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Household Decision Making, Time Preferences, and Positional Concern: Experimental Evidence from Rural China

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To my parents

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Abstract

Paper I: Intra-household Decision Making on Intertemporal Choices: An Experimental Study in Rural China

In this paper, we conduct an artefactual field experiment in rural China to investigate the determinants of individual and joint decisions regarding intertemporal choices, and estimate the relative influence of spouses on the joint decisions. We use the Convex Time Budget experimental method to elicit both individual and joint decisions on how much money to allocate to an early date and a later date. We find that the rates of return have a significant and positive effect on the allocations to later dates, yet both individual and joint decisions exhibit present-biased time preferences. We also find that both spouses have a significant influence on joint decisions. However, husbands on average have a stronger influence than wives. In particular, the relative patience of husbands significantly increases their relative influence on joint decisions. Although there are few individual and household characteristics related to the relative influence, we do find a link between relative influence in the experiment and households' decisions on financial savings in real life.

Paper II: Choice Shifts in Households: An Experiment on Intertemporal Decisions

In this paper, we investigate choice shifts in households regarding intertemporal choices. In particular, we examine whether and to what extent joint choices are more or less patient and time-consistent than individual choices. We use data from an artefactual experiment conducted by Yang and Carlsson (2012), where the Convex Time Budget experimental method was used to elicit both individual and joint time preferences. We find that 11% of the joint choices are more impatient than the two individual choices, while 9% are more patient. We also find that 17% of joint choice pairs are less time-consistent than the two individual choice pairs, while 12% of the joint choice pairs are more time-consistent. In addition, a number of observable characteristics are significantly correlated with these shifts in preferences from individual decisions to joint decisions. Finally, we also find a significant and consistent pattern between time-consistent/-inconsistent and patient/impatient shifts.

Paper III: Are You More Patient and Time-Consistent with Your Spouse's Money? An Experimental Study with Rural Couples in China

In this paper, we study how partners in a household make decisions for themselves and for their spouses regarding intertemporal choices. In particular, we investigate whether and to

what extent the decisions made for the spouse are more or less patient and time-consistent than the subject's own decisions and predictions of the spouse's decisions. We conduct an artefactual field experiment with 122 married couples in rural China, and use the Convex Time Budget experimental method to elicit subjects' time preferences when it comes to own money and spouses' money as well as the predictions of the spouses' time preferences. We find that husbands are more patient when making decisions for their wives compared with their predictions of their wives decisions. However, the decisions made for the wives are more patient than the husbands' own decisions when the choice only involves delayed options. Regardless of the choice involving an immediate option or not, wives' decisions made for their husbands are similar to the wives' own decisions and their predictions of the husbands' decisions. We do not find any evidence that either husbands or wives are significantly more or less time-consistent for their spouses compared with their own decisions and the predictions of their spouses' decisions. However, highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for their spouses compared with their own decisions. In contrast, patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions.

Paper IV: Positional Concern, Gender, and Household Expenditures

This paper uses a survey-based experiment to investigate Chinese farmers' positional concerns and their determinants. We also examine the correlation between degree of positionality and household expenditures on a set of visible goods. On average, respondents have strong positional concerns for income. In particular, respondents from high-income households are more concerned with their relative position than others. We find a difference between males and females with respect to correlation between degree of positionality and household expenditures on visible goods. For females, there is a positive correlation between degree of positionality and household expenditures on clothes, restaurants, and mobile phones, respectively. For males, there is a positive correlation between degree of positionality and household expenditures on mobile phones. No significant correlation is found for either gender between degree of positionality and household expenditures on vehicles or housing.

Preface

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Xiaojun Yang
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Summary of the thesis

Households comprise a universal and fundamental economic decision unit in social interaction and economic development. In recent years, the experimental approach has become increasingly prevalent when studying household decisions or household preferences. This thesis consists of four self-contained papers. In the first three papers, we conduct artefactual field experiments with married couples in rural China, and use the Convex Time Budget experimental method to elicit subjects' time preferences. In particular, the first two papers use the same experimental data, where the spouses made both individual and joint decisions on intertemporal choices. The first paper investigates the relative influence of individual decisions on joint decisions. The second paper instead examines the likelihood of choice shifts from individual decisions to joint decisions. The third paper compares the intertemporal decisions subjects make for their spouses with the same type of decisions they make for themselves and their predictions of their spouses' decisions, respectively. Different from the first three papers, the fourth paper uses a stated preference method to investigate Chinese farmers' positional preferences for income, and how the degree of positionality correlates with household expenditures on a set of visible goods.

Paper I: Intra-household Decision Making on Intertemporal Choices: An Experimental Study in Rural China

Intertemporal choices are generally of great importance to households since they often concern decisions such as savings, investments, and education. Although many important household decisions are often made jointly, they depend on a number of factors including the preferences of the individual household members and the bargaining position of each individual. Empirical evidence looking at actual decisions in the household suggests that the outcomes of household decisions depend on who in the household has control over the resources (Browning et al., 1994; Lundberg et al., 1997; Phipps and Burton, 1998). However, the major drawback of this approach is that it is, by definition, difficult to observe both individual and household decisions. An alternative approach to measure the influence of individual decisions on joint household decisions is to use laboratory or artefactual experiments. Apart from having control over the decision environment, the perhaps main advantage is that individual and joint decisions can be observed and related to each other.

In this paper we investigate the determinants of both spouses' individual and joint decisions regarding intertemporal trade-offs, and to what extent the joint decisions are influenced by the individual preferences. We do this by conducting an artefactual field experiment with 164 married couples in rural China. Besides the fact that relatively few studies have looked at households' intertemporal choices, a novel contribution of this paper is that we employ the Convex Time Budget (CTB) experimental method suggested by Andreoni and Sprenger (2012) to elicit individual and couple's time preferences. The basic idea is that the subjects can continuously allocate a certain amount of money between a sooner date and a later date. In the experiment, the subjects were asked to make ten different decisions where the interest rate and whether the early date is immediate or not are varied, and the decisions were made both individually and jointly.

We find that the rates of return have a significant and positive effect on the allocations to later dates, yet both individual and joint decisions exhibit present-biased time preferences. We also find that both spouses have a significant influence on joint decisions. However, husbands on average have a stronger influence than wives. In particular, the relative patience of husbands significantly increases their relative influence on joint decisions. Although there are few individual and household characteristics related to the relative influence, we do find a link between relative influence in the experiment and households' decisions on financial savings in real life. Husbands who are the main decision makers with respect to savings also have a stronger influence on joint decisions in the experiment.

Paper II: Choice Shifts in Households: An Experiment on Intertemporal Decisions

While the first paper investigates to what extent spouses can influence their joint decisions, the second paper explores to what degree joint decisions are shifted outside the range between the two spouses' individual decisions. A growing number of studies have investigated the differences between group and individual decision-making (Kocher and Sutter, 2005; Charness and Sutter, 2012). As far as findings, there is evidence that group decisions can become more extreme or polarized than individual decisions (Stoner, 1968; Eliaz et al., 2006), and similar to group decisions, many household decisions reflect individual members' preferences to varying extents. Moreover, the "diffusion of responsibility" and altruism also play potentially important roles in household decision-making. Hence, choice shifts could also be expected to occur when individual spouses discuss and make decisions jointly.

This paper uses the same experimental data as the first paper, yet we focus on examining whether and to what extent joint choices are more or less patient and time-consistent than individual choices. To our knowledge, this has not been investigated before. The main contribution of this paper is that we provide empirical evidence on the occurrence of time-consistent/-inconsistent and patient/impatient shifts. Of particular interest is that we study this in a household setting, which is perhaps the most common group decision environment.

We find that 11% of the joint choices are more impatient than the two individual choices, while 9% are more patient. We also find that 17% of joint choice pairs are less time-consistent than the two individual choice pairs, while 12% of the joint choice pairs are more time-consistent. Consequently, there is a substantial shift from individual to joint household decisions, in particular with respect to time-consistency. Interestingly, it is not the case that joint decisions tend to generate only beneficial shifts, i.e., patient and time-consistent shifts. On the contrary, a majority of the observed shifts are impatient and time-inconsistent shifts. We find that a number of observable characteristics are significantly correlated with these shifts in preferences from individual decisions to joint decisions. Finally, we also find a significant and consistent pattern between (im)patient shifts and time-(in)consistent shifts.

Paper III: Are You More Patient and Time-Consistent with Your Spouse's Money? An Experimental Study with Rural Couples in China

Similar to the first two papers, the third paper uses the Convex Time Budget (CTB) experimental method to elicit subjects' time preferences. However, this paper investigates how partners in a household make decisions for their spouses regarding intertemporal choices. In the existing literature, present-biased or dynamically inconsistent time preferences are well documented, and a pre-commitment device has often been suggested as a way to overcome the self-control problem (Bryan et al., 2010; Beshears et al., 2011). In this paper, we examine whether the self-control problem or the degree of time-inconsistency could be mitigated when making intertemporal decisions for someone else. Since people could be less influenced by immediate payments when making decisions for others, they are expected to be more patient and time-consistent for others than for themselves (Pronin et al., 2008; Shapiro, 2010; Albrecht et al., 2011).

Relatively few studies have investigated how people make decisions for others with regard to intertemporal choices, especially when the decision-maker has a close relationship with the persons the decisions are made for. To our knowledge, this paper is the first attempt to

investigate whether and to what extent the decisions made for one's spouse are more or less patient and time-consistent than one's own decisions and one's predictions of the spouse's decisions, respectively. We conducted an artefactual field experiment with 122 married couples in rural China. In the experiment, subjects made decisions for themselves and for their spouses on how much money to allocate to an early date and a later date. We also obtained information about how subjects predicted their respective spouses' allocation decisions.

We find that husbands make significantly more patient decisions for their wives than their predictions of the wives' decisions. However, the decisions made for the wives are more patient than the husbands' own decisions when the choice only involves delayed options. Regardless of the choice involving an immediate option or not, wives' decisions made for their husbands are similar to wives' own decisions and their predictions of their husbands' decisions. For neither gender do we find any evidence that the decisions made for the spouses are significantly more or less time-consistent than the subjects' own decisions and their predictions of the spouses' decisions. However, highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for their spouses compared with their own decisions. In contrast, patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions.

Paper IV: Positional Concern, Gender, and Household Expenditures

In contrast to the first three papers, which concern household decision-making, the fourth paper investigates Chinese farmers' positional concerns for income. The empirical findings in support of positional concern, using either reported happiness or an experimental method, are generally based on studies on relatively rich people. It seems that positional concern can be taken as a "normal good," and that people are more likely to care about their relative position when their income increases, or is above the subsistence level (Frey and Stutzer, 2002; Clark et al., 2008). In light of this, the poor could have lower positional concerns than the rich. However, a number of studies have found that also people in poor countries are concerned about their relative position.

China has experienced rapid and unbalanced economic growth since the economic reform, and the drastic rural-urban income inequality in recent decades could have challenged farmers' prior perceptions of "equality". Yet, there have only been a few studies on positional concerns among Chinese farmers. Following the experimental design of Carlsson and Qin (2010), we

use a survey-based experiment to investigate Chinese farmers' positional concerns and their determinants. An important contribution of the paper is that we investigate whether there is a significant correlation between the degree of respondents' positional concerns for income and household expenditures on a set of visible goods. If people with strong positional concerns for income spend more on visible goods than on other goods, it indicates that people do care about their status.

Our findings are in line with previous studies in that Chinese farmers do have a strong concern for relative income. Moreover, respondents from high-income households are more concerned with their relative position than others. We also find that respondents who live in a larger village or a village more isolated from the market have less positional concern. The positional concern is also lower in households with a member who has ever participated in a village cooperative association. Furthermore, we find a difference between males and females with respect to the correlation between degree of positionality and household expenditures on visible goods. For females, there is a positive correlation between degree of positionality and household expenditures on clothes, restaurants, and mobile phones, respectively. For males, there is a positive correlation between degree of positionality and household expenditures on mobile phones. No significant correlation is found for either gender between degree of positionality and household expenditures on vehicles or housing.

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Paper I

Intra-household Decision Making on Intertemporal Choices: An Experimental Study in Rural China

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Abstract: In this paper, we conduct an artefactual field experiment in rural China to investigate the determinants of individual and joint decisions regarding intertemporal choices, and estimate the relative influence of spouses on the joint decisions. We use the Convex Time Budget experimental method to elicit both individual and joint decisions on how much money to allocate to an early date and a later date. We find that the rates of return have a significant and positive effect on the allocations to later dates, yet both individual and joint decisions exhibit present-biased time preferences. We also find that both spouses have a significant influence on joint decisions. However, husbands on average have a stronger influence than wives. In particular, the relative patience of husbands significantly increases their relative influence on joint decisions. Although there are few individual and household characteristics related to the relative influence, we do find a link between relative influence in the experiment and households' decisions on financial savings in real life.

Keywords: individual decisions; joint decisions; intertemporal choices; Convex Time Budget; relative influence; rural China.

JEL classification: C91, C92, C93, D10

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1. Introduction

Intertemporal choices concerning, e.g., savings, investments, education, and insurance are important determinants of household development. Although household decisions on such choices are often made jointly, they depend on a number of factors including the preferences of the individual household members and the bargaining position of each individual. Previous research for example shows that who is in control of the resources could have important implications for decisions relating to children health and nutrition (Thomas, 1990, 1994), household expenditure patterns (Phipps and Burton, 1998), and children's education (Namoro and Roushdy, 2008). The approach of these studies is to compare households where the woman has relatively strong control over the assets with households where the woman has little control over the assets. Another approach is to study how the control of income or access to financial assets in the households is exogenously changed by external public programs (Hashemi et al., 1996; Lundberg et al., 1997; Duflo, 2003; Pitt et al., 2006; Bobonis, 2009) or field experiments (De Mel et al., 2009; Ashraf, 2009; Ashraf et al., 2010; Mani, 2010; Robinson, 2011). These studies consistently find the importance of financial control in improving women's decision power and the allocation decisions of the household. Finally, an alternative approach to measure the influence of individual decision on joint household decision is to use laboratory or artefactual experiments (de Palma et al., 2011; Carlsson et al., 2012a, 2012b). Apart from having control over the decision environment, the perhaps main advantage is that both individual and joint decisions can be observed and related to each other.

