than 9 percent to more than 11 percent. The results of a fixed-effects model on the probability of separation, including controls for each spouse's risk aversion coefficient and time-varying characteristics, provide a similar conclusion. A one percent increase in the intrahousehold absolute difference in CARA coefficients increases the likelihood of separation by 0.5 percentage points (bootstrapped s.e.=.002, p = 0.017). The same qualitative results emerge if the (log) difference in investment amounts between the spouses is used as a measure of heterogeneity in risk preference, rather than the difference in CARA coefficients.

both years, we cannot identify the coefficient of absolute risk aversion at the individual level using an ordered response model such as an ordered logit or an ordered probit. Other stochastic choice models such as the Luce model used in experimental studies of risk aversion (e.g. Holt and Laury, 2002) face similar limitations.

C.1. Intrahousehold difference in CARA coefficient and likelihood of separation



Note: This figure presents the predicted likelihood of separation estimated using probit model of household instability as a function of the intrahousehold difference in CARA coefficients. Standard errors are bootstrapped (1,000 replications). The standard error of the prediction is shown with the light grey lines, while the linear prediction is shown with the solid black line.

To put this result into perspective, consider a household deciding whether to accept an investment offer, which yields \$20,000 with a probability of one half, and nothing otherwise. There is an alternative investment that yields a certain payoff. For an individual with a CARA coefficient of 0.0002, the certainty equivalent of the investment lottery is \$3,375. Suppose that the spouse is 20% more risk averse, and her CARA coefficient is 0.00024. In this case, the certainty equivalent is 15% smaller, \$2,854. This suggests that a relatively small difference in CARA coefficients could have important consequences for financial decisions, and thus household utility.

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