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ABSTRACT

Household Decision Making and the Influence of Spouses' Income, Education, and Communist Party Membership: A Field Experiment in Rural China*

We study household decision making in a high-stakes experiment with a random sample of households in rural China. Spouses have to choose between risky lotteries, first separately and then jointly. We find that spouses' individual risk preferences are more similar the richer the household and the higher the wife's relative income contribution. A couple's joint decision is typically determined by the husband, but women who contribute relatively more to the household income, women in high-income households, women with more education than their husbands, and women with communist party membership have a stronger influence on the joint decision.

JEL Classification: C91, C92, C93, D10

Keywords: household decision making, risk, field experiment, China

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1 Introduction

Many important economic decisions – e.g., labor supply, residential location, buying insurance or a new car, and investing in stocks and bonds or in children's education – are often made by households rather than by individuals. While the traditional, neoclassical model of household behavior – known as the unitary model – has assumed that households behave as if they were a single entity with a common utility function and income pooling (see Vermeulen, 2002, for a survey), the approach of collective models of household decision making (Manser and Brown, 1980; McElroy and Horney, 1981) has allowed for different preferences of household members. Collective (non-unitary) models assume that household behavior is determined in a bargaining process that leads to an efficient use of the available resources (see, e.g., Bourguignon et al., 1994; Lundberg and Pollak, 1993, 1996; Browning and Chiappori, 1998). Field evidence generally favors the non-unitary models. In particular, it has been shown that decisions and outcomes in a household – such as child health, nutrition, and expenditures for different goods and services (e.g., tobacco and child care) – depend strongly on whether its income is controlled by the husband or the wife (see, e.g., Thomas, 1994; Lundberg, Pollak and Wales, 1997; Phipps and Burton, 1998; Duflo, 2003). Qian (2008), for instance, reports that the relative female income (as a share of total household income) in Chinese households has had a significantly positive impact on the survival rates for girls and on the educational attainment of children.

Typically, field studies exploit the occurrence of exogenous shocks to the income of different household members to investigate the effects of such shocks on key household variables, such as how income is spent or how the household income distribution affects children. Recently, field studies have been complemented by laboratory experiments as a method for gaining deeper insights into household behavior by carefully controlling – and varying – the conditions under which household members can make decisions. While most of the experimental papers tested existing models of household behavior (see, e.g., Peters et al.,

2004; Bateman and Munro, 2005; Iversen et al., 2006; de Palma, Picard and Ziegelmeyer, 2008; Munro, Bateman and McNally, 2008), Ashraf (forthcoming) used an experiment to uncover features that might be missing in existing models. Running an experiment in the Philippines, she showed that the financial decisions of spouses are influenced by whether the (experimental) income is known to the other spouse and whether spouses communicate about how to spend the experimental earnings before making a decision on how to use them. In particular, she found that spouses are much more likely to hide money from their partner by putting it into a private account (even if this is inefficient) if the income is private information and the partner controls household savings. When spouses communicate about how to spend the income of each spouse, the spouse not in charge of household savings (typically the husband) has typically transferred his income to the account of the spouse who controls household savings (typically the wife).

The present paper examines household decision making under risk in an artefactual field experiment (Harrison and List, 2004) in rural China. Similarly to Ashraf (forthcoming), our primary aim is not to test the predictive success of a particular model of household decision making, but rather to provide empirical evidence on two important aspects of household decision making, each of which is key to either the unitary or the collective model of the household. First, we address how similar the two spouses' individual decisions are when decisions are made separately, and which socioeconomic factors influence the level of similarity. This is another way of asking under which conditions the assumption of identical preferences of household members – key to the unitary model – might be more or less fulfilled. Second, we study how a couple's joint decision relates to the spouses' separate decisions, and which conditions promote a stronger influence of the wife on the joint decision. Thus, we can study the circumstances that determine the outcome of an implicit bargaining process that is assumed to take place in the household. Our experiment will allow us to observe both spouses' individual preferences and their joint decision when a situation calls for

one. Such a *ceteris paribus* comparison of individual and joint decisions is hardly possible with non-experimental field data.

Compared to earlier experiments on household decision making, one novel feature of our experiment is that the participating households were randomly sampled. The experiment was run in seven randomly selected villages in the *Majiang* region in the *Guizhou* province, which is a relatively poor province in southwest China. In each village, the local village council drew between 10 and 24 households randomly from the official household registration list. The selected households were then approached by the experimenters to take part in the experiment. In total, 117 married couples ended up participating. Another important feature of our experiment is the fact that it is a high-stakes experiment. The mean earnings per participant were equivalent to the average income from three days of work.

Bateman and Munro (2005) and de Palma et al. (2008) are most closely related to our paper. Bateman and Munro (2005) examined whether decisions made by couples conform more or less to the axioms of expected utility theory compared to decisions made by spouses individually. To do this, they invited 76 couples and let the spouses make risky decisions both separately and jointly. Their results suggest that couples exhibit the same kinds of departures from expected utility theory as individuals. Furthermore, they found joint decisions to be typically more risk averse than the spouses' individual decisions. de Palma et al. (2008) focused on the question of which spouse has more influence on joint decisions. Based on observations from 22 couples, they concluded that husbands generally have a stronger influence on joint decisions than wives, although wives gain influence if they control the computer keyboard while entering the joint decisions in the experiment. In addition, de Palma et al. (2008) reported, contrary to Bateman and Munro (2005), that the joint decision of a couple tends to be less risk averse than the spouses' individual decisions.