In this paper we investigate the determinants of both spouses' individual and joint decisions regarding intertemporal trade-offs, and to what extent the joint decisions are influenced by the individual preferences. We do this by conducting an artefactual field experiment (Harrison and List, 2004) where subjects decide how much money to allocate to an early date and a later date.[1] Relatively few studies have looked at households' intertemporal choices. Instead, factors such as risk taking (Bateman and Munro, 2005; Carlsson et al., 2012b; de Palma et al., 2011; Abdellaoui et al., 2011), stated preferences (Quiggin, 1998; Dosman and Adamowicz, 2006; Strand, 2007; Beharry-Borg et al., 2009), public good provisions (Iversen et al., 2011; Peters et al., 2004) and social dilemmas (Cochard et al., 2009) have been studied. In contrast, Abdellaoui et al. (2011) compare the difference between individuals' and couples' intertemporal and risk preferences, and find that couples make more patient decisions than the

[1] Here and henceforth, the subjects indicate husbands, wives or couples.

corresponding individual decisions. Moreover, the study by Carlsson et al. (2012a) is similar to ours, since it also investigates intertemporal choices within households in rural China. There are, however, some important differences that make the current paper a novel contribution as well. Both Abdellauoui et al. (2011) and Carlsson et al. (2012a) use a multiple price list elicitation method (Coller and Williams, 1999) that has been used extensively in time preference experiments (see, e.g., Frederick et al., 2002 for a review; Harrison et al., 2002, 2005; Andersen et al., 2006, 2008; Reuben et al., 2010; Tanaka et al., 2010). A multiple price list method is designed to elicit subjects' time preferences by having them make multiple choices between smaller rewards in the sooner dates and larger rewards in the later dates. The time discounting rates can then be calculated based on the points at which subjects switch from sooner choices to later choices. While the method is fairly simple for subjects, it often results in high discount rates (upwards-biased) due to the assumption of linear utility (Andreoni and Sprenger, 2012). In addition, the amount of information gained is rather limited, since what is observed is at what point subjects switch, or which of two options is chosen. An additional difference is that we investigate a number of potential order effects that could affect the decisions (as described further down).

In this paper, we employ the Convex Time Budget (CTB) experimental method suggested by Andreoni and Sprenger (2012) to elicit individual and couple's time preferences. The basic idea is that the subjects can continuously allocate a certain amount of money between a sooner date and a later date. This method allows us to collect substantial information about both individual and joint decisions. It also provides the possibility to test subjects' understanding of the experimental environment. Although this method has been applied in rural Malawi by Gine et al. (2012) who investigate how the revision affects individual decision making on intertemporal choices, we modify the experimental design with special emphasis on how individual decisions affect joint decisions. The experiment was conducted in rural China with the average household payments corresponding to three days of non-farm wages of one local full-time worker. In the individual experiment, each spouse had to make 10 independent choices—five for each of two timeframes. The first timeframe relates to the near future, i.e., allocation of money between today and one month from today. The second timeframe concerns allocation of money between two months from today and three months from today. Within each timeframe, each choice corresponds to one of five different rates of return for waiting that increase from the first to the fifth choice. Hence, each spouse needed to trade off the monetary allocations between early and later date at different timeframes

corresponding to the specific rate of return for waiting in each choice situation. The spouses also made the same choices jointly. Using the framework in Carlsson et al. (2012a), we can relate the individual choices to the choices made jointly and investigate to what extent the husband and wife influence joint decisions. Moreover, we investigate whether the influence in the experiment is correlated with household and individual characteristics such as income and education, and with the households' actual decisions on savings in real life.

There are several potential order effects that could affect how subjects respond. Hence, we control for both the order between the individual and joint decisions, and the order of the two parts of the time preference experiment. Moreover, we control for the effect of who has initial control over the tokens in the joint decision.

We find that both wives' and joint decisions are generally more patient than husbands' decisions, and that both individual and joint decisions suffer from present time bias. The rates of return have a significant and positive effect on the allocations to later dates, which confirms that the respondents can understand the trade-offs between choices well. However, only a few observable characteristics are correlated with the individual and joint decisions. We find that both husbands and wives have an influence on the joint decisions. However, the husband on average has a stronger influence than the wife. In particular, the relative patience of husbands significantly increases their relative influence on joint decisions. Although there are few individual and household characteristics related to the relative influence, we find that there is a link between relative influence in the experiment and the households' decisions on financial savings in real life. Husbands who are the main decision makers with respect to savings also have a stronger influence on joint decisions in the experiment.

The rest of this paper is organized as follows. In Section 2, we introduce the experimental design and procedure in detail. Section 3 presents the econometric framework. We describe and discuss results in Section 4. Finally, Section 5 concludes the paper.

2. Experimental design and procedure

2.1 Location of the experiment and description of the sample

The experiment was conducted in two poor counties of the Gansu province, which is located in the northwest of China. The province is one of the poorest provinces in China due to its severely dry climate. The two counties, Linxia and Jingning, were randomly selected. They are located in the southwestern and southeastern parts of the province, respectively. Linxia

County is home to diverse groups of minorities, which account for around 41% of the population. In each county, we randomly chose three townships, and in total 13 villages were randomly selected. [2]

In each of the eight villages, we randomly chose 10 to 25 households in each village with official marital status from the village registration list provided by the village leaders. In the other five villages, we randomly selected around five households in each village, also with official marital status. With the assistance of one village cadre, two randomly matched enumerators (always one male and one female) approached the selected households. If both the husband and wife voluntarily agreed to be interviewed after our welcome announcement, the village cadre left. If one of the spouses was not home when the enumerators arrived at their house, the enumerators waited for a while or made an appointment to come back later. We had to make sure to interview the selected households in each village within one day in order to keep information about the experiment from spreading. If an appointment could not be made or if one spouse in a couple refused to be interviewed[3], the enumerators visited the neighbor instead. Finally, 164 couples agreed to voluntarily participate in the experiment.

Table 1 describes the summary statistics of the sampled households. The average ages of the husbands and wives are 49 and 46 years, respectively. On average, the husbands have 5 years of education and the wives 2.5 years. As regards individual questions, husbands and wives have surprisingly similar responses. For example, the average income contribution to the households of the wives is around 40%. Husbands are the main decision makers in everyday life, but wives have more decision power when it comes to daily expenses such as food and clothes. As for the common household characteristics, the average household has five members, and the average length of marriage is 26 years. In 2010, the average household's gross income per capita was 7,064 yuan.[4]

[2] We originally planned to randomly select two villages in each township. But one village was spread out, and it was hard to reach all households due to the bad road conditions after raining. We could therefore only interview 15 households in that village. Therefore an additional 10 households were randomly selected from the neighborhood village.

[3] Three households refused to be interviewed. Among them, two households could not participate in the survey mainly because the wife stated they were too busy. One household refused to continue the experiment when the enumerators told them they could obtain some payments from our experiment. They did not tell us the concrete reason—they just did not want to continue.

[4] At the time of the experiment, 1 USD=6.59 CNY.

Table 1. Descriptive statistics of individual and household characteristics (N = 164 households)

	Husband		Wife	
	Mean	Std. Dev.	Mean	Std. Dev.
Individual characteristics				
Age (years)	48.78	9.34	46.26	9.11
Higher than primary school (1=yes)	0.50		0.19	
Communist party member (1=yes)	0.12		0.01	
Individual attitudes				
General decision maker (1=husband; 2=joint; 3=wife)	1.24	0.46	1.38	0.59
Wife income contribution	0.40	0.17	0.39	0.17
Husband income contribution	0.60	0.17	0.61	0.17
Decision maker on savings (1=husband; 2=joint; 3=wife)	1.31	0.49	1.34	0.51
Decision maker on daily expense (1=husband; 2=joint; 3=wife)	2.36	0.78	2.18	0.81
Decision maker on durable goods (1=husband; 2=joint; 3=wife)	1.55	0.53	1.55	0.61
Decision maker on expensive fixed asset (1=husband; 2=joint; 3=wife)	1.55	0.52	1.50	0.54
If financial conflict with spouse in the past two years (1=yes)	0.09		0.17	
If husband answered it's him making decisions on financial savings (1=yes)	0.70		-	
If wife answered it's her or joint making decisions on financial savings (1=yes)	-		0.32	
If both husband and wife agreed that it's husband making decisions on savings (1=yes)	0.50		-	
If both husband and wife agreed that they jointly make decisions on savings (1=yes)	-		0.12	
Trustiness on the future payments (1= do not trust at all; 2=do not quite trust; 3=neither trust nor not trust; 4= trust somewhat; 5=trust completely)	4.56	0.82	4.49	0.77
Household characteristics				
Household is minority (1=yes)	0.15			
Household population (persons)	4.98	1.50		
The length of marriage (years)	26.06	9.80		
The number of children 16 years old or younger (persons)	0.85	0.85		
If wife is older than husband (1=yes)	0.11			
If wife is more educated than husband (1=yes)	0.13			
If the couple is living with husband's parents (1=yes)	0.24			
If household experienced serious illness or death in the past two years (1=yes)	0.34			
Log of equivalence scaled total gross income (yuan); Equivalence=(Adults+0.5*children)^0.75	9.03	0.68		

2.2 Experimental design

We apply the Convex Time Budget method suggested by Andreoni and Sprenger (2012) to investigate subjects' intertemporal choices. In Table 2, the 10 intertemporal choice sets for each respondent are described. There are only two timeframes with the same delay time of one month:the near period between today and one month from today and the far period between two months and three months from today. As we will discuss later, this design limits the estimations of discount factors since we are not varying the delay time. The main reason for still choosing this design was that from the pilot studies it was clear that using more than 20 decisions would result in fatigue among a potentially large number of subjects. Moreover, since the main objective of the experimental design is to investigate the relationship between individual and joint decisions, the constant delay will not matter much for our main results. To investigate whether respondents have present-biased preferences, we use "today" not "tomorrow" in the experimental design. However, this could imply different transaction costs between payments today and future payments (Anderson et al., 2008). To investigate how the credibility of future payment affects respondents' decisions in the experiment, before respondents started to make decisions, we asked questions about how they trusted they would receive the money in the future. The five interest rates we used in the experiment were tested and decided upon based on the results of the pilot experiment.[5] Respondents needed to allocate the given 20 tokens[6] between a sooner and a later date with increasing interest rates.

As described in detail below, subjects were presented with two plates. The red plate represented the sooner date (today or two months from today) and the orange plate represented the later date (one month from today or three months from today). Their task was to decide how many tokens to put on each plate, where in all choices each token was worth 2 yuan if it was allocated to the red plate. One token was worth $2\times(1+r)$ yuan if it was allocated to the orange plate. r is the rate of return for waiting, and it increased from the first choice to the fifth choice.

The spouses made both individual and joint decisions. As described below the order was randomly determined. When they made the individual choices they were clearly told that the money was theirs, and when they made the joint choices they would receive the same amount

[5] During the pilot studies, we first used the interest rates used by Gine et al. (2012), i.e., 0.1, 0.25, 0.5, 0.75, and 1. However, especially at the high interest rates, there were almost no trade-offs; hence we reduced the rates to 0.05, 0.1, 0.25, 0.4, and 0.6.

[6] The main reason for why we use tokens instead of Chinese Yuan is that the total amount of money varies in each decision since it depends on the interest rate and amount of money allocated to the earlier date.

each. The basic idea of the analysis is to relate the decisions made individually to the decisions made jointly. It is of course possible that the individual choices were made taking into consideration the preferences of the spouse, and we have no way to control for that. However, what we did was to stress that the choices were anonymous to the spouse and that the money was individual and not to be paid to the household.

Table 2. Description of the 10 decisions in the time preference experiment

Sooner date	Later date	Token budget	Interest rate	Sooner value of one token	Later value of one token
0	30	20	0.05	2	2.1
0	30	20	0.1	2	2.2
0	30	20	0.25	2	2.5
0	30	20	0.4	2	2.8
0	30	20	0.6	2	3.2
60	90	20	0.05	2	2.1
60	90	20	0.1	2	2.2
60	90	20	0.25	2	2.5
60	90	20	0.4	2	2.8
60	90	20	0.6	2	3.2

2.3 Experimental procedure

We employed and trained 10 interviewers, from now on called experimenters, to conduct the experiment. Among them, five were from Beijing University and five were from the local university. The five local experimenters were able to understand and speak the local dialect.[7] All experiments were conducted by pairs of experimenters where one experimenter was from the local university.

Once a couple had agreed to participate in the whole survey, one of the experimenters gave a brief introduction of the tasks. Then the couple together answered a set of questions about the household. The rest of the procedure depended on the order of the parts of the experiment (see Section 2.4). However, we will for simplicity only describe in detail one of the orders used.

In the version where individual decisions were made before the joint decisions, the respondents were (following the first initial questions) physically separated into two rooms

[7] The reason why we included the local students as experimenters was that they made the initial contact with the households much easier since they spoke the local dialect. However, during the experiment, all of the experimenters spoke Mandarin Chinese since not even the local experimenters could fully understand the local dialect.

where they could not hear each other; one experimenter followed the wife and one followed the husband. The experimenter read out the experimental instructions to the respondent, and the respondent was told that s/he could earn some money and that the amount earned depended on his/her decisions in the experiment. The respondent needed to make 10 separate decisions, and one of these decisions would be randomly chosen to be paid out by rolling a 10-sided die. The number that came up on the die decided which choice would determine the respondent's earnings. Thus, each decision had an equal chance of being used in the end. Moreover, the respondent was told that s/he would get two vouchers, one for sooner payments and one for later payments, signed by the project coordinator. The voucher indicated the amount of cash and corresponding date the respondent could redeem the money. After the experiment, the respondent decided whether we should send the money to them by the postal savings bank or other commercial bank.

To help the respondents understand the experiment, they first made two trial decisions.[8] The purpose of the trial decisions is to help respondents make more informed decisions and avoid misunderstandings of the experimental tasks. The drawback with trial decisions is that the experiment takes too long and hence causes respondents to be fatigued. However, our experience from the pilot experiment was that the trial tasks were crucial for the understanding of the experiment. Once the experimenter was certain that the respondent had understood, s/he was asked to make the first five independent decisions about how to allocate 20 tokens between today and one month from today. Following the experimental design in Section 2.2, to help the respondent remember which dates the two plates represented, the experimenter put a sign in front of each plate with the corresponding date and the value of a token. The respondent then decided how to allocate the tokens between today and one month from today for each choice. After a decision was confirmed, the experimenter translated the total tokens on each plate into Chinese yuan and wrote the decision on the whiteboard. The experimenter then repeated the allocation by pointing to the whiteboard, and at this point the respondent had the possibility to revise the decision. If the respondent did not want to change the allocation, the experimenter moved on to introduce the next choice. When the respondent had finished all five decisions, the experimenter presented all notes on the whiteboard to her/him and asked whether s/he would like to change the allocation for any of the choices. If

[8] The trial decisions were about how to allocate 10 tokens between one month from today and two months from today. Before the respondent did this, the experimenter asked some control questions about the meaning of the plates and the tokens. The respondent started to make the trial decisions only when s/he had understood the meaning of the plates and the tokens. The trial decisions were the same regardless of the order between individual decisions and joint decisions.

the respondent wanted to make changes, they were asked what they wanted to change. Once the respondent did not want to make any more changes, the experimenter continued to the next five independent choices, i.e., for allocation between two months and three months from today. The elicitation procedure was similar for the second five independent choices. Yet the respondent was reminded that s/he needed to wait for both the sooner payment (two months from today) and the later payment (three months from today). After the respondent had finished all 10 choices, s/he was asked some questions about individual characteristics.