Our paper distinguishes itself from Bateman and Munro (2005) and de Palma et al. (2008) in several dimensions: First, the subject pools are completely different. Whereas Bateman and

Munro (2005) and de Palma et al. (2008) ran their experiments in highly developed countries, ours was conducted in the field in a rather poor area of China, which by many accounts is still a developing country. On average, our subjects had 4.8 years of schooling and a yearly income of 570 USD. Second, and most importantly, our sample is random. This means that the subjects were not invited through flyers or newspaper ads to participate in an experiment; instead they were randomly selected by the village council and then approached by the experimenters in their homes. Although participation was voluntary, no couple refused to participate given they were present at home. Third, our experiment involves much higher stakes than those used in the UK by Bateman and Munro (2005) or in Germany by de Palma et al. (2008). In our experiment, the average earnings from participating in the experiment were equivalent to the average income earned from three days of off-farm work.[1] Fourth, the research focus is different. Unlike Bateman and Munro (2005), we are not interested in whether couple decisions exhibit more or less so-called anomalies in decision making than decisions made individually; instead we examine the socio-demographic conditions under which (*i*) a couple's separate decisions are more similar and (*ii*) a couple's joint decision is more likely to be driven by the wife's individual preferences. Although de Palma et al. (2008) did address item (*ii*), they only took account of who was holding the computer mouse when entering the joint decision, while we consider a set of socio-demographic variables to estimate how individual decisions of spouses relate to the couple's joint decision.

We find that spouses in richer households have more similar individual risk attitudes. In contrast, length of marriage, for instance, has no impact on similarity. The latter result seems at odds with the layman's view that couples either become more similar in their behavior the longer they have been together or stay together for a long time only if they have similar preferences to begin with. A couple's joint decision is, in general, closer to the husband's

[1] Kachelmeier and Shehata (1992) also ran a high-stakes experiment on risky decision making in China. They focused on the question of how the level of incentives affects revealed risk preferences. The experiment involved students from Peking University, and is thus unrelated to household decision making.

individual decision. However, we show that women who contribute relatively more to household income, women with more education than their husbands, and women with communist party membership have a significantly stronger influence on joint decisions.

The outline of the paper is as follows: Section 2 provides background information on our subject pool and on the Chinese province where the experiment was conducted. Section 3 introduces the experimental design and procedure. Section 4 presents the experimental results, and Section 5 concludes the paper.

2 Location of the experiment and background information on the sample

The experiment was conducted in rural communities in the *Guizhou* province, which is the 16th largest out of 32 provinces in China and is located in the southwest part of the country. *Guizhou's* total population is 39 million, and its main industries are mining, timber, and forestry. The gross domestic product per capita was around 6,700 Chinese Yuan in 2007.[2] This figure – the lowest among all provinces – corresponds to approximately 34% of the national average (20,000 Chinese Yuan in 2007; see NBS, 2008).

The University of GOTHENBURG (with which all authors are affiliated) supports a research program at Peking University. The *Guizhou* province is one of the regions where this program conducts research, which is the reason for choosing this province for our experiment. The sampled region is *Majiang*, located in the eastern part of *Guizhou* and around 100 kilometers away from the province's capital city. The local forestry bureau officials provided us with a list of villages and townships, from which they randomly selected five townships and then a total of seven villages from these five townships. In each village, the local village council randomly selected from the household registration list – which includes all officially married couples – between 10 and 24 households, depending on the size of the village. In

[2] 1 US Dollar corresponded to 7.42 Chinese Yuan at the time of running the experiment (November 2007).

order to prevent villagers from spreading the word about the experiment within a village, we employed 20 interviewers[3] so that all experiments in a village could be finished within at most five hours. The whole selection process was supervised by the principal field researcher. Then, one member of the village cadre (i.e., a local official) accompanied two interviewers to the selected households. These households were then approached by the interviewers. In total, 117 households were interviewed, and all of them participated voluntarily in the experiment. If one of the spouses was not at home at the time of the interviewers' visit, the household next door was approached.[4] Upon entering the homes, the couples were first surveyed on several issues concerning farming and forestry (as part of the *Environment for Development* project at the University of GOTHENBURG), and were then invited to participate in a risk experiment.

Table 1 about here

Table 1 reports background statistics of the sampled households. The average yearly income per capita is 3,919 Chinese Yuan, which is about 40% lower than the *Guizhou* province yearly average, but very close to the *Majiang* region average. Forty-two percent of the household income is generated from off-farm sources, and 36% from agriculture. The remaining income originates from forestry, remittances, and other sources. Women contribute on average 42% of the total household income. Among the couples in our sample, only one had been married for less than one year. The maximum length of marriage was 52 years, and the average was 27 years. It is important to note that many families in this region are not affected by the official one-child policy, and therefore the average number of children is larger than one. The reason for this is that the one-child policy is mainly for *Han* Chinese, and in our sampled region more than one-third of the inhabitants belong to other ethnic groups. The level of education is very low in our sample; the average number of years of schooling is

[3] To avoid any interviewer effects, we randomly reshuffled the pairs of interviewers each day in the field.
[4] This happened in around 20 cases.

6.09 for husbands and 3.62 for wives. The overall average in the *Guizhou* province is 6.75 years of schooling, which indicates that the *Majiang* region is relatively underdeveloped.

3 Experimental design and procedure

3.1 The experimental task

We used the choice list introduced by Holt and Laury (2002) to let subjects make risky decisions. Table 2 shows the ten pairwise choices. In each choice task, subjects had to choose either Option A (which can be regarded the relatively safe option) or Option B (the relatively risky option). While the possible payoffs in both options were fixed in all ten choices, the probability for the high payoff in each option increased in steps of 10 percentage points from 10% to 100%. Consequently, the probability for the low payoff decreased by 10 percentage points from 90% to 0%. For instance, in the first decision the respondents had to choose between an Option A of earning either 20 Chinese Yuan with a probability of 10% or 16 Chinese Yuan with a probability of 90%, and an Option B of earning either 38.5 Chinese Yuan with a 10% probability or 1 Chinese Yuan with a 90% probability.

Table 2 about here

The far-right column of Table 2 indicates the difference in expected payoffs. In the first four (final six) rows, Option A (Option B) has a higher expected payoff. Therefore, a risk neutral subject would choose Option A in the first four decisions and Option B in the last six decisions. Subjects who switch to Option B after the fifth choice can be classified as risk averse, whereas subjects switching to Option B prior to the fifth choice are considered risk loving.

3.2 Procedure

Two interviewers (henceforth called experimenters) visited each randomly selected household. The experimenters arrived at the household together with one member of the village cadre, who introduced the experimenters to the spouses. The cadre member then kindly asked the spouses if they would like to participate in a survey and an experiment which was going to be conducted by the two experimenters. If the spouses were willing to participate, the cadre member left before the experiment began. It turned out that all of the selected couples that were home were willing to participate in the experiment.

In total, there were four stages in the experiment. Each stage was explained only after the previous stage had been finished. Before Stage 1, spouses were separated into two different rooms, each of them accompanied by an experimenter.[5] This was done to avoid that the answers of one spouse would be influenced by the presence of the other spouse. In Stage 1, each spouse had to answer a detailed questionnaire on socio-demographic characteristics, health status, and social capital individually. In Stage 2, each spouse made individual decisions in the choice task of Holt and Laury (2002). In Stage 3, the two spouses were reunited and had to give joint answers regarding the financial situation of the household and some additional household characteristics. In this stage and the following, the spouses could talk to each other. Stage 4 was identical to Stage 2, except that the spouses had to make a joint decision, which means that they had to agree on which option to choose in the ten choice tasks. In the introduction to Stage 4, the participants were informed that the amounts in each option would be paid to each of the spouses. This procedure was chosen to keep each spouse's incentives constant across Stage 2 and Stage 4. The experimenters were present in the same room to be able to answer any questions immediately, and they recorded a joint decision as fixed only after both spouses had given their consent. Both in Stage 2 and Stage 4,

[5] In order to avoid any kind of experimenter effects, we balanced the genders of the two experimenters in each household visit. Furthermore, we instructed the experimenters to switch back and forth between interviewing the wife and interviewing the husband when moving from one household to the next.

participants were instructed that one of the ten decisions in each stage would be played out for real at the end of the experiment, and in Stage 2 it was stressed that the payment for Stage 2 would be done separately for husbands and wives in different rooms.

Given the generally low educational level of our participants, we took great care to explain the rules of the experiment as clearly as possible. To do so, the task at hand was first explained orally and then demonstrated visually both in Stage 2 and Stage 4. The probabilities for the high and low payoff in a given option were illustrated by using white and black chips on two separate boards that illustrated an Option A and an Option B. On the left-hand side of each board, we wrote down the high amount and on the right-hand side the low amount. For example, for the first decision (see Table 2), we placed one white chip next to the high amount and nine black chips next to the low amount. Then we put all chips in a bag and told the participants that at the end of the experiment they would be able to draw one chip from such a bag, and that drawing a white (black) chip would yield the high (low) payoff in the chosen option.

At the end of the experiment, the spouses were sent to two separate rooms again. There each spouse had to draw one card from a deck of ten numbered cards to determine which Stage 2 decision would be played for real. Then, as described above, he/she got to draw a chip from a bag with the corresponding distribution of white and black chips. Since this procedure was executed in two separate rooms, each spouse could receive his/her income privately, which means that spouses could hide their earnings from their partner if they wished to (earnings from Stage 2 were not disclosed to the other spouse by the experimenters). To determine Stage 4 payoffs, the couple was brought together again. Then, one spouse had to draw one card from the deck, and the other picked one chip from a bag that contained a corresponding distribution of chips.

In total, executing the four stages took about 1.5 hours. On average, participants earned 37 Yuan, which equals 0.9% of an average yearly income, or three days of off-farm work.