When both the husband and the wife finished, they were brought together for the joint decisions. The couple was told that they would make 10 intertemporal choices similar to the individual decisions they had just made. The main difference was that both of them would obtain the same amount of experimental payments according to one of the joint decisions, which would be randomly selected by rolling a 10-sided die. Before each decision was made, they were encouraged to speak to each other and discuss the decision, as they needed to agree on how to allocate the money between the sooner and later dates. The couple followed the same elicitation method as the individual decisions, i.e., they first made joint decisions about how to allocate the 20 tokens between today and one month from today, and then made the other five joint decisions about how to allocate the 20 tokens between two months and three months from today.

On average, the whole survey lasted for one and a half hours for each household. The average experimental payment for each individual respondent was 52 yuan, and the average experimental payment for each household was 208 yuan, which equals three days of non-farm wages for one local full-time worker.

2.4 Order effects and initial control over the tokens

In the design, we control for two important order effects. The first one is about the order of making individual decisions and joint decisions. Half of the households made the individual decisions first and then the joint decisions. The other half of the households made the joint decisions first and then the individual decisions. While the natural order would be to first conduct the individual experiment and then the joint, we want to test if the ordering affects the behavior in the joint decision experiment. There could, for example, be learning effects, or the respondents may try to smooth out the earnings over time and the two parts of the experiment.

The second order effect concerns the order of the two parts of the time preference experiment. Half of the households answered the five questions regarding money allocated between today and one month from today first, while the other half started with the five questions regarding money allocated between two months and three months from today.

In addition, we control for experimenter effects by interchanging their interviewing subjects in each household. For example, if the male experimenter interviewed the husband and the couple in one household, then the female experimenter needed to interview the husband and couple in the next household.

Finally, in the joint experiment, to control for the effects of who had the initial control over the tokens on the joint decisions, we had four alternatives for how the tokens were initially distributed. The first reference situation was that the experimenter just put the 20 tokens between the husband and the wife, but did not say anything else about who was responsible to put tokens on the plates. The second situation was that the experimenter gave the 20 tokens to the wife, making her in charge of putting the tokens on the plates. In the third situation, the experimenter gave the 20 tokens to the husband, who was initially responsible to put the tokens on the plates. The fourth situation was that the experimenter gave 10 tokens to the wife and 10 tokens to the husband, making both of them in charge of putting the tokens on the plates. For all cases, both spouses could adjust the amount of tokens on the plates until they had reached an agreement, i.e., they were not told that only one or both should put the tokens on the plates.

3. Econometric framework

In the experiment, for a given interest rate, *r*, the subjects had to decide how much of a given initial amount of money to allocate to a sooner date, c_t, and a later date, $c_{t+\tau}$, where t indicates the sooner dates, i.e., t=0 or t=60 days; τ is the delay time, i.e., $\tau = 30$ days. Since the experiment was fairly complex and we could not ask the subjects to make too many decisions, we chose to keep the delay time constant. This means that we will not obtain a full picture of subjects' discounting preferences. Although we cannot directly estimate subjects' discount factors as what Andreoni and Sprenger (2012) has done with the varying time delays, we instead use the monetary difference between later and sooner allocations ($c_{t+\tau} - c_t$) to represent subjects' patience. We thus investigate how the allocation difference between later and sooner dates ($c_{t+\tau} - c_t$) are affected by the rates of return, whether the choice involves a

today payment, and a set of individual and household characteristics. In addition, since individual spouses and the couple have made exactly the same experimental decisions, we can examine the relative influence of husband's and wife's decisions on joint decisions.

Household decisions depend on the preferences of the household members, the bargaining process, and the relative strengths of the household members. Since the introduction of a bargaining mechanism into the household decision making process by Manser and Brown (1980) and McElroy and Horney (1981), there has been a development of so-called collective household models, which assume that households can achieve efficient decisions (Chiappori, 1992; Browning and Chiappori, 1998). According to Browning and Chiappori (1998), a household's jointly discounted utility can be expressed as

$$V_j = \mu_h \cdot U_h + \mu_w \cdot U_w \qquad (1)$$

where V_j is joint utility, U_h and U_w represent the husband's and wife's utility respectively, and μ_h and μ_w denote the husband's and wife's decision or bargaining power respectively, which measures how individual preferences are aggregated into household joint decisions. One approach to measure the influence of spouses on household decisions is to look at who is in control of the income and correlate this with household decisions (see, e.g., Browning et al., 1994; Lundberg et al., 1997; Phipps and Burton, 1998; Duflo, 2003). The major drawback of this approach is that it is, by definition, difficult to observe both individual and household decisions. However, using an experimental approach, it is possible to observe both individual and joint decisions. This in turn means that we can measure to what extent each spouse influences the joint decisions. We follow the approach outlined in Carlsson et al. (2012a) and estimate the influence of each spouse by explaining the joint decisions by the individual decisions. The joint allocation decision for household *i* in choice situation *j* is specified as

$$(c_{t+\tau} - c_t)^J_{ij} = \alpha + \mu^H (c_{t+\tau} - c_t)^H_{ij} + \mu^W (c_{t+\tau} - c_t)^W_{ij} + \varepsilon_{ij} \quad (2)$$

where *J*, *H*, and *W* denote decisions made jointly, by the husband, and by the wife respectively. Thus, the parameters μ^H and μ^W are measures of the husband's and wife's influence on the joint decision. The ratio between these two parameters, $\lambda = \frac{\widehat{\mu^W}}{\widehat{\mu^H}}$, is then a measure of the relative influence of the wife and the husband. If the ratio is above one, then the wife has a stronger influence on the joint decision. However, the above specification only allows us to estimate the average relative influence. We will therefore also estimate a model

where the estimated influence parameters depend on a set of observable individual characteristics, by interacting the husbands' and wives' individual decisions with these variables. From this model, we can estimate the relative influence of the wife and husband for household i: $\lambda_i = \frac{\widehat{\mu_i^W}}{\widehat{\mu_i^H}}$. This will give us a distribution of the sampled spouses' relative influence. Moreover, we can investigate whether this relative influence is correlated with household-specific characteristics. We therefore estimate a regression model where the relative influence is explained by a number of household characteristics.

4. Results

4.1 Descriptive results

In Table 3, we summarize the average allocations, in Chinese yuan, made to the sooner dates by the husbands, wives, and couples for all the decisions.

Table 3. Husband's, wife's and joint allocations to the sooner dates in Chinese yuan

Sooner date	Interest rate	Husband			Wife			Joint		
		Mean	Median	Share corner	Mean	Median	Share corner	Mean	Median	Share corner
0	0.05	22.5 (16.2)	24	23%	24.1 (15.9)	28	17%	20.8 (15.8)	20	24%
0	0.1	18.4 (15.9)	16	28%	17.9 (15.1)	19	26%	16.5 (15.2)	16	30%
0	0.25	12.7 (14.3)	8	39%	10.0 (12.9)	4	48%	10.3 (12.6)	6	44%
0	0.4	9.7 (13.2)	2	49%	7.0 (11.3)	0	59%	7.8 (11.7)	0	52%
0	0.6	7.1 (12.2)	0	62%	4.3 (9.5)	0	76%	4.9 (9.9)	0	70%
60	0.05	16.8 (14.9)	17	30%	12.7 (13.5)	10	38%	14.7 (15.0)	12	37%
60	0.1	11.9 (13.1)	8	40%	8.9 (11.9)	4	47%	9.6 (12.0)	4	47%
60	0.25	8.2 (11.5)	0	51%	4.8 (8.4)	0	64%	6.2 (9.6)	0	58%
60	0.4	5.8 (10.0)	0	60%	2.9 (6.7)	0	77%	4.1 (8.1)	0	68%
60	0.6	3.8 (8.7)	0	73%	2.0 (5.6)	0	84%	2.5 (7.1)	0	83%

Notes: 1. Figures in the parentheses are standard deviation.
2. Share corner is the percentage of zero allocation to the sooner date.

As can be seen, the allocation to the sooner date decreases when the rate of return increases, which is an indication of that the subjects are aware of the basic trade-offs they face in the choice tasks. On average, subjects allocate more money to later dates, except when the rate of

return is 0.05 and when the sooner date is today. For example, when the rate of return is 0.25 and the sooner date is today, husbands' median allocation to the sooner date (today) is 8 Chinese yuan, and to the later date (one month from today) it is 40 Chinese yuan. The wives' median allocation to the sooner date is 4 Chinese yuan, and to the later date it is 45 Chinese yuan. The median allocation in the joint decisions is 6 Chinese yuan to the sooner date and 42.5 Chinese yuan to the later date. The table also reports the share of allocations that are corner allocations, i.e., when the subject allocates zero yuan to the sooner date and thus allocates everything to the later date. As expected, the share of corner allocations increases when the rate of return increases. Finally, we can also look at how subjects change their allocations when the rate of return increases. If they are consistent, they should not decrease their allocation to the later date. Following Gine et al. (2012), we evaluate subjects' basic consistency by partitioning their 10 decisions into pairs, where each element within each pair represents the tokens allocated to the same later dates but with the different rates of return. The first element within each pair is the allocation of tokens in the face of the rate of return r, which is the lowest rate of return. The other element is the allocation of tokens in the face of the next higher rate of return r'. Hence, for each timeframe, there are four such pairs, and each subject has eight decision pairs in total. We have in total 164 sample households, and there are thus 1,312 decision pairs for husbands, wives, and couples, respectively. A consistent pair implies a pair within which the later allocation of tokens is not decreasing with the rate of return r. It thus also includes the cases when allocations do not change within one pair. Among these pairs, there are only seven inconsistent pairs among the husbands' decisions, nine inconsistent pairs among the wives' decisions, and eight inconsistent pairs among the joint decisions. Thus, around 99% of the pairs are in line with a basic test of consistency. Compared with the similar study by Gine et al. (2012), where only 81% of the pairs were consistent, this is a very high share of consistent pairs.

To summarize, we can thus say that subjects are making trade-offs between sooner and later dates, and that they are making few inconsistent choices. There is a relatively high share of corner allocations, but far from all decisions are corner allocations. As argued by Gine et al. (2012), interior allocations imply that subjects have not realized that they have the opportunity to smooth income over time. However, if the local credit market functions well, subjects should allocate all the money to the sooner date when the market interest is higher than the experimental rate of return and vice versa.

Table 4 presents Wilcoxon rank sum tests of the differences between husbands' and wives' choices, and Wilcoxon signed rank tests of the differences between the joint decisions and the husbands' and wives' decisions. The difference in choices between wives and husbands is statistically significant for almost all choice situations, i.e., wives are on average more patient than husbands. Most joint allocations are in between the husbands' and wives' allocations, with the exception of the first two choices when the sooner date is today. In addition, the joint decisions are significantly more patient than the husbands' decisions, yet there are no significant differences between wives' decisions and joint decisions. However, this is looking at the aggregate level. The next step is to use the information at the household level.

Table 4. Non-parametric tests of the differences between husband's, wife's and joint decisions on sooner dates in Chinese yuan

Sooner date	Interest rate	Husband-Wife		Joint-Husband		Joint-Wife	
		Difference	Z-value[1]	Difference	Z-value[2]	Difference	Z-value[2]
0	0.05	-1.6	-0.93	-1.7	-1.16	-3.3***	-3.09
0	0.1	0.5	0.14	-1.9	-0.60	-1.4	-1.42
0	0.25	2.7*	1.85	-2.4**	-2.35	0.3	0.11
0	0.4	2.7**	1.96	-1.9**	-2.12	0.8	0.04
0	0.6	2.8***	2.70	-2.2**	-2.45	0.6	0.40
60	0.05	4.1***	2.44	-2.1*	-1.68	2.0*	1.85
60	0.1	3.0**	2.05	-2.3**	-2.40	0.7	1.38
60	0.25	3.4***	2.80	-2.0***	-3.05	1.4	1.58
60	0.4	2.9***	3.41	-1.7***	-3.21	1.2**	2.05
60	0.6	1.8**	2.34	-1.3***	-3.76	0.5	0.91

Notes: 1. Z-value[1]is Wilcoxon rank sum test; Z-value[2]is Wilcoxon signed rank test.
2. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

4.2 Husbands', wives' and joint allocation decisions

To investigate what factors influence individual and joint decisions, we regress the difference between allocations to the later date and the sooner date ($c_{t+\tau} - c_t$) on the rate of return, a present time dummy variable that is equal to one if the sooner allocation involved the today payment, and a set of observable characteristics. The dependent variable ($c_{t+\tau} - c_t$) is censored when the subject allocates all money to the sooner date or the later date. We therefore employ a censored model with varying limits since the maximum amount of money

allocated to the later date depends on the interest rate.[9] We estimate separate models for the husbands', wives', and joint decisions. We cluster the standard error at the household level, and the average marginal effects are reported in Table 5.[10]

As expected, the coefficient of the rate of return is positive and highly significant. The significant and negative sign of the present time dummy variable indicates that subjects on average have present-biased time preferences. This is different from Andreoni and Sprenger (2012), who find little evidence of present-biased preferences using the CTB approach.

There are actually very few observable characteristics that have a statistically significant effect on the allocation decisions. For husbands, the only significant effect is that in minority households, husbands allocate more money to the sooner date, i.e., are more impatient. For wives, in households with many children being or under 16 years of age, wives allocate more to the sooner date. This is contrary to Bauer and Chytilova (2009) who find the significant evidence that women in rural India are more patient if they have many children under 18 years old.[11] This could be due to on average the family has less children in rural China than that in rural India.[12] Finally, we find that subjects who had more confidence in that they would actually get paid were more likely to allocate money to the later date. While this may be an indication that some subjects did not trust us, and hence preferred to receive the money today, it is also possible that it is just an indication of a rationalization of the behavior in the experiment. Moreover, the fraction of husbands and wives who did not trust that they would get paid in the future was rather low, 5% and 4% respectively[13]. For the joint decisions, we find that in households where the husband has a higher education than primary school, the joint decisions are more impatient. There are no significant effects of wives' characteristics on joint decisions. In minority households, or households with a large number of children being or under 16 years of age, joint decisions are also more impatient.

[9] The lower limit is -40 when subjects allocated all tokens to the sooner dates; the higher limits are varying with the five different interest rates when subjects allocated all tokens to the later dates, i.e., 42, 44, 50, 56, and 64 when the interest rate equals 0.05, 0.1, 0.25, 0.4, and 0.6, respectively.

[10] We have also estimated a model with the difference between the natural log of allocations to the later date and sooner date as the dependent variable. The results are similar to the ones for the level model, and are available upon request. However, the disadvantage of log model specification is that the log of zero allocation cannot be identified, and thus the corner allocations are excluded.

[11] We also estimate an alternative model by including the number of children under 18 years old, and the results are similar to what we have presented in Table 5.

[12] In our sample, for the households that have children, 55% of them only have one child. The parents thus could spoil the children for the current consumption.