4 Results

4.1 Analysis of aggregate data

Table 3 shows the relative frequency with which husbands, wives, and couples chose the safer Option A over the more risky Option B. We report only consistent choices, meaning that we exclude all observations where a decision maker switched back at least once to Option A after having chosen Option B earlier, or where Option A was chosen in the tenth decision (i.e., preferring 20 Chinese Yuan for sure over 38.5 Chinese Yuan for sure). In total, 105 (out of 117) husbands, 108 wives, and 105 couples made consistent decisions. Hence, 318 out of 351 choice sets (90.5%) are fully consistent. Given the low educational level of our sample (compared to university students), we consider this large fraction of consistent choices a success of the experimental procedure.[6]

Table 3 about here

The bottom row of Table 3 indicates the average number of safe choices. Recall that a risk-neutral decision maker would choose the relatively safer Option A four times, and then switch to Option B. Overall, Option A was chosen 5.52 times, hence indicating risk aversion in the aggregate data. Looking at the number of safe choices made by husbands and wives separately, we do not find a significant difference, meaning that there are no gender differences in risk aversion in the aggregate.[7] The large fraction of extremely risk-averse husbands (25% chose Option A nine times and only then switched to Option B) and wives (17%) might seem unusual at first sight. However, these fractions are in the range of extremely risk-averse choices reported in Holt and Laury (2002) for their treatments with

[6] Note that the fraction of inconsistent choices ranged from 5% to 13% in Holt and Laury (2002), depending upon treatment. Between 9% and 23% of all choices were inconsistent in de Palma et al. (2008). In Bateman and Munro (2005), 6% of the participants chose strictly dominated options.

[7] To test the null hypothesis of no gender difference, we matched the number of safe choices of both spouses in a household and then applied a Wilcoxon signed ranks test using matched pairs (p-value = 0.14). In their high-stakes treatment, Holt and Laury (2002) did not find any gender differences either.

relatively high stakes. When the high payoff from the safe (risky) option was 100 USD (192.50 USD), 15% of all subjects chose the safe option nine times and only shifted to the risky option in the final, tenth choice (when there is no longer risk involved). In their treatment with very high stakes – with the high payoff in the safe (risky) option yielding 180 USD (346.50 USD) – Holt and Laury (2002) observed that 40% of their subjects chose the safe option nine times.

The average number of safe choices made by couples is between the corresponding figures for husbands and wives. Although the data in Table 3 might seem as if the decisions of couples were less extreme than individual decisions (maybe as a consequence of a willingness to compromise), Kolmogorov-Smirnov tests do not reveal any significant distributional differences in terms of number of safe choices between couples and husbands and wives respectively. In the aggregate, therefore, the joint decisions of couples and the individual decisions of spouses look the same.

However, the aggregate perspective does not answer our main research questions about what makes spouses' individual decisions similar and which spouse has more influence on a couple's joint decision. We therefore turn to an analysis of data at the household level. In the following we consider only households in which all three sets of decisions (those of the husband, of the wife, and of the couple) were fully consistent. Recall that twelve husbands and nine wives made inconsistent choices in the individual decision making part of Stage 2. Out of these, there were three couples where both the husband and the wife made inconsistent choices, implying a total of 18 households where at least one spouse made inconsistent choices. In addition, three couples made inconsistent choices while at the same time none of the spouses involved made any inconsistent decisions individually. Hence, the total sample of 117 households is reduced by 18 households with individual inconsistencies and three households where the joint decisions were inconsistent. This yields a total of 96 households with fully consistent choices.

4.2 Analysis of data at the household level

4.2.1 Similarity of spouses in individual decisions

The husband and the wife made the same number of safe choices in the individual decision making part in only six out of 96 households (6%). Hence, we observe substantial differences in risk preferences between spouses (contrary to what the unitary model of the household would assume). In 49 households (51%), the husband is more risk averse, and in 41 household (43%) the wife. If we look at the difference in number of safe choices between wives and husbands, the mean value is –0.5 (standard deviation 3.64), the maximum 7, and the minimum –9. The average *absolute* difference in number of safe choices between wives and husbands is 2.98 (standard deviation 2.13).

Table 4 about here

We will now analyze the conditions under which the spouses' individual decisions are more similar. We estimate an OLS model with the absolute difference in number of safe choices between the husband and the wife in a given household as the dependent variable.[8] Table 4 reports the results.

Household income has a significantly negative effect on the absolute difference in number of safe choices; i.e., the higher the household income, the more similar the spouses' individual choices with respect to risk taking. The share of household income contributed by the wife has a strong and significant effect as well; an increase in this share by 10 percentage points reduces the absolute difference in number of safe choices by 0.34.

We also find a weakly significant effect of communist party membership. In households where both spouses are members of the communist party, the absolute difference in number of

[8] The dependent variable is between zero and nine, since the maximum difference in the number of safe choices is nine. We also estimated a negative binomial model, which could be more suitable for non-negative integer data. In terms of the signs and significance levels of marginal effects, there were very small differences compared to the OLS model. The results from the negative binomial model are available upon request.

safe choices is reduced by approximately one unit. None of the other variables we considered to be potentially important has any significant effect on similarity of risk preferences. Among these, it seems particularly noteworthy that length of marriage does not have an effect. In addition, there is no significant influence of number of children, absolute difference in age (in years), or difference in years of education.

4.2.2 The relative influence of each spouse on a couple's joint decision

To analyze which spouse's risk preferences are better reflected in a couple's joint decision, we distinguish three possible cases: (i) The number of safe choices made by the couple is in the range of safe choices made by the husband and the wife individually. (ii) The couple makes more safe choices, i.e., is more risk averse, than each of the spouses individually. (iii) The couple makes fewer safe choices, i.e., is more risk loving, than the husband and the wife individually. If the couple's decision is closer to the husband's (wife's) individual decisions, we conclude that the husband (wife) has a stronger influence on the joint decision since the other spouse accepted a larger deviation from her (his) individually preferred number of safe choices. Table 5 summarizes the three cases introduced above and indicates how the decisions of the couple relate to the spouses' individual decisions. In order to check whether the relationship between a couple's decisions and those of each spouse is different depending on how far apart the spouses' individual decisions are, Table 5 splits the full sample at the median absolute difference of number of safe choices (which is 2) and the subsamples are presented in Columns [B] and [C].

Table 5 about here

First note from panels [1] and [1'] in Table 5 that 74 out of 96 couples agree on a number of safe choices that is in the range of the husband's and the wife's number of safe choices. For

the remaining 22 couples we observe more extreme decisions (in either direction) than made by the spouses individually (see panels [2] and [3]).[9] Within each panel, we classify the joint decisions in relation to the spouses' individual decisions as follows: (a) The number of safe choices made by the couple is identical to the husband's number of safe choices, but different from the wife's; (b) it is closer to the husband's number of safe decisions; (c) it is of equal distance to both spouses; (d) it is closer to the wife's number of safe choices; or (e) it is identical to the wife's number of safe choices, but different from the husband's. We use a χ^2 test to examine the null hypothesis that the couple's joint decision has the same probability of belonging in any of the five categories (a) to (e).[10] For panel [1], which covers the large majority of cases, we can clearly reject the null hypothesis (*p*-value = 0.007). Rather, Table 5 reveals that the couple's decision is significantly more often closer to the husband's decision. This raises the question about under what circumstances a couple's decision is more strongly influenced by the wife's preferences.

For the econometric analysis, we use three categories of how the number of safe choices made by a couple relates to the number of safe choices made by the husband and the wife separately: (1) couple is closer to husband, (2) couple is equally distant from husband and wife, and (3) couple is closer to wife. We estimate the probability that the decision of the couple falls into one of the three categories with an ordered probit model. The marginal effects of the ordered probit model are presented in Table 6.[11] For dummy variables, we report the discrete change of the variable from 0 to 1. The independent variables are intended to capture factors that influence both the absolute and the relative bargaining strength of the

[9] A model by Mazzocco (2004) can explain how differences in the spouses' individual risk attitudes can lead to more extreme choices of the household than those made by either of the spouses. Hence, couples that make more extreme decisions than either spouse individually can not simply be dismissed as having made a mistake. A paper by Eliaz, Raj and Razin (2006) also shows that decisions in groups (like families) can lead to choice shifts that yield more extreme outcomes than the decisions of individual group members.

[10] Given the discrete choice set, it is clear that with an odd difference in the number of safe choices between the husband and the wife, category (c) is not feasible. When applying the χ^2 test, we therefore correct for the possibility of different probabilities of the five possible categories.

[11] Calculating the predicted probabilities for the three categories at sample means shows that the joint decision is closer to the husband's decision with a predicted probability of 57% but closer to the wife's decision with a predicted probability of only 33%.

husband and the wife. With respect to age and education, we include dummy variables indicating whether the wife has more years of education (= 1) and whether she is older than the husband (= 1), instead of using the differences in years, since for the relative bargaining strength, the fact of being better educated or older (and hence more experienced) might carry more weight than the size of the difference.[12]

Table 6 about here

Both the total household income and the relative female contribution to the household income have a significant effect on the outcome of the couple's decision. If the wife contributes relatively more to the household income, or if the household is richer, then the couple's number of safe choices is more likely to reflect the wife's risk preferences. Recall that these same two variables have been found to make husbands and wives more similar with respect to their individual choices. The estimations in Table 6 show that household income and relative income contribution of the wife have, in fact, two effects: one on individual similarity in risk attitudes, and one on the wife's influence on a couple's joint decision.

Education and party membership are two other factors that give more power to women. If a wife has more years of schooling than her husband, the couple's decision becomes less likely to be closer to the husband's preferences, although the effect is only weakly significant. Taking all other variables at sample mean, the predicted probability of the joint decision being closer to the wife's decision is 44% if the wife is better educated than the husband, but only 27% if not. This shows that education is an important factor for household decision making. If the wife is a member of the communist party, she has a significantly stronger influence on the couple's decision (increasing *ceteris paribus* the likelihood of the joint decision being closer to the wife's decision from 26% without party membership to 70% with party membership).

[12] In fact, using the differences in years of education and age instead of the dummies "Wife better educated" or "Wife older" yields practically the same results.

A similar effect is not found for men, as their party membership does not shift the couple's decision significantly in their favored direction. Although we want to refrain from speculating why party membership is associated with a stronger influence of women in the household, it is interesting that communist party membership affects both the similarity of the spouses' individual decisions (when both are party members) and the closeness of the joint decision to the wife's individual decision.

The ordered probit has also controlled for other possibly important factors, such as the wife being older, number of children, length of the marriage, and difference in number of safe choices between wives and husbands. However, none of these has a significant influence on whether a couple's joint decision is closer to the husband's or the wife's number of safe choices. Motivated by the insights from Ashraf (forthcoming) – whose study shows that the allocation of control over household savings has a strong influence on spouses' joint financial decisions – we included some questions on who makes decisions in three different types of situations in a post-experimental questionnaire. Table 7 reports the three questions and the answers of the 96 couples. The responses to Question 1 make clear that women are ascribed a stronger influence on daily decisions, while men are indicated to have more influence in small investment decisions (Question 2). Concerning big investment decisions (Question 3), a large majority of couples report making joint decisions. The distribution of answers is significantly different across the three questions (χ^2-test, p-value = 0.000). However, including the answers to these questions in the ordered probit regression reported in Table 6 shows that none of them has a significant impact on how the couple's joint decision relates to the husband's or wife's number of safe choices.