[13] If we exclude the households who did not trust or were uncertain about future payments, we obtain similar results as those reported in Table 5. The results are available upon request.

Table 5. The determinants of husband's, wife's, and joint decisions; dependent variable is the difference between later and sooner allocations $(c_{t+\tau} - c_t)$

	Husband	Wife	Joint
Interest rate (r)	72.428***	79.297***	71.959***
	(4.912)	(4.936)	(4.648)
Present time dummy	-10.905***	-14.099***	-10.845***
(1=today)	(2.114)	(1.787)	(1.801)
Husband trustiness on future payments	6.733**		1.754
(scale from 1 to 5)	(2.652)		(2.032)
Husband age (years)	-0.026		0.160
	(0.215)		(0.475)
Husband higher than primary school (1=yes)	-3.802		-7.298*
	(4.413)		(3.862)
Husband communist party member (1=yes)	-2.953		4.955
	(5.698)		(5.092)
Wife trustiness on future payments		4.112**	0.989
(scale from 1 to 5)		(1.914)	(2.308)
Wife age (years)		0.240	0.094
		(0.187)	(0.491)
Wife higher than primary school (1=yes)		-5.177	1.900
		(4.526)	(5.249)
Household is minority (1=yes)	-24.622***	-19.271	-16.759**
	(7.866)	(12.089)	(8.434)
Log of equivalence scaled total gross income	0.290	-0.875	0.763
(yuan)	(2.982)	(2.285)	(3.196)
The number of children 16 years old or	-1.968	-4.344**	-3.468*
younger (persons)	(2.283)	(1.920)	(2.008)
If first separate then joint decision (1 = yes)	-1.186	-5.616*	1.283
	(4.628)	(3.177)	(4.168)
If first five choices are between today and one	-7.974*	3.166	-2.417
month (1=yes)	(4.167)	(3.148)	(6.785)
Experimenter gender dummy (1=female)	-0.469	-6.270*	0.709
	(4.438)	(3.233)	(6.924)
The dummies of initial control over tokens	no	no	yes
Village dummies	yes	yes	yes
Observations	1640	1640	1640

Notes: 1. The results reported in table are average marginal effects based on the censored regression model with varying limits.
2. All regressions are clustered at household level. Figures in parentheses are robust standard errors.
3. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

4.3 Order effects

We controlled for order and experimenter effects in all models. There were two order effects: (i) the order of making separate and joint decisions and (ii) the order of the two parts of the time preference experiment. We cannot reject the order effects. In particular, the first ordering has a significantly negative effect on wives' decisions. Wives are more impatient when they first make the separate decisions then joint decisions. There thus could have some learning effects on wives' decisions. The second ordering significantly and negatively affects husbands'

decisions. When husbands make the five choices between today and one month from today first, they tend to allocate more to the sooner date compared with if they make these five choices in the second part of the individual experiment. Finally, we also find some evidence that female experimenters have a negative effect on wives' later allocations; i.e., with female experimenters wives become more impatient.

4.4 The influence of individual decisions on joint decisions

We now move to the main interest of this paper: the relationship between the individual decisions and the joint decisions. We first estimate models where we explain the joint decisions with the husbands' and wives' decisions, as specified in equation (2). Again we employ a censored model with varying limits to estimate all model specifications. The standard errors are clustered at household level, and the average marginal effects are presented in Table 6.

Table 6. The influence of individual decisions on joint decisions; dependent variable is the difference between later and sooner allocations $(c_{t+\tau} - c_t)$

	(1)	(2)	(3)
Husband's decision	0.470***	0.451***	0.476***
	(0.048)	(0.063)	(0.081)
Wife's decision	0.317***	0.313***	0.324***
	(0.035)	(0.054)	(0.081)
Husband's decision× If first separate then joint decision (1 = yes)		0.038	
		(0.085)	
Wife's decision× If first separate then joint decision (1 = yes)		0.010	
		(0.077)	
Husband's decision× 20 tokens to wife			0.037
			(0.121)
Husband's decision× 20 tokens to husband			-0.119
			(0.116)
Husband's decision× 10 tokens to each			0.067
			(0.098)
Wife's decision × 20 tokens to wife			-0.048
			(0.119)
Wife's decision× 20 tokens to husband			0.052
			(0.105)
Wife's decision× 10 tokens to each			-0.043
			(0.099)

Notes: 1. Joint, husband's and wife's decision is the difference between later and sooner allocations in level form: $(c_{t+\tau} - c_t)$.
2. The results reported in table are average marginal effects based on the censored regression model with varying limits.
3. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
4. Two order dummies, experimenter gender dummy, and village dummies are also included in the regressions.
5. *, **, and *** represent the significant level at 10%, 5%, and 1%, respectively.

In the first model, we only control for the husbands' and wives' individual decisions. As can be seen, both spouses have a significant impact on the joint decision in the sense that there is a positive and significant correlation between the individual decisions and the joint decision. However, both coefficients are well below one, suggesting that on average neither spouse has complete control over the joint decision. As discussed above, the relative influence of the two spouses can be estimated as the ratio between the wife's individual decision coefficient and the husband's individual decision coefficient. This parameter is 0.67, which means that the husband on average has a stronger influence on the joint decision than the wife. The value of the relative influence parameter has a clear and simple explanation. It is the ratio of marginal effects of the two spouses' influence on the joint decisions. The husbands' influence parameter is around 0.47. This means that if the husband allocates, say, 10 yuan more to the later date in the individual experiment, then the allocation to later date in the joint experiment increases by 4.7 yuan. For the wife, the increase in the joint experiment for the same change is 67% of this, i.e. 3.2 yuan. Moreover, we can reject the hypothesis that the relative influence parameter is equal to one (p-value=0.03).

In the second model, we add the interaction terms between husband's and wife's decisions and a dummy variable equals one if firstly making the separate decisions then joint decisions, respectively. The estimated results in column (2) show that there is no significant order effect on the influence of individual decisions on joint decisions.

In the third model, we interact the spouses' individual decisions with the treatment dummy variables concerning who had initial control over the tokens. As can be seen, none of the interaction terms are significant. This is different from the study by de Palma et al. (2011), where, in an experiment on risky choices, women who ultimately implement the joint decisions show more decision power.

In order to say more about what factors are correlated with the extent of the individual spouses' influence on the joint decision, we next estimate three additional models. In the first model the individual decisions are interacted with the absolute difference between husband's and wife's sooner allocations and a set of individual characteristics. In the second model we add two sets of variables. The first set is a dummy variable equal to one if the husband/wife claimed to have experienced conflicts over financial decisions in the past. The second set is a dummy variable equal to one if the husband stated that he is the primary decision maker when it comes to savings in the household, but wife stated that it's her or joint making decisions on

the savings in the household.[14] In the third model, we add two interaction terms between husband's and wife's decisions and a dummy variable equals one if the husband is more patient than the wife, respectively.[15] We do this since we find that husbands in general are more impatient and at the same time have stronger bargaining power. In order to investigate if this holds at the household level as well, we include these two interaction terms in the third model. We present the average marginal effects in Table 7.

In the first model, we do not find any individual characteristics that statistically and significantly affect husbands' or wives' relative influence on the joint decisions. The second model reveals that there is some correlation between individual spouses' influence on the joint decision and households' decisions on savings in the real life, although not a strong one. In households where the husband stated that he primarily makes the decisions on savings, he also has a stronger influence on joint decisions. In households where wife stated that it's her or joint making decisions on savings, she has more influence on joint decisions. However, a history of financial conflicts in the households does not correlate with the influence of the spouses.

In the third model, we find that wives' decisions would have less influence on the joint decisions when there is a large difference between husbands' and wives' separate decisions on the sooner dates. This reconfirms that husbands have more decision power on the household decisions especially when there have some disagreements. Of particular interest, we find that husbands who are more patient than wives have a significantly stronger influence on the joint decisions.[16] Thus it is the relative patience of the spouses that affect the bargaining power. This is interesting and to some extent consistent with the theoretical prediction that demonstrates the important role of patience for the bargaining power (Rubinstein, 1982; Binmore et al., 1986).

Finally, based on the first model in Table 7, we estimate the spouses' influence and the relative influence on the joint decision for each household, by predicting the influence parameters, μ^H and μ^W, and the corresponding ration between these two parameters: $\lambda = \frac{\widehat{\mu^W}}{\widehat{\mu^H}}$,

[14] Since there are only 2% of wives who stated it's her making decisions on savings, we combine the observations that wives stated it's her or joint making decisions on savings.
[15] Husband is more patient than wife if husband's sooner allocations are smaller than wife's. For 25% of choices, husband is more patient than wife.
[16] We also use the difference between husband's and wife's sooner allocations to measure the extent of husband's relative patience, yet we do not find the extent of husband's relative patience is statistically significant.

as discussed in Section 3. The descriptive results are reported in Table 8, and the distribution of the relative influence is plotted in Figure 1.

Table 7. The influence of individual decisions on joint decisions; dependent variable is the difference between later and sooner allocations ($c_{t+\tau} - c_t$), with interaction terms for husband's and wife's decisions

	(1)	(2)	(3)
Husband decision	0.351	0.277	0.181
	(0.223)	(0.225)	(0.233)
Wife decision	0.109	0.088	0.204
	(0.197)	(0.184)	(0.199)
Husband decision × absolute difference between husband's and wife's sooner allocation	-0.003	-0.004	-0.005
	(0.003)	(0.003)	(0.003)
Wife decision × absolute difference between husband's and wife's sooner allocation	-0.005	-0.005	-0.008**
	(0.003)	(0.003)	(0.004)
Husband decision × if husband is more patient than wife (1=yes)			0.163*
			(0.095)
Wife decision × if husband is more patient than wife (1=yes)			-0.153
			(0.102)
Husband decision × husband age (years)	0.002	0.002	0.002
	(0.004)	(0.004)	(0.004)
Husband decision × husband higher than primary school (1=yes)	0.005	0.004	0.003
	(0.008)	(0.009)	(0.009)
Husband decision × husband communist party member (1=yes)	-0.114	-0.108	-0.101
	(0.079)	(0.078)	(0.077)
Husband decision × If husband answered financial conflict with spouse (1=yes)		-0.032	-0.043
		(0.112)	(0.113)
Husband decision × If husband answered it's him making decisions on financial savings (1=yes)		0.111*	0.113*
		(0.060)	(0.060)
Wife decision × wife age (years)	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)
Wife decision × wife higher than primary school (1=yes)	0.009	0.008	0.009
	(0.009)	(0.009)	(0.009)
Wife decision × If wife answered financial conflict with spouse (1=yes)		0.023	0.035
		(0.072)	(0.073)
Wife decision × If wife answered it's her or joint making decisions on financial savings (1=yes)		0.106*	0.113*
		(0.059)	(0.059)

Notes: 1. Joint, husband's and wife's decision is the difference between later and sooner allocations in level form: ($c_{t+\tau} - c_t$).
2. The results reported in table are average marginal effects based on the censored regression model with varying limits.
3. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
4. Two order dummies, experimenter gender dummy, the dummies of initial control over tokens, and village dummies are also included in the regressions.
5. *, **, and *** represent the significant level at 10%, 5%, and 1%, respectively.

There is some variation in the influence of the spouses and hence the relative influence. The average relative influence is 0.77, which is higher than what we found in the model without socio-economic characteristics. This is explained by a few observations with a high relative influence for wives. The median is also higher: 0.76. The ratio of relative influence is lower than one in 91% of the households. It means that there are only 9% of households where the wife actually has a stronger influence than the husband. Our results are comparable to Carlsson et al. (2012a) who find in a similar study in China that there are very few households (1%) where the wife has a stronger influence than the husband. Although we can say that husbands have more decision power on household decisions from these two studies, it is of course difficult to make a direct comparison since the experimental method and context are different. This points to the difficulties with generalizing findings from a single experiment.

Table 8. Descriptive results for husbands' and wives' influences, and wives' relative influences

Individual influence	Mean	Std. Dev	10^{th} percentile	25^{th} percentile	50^{th} percentile	75^{th} percentile	90^{th} percentile
Husband's influence	0.78	0.09	0.63	0.75	0.80	0.85	0.88
Wife's influence	0.61	0.12	0.44	0.53	0.61	0.70	0.75
Wife's relative influence	0.77	0.16	0.59	0.69	0.76	0.84	0.97

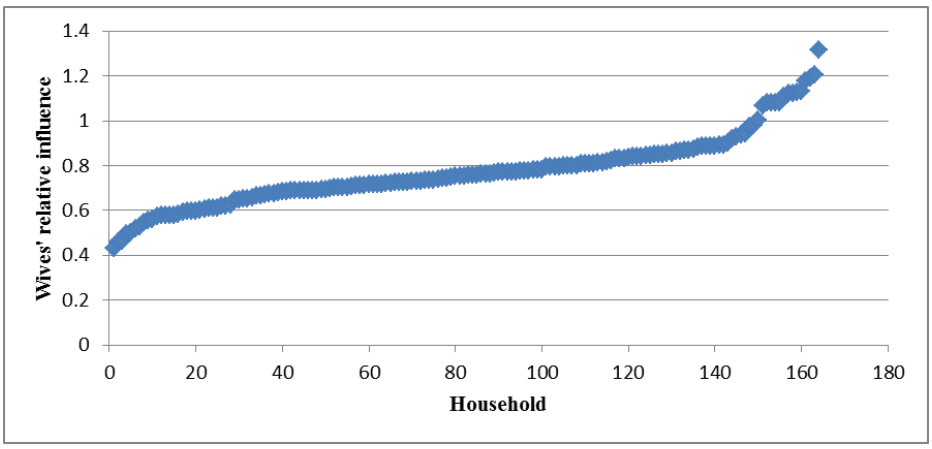

Figure 1. The distribution of wives' relative influences

The relatively low variation in relative influence is explained by the fact that few of the individual observable characteristics are significant in the model in Table 7. However, in the last step we will estimate a model with the wife's relative influence as the dependent variable and a set of household characteristics as independent variables. The estimated results are reported in Table 9.

Again, with the exception of the length of marriage, there is no other observable household characteristics are significant. The longer the couple has been married, the stronger the influence of the wife. Again, our results are quite comparable to Carlsson et al. (2012a) who do not find any other significant household characteristics that could affect the wife's relative influence except the dummy for whether the couple is living with husband's parents.