5 Conclusion

This paper has presented an artefactual field experiment through which we have studied the decision making of couples in a rural area of China. A novel feature of this experiment on the economics of household decision making is the fact that the 117 participating couples were randomly sampled from the region of *Majiang* in the southwest province of *Guizhou*. The average earnings from the experiment equaled almost 1% of the average yearly participant income, making it a high-stakes experiment on decision making under risk. We were particularly interested in examining (*i*) the conditions under which the individual decisions of spouses are similar and (*ii*) the main factors that yield more influence to the wife when couples have to make joint decisions.

We found that spouses have more similar individual risk preferences the richer the household, the larger the income share contributed by the wife, or when both spouses are members of the communist party. However, these findings should not cover up the fact that the spouses' individual risk preferences were identical in only 6% of the households. Hence, there is a large degree of heterogeneity within households, which shows that the assumptions of the unitary model of household decision making are, in general, too restrictive. Although the latter has been shown with the use of empirical data before (see, e.g., Thomas, 1994; Duflo, 2003), we are not aware of any controlled experiment that has studied the level of similarity of spouses' individual decisions.

We also found that a couple's joint decision is typically closer to the individual preferences of the husband, which is similar to what is reported in de Palma et al. (2008). However, we were also able to identify crucial conditions that shift a couple's joint decision in the direction of the wife's individual preferences. An increase in the overall household income or in the relative share of household income contributed by the wife increases the likelihood that a couple's decision is closer to the wife's risk preferences than to the husband's. Furthermore, if the wife has more years of education than her husband, or if she is

a member of the communist party, then the husband has less influence on the couple's joint decision. These findings provide controlled evidence of the conditions that favor the wife in the intra-household decision-making process. Note that we did not set up a structured bargaining procedure in our experiment (which could have been necessary had we wanted to test a particular collectivist model of household decision making; see Vermeulen, 2002) since that could have been perceived as artificial by the participants. Rather, we asked couples to discuss the experimental task and come up with a joint decision on each lottery choice. This seems to be a natural environment for making decisions in a household. Contrary to earlier experiments on the decision making of couples (e.g., Bateman and Munro, 2005; de Palma et al., 2008; Ashraf, forthcoming), our experiment was run in the homes of the participating couples rather than in an external place like a bank or town hall in order to observe household decision making where it usually takes place, namely at home. By using very high stakes, we wanted to make the decisions very salient, such that it is in the best interest of any participant to make a decision that fits his or her preferences best.

It seems important to stress that our experimental approach should be considered to be complementary to non-experimental studies of household decision making. One advantage of running an experiment such as ours is the opportunity to observe the individual preferences of both spouses as well as the joint decision of the couple. Such a comparison of individual and joint decisions would be much more complicated with non-experimental field data since it would be very demanding to keep the conditions for decision making constant in both instances, i.e., when making decisions individually and when making them jointly with one's spouse.

In sum, our experiment identified several important factors that contribute to an increase in the decision-making power of wives. Historically, Chinese women have had very little say in household decisions, in particular in rural areas. They have also been discriminated against when it comes to access to education. For example, educating sons has been seen as an

investment in old-age support since it has been regarded as more likely that sons will get paid work, therefore leaving women to work on the farmland (Hannum, 2005). Our results suggest that policy measures to improve the education and the labor force participation of women are key factors in increasing the power of women in households and ultimately putting them on equal footing with men. The rapid economic growth in China in recent decades has had double-edged effects on female education and work conditions, though: While female school enrollment has increased (Hannum, 2005), so has the gender-wage gap, although from a low initial level (Gustafsson and Li, 2000). According to our findings, the former effect increases the influence of women on household decisions, while the latter effect – through a *ceteris paribus* decrease in the share of household income contributed by women – decreases the influence of women. The findings of Qian (2008), i.e., that an increase in female income affects the survival rate of girls and improves the school attainment of children, indicate that not only the current generation of women, but also the future generation of their children will benefit from an increased power of women in the household. Our results suggest that the factors leading to more power are better education and higher relative income contribution. In addition, communist party membership was found to empower women. Whether this is an artifact of our data or an intended – and successful – aim of the communist party is beyond the scope of this paper.

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Tables

Table 1. Descriptive statistics (*N* = 117 households)

Variable	Description	Mean	St Dev	Min	Max
Income per capita	Household yearly income in Chinese Yuan per capita	3,919	8,200	200	84,117
Log Equivalence scaled income	Log of equivalence scaled household income in Chinese Yuan. Equivalence scale = (Adults + 0.5 x Kids)^0.75	8.058	1.024	5.645	11.751
Wife income contribution	Wife's share of total household income	0.418	0.152	0	1
Length of marriage	Number of years the couple has been married	26.465	12.458	1	52
Number of children	Number of children the couple has	1.077	1.043	0	6
Wife more educated	= 1 if wife has a higher education than the husband	0.145	0.354	0	1
Education difference between spouses	Education difference between spouses in absolute value	3.235	2.513	0	10
Wife older	= 1 if wife is older than husband	0.291	0.456	0	1
Age difference between spouses	Age difference between spouses in absolute value	2.863	3.109	0	19
Wife, party member	= 1 if wife is party/cadre member	0.077	0.268	0	1
Husband, party member	=1 if husband is party/cadre member	0.179	0.385	0	1
Both spouses party members	= 1 if both spouses are party/cadre members	0.043	0.203	0	1

Table 2. The ten paired lottery-choice decisions in amounts of Chinese Yuan (¥).