Table 9. The determinants of wives' relative influences

Household characteristics	Coefficients
Wife older (1=yes)	0.048
	(0.033)
Wife more educated (1=yes)	-0.024
	(0.031)
Wife's income contribution (%)	-0.044
	(0.074)
Household is minority (1=yes)	-0.042
	(0.031)
Log of equivalence scaled total gross income (yuan)	-0.007
	(0.015)
Length of marriage (years)	0.010***
	(0.001)
Number of children 16 years old or younger	-0.020
	(0.013)
If household experienced serious illness or death in the past two years (1=yes)	-0.015
	(0.022)
If the couple is living with husband's parents(1=yes)	-0.008
	(0.025)
If financial conflict with spouse in the past two years (1=yes)	0.010
	(0.023)
If both husband and wife agreed that husband makes decisions on savings (1=yes)	-0.028
	(0.023)
If both husband and wife agreed that they jointly make decisions on savings (1=yes)	0.018
	(0.033)
Constant	0.639***
	(0.147)
Observations	164
R-squared	0.410

Notes: 1. Figures in parentheses are standard errors.
2. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

5. Conclusions

In this paper, we have investigated the determinants of individual and joint decisions, and the influence of spouses' preferences on joint decisions regarding intertemporal allocations. We have also examined how the influence in the experiment is related to household and individual characteristics, and households' decisions on savings in real life. We did this by conducting an artefactual field experiment with 164 married couples in rural China, and used the Convex Time Budget experimental method to elicit individual and joint time preferences.

In general, we find that both wives and joint decisions show more patience than husbands, which provides evidence of misaligned time preferences between spouses (Schaner, 2012). Furthermore, both individual and joint decisions exhibit present-biased time preferences. We find that both husbands and wives have an influence on the joint decisions, but on average husbands have a stronger influence than wives. In particular, husbands have a stronger influence on the joint decisions in 91% of the households. Thus, only in 9% of households, wives have a stronger influence. However, few observable individual and household characteristics are significantly correlated with the spouses' relative influence on joint decisions, which is in line with the moderate variation in relative influence at the household level. Interestingly, more patient husbands have stronger influence on joint decisions. Moreover, we find there is a link between relative influence in the experiment and the households' decisions on financial savings in real life. Husbands who mainly make decisions on savings also have a stronger influence on the joint decisions in the experiment.

We present some interesting results regarding the design of this type of experiment. In particular, in an attempt to affect the influence of the spouses on the joint decisions, we had a set of treatments where the initial control over the tokens was given to one of the spouses. This did not affect the influence of the spouses, however. One explanation for this could be that the treatment was not strong enough (it was not intended to be stronger). Future research should, among other things, look into what exogenous factors could affect the relative influence of the spouses, and whether the effects are similar between husbands and wives. For example, it would be interesting if the spouses have to earn the endowments in a real effort experiment, and then investigate to what extent they have influence over the resources.

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Paper II

Choice Shifts in Households: An Experiment on Intertemporal Decisions

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Abstract: In this paper, we investigate choice shifts in households regarding intertemporal choices. In particular, we examine whether and to what extent joint choices are more or less patient and time-consistent than individual choices. We use data from an artefactual experiment conducted by Yang and Carlsson (2012), where the Convex Time Budget experimental method was used to elicit both individual and joint time preferences. We find that 11% of the joint choices are more impatient than the two individual choices, while 9% are more patient. We also find that 17% of joint choice pairs are less time-consistent than the two individual choice pairs, while 12% of the joint choice pairs are more time-consistent. In addition, a number of observable characteristics are significantly correlated with these shifts in preferences from individual decisions to joint decisions. Finally, we also find a significant and consistent pattern between time-consistent/-inconsistent and patient/impatient shifts.

Key words: individual decisions; joint decisions; patience; time-consistency; choice shifts; rural China

JEL classification: C91, C92, C93, D10

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1. Introduction

The empirical literature on household decision making is by now extensive. A large number of studies show that household decisions may be inefficient due to limited information and limited commitment within the household (Udry, 1996; Duflo and Udry, 2004; Mazzocco, 2007; Ashraf, 2009; Mani, 2010; Robinson, 2011). Furthermore, empirical evidence looking at actual decisions in the household suggests that the outcomes of household decisions depend on who in the household has control over the resources (Thomas, 1990, 1994; Browning et al., 1994; Lundberg et al., 1997; Phipps and Burton 1998; Duflo, 2003; Namoro and Roushdy, 2008). Recently, experiments have also been used to investigate the influence of spouses on joint decisions (Carlsson et al. 2012a, 2012b; Abdellaoui et al., 2011; de Palma et al., 2011; Yang and Carlsson, 2012). Experiments have allowed researchers to directly estimate the spouses' respective influences and relate them to the characteristics of the households and the individual decision makers.

At the same time, a growing number of studies have investigated the differences between group and individual decision-making (Kocher and Sutter, 2005; Charness and Sutter, 2012; Kugler et al., 2012). Although the empirical findings are mixed, there is evidence that group decisions are more in line with standard game-theoretical predictions than are individual decisions, and that groups can be used by individuals as a way to protect themselves from irrational decisions (Charness and Sutter, 2012). Furthermore, there is evidence that group decisions can become more extreme or polarized than individual decisions (Stoner, 1968; Moscovici and Zavalloni, 1969; Cason and Mui, 1997; Sunstein, 2000, 2002; Eliaz et al., 2006; Ambrus et al., 2009; Shapiro, 2010). Theoretically, there are a number of factors that can explain the difference between group and individual decisions as well as shifts in decisions. Social comparison concerns could make individuals behave differently when making decisions in a group rather than in isolation, since they obtain information about the other group members' preferences (Levinger and Schneider, 1969). For example, if people wish to portray themselves as more patient than others, they might shift their decisions when learning that other group members are more patient than themselves. Also, individuals might not want to be responsible for a certain outcome, and might therefore avoid making a risky choice that could result in an unpleasant outcome for the others (Eliaz et al., 2006). Of course, there could also simply be learning effects, i.e., that the group members learn from each other. Finally, altruistic concerns could make group decisions more patient and time consistent (Shapiro, 2010). For example, a subject might think that it is better for another group member

to be very patient, and therefore argue for a patient decision even if she herself would prefer an impatient decision. Similar to group decisions, many household decisions are discussed and reflect, to varying extents, individual members' preferences. Moreover, the "diffusion of responsibility" and altruism also play potentially important roles in household decision-making. Hence, choice shifts could also be expected to occur when individual spouses discuss and make decisions jointly.

In this paper we study households' and both spouses' intertemporal decisions in an experiment where the respondents decide how much money to allocate to an early date and a later date.[1] Decisions are made both individually and jointly. Intertemporal choices are generally of great importance to households since they often concern decisions such as savings, investments, and education. The literature on households' intertemporal decisions is relatively scarce. Abdellauoui et al. (2011), Carlsson et al. (2012a), and Yang and Carlsson (2012) explore the relationship between individual spouses' decisions and joint household decisions and investigate to what extent spouses can influence their joint decisions. In this paper we address another issue, which to our knowledge has not been investigated before: to what extent are joint decisions shifted outside the range between the two spouses' individual decisions.

We investigate two types of shifts that could occur in the household. The first one concerns to what extent joint decisions are more patient or impatient than individual ones. If a joint choice is more patient than the individual ones, we refer to it as a *patient shift*. The opposite case, where the joint choice is more impatient than the individual ones, is referred to as an *impatient shift*. In contrast to patient/impatient shifts without consideration of the dynamic change in discount rates over time, the second investigated type of shift concerns to what extent joint decisions are more or less time-consistent than individual decisions. A large number of studies have shown that discount rates are higher in the short run than in the long run (see, e.g., Loewenstein and Prelec, 1992, for an early contribution, and Frederick et al., 2002, for a survey). This implies that time preferences are dynamically inconsistent or present-biased (Strotz, 1955-1956; Thaler, 1981; Laibson, 1997; O' Donoghue and Rabin, 1999). Hence, when making decisions that involve inter-temporal trade-offs, a person will have two sets of revealed preferences. At a present time, when evaluating future benefits and costs, the individual will use a lower discount rate for the future, which means that he or she

[1] Here and henceforth, the respondents indicate husbands, wives or couples.

will, for example, decide to invest in the future. However, when the future arrives, the individual is going to use a higher discount rate and might then end up not investing. This self-control problem has been addressed as an important reason for both under-saving (Laibson et al., 1998; Thaler and Benartzi, 2004) and over-consuming and acquiring high credit card debts (Meier and Sprenger, 2010). One way to overcome the problem of present-biased preferences is designing commitment devices (Bryan et al., 2010; Beshears et al., 2011). For example, Ashraf et al. (2006) find that women with present-biased preferences are more likely to open a commitment saving account. In particular, there is a wide array of literature studying the commitment role of group savings in developing economies (Anderson and Baland, 2002; Ambec and Treich, 2007; Basu, 2008; Shapiro, 2010). Since a household is a group where individuals know their partners well, household joint intertemporal decisions could be useful in helping some individuals overcome for example self-control problem (Kono et al., 2011). In this sense, individual spouses could make less time-inconsistent decisions in a joint setting than they would have made the decisions separately. We refer to this phenomenon as a *time-consistent shift*. A plausible explanation for why the joint choices are shifted to be more time-consistent or patient is that the spouses care about each other's preferences, and apply time-consistent or patient preferences when they know that the outcome will affect their spouse (Shapiro, 2010). Thus, even if, say, the husband is a hyperbolic discounter he might think it is better if the joint decision is more patient/time-consistent and is therefore willing to shift the decision. In contrast, recent theoretical literature demonstrates that the aggregation of heterogeneous time preferences can lead to a higher extent of time-inconsistency, even if the individuals exhibit constant discount rates (see, e.g., Gollier and Zeckhauser, 2005; Jackson and Yariv, 2011; Hertzberg, 2012). In this sense, it is possible that the joint intertemporal decisions could become more time-inconsistent than individual decisions. We thus refer to this phenomenon as *time-inconsistent shifts*.

One obvious question is of course whether these shifts are good or bad. When it comes to time-consistency, it is reasonable to view a more time-consistent decision as better. A more time-consistent, or less present-biased decision, implies that the household in question will not revise its decisions when the future arrives. How about patience? Patience is often seen as a virtue, and as shown by Becker (1980), based on a conjecture of Ramsey (1928), income distribution in a long-run steady state is determined by the lowest discount rate; i.e., the household with the lowest discount rate will own all the capital. This conclusion of course

rests on a number of simplifying assumptions, but, taking these as given, a more patient shift would be beneficial for the household.

In order to study the occurrence of choice shifts, we use data from an artefactual field experiment in Yang and Carlsson (2012). In this experiment, couples made both separate and joint decisions on how much money to allocate to an early date and a later date. Instead of the widely used multiple price list elicitation method in time preference literature (Coller and Williams, 1999; Harrison et al., 2002; Andersen et al., 2006, 2008; Tanaka et al., 2010), the experiment in the present paper uses the Convex Time Budget experimental method suggested by Andreoni and Sprenger (2012) to elicit individual and couple's intertemporal allocation decisions. As Andreoni and Sprenger (2012) have argued, the multiple price list method can result in upwards-biased discount rates due to the assumption of linear utility. By "convexifying" the experimental budgets, the Convex Time Budget method has provided a simple solution to the estimation bias of discount rates if utility is concave. The subjects can thus continuously allocate a certain amount of money between a sooner date and a later date. In the experiment, the subjects were asked to make ten different decisions where the interest rate and whether the early date is immediate or not are varied. With this approach we obtain detailed information about the characteristics of the choices, including to what degree preferences are present- or future-biased, and to what extent joint decisions are more or less patient and time-consistent than the respective individual decisions.

The main contribution of this paper is that we provide empirical evidence on the occurrence of time-consistent/-inconsistent and patient/impatient shifts. Of particular interest is that we study this in a household setting, which is perhaps the most common group decision environment. We find that 11% of the joint choices are more impatient than the two individual choices, while 9% are more patient. We also find that 17% of joint choice pairs are less time-consistent than the two individual choice pairs, while 12% of the joint choice pairs are more time-consistent. Consequently, there is a substantial shift from individual to joint household decisions, in particular with respect to time-consistency. Interestingly, it is not the case that joint decisions tend to generate only beneficial shifts, i.e., patient and time-consistent shifts. On the contrary, a majority of the observed shifts are impatient and time-inconsistent shifts. We also find a significant and consistent link between (im)patient shifts and time-(in)consistent shifts. Time-inconsistent shifts are related to impatient shifts when the early payment is immediate (today) and patient shifts when the early payment is delayed. Time-consistent shifts are related to impatient shifts when the early payment is immediate (today)

and when the early payment is delayed, and to patient shifts when the early payment is immediate (today) and when the early payment is delayed.

The rest of this paper is organized as follows. In Section 2 we introduce the details about experimental design and procedure. Section 3 presents the econometric framework. We describe and discuss results in Section 4. Finally, Section 5 concludes the paper.

2. Experimental design and procedure

2.1 Location of the experiment and description of the sample

We use data from an artefactual experiment conducted by Yang and Carlsson (2012). The experiment was conducted in two counties of the Gansu province, which is located in northwestern China. The two counties, Linxia and Jingning, were randomly selected. In each county, three townships and in total thirteen villages were randomly chosen.

In each of the eight villages, 10 to 25 households with officially married spouses were randomly chosen from the village registration list provided by the village leaders. In the other five villages, around five households were randomly selected in each village, also with married spouses. With the assistance of one village cadre, two randomly matched experimenters (always one male and one female) approached the selected households. If both the husband and wife voluntarily agreed to be interviewed after welcome announcement, the village cadre left. If one of the spouses was not at home when the experimenters arrived at their house, the experimenters waited for a while or made an appointment and revisited them later when both spouses were at home. However, we always made sure to interview the selected households in each village within one day in order to keep information about the experiment from spreading. If an appointment could not be made or if one spouse refused to be interviewed, the experimenters visited the neighbors instead. All in all, 164 couples agreed to voluntarily participate in the experiment.

Table 1 describes the summary statistics of the sampled households. The average ages for the husbands and wives are 49 and 46 years, respectively. They have an average of 5 and 2.5 years of education, respectively. Fifteen percent of sampled households belong to minorities. Wives' average income contribution to the households is around 40%. Husbands are the main decision makers in everyday life, but wives have more influence when it comes to daily expenses for items such as food and clothes. As for household characteristics, the average

household has five members and the average length of marriage is 26 years. In 2010, the average household's gross per capita income was 7,064 yuan.[2]

Table 1. Descriptive statistics of individual and household characteristics (N = 164 households)

	Husband		Wife	
	Mean	Std. dev.	Mean	Std. dev.
Individual characteristics				
Age (years)	48.78	9.34	46.26	9.11
Higher than primary school (1=yes)	0.50		0.19	
Communist party member (1=yes)	0.12		0.01	
Individual attitudes				
General decision maker (1=husband; 2=joint; 3=wife)	1.24	0.46	1.38	0.59
Wife income contribution	0.40	0.17	0.39	0.17
Husband income contribution	0.60	0.17	0.61	0.17
Decision maker on savings (1=husband; 2=joint; 3=wife)	1.31	0.49	1.34	0.51
Decision maker on daily expense (1=husband; 2=joint; 3=wife)	2.36	0.78	2.18	0.81
Decision maker on durable goods (1=husband; 2=joint; 3=wife)	1.55	0.53	1.55	0.61
Decision maker on expensive fixed asset (1=husband; 2=joint; 3=wife)	1.55	0.52	1.50	0.54
If financial conflict with spouse in the past two years (1=yes)	0.09		0.17	
Trustiness on the future payments (1=totally do not trust; 2=do not trust; 3=neither trust nor distrust; 4= trust; 5=totally trust)	4.56	0.82	4.49	0.77
Household characteristics				
Household is minority (1=yes)	0.15			
Household population (persons)	4.98	1.50		
The length of marriage (years)	26.06	9.80		
The number of children 16 years old or younger (persons)	0.85	0.85		
If the couple is living with husband's parents (1=yes)	0.24			
If household experienced serious illness or death in the past two years (1=yes)	0.34			
Log of equivalence scaled total gross income (yuan); Equivalence=(Adults+0.5*children)^0.75	9.03	0.68		

[2] At the time of the experiment, 1 USD=6.59 CNY.

2.2 Experimental design

A Convex Time Budget method suggested by Andreoni and Sprenger (2012) was used to investigate subjects' intertemporal choices. We present the 10 intertemporal choice sets for each respondent in Table 2. There are two time frames with the same delay of one month: In the first frame the sooner period was immediate which meant that they would receive payment on the experiment day, and in the second frame the sooner period was delayed as well which meant that they would receive payment two months from today. In the first frame, "today" and not "tomorrow" was used in the experimental design. This could imply different transaction costs between payments today and future payments (Anderson et al., 2008). To investigate how the credibility of a future payment affects respondents' decisions in the experiment, before respondents started to make decisions, we asked questions about to what extent they trusted they would receive the money in the future. From the descriptive statistics in Table 1, we can see that both husbands and wives highly trusted that they would receive the experimental payments in the future. Also, the five interest rates used in the experiment were tested and decided upon based on the results of the pilot experiment. Respondents needed to allocate 20 tokens between a sooner date and a later date with increasing interest rates.

Table 2. Description of the 10 decisions in the time preference experiment

Sooner date	Later date	Token budget	Interest rate	Sooner value of one token	Later value of one token
0	30	20	0.05	2	2.1
0	30	20	0.1	2	2.2
0	30	20	0.25	2	2.5
0	30	20	0.4	2	2.8
0	30	20	0.6	2	3.2
60	90	20	0.05	2	2.1
60	90	20	0.1	2	2.2
60	90	20	0.25	2	2.5
60	90	20	0.4	2	2.8
60	90	20	0.6	2	3.2

As described in detail below, subjects were presented with two plates: a red plate representing the sooner date (today or two months from today), and an orange plate representing the later date (one month from today or three months from today). Their task was to decide how many tokens to put on each plate. In all choices, each token was worth 2 yuan if it was allocated to

the red plate, and each token was worth 2×(1+r) yuan if it was allocated to the orange plate, where r is the rate of return for waiting, which increased from the first to the fifth choice.

The spouses made both individual and joint decisions. As described below, the order was randomly determined. When they made the individual choices they were clearly told that the money was theirs, and when they made the joint choices they were clearly told that they would each receive equal amounts. Thus, even when the decisions were made jointly, each spouse would receive their own individual money. The basic idea of the analysis is to compare the decisions made individually with the decisions made jointly. It is of course possible that the individual choices were made taking into consideration the preferences of the spouse, but we have no way to control for that. However, we did stress that the choices would not be revealed to the spouse and that the money was individual and would not to be paid to the household.

2.3 Experimental procedure

Ten experimenters were employed and trained to conduct the experiment. Among them, five were from Beijing University and five were from the local university. All experiments were conducted by two experimenters, where one experimenter was from the local university.

Once the couple agreed to participate in the whole survey, one of the experimenters gave a brief introduction about the tasks. Then the couple jointly answered a set of questions about the household. The rest of the procedure depended on the order of the parts of the experiment. The order of separate and joint decision-making was varied. Half of the households first made the individual decisions and then the joint decisions. The other half first made the joint decisions and then the individual decisions. The order of the two parts of the time preference experiment was also varied. Half of the households first answered the five questions regarding money allocated between today and one month from today; the other half first answered the five questions regarding money allocated between two months from today and three months from today.[3]

We will for simplicity only describe in detail one of the orders. In the version where individual decisions were made before the joint decisions, the respondents were (following

[3] Experimenter effects were also controlled by interchanging their interviewing subjects in each household. For example, if the male experimenter interviewed the husband and the couple in one household, then the female experimenter interviewed the husband and the couple in the next household.

the first initial questions) physically separated into two rooms where they could not hear each other. One experimenter followed the wife and one followed the husband. The experimenter read the experimental instructions to the respondent, and the respondent was told that s/he could earn some money and that the amount earned depended on his/her decisions in the experiment. The respondent needed to make 10 separate decisions, and one of these decisions would be randomly chosen to be paid out by rolling a 10-sided die. The number that came up on the die decided which choice would determine the respondent's earnings. Each decision had an equal chance of being used in the end. Moreover, the respondent was told that s/he would get two vouchers, one for sooner payments and one for later payments, signed by the project coordinator. The voucher indicated the amount of cash and corresponding date the respondent could redeem the money. After the experiment, the respondent decided whether we should send the money to them by the postal savings office or other commercial bank.

To make sure the respondents had understood the experiment, they first made two trial decisions.[4] The purpose of the trial decisions is to help respondents make more informed decisions and avoid misunderstandings of the experimental tasks. The drawback with trial decisions is that the experiment takes too long and hence causes respondents to be fatigued. However, our experience from the pilot experiment was that the trial tasks were crucial for the understanding of the experiment. Once the experimenter was certain that the respondent had understood well, s/he was asked to make the first five independent decisions. Following the experimental design in Section 2.2, to help the respondent remember which dates the two plates represented, the experimenter put a sign in front of each plate with the corresponding date and the value of a token. The respondent then decided how to allocate the tokens between today and one month from today for each choice. After each decision was confirmed, the experimenter translated the value of the total tokens on each plate into Chinese yuan and wrote the decision on the whiteboard. The experimenter then repeated the allocation by pointing to the whiteboard, and at this point the respondent had the possibility to revise the decision. When the respondent had finished all five decisions, the experimenter presented the outcomes on the whiteboard and asked whether s/he would like to change the allocation for any of choices and, if so, which one(s). Once the respondent did not want to make any more

[4] The trial decisions were about how to allocate 10 tokens between one month from today and two months from today. Before the respondent did this, the experimenter asked some control questions about the meaning of the plates and the tokens. The respondent started to make the trial decisions only once s/he had understood the meaning of the plates and the tokens. The trial decisions were the same regardless of the order between individual decisions and joint decisions.

changes, the experimenter moved to the next five independent choices, i.e., concerning allocation between two months and three months from today. The elicitation procedure was similar for the second five independent choices. After the respondent had finished all 10 choices, s/he was asked some questions about his/her individual characteristics.

When both spouses had finished, they were brought together for the joint decisions. The couple was told that they would make 10 intertemporal choices similar to the individual decisions they had just made. The main difference was that both of them would obtain the same experimental payment according to one of the joint decisions, which would be randomly selected by rolling a 10-sided die. Before each decision was made, they were encouraged to speak to each other and discuss the decisions, as they needed to agree on how to allocate the money between the sooner and later dates. The couple also followed the same elicitation method as for the individual decisions: they first made joint decisions about how to allocate the 20 tokens between today and one month from today, and then made the other five joint decisions about how to allocate the 20 tokens between two months and three months from today.

In the joint experiment, to control for the effects of who has the initial control over the tokens on the joint decision, there were four alternatives for how the tokens were initially distributed. The first reference situation was that the experimenter just put the 20 tokens between the husband and the wife, but did not say anything else about who was responsible to put tokens on the plates. The second situation was that the experimenter gave the 20 tokens to the wife, making her in charge of putting the tokens on the plates. In the third situation, the experimenter gave the 20 tokens to the husband, who was initially responsible to put the tokens on the plates. The fourth situation was that the experimenter gave 10 tokens to the wife and 10 tokens to the husband, making both of them in charge of putting the tokens on the plates. For all cases, both spouses could adjust the amount of tokens on the plates until they had reached an agreement, i.e., they were not told that only one or both should put the tokens on the plates.

On average, the whole survey lasted one and a half hours for each household. The average experimental payment for each individual respondent was 52 yuan, and the average experimental payment for each household was 208 yuan, which equals three days of non-farm wages for one local full-time worker.

3. Econometric framework

In the experiment, for a given interest rate, *r*, the respondents had to decide how much of a given initial amount of money to allocate to a sooner date, c_t, and a later date, $c_{t+\tau}$, where *t* indicates the sooner dates, i.e., *t*=0 or *t*=60 days; τ is the delay time, i.e., $\tau = 30$ days. In total, respondents made ten individual and ten joint choices. Since the experimental design was exactly the same in both the individual and joint choices, we can make direct comparisons between the two spouses' choices and the joint choice in each of the ten choice situations. In particular we can investigate to what extent the joint choice is shifted outside the range of the two individual choices at the choice level. We classify the joint decisions into three categories for household *i* in choice situation *k:*

$$Joint\ Shift_{ik} 1\ if\ c_{tik}^{J} > Max\{c_{tik}^{H},\ c_{tik}^{W}\}$$
$$Joint\ Shift_{ik} = 2\ if\ c_{tik}^{J} \in [c_{tik}^{H},\ c_{tik}^{W}]$$
$$Joint\ Shift_{ik} = 3\ if\ c_{tik}^{J} < Min\{c_{tik}^{H},\ c_{tik}^{W}\}$$

where *J*, *H*, and *W* denote the joint, husband's, and wife's decisions respectively in household *i*. The first category represents the case when the joint decision is more impatient than both individual decisions; i.e., the amount of money allocated to the sooner date in the joint decisions is larger than both the husband's and the wife's individual allocations. Thus, this is an impatient shift. The second category is that the joint decision is in between the spouses' individual decisions (or exactly the same). The third category represents the case when the joint decision is more patient than both individual decisions; i.e., the amount of money allocated to the sooner date in the joint decisions is smaller than both the husband's and the wife's individual allocations. Thus, this is a patient shift. We employ a multinomial logit model using these three categories as dependent variable, and investigate the factors that could explain the likelihood of a household joint decision ending up in a certain category. To investigate how the potential conflicts between husband's and wife's preferences affect the likelihood of a shift, we include the absolute difference between the husband's and wife's sooner allocations, and a dummy variable equals one if the husband and wife make the same sooner decisions in model specification. In addition, we control for a number of individual and household characteristics, the interest rates, and the present time dummy that is equal to one if the sooner choice involves payment today.

Second, we compare the extent to which joint choices are more or less time-consistent with the individual choices. Present bias is widely referred to as a time-inconsistent preference in

the literature, but the phenomenon of future bias or reverse time-inconsistency has also been observed (Sayman and Önculer, 2009; Shapiro, 2010; Takeuchi, 2011; Gine et al., 2012). In the present paper, we analyze time-inconsistency by considering both present bias and future bias at the choice level. The respondents made 10 choices over the two time frames with different starting points but the same delay: today vs. one month from today and two months from today vs. three months from today. We can thus partition the choices into five pairs, one for each interest rate. We use the difference between allocations today and two months from today in each pair to evaluate whether the decision is time-(in)consistent at the choice level. We define a choice to be present-biased if the allocation is larger when the sooner date is today than that when the sooner date is two months from today. Similarly, the choice is future-biased if the allocation when the sooner date is two months from today is larger than that when the sooner date is today. A decision is time-consistent if the allocations are the same over the two sooner dates. We use the absolute difference between allocations when the sooner date is today and when it is two months from today to measure the extent of time-inconsistency for the husband's, wife's, and joint decisions (thus we include both present- and future-biased preferences). We can then classify the household joint decisions into three categories for household *i* in choice pair *m*:

$$Time\ Consistency\ Shift_{im} = 1\ if\ |c_0^J - c_{60}^J|_{im} > Max\ \{|c_0^H - c_{60}^H|_{im},\ |c_0^W - c_{60}^W|_{im}\}$$
$$Time\ Consistency\ Shift_{im} = 2\ if\ |c_0^J - c_{60}^J|_{im} \in\ [|c_0^H - c_{60}^H|_{im},\ |c_0^W - c_{60}^W|_{im}]$$
$$Time\ Consistency\ Shift_{im} = 3\ if\ |c_0^J - c_{60}^J|_{im} < Min\ \{|c_0^H - c_{60}^H|_{im},\ |c_0^W - c_{60}^W|_{im}\}$$

where c_0^J, c_0^H, and c_0^W denote the joint, husband's, and wife's allocation when the sooner date is today and c_{60}^J, c_{60}^H, and c_{60}^W denotes the joint, husband's and wife's allocation when the sooner date is two months from today. The first category represents the case when the joint decisions result in a larger absolute difference between sooner allocations today and two months from today than that of both the husband and the wife, i.e., a time-inconsistent shift. The second category represents the case when the absolute difference between sooner allocations is in between that of the husband and the wife (or equal to that of one of the spouses). Finally, the third category represents the case when the joint decisions result in a smaller absolute difference between sooner allocations today and two months from today than that of both the husband and the wife, i.e., a time-consistent shift. Similar to (im)patient shifts, we employ a multinomial logit model using these three categories as dependent variable, and include interest rates and a number of individual and household characteristics in model

specification. In addition, the time-(in)consistent shifts are potentially linked to the case of (im)patient shifts. For example, households that become more time-consistent when making joint decisions could do this by making a patient shift when the sooner date is today, or by making an impatient shift when the sooner date is two months from today. Consequently, it is not necessarily the case that a time-consistent shift requires a patient shift. To evaluate the link between time-(in)consistent shifts and (im)patient shifts, we include four dummy variables based on each choice pair: the first dummy equals one if the joint choice is a patient shift when the sooner date is today; the second dummy equals one if the joint choice is a patient shift when the sooner date is two months from today; the third dummy equals one if the joint choice is an impatient shift when the sooner date is today; and the fourth dummy equals one if the joint choice is an impatient shift when the sooner date is two months from today.

4. Results

4.1 Descriptive results

Figure 1 presents the average numbers of Chinese yuan allocated to the sooner dates for husbands', wives' and joint decisions for the ten decisions. The first graph shows the distribution for the five decisions where the sooner date is today, and the second shows the distribution for the five decisions where the sooner date is two months from today.

The average allocation to the sooner date decreases as the rate of return increases, which indicates that the subjects are aware of the basic trade-offs they face in the choice tasks. The graphs also show that the husbands are on average more impatient than both wives and the decisions made jointly, but there are no significant differences between wives' decisions and joint decisions.[5] In addition, apart from the first two choices when the sooner date is today, the average joint decisions are in between the spouses' decisions. Based on our definitions of present bias, future bias, time inconsistency, and time consistency in Section 3, we present the distribution of the fractions of present-biased, future-biased, time-inconsistent, and time-consistent responses in Figure 2. Around 50% of the choice pairs are time-consistent for husbands, wives, and joint decisions, and there are no significant differences between husbands' and wives' decisions based on a Wilcoxon rank sum test, and between individual

[5] The p-value of Wilcoxon rank sum test of the difference between husbands' and wives' sooner allocations is 0.000, and the p-values of Wilcoxon signed rank tests of the differences between husbands', wives', and joint sooner allocations are 0.000 and 0.482, respectively.

decisions and joint decisions based on a Wilcoxon signed rank test. The fraction of present-biased decisions is higher among wives than among husbands and joint decisions,[6] but the fraction of future-biased decisions is lower.[7] Finally, at this aggregate choice level, we observe that the fraction of present- and future-biased decisions and the fraction of time-consistent and -inconsistent decisions for the joint decisions are in between the corresponding fractions for the husbands' and wives' decisions.