Decision	Option A	Option B	Difference in expected payoff (Option A-Option B)
[1]	1/10 of ¥20, 9/10 of ¥16	1/10 of ¥38.5, 9/10 of ¥1	¥ 11.7
[2]	2/10 of ¥20, 8/10 of ¥16	2/10 of ¥38.5, 8/10 of ¥1	¥ 8.3
[3]	3/10 of ¥20, 7/10 of ¥16	3/10 of ¥38.5, 7/10 of ¥1	¥ 5.0
[4]	4/10 of ¥20, 6/10 of ¥16	4/10 of ¥38.5, 6/10 of ¥1	¥ 1.6
[5]	5/10 of ¥20, 5/10 of ¥16	5/10 of ¥38.5, 5/10 of ¥1	-¥ 1.8
[6]	6/10 of ¥20, 4/10 of ¥16	6/10 of ¥38.5, 4/10 of ¥1	-¥ 5.1
[7]	7/10 of ¥20, 3/10 of ¥16	7/10 of ¥38.5, 3/10 of ¥1	-¥ 8.5
[8]	8/10 of ¥20, 2/10 of ¥16	8/10 of ¥38.5, 2/10 of ¥1	-¥ 11.8
[9]	9/10 of ¥20, 1/10 of ¥16	9/10 of ¥38.5, 1/10 of ¥1	-¥ 15.2
[10]	10/10 of ¥20, 0/10 of ¥16	10/10 of ¥38.5, 0/10 of ¥1	-¥ 18.5

"p/10 of ¥x, q/10 of ¥y" reads that the amount x is gained with probability p/10 and the amount y with the probability q/10 (= 1 – p/10).

Table 3. Risk-aversion classification based on lottery choices

Number of Safe choices	Proportion of choices		
	Husbands (N = 105)	**Wives** (N = 108)	**Couples** (N = 105)
0-1	0.02	0.09	0.05
2	0.06	0.05	0.03
3	0.10	0.09	0.04
4	0.16	0.10	0.12
5	0.10	0.19	0.26
6	0.16	0.14	0.17
7	0.09	0.09	0.11
8	0.06	0.08	0.09
9	0.25	0.17	0.13
Average number of safe choices	*5.79*	*5.19*	*5.59*

Table 4. OLS regression on the similarity of risk attitudes (*p*-values in parentheses)

Variable	Coefficient	
Log equivalence scaled income	-0.728	***
	(0.000)	
Wife's relative contribution to household income	-3.387	**
	(0.024)	
Length of marriage in years	0.005	
	(0.828)	
Number of children	-0.003	
	(0.989)	
Age difference between husband and wife	-0.023	
	(0.775)	
Difference in years of education	-0.013	
	(0.871)	
Both spouses party members (= 1)	-1.038	*
	(0.099)	
Constant	6.958	
	(0.000)	
R-square	0.14	
Number of observations	96	

Dependent variable: Absolute difference in number of safe choices of husband and wife.

Robust standard errors are estimated.

*** (**) [*] significant at 1% (5%) [10%] level.

Table 5. Relation between couples' decisions and those of the husbands and wives individually

Relation between decisions	**[A]** Total	**[B]** Difference in number of safe choices of spouses ≤ 2	**[C]** Difference in number of safe choices of spouses > 2
[1] Safe choices of couple in the range of the husband and the wife (with husband different from wife)			
(a) Couple same as husband	24 (34%)*	13 (52%)	11 (24%)
(b) Couple closer to husband	16 (23%)		16 (35%)
(c) Couple equally distant to husband and wife	7 (10%)	4 (16%)	3 (7%)
(d) Couple closer to wife	11 (15%)		11 (24%)
(e) Couple same as wife	13 (18%)	8 (32%)	5 (11%)
Total	*71 (100%)*	*25 (100%)*	*46 (100%)*
[1'] Risk preference of couple is identical to husband's and wife's			
Couple equal to both	3 (100%)	-	-
[2] Couple makes more safe choices than either spouse			
(a-b) Couple closer to husband	6 (86%)	4 (80%)	2 (100%)
(c) Couple equally distant to husband and wife	0 (0%)	0 (0%)	0 (0%)
(d-e) Couple closer to wife	1 (14%)	1 (20%)	0 (0%)
Total	*7 (100%)*	*5 (100%)*	*2 (100%)*
[3] Couple makes fewer safe choices than either spouse			
(a-b) Couple closer to husband	7 (47%)	6 (55%)	1 (25%)
(c) Couple equally distant to husband and wife	3 (20%)	3 (27%)	0 (0%)
(d-e) Couple closer to wife	5 (33%)	2 (18%)	3 (75%)
Total	*15 (100%)*	*11 (100%)*	*4 (100%)*

* Percentages in parentheses are in relation to the absolute number of cases within each panel.