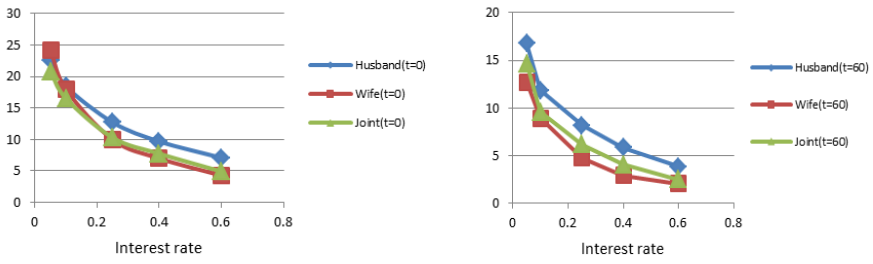

Figure 1. The average distribution of husbands', wives', and joint sooner allocations

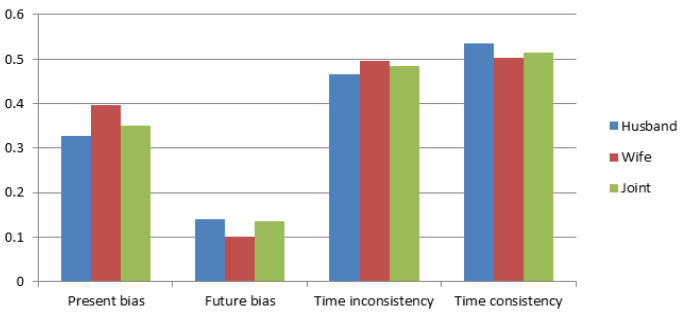

Figure 2. The distribution of the fractions of present bias, future bias, time-inconsistency and time-consistency for husbands', wives' and joint decisions

[6] The p-value of the Wilcoxon rank sum test of the difference between husbands' and wives' present bias fraction is 0.003, and the p-value of the Wilcoxon signed rank test of the difference between wives' and joint present bias fraction is 0.027.

[7] The p-value of the Wilcoxon rank sum test of the difference between husband's and wife's future bias fraction is 0.015, and the p-value of the Wilcoxon signed rank test of the difference between wife's and joint future bias fraction is 0.017.

4.2 Patient and impatient shifts

In this section we examine to what extent joint decisions are more patient or impatient than individual decisions at the choice level. Based on the classification of responses in Section 3, we find that 11% of the joint choices are more impatient than both the husbands' and wives' individual choices, while 9% of the joint choices are more patient. Thus, in 80% of the choice situations, the joint choice is in between, or equal to, the spouses' individual choices. At the same time, a majority of the households experience a shift. In 27% of the households there is at least one impatient shift, in 25% there is at least one patient shift, and in 15% there are both patient and impatient shifts. Furthermore, the size of shifts is often not small. Table 3 reports the mean and standard deviations of the observed shifts, measured as the difference between the joint allocation on the early period and the corresponding lowest or highest individual allocation. The minimum size of a shift is 2 yuan (since each token is worth 2 yuan) and the maximum size is 40 yuan. The average size of both patient and impatient shifts is around 9 yuan, i.e., a little bit more than 4 out of 20 tokens.

Table 3. Size of observed shifts

	Mean	Std. dev	Median	No. of obs.
Impatient shift	9.456	8.323	8	180
Patient shift	9.213	7.946	8	155
Inconsistent shift	11.285	9.439	8	137
Consistent shift	7.620	6.707	6	100

Next we estimate a multinomial logit model where the dependent variable is the three joint shift categories and the standard errors are clustered at the household level. Table 4 reports the estimated average marginal effects.

There are some intriguing and conflicting results regarding the correlation between individual and household characteristics and the likelihoods of both *impatient shifts* and *patient shifts*. In households with older wives or if the husband has obtained an education higher than primary school, it is more likely that the joint choice is an impatient shift. Given that we see patience as something advantageous for the households in the long run, it is thus more likely in these households that the joint decision is worse than the individual decisions. On the other hand, in households where the husband is a communist party member, it is more likely that the joint

Table 4. The determinants of the likelihood of impatient and patient shifts

	Impatient shifts	In between	Patient shifts
Absolute difference between husband's and wife's sooner allocation	-0.008***	0.010***	-0.003***
	(0.001)	(0.002)	(0.001)
Husband and wife have the same sooner allocation (1=yes)	-0.097***	0.204***	-0.107***
	(0.024)	(0.033)	(0.026)
Interest rate (r)	-0.144***	0.335***	-0.191***
	(0.039)	(0.062)	(0.055)
Present time dummy (1=today)	-0.003	-0.038	0.035*
	(0.022)	(0.026)	(0.019)
Husband age (years)	-0.010***	0.005	0.005
	(0.003)	(0.003)	(0.003)
Husband higher than primary school (1=yes)	0.094***	-0.095**	0.001
	(0.026)	(0.033)	(0.022)
Husband communist party member (1=yes)	-0.061	0.005	0.055*
	(0.039)	(0.047)	(0.029)
Wife age (years)	0.007**	-0.004	-0.003
	(0.003)	(0.004)	(0.003)
Wife higher than primary school (1=yes)	-0.095***	0.094**	0.002
	(0.034)	(0.041)	(0.027)
Wife's income contribution (%)	0.042	-0.153	0.111
	(0.066)	(0.105)	(0.077)
Household is minority (1=yes)	-0.164	-0.058	0.222***
	(0.196)	(0.099)	(0.051)
Log of equivalence scaled total gross income (yuan)	-0.032	0.015	0.016
	(0.022)	(0.027)	(0.015)
The number of children 16 years old or younger (persons)	-0.027*	0.033*	-0.006
	(0.016)	(0.019)	(0.013)
If financial conflict with spouse in the past two years (1=yes)	0.033	-0.000	-0.033
	(0.031)	(0.038)	(0.025)
If household experienced serious illness or death in the past two years (1=yes)	0.009	0.043	-0.051**
	(0.027)	(0.033)	(0.022)
If the couple is living with husband's parents (1=yes)	-0.009	-0.029	0.038
	(0.029)	(0.034)	(0.024)
Experimenter gender dummy (1=female)	-0.014	0.002	-0.011
	(0.038)	(0.047)	(0.035)
If first separate then joint decision (1 = yes)	-0.059**	0.084**	-0.024
	(0.028)	(0.034)	(0.024)
If first five choices are between today and one month (1=yes)	0.006	-0.017	0.011
	(0.039)	(0.047)	(0.034)

Notes: 1. The dependent variable equals one if the joint decision is less patient than the least patient individual decision, equals two if the joint decision is in between the spouses' individual decisions, and equals three if the joint decision is more patient than the most patient individual decision.
2. The results reported in table are average marginal effects based on the multinomial logit model.
3. All the regressions are clustered at household level. Robust standard errors are in parentheses.
4. The dummies of initial control over tokens and village dummies are also included in all regressions.
5. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

choice is a patient shift. If the husband has obtained an education higher than primary school, it decreases the likelihood of a joint choice in between the spouses' individual choices. Yet if the wife has obtained an education higher than primary school, it increases the likelihood of a joint choice in between the spouses' individual choices. The marginal effects are not very small. For example, if the husband has more than primary school education, the probability of an impatient shift is almost 0.094 units higher, while if the wife has more than primary school education, the probability of an impatient shift decreases by 0.095 units. Regarding the household characteristics, we find that minority households are more likely to make more patient joint decisions. In households that have experienced serious illness or death in the past two years, the likelihood to make patient choice shifts for joint decisions is lower. Households with more children being 16 years old or younger are less likely to make an impatient shift. In addition, if the sooner choices involve today payment, the likelihood of a patient choice shift increases. What this suggests is that patient shifts primarily occur when the early payment is immediate. When the interest rate is high, both patient and impatient shifts are less likely. Furthermore, the absolute differences between husbands' and wives' sooner allocations significantly decrease the likelihood of choice shifts. Thus, when there is a large difference in spouses' time preference, it is more likely that the joint decision is a compromise between the two individual decisions. This is in contrast to what Schaner (2012) has found that a large difference in patience between spouses leads to inefficient savings behavior in Kenya. As expected, if husbands and wives have the same sooner allocations, the joint decision also tends to be similar to the individual decisions. The gender of the experimenter does not affect the likelihood of patient or impatient shifts, but there is a significant order effect in that if the individual decisions were made before the joint decisions, then an impatient shift is less likely.

4.3 Time-consistent and -inconsistent shifts

Next we investigate to what extent joint decisions are more or less time-consistent than the individual decisions. In total, 17% of the joint choice pairs are more time-inconsistent than both of the spouses' choice pairs, while 12% of the joint choice pairs are more time-consistent. In the remaining 71% of the choice pairs, the joint decision is in between or equal to both spouses' individual decisions. At the household level, in 26% of the households there is at least one consistent shift, in 27% there is at least one time-inconsistent shift, and in 13% of the households there are both consistent and inconsistent shifts. Again, the magnitudes of the shifts are considerable: around 11 yuan for the inconsistent shifts and almost 8 yuan for the consistent shifts (see Table 3).

We will now move on to the econometric analysis of what factors are correlated with the likelihoods of time-consistent and -inconsistent shifts. As discussed in Section 3, we estimate a multinomial logit model with the three *time consistency shift* categories as dependent variable, and the standard errors are clustered at the household level. The estimated average marginal effects are reported in Table 5.

In model (1) we find that there are relatively few individual and household characteristics that are significantly related to the likelihoods of time-consistent and -inconsistent shifts. What we find is that in households where the husband has higher than primary school education, the likelihood of joint choices in between spouses' individual choices is decreased, and if the household has experienced serious illness or death in the past two years, a time-consistent shift is also less likely. Finally, we find significant experimenter effects and time order effects on the likelihood of in-between and time-consistent joint choices. If the experimenter is female, the respondents are more likely to make a joint decision that is in between the individual decisions and less likely to make a time-consistent shift. If respondents first make five choices between today and one month from today, the likelihood of in-between joint choices decreases and the likelihood of a time-consistent shift increases.

In model (2) in Table 5 we add the dummy variables of patient and impatient shifts. What we find is that there is a consistent pattern between *patient/impatient* and time-*consistent/-inconsistent* shifts. If there is an impatient shift when the choice involves payment today, or a patient shift if the choice only involves future payment, the likelihood of a time-inconsistent shift increases. Conversely, if there is a patient shift when the choice involves payment today and when the choice only involves future payment, or an impatient shift when the choice involves payment today and when the choice only involves future payment, the likelihood of a time-consistent shift increases. Thus, as expected there is a clear link between the two types of shifts. However, it is obviously not the case that patient shifts always result in a higher probability of a time-consistent shift, since this depends on whether the sooner date is today or not.

In model (3) we add both individual and household characteristics and the dummy variables of impatient and patient shifts. For most of the key variables, the size and significance remain the similar. We will not discuss the detailed results of the third model specification.

Table 5. The determinants of the likelihoods of time-inconsistent and time-consistent shifts

	Time-inconsistent shifts			In between			Time-consistent shifts		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Interest rate (r)	-0.145**	-0.145**	-0.145**	0.418***	0.294***	0.293***	-0.272***	-0.149**	-0.148***
	(0.063)	(0.062)	(0.063)	(0.077)	(0.074)	(0.073)	(0.064)	(0.061)	(0.059)
Patient shifts when the sooner date is today		-0.026	-0.030		-0.181***	-0.182***		0.208***	0.212***
(1=yes)		(0.054)	(0.054)		(0.055)	(0.054)		(0.027)	(0.027)
Patient shifts when the sooner date is two		0.116***	0.119**		-0.185***	-0.188***		0.069*	0.068*
months from today (1=yes)		(0.041)	(0.047)		(0.054)	(0.060)		(0.041)	(0.040)
Impatient shifts when the sooner date is today		0.307***	0.306***		-0.304***	-0.288***		-0.002	-0.018
(1=yes)		(0.033)	(0.032)		(0.056)	(0.052)		(0.054)	(0.038)
Impatient shifts when the sooner date is two		0.022	0.033		-0.102**	-0.117**		0.080**	0.085***
months from today (1=yes)		(0.042)	(0.044)		(0.049)	(0.049)		(0.035)	(0.032)
Husband age (years)	-0.011		-0.003	0.008		0.001	0.002		0.001
	(0.007)		(0.006)	(0.008)		(0.007)	(0.004)		(0.004)
Husband higher than primary school (1=yes)	0.055		-0.000	-0.127***		-0.080**	0.072		0.080**
	(0.043)		(0.036)	(0.046)		(0.041)	(0.039)		(0.036)
Husband communist party member (1=yes)	-0.003		0.004	-0.052		-0.031	0.055		0.027
	(0.050)		(0.043)	(0.064)		(0.049)	(0.046)		(0.035)
Wife age (years)	0.010		0.004	-0.011		-0.005	0.001		0.001
	(0.007)		(0.006)	(0.008)		(0.007)	(0.004)		(0.004)
Wife higher than primary school (1=yes)	-0.111		-0.042	0.071		-0.015	0.040		0.058
	(0.064)		(0.052)	(0.067)		(0.051)	(0.041)		(0.036)
Wife's income contribution (%)	0.005		-0.018	-0.128		-0.019	0.123		0.037
	(0.129)		(0.115)	(0.138)		(0.117)	(0.113)		(0.092)
Household is minority (1=yes)	-0.013		0.106*	-0.085		-0.045	0.098		-0.060
	(0.122)		(0.061)	(0.120)		(0.075)	(0.059)		(0.055)

(continued)

Table 5. The determinants of the likelihoods of time-inconsistent and time-consistent shifts (continued)

	Time-inconsistent shifts			In between			Time-consistent shifts		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Log of equivalence scaled total gross income	-0.029		-0.015	0.037		0.020	-0.008		-0.005
(yuan)	(0.026)		(0.020)	(0.030)		(0.026)	(0.023)		(0.021)
The number of children 16 years old or	0.011		0.016	-0.023		-0.038*	0.013		0.022
younger (persons)	(0.026)		(0.020)	(0.028)		(0.021)	(0.018)		(0.017)
If financial conflict with spouse in the past	0.003		-0.026	0.035		0.046	-0.038		-0.020
two years (1=yes)	(0.051)		(0.043)	(0.053)		(0.042)	(0.038)		(0.033)
If household experienced serious illness or	0.031		0.026	0.047		0.020	-0.077**		-0.045
death in the past two years (1=yes)	(0.044)		(0.034)	(0.048)		(0.040)	(0.033)		(0.031)
If the couple is living with husband's parents	-0.107		-0.070*	0.089		0.090*	0.018		0.020
(1=yes)	(0.061)		(0.040)	(0.063)		(0.046)	(0.032)		(0.029)
Experimenter gender dummy (1=female)	-0.006	-0.005	0.001	0.145**	0.133**	0.148***	-0.139***	-0.128***	-0.149***
	(0.063)	(0.050)	(0.049)	(0.064)	(0.057)	(0.056)	(0.051)	(0.045)	(0.042)
If first separate then joint decision	-0.035	-0.010	0.004	0.008	-0.049*	-0.034	0.027	0.060	0.030
(1=yes)	(0.048)	(0.034)	(0.033)	(0.051)	(0.042)	(0.041)	(0.046)	(0.037)	(0.037)
If first five choices are between today and one	0.080	0.023	0.024	-0.153***	-0.104**	-0.112**	0.073*	0.081**	0.088**
month (1=yes)	(0.058)	(0.046)	(0.046)	(0.058)	(0.051)	(0.052)	(0.044)	(0.039)	(0.040)

Notes: 1.The dependent variable equals one if the joint decision is less time-consistent than the least time-consistent individual decision, equals two if the joint decision is in between the spouses' individual decisions, and equals three when the joint decision is more time- consistent than the most time-consistent individual decision.
2. The results reported in table are average marginal effects based on the multinomial logit model.
3. All the regressions are clustered at household level. Robust standard errors are in parentheses.
4. The dummies of initial control over tokens and village dummies are also included in all regressions.
5. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

5. Conclusions

In this paper we have investigated the occurrence of choice shifts from individual decisions to household joint decisions regarding intertemporal choices. We use data from an artefactual experiment conducted by Yang and Carlsson (2012), where the Convex Time Budget experimental method was used to elicit both individual and joint time preferences. We find that there are substantial shifts between individual and joint decisions. At the choice level, 11% of the joint choices are more impatient than the individual choices, while 9% are more patient. Thus, a total of 20% of the joint choices are shifted outside the preferences of both spouses when they make their decisions in isolation, which is certainly a large fraction. At the choice-pair level, we find that 17% of joint choice pairs are less time-consistent than the two individual choice pairs, while 12% of the joint choice pairs are more time-consistent. Moreover, we find that a number of observable characteristics are significantly correlated with the likelihood of joint choice shifts.

Our results imply that in some cases, households can work as an informal commitment device helping individuals mitigate their impatience and time-inconsistency. However, at the same time there are almost equally many reverse observations that joint choices are more impatient and time-inconsistent than individual ones. This is consistent with Hertzberg (2012), who documents that a household could have hyperbolic discounting preferences even if the two spouses are time-consistent if the spouses have misaligned altruistic preferences over each other's outcomes. Thus, there is no clear pattern in the sense that joint household choices tend to generate beneficial shifts, i.e., patient and time-consistent shifts. Therefore, household joint decisions or marriage cannot often function as a savings commitment device to help individual spouses overcome present-biased preferences (Kono et al., 2011). In addition, our findings provide additional evidence on the efficiency and rationality of group decisions. As discussed in the introduction, there is evidence that group decisions are more in line with the standard game-theoretical predictions of rationality and selfishness than individuals (see Kugler et al., 2012; Charness and Sutter, 2012). What we find in our experiment is that there are almost as many cases where the joint decisions are improved (patient and consistent shifts) as where the joint decisions are worse (impatient and inconsistent shifts) in a joint household decisions setting. Clearly, more empirical studies are needed to examine in what types of households these shifts are more likely to occur. Finally, we find a significant and consistent pattern between time-consistent/-inconsistent and patient/impatient shifts. In particular, we

find that the time-consistent shift is caused not only by the patient shifts, but also by the impatient shifts both when the sooner date is today and when it is two months from today.

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Paper III

Are You More Patient and Time-Consistent with Your Spouse's Money?

An Experimental Study with Rural Couples in China

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Abstract: In this paper, we study how partners in a household make decisions for themselves and for their spouses regarding intertemporal choices. In particular, we investigate whether and to what extent the decisions made for the spouse are more or less patient and time-consistent than the subject's own decisions and predictions of the spouse's decisions. We conduct an artefactual field experiment with 122 married couples in rural China, and use the Convex Time Budget experimental method to elicit subjects' time preferences when it comes to own money and spouses' money as well as the predictions of the spouses' time preferences. We find that husbands are more patient when making decisions for their wives compared with their predictions of their wives decisions. However, the decisions made for the wives are more patient than the husbands' own decisions when the choice only involves delayed options. Regardless of the choice involving an immediate option or not, wives' decisions made for their husbands are similar to the wives' own decisions and their predictions of the husbands' decisions. We do not find any evidence that either husbands or wives are significantly more or less time-consistent for their spouses compared with their own decisions and the predictions of their spouses' decisions. However, highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for their spouses compared with their own decisions. In contrast, patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions.

Key words: own decisions; predictions; decisions for spouse; patience; time-consistency; Convex Time Budget; rural China

JEL classification: C90, C91, C93, D10

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1. Introduction

In the time preference literature, it is well documented that people prefer sooner smaller rewards to later larger rewards in the near future, but switch to later larger rewards when both rewards are equally delayed in the distant future. This preference reversal is widely referred to as present-biased or dynamically inconsistent time preferences (Strotz, 1955-1956; Thaler, 1981; Loewenstein and Prelec, 1992; Laibson, 1997; O'Donoghue and Rabin, 1999). This indicates that people are impatient/impulsive when there is an immediate option, and that they have self-control problems when executing their intended plans for intertemporal choices. A growing literature has addressed the important implications of self-control problem on under-savings, credit card borrowing, and procrastination (Laibson et al., 1998; O'Donoghue and Rabin, 2001; Thaler and Benartzi, 2004; Meier and Sprenger, 2010), and a pre-commitment device has often been suggested as a way to overcome the self-control problem (Ashraf et al., 2006; Bryan et al., 2010; Beshears et al., 2011). In this paper, we examine whether people' self-control problems or the degree of time-inconsistency could be mitigated when making intertemporal decisions for someone else.

There are many important situations where people make decisions for others in everyday life. For example, politicians make decisions for their constituents, doctors make medical decisions for their patients, financial advisors make investment decisions for their clients, and household heads make decisions for other household members. Psychologically, people have less emotional involvement in choices made for others than in choices made for themselves (Beisswanger et al., 2003). Pronin et al. (2008) find that people pay strong attention to immediate subjective feelings when making decisions for present selves compared with decisions made for future selves and for others. In neuroeconomics, Albrecht et al. (2011) provide evidence that there is a different neural activation system when making decisions for others compared with decisions made for oneself. Especially, choices including an immediate option made for oneself can activate an affective and reward-related brain network. Therefore, with regard to intertemporal choices, people could be more patient and time-consistent for others than for themselves since they are less influenced by immediate payments when making decisions for others (Pronin et al., 2008; Shapiro, 2010; Albrecht et al., 2011).[1]

[1] Based on the experimental estimation of a *q*-exponential discount function, Takahashi (2007) finds that individuals are more time-inconsistent and impulsive when making intertemporal choices for other unknown people than when making the same type of choices for themselves.

Relatively few studies have investigated how people make decisions for others with regard to intertemporal choices (Takahashi, 2007; Pronin et al., 2008; Shapiro, 2010; Albrecht et al., 2011), especially when the decision-maker has a close relationship with the persons the decisions are made for.[2] To our knowledge, this paper is the first attempt to investigate how partners in a household make decisions for their spouses regarding intertemporal choices. One interesting question related to these types of decisions is what determines the decisions, in particular whether the decision-maker bases the decisions on own preferences and/or on the prediction of the principal's preferences. In most circumstances this is difficult to identify, and what makes it even more problematic is that the decisions often have an effect on both the decision-maker and the person(s) the decisions are made for. One way to handle this is to construct a controlled experiment where there is no direct consequence for decision-makers when they make decisions for others. We can then directly compare the decisions for others and for the decision-makers themselves (Stone et al., 2002; Beisswanger et al., 2003; Pronin et al., 2008; Shapiro, 2010; Albrecht et al., 2011; Chakravarty et al., 2011). By eliciting the decisions-makers' information about the preferences of others, we can also investigate to what extent this information influences the decisions made for others.

We conduct an artefactual field experiment (Harrison and List, 2004) with 122 married couples in rural China, where subjects make decisions for themselves and for their spouses on how much money to allocate to an early date and a later date.[3] We also obtain information about how subjects predict their spouses' allocation decisions. With the exception of Daruvala (2007) who studies the decision-making on risk choices for others using university students as experimental subjects, the present paper is the first one not only to investigate the decisions made for spouses and for the subjects themselves but also to have the information of the predictions of spouses' decisions with regard to intertemporal choices. In this paper, we therefore aim to investigate whether and to what extent the decisions made for the spouses are more or less patient and time-consistent than the subjects' own decisions and their predictions of the spouses' decisions, respectively. Following Pronin et al. (2008) and Albrecht et al. (2011), who find that the decisions individuals make for an unknown stranger are similar to the decisions they make for themselves when the choices only involve options in the future but different when the choices involve immediate options, we also examine whether subjects are more or less patient for their spouses compared with their own decisions and their

[2] Much close to our study, Shapiro (2010) investigates how individuals make discounting decisions for other group members of a microfinance cooperative in India.
[3] Here and henceforth, the subjects indicate husbands or wives.

predictions of the spouses' decisions when the choice involves an immediate option. In addition, we investigate whether highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for the spouses compared with their own decisions. We also investigate whether patient and time-consistent subjects make less patient and less time-consistent decisions for the spouses compared with their own decisions. We conduct separate analyses for husband and wife to account for the gender difference in preferences (Croson and Gneezy, 2009), and women are often found to be more patient than men (Kirby and Marakovich, 1996; Bauer and Chytilova, 2009; Yang and Carlsson, 2012).

Instead of the standard multiple price list elicitation method, we employ the Convex Time Budget (CTB) experimental method suggested by Andreoni and Sprenger (2012) to elicit subjects' time preferences over own money and their respective spouses' money as well as their predictions of the spouses' time preferences. The multiple price list elicitation method is designed to make multiple binary choices between receiving a smaller payment at a sooner date and a larger payment at a later date. Under the assumption of a linear utility function, the interval of individual discount rates can be estimated from the switching points. Although the multiple price list elicitation has been extensively used in the time preference literature (Coller and Williams 1999; Frederick et al., 2002; Harrison et al., 2002, 2005; Andersen et al., 2006, 2008; Reuben et al., 2010; Tanaka et al., 2010), it can result in upwards-biased discount rates if the utility is concave (Andreoni and Sprenger, 2012). To account for the curvature of utility, one strategy is to jointly elicit the risk and time preference (Andersen et al., 2008), which is referred to as the double multiple price list method. The other solution is to convexify the experimental budgets (Andreoni and Sprenger, 2012), i.e., the CTB. The reason why we prefer this method is that it is much simpler to implement. In addition, Andreoni and Sprenger (2012) find that there is no correlation between the curvature elicited by risk experiment and the discounting bias induced by the multiple price list method, and it could thus be problematic to correct for the curvature in discounting by using a risk experiment. This quite innovative CTB method was firstly extended from the lab to the field by Gine et al. (2012). In contrast them, who studied subjects' revision behavior with respect to intertemporal choices in rural Malawi, we investigate how the decisions made for a spouse are associated with the subject's own decisions and the predictions of the spouse's decisions in households in rural China.

In the experiment, subjects conducted three decision tasks: making decisions for themselves, predicting their spouses' decisions, and making decisions for their spouses. For each decision

task, the subjects made ten independent choices over two time frames. The first time frame related to the near period, i.e., allocating money between today and one month from today. The second time frame related to a more distant period, i.e., allocating money between two months and three months from today. Within each time frame, there were five choices and each choice corresponded to one of five different, progressively increasing, rates of return for waiting. Hence, the subjects needed to make tradeoffs between money at an earlier date and money at a later date at different time frames and the rates of return for waiting.

We find that husbands make significantly more patient decisions for their wives than their predictions of the wives' decisions. However, the decisions made for the wives are more patient than the husbands' own decisions when the choice only involves delayed options. Regardless of the choice involving an immediate option or not, wives' decisions made for their husbands are similar to wives' own decisions and their predictions of their husbands' decisions. For neither gender do we find any evidence that the decisions made for the spouses are significantly more or less time-consistent than the subjects' own decisions and their predictions of the spouses' decisions. However, highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for their spouses compared with their own decisions. In contrast, patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions. We also investigate whether the order of three decision tasks could influence the decision-making, and only find significant order effects on the difference in time-inconsistency between husbands' decisions for their wives and the husbands' own decisions.

The rest of this paper is organized as follows. Section 2 introduces the experimental design and procedure in detail. Section 3 presents the econometric framework. Descriptive and regression results are reported in Sections 4 and 5, respectively. Finally, Section 6 concludes the paper.

2. Experimental design and procedure

2.1 Location of the experiment and description of the sample

We conducted the experiment in two randomly selected counties, Linxia and Jingning, in the Gansu province, which is located in the northwest of China. From the two counties, four townships and six villages were randomly chosen. In each of the six villages, we randomly chose around 20 households with official marital status from the village registration list

provided by the village leaders. With the assistance of one village cadre, two randomly matched experimenters (one male and one female) approached the selected households. If both the husband and wife voluntarily agreed to be interviewed after our welcome announcement, the village cadre left. If one spouse was not at home when the experimenters arrived at their house, the experimenters waited for a while or made an appointment to come back later (see the welcome announcement in the Appendix B). We had to make sure to interview the selected households in each village within one day in order to keep information about the experiment from spreading. If an appointment could not be made, the experimenters visited the neighbor instead. In total, 122 couples agreed to voluntarily participate in the experiment for this study. [4]

Table 1 presents the summary statistics of the sampled households. The average ages for the husbands and the wives are 47 and 45 years, respectively. On average, the husbands and wives have obtained 6 and 4 years of education, respectively. Regarding individual attitudes, both husbands and wives highly trusted that we would send them the experimental payments in the future. As for household characteristics, the average household has five members and the average length of marriage is 25 years. In 2010, the average household's gross per capita income was 6,410 yuan.[5]

2.2 Experimental design

We apply the convex time budget method developed by Andreoni and Sprenger (2012) to investigate subjects' intertemporal choices. The ten intertemporal choice sets for each subject are described in Table 2. There are two time frames with the same delay of one month: in one frame, the sooner date is today; in the other frame, the sooner date is two months from today. As we will discuss later, this design may limit the estimation of discount factors since the delay time is not varying. The main reason for still choosing this design was that the pilot study clearly indicated that using more than twenty decisions would result in fatigue