Table 6. Marginal effects from an ordered probit model (*p*-values in parentheses)

Dependent variable	(i) Couple closer to husband		(ii) Equal distance	(iii) Couple closer to wife	
Variable	Marginal		Marginal	Marginal	
Log equivalence scaled income	-0.143	***	0.019	0.124	***
	(0.009)		(0.107)	(0.009)	
Wife's relative income contribution	-0.812	**	0.108	0.704	**
	(0.031)		(0.144)	(0.029)	
Length of marriage in years	0.006		-0.002	-0.005	
	(0.307)		(0.374)	(0.304)	
Number of children	-0.013		0.002	0.011	
	(0.787)		(0.788)	(0.787)	
Wife better educated (= 1)	-0.189	*	0.013	0.175	
	(0.093)		(0.192)	(0.112)	
Wife older (= 1)	0.075		-0.011	-0.064	
	(0.518)		(0.563)	(0.512)	
Wife is party member (= 1)	-0.420	***	-0.023	0.443	**
	(0.004)		(0.637)	(0.019)	
Husband is party member (= 1)	0.093		-0.015	-0.078	
	(0.543)		(0.624)	(0.527)	
Difference in safe choices (wife – husband)	-0.014		0.002	0.012	
	(0.378)		(0.417)	(0.378)	
Threshold parameter 1 (standard error)	2.005				
	(0.708)				
Threshold parameter 2 (standard error)	2.417				
	(0.719)				
Pseudo R2	0.103				
Number of observations	96				

Robust standard errors are estimated.

*** (**) [*] significant at 1% (5%) [10%] level.

Table 7. Questionnaire responses

Question	… it is mainly the wife who decides	… we decide jointly	… it is mainly the husband who decides
A) When it comes to daily decisions about what to do with the money in your household, for example buying food and clothes, would you say that …	38 (40 %)	46 (48 %)	12 (12 %)
B) When it comes to small investment decisions, for example buying equipment for the house, would you say that …	20 (21 %)	34 (35 %)	42 (44 %)
C) When it comes to big investment decisions or using a large amount of money to purchase some goods, for example furniture or a TV, would you say that …	10 (10 %)	61 (64 %)	25 (26 %)

Appendix: *Oral presentation of the risk experiment to participants (script for experimenters – not intended for publication)*

We will now ask you to make 10 choices between alternatives. In each alternative there is a chance that you will earn a certain amount of money. How much you earn depends on things you cannot affect. In the end, you will draw a card randomly to decide which question will be used. This means that you will answer 10 questions, but only one question will determine your income. Right now, we do not know which one will be used.

Now let me explain to you how it works. Let us look at the chips and price tag on the table, and at the first choice situation. On the table, on this side, we have 1 white chip and 9 black chips with 2 price tags reading 20 and 16. On that side, we have 1 white chip and 9 black chips as well, but with 2 price tags reading 38.5 and 1. White chips stand for higher income on both sides and black chips stand for lower income on both sides. Therefore, on this side, if you draw a white chip you will get 20 (Yuan), and if you draw a black chip, you will get 16 (Yuan). On the other side, if you draw a white chip you will get 38.5 (Yuan) and if you draw a black chip you will get 1 (Yuan). Now let us look at numbers – we have 1 white chip and 9 black chips. This means that on this side there is a 90% chance you will get 16 (Yuan) and a 10% chance you will get 20 (Yuan). On the other side, you will have a 90% chance to get 1 (Yuan) and a 10% chance to get 38.5 (Yuan). Which side do you prefer?

Let us now look at the second choice situation. On the table, on this side, there are 2 white chips and 8 black chips with 2 price tags reading 20 and 16. On that side, there are 2 white chips and 8 black chips as well, with 2 price tags reading 38.5 and 1. As you know, white chips stand for higher income on both sides and black chips stand for lower income on both sides. Therefore, on this side, if you draw a white chip you will get 20 (Yuan), and if you

draw a black chip you will get 16 (Yuan). On the other side, if you draw a white chip you will get 38.5 (Yuan), and if you draw a black chip you will get 1 (Yuan). Now let us look at numbers. There are 2 white chips and 8 black chips. This means that on this side there is an 80% chance that you will get 16 (Yuan) and a 20% chance that you will get 20 (Yuan). On the other side, you will have an 80% chance of getting 1 (Yuan) and a 20% chance of getting 38.5 (Yuan). Which side do you prefer?

At the end of the survey, when you have answered all the questions, you will draw a card to decide which question will be used, and then draw a chip to decide how much you will earn. Let me remind you again, you will make ten decisions, but at the end, only one of these will end up affecting your earnings. You will not know in advance which decision will be used. Each decision has an equal chance of being chosen.

Let us practice before we start. Suppose a random draw of one card from ten cards determines the first decision to be played for real. Hence, we will use the first decision as an example. Assume that you have chosen this side (with high payoff of 38.5 Yuan). In order to determine how much you will be paid, you need to draw a chip (let the subject draw a chip). How much money do you make? Assume that you have chosen that side (with high payoff of 20 Yuan). In order to determine how much you will be paid, you need to draw a chip (let the subject draw a chip). How much money do you make?

Do you have any questions or should we proceed with the ten decisions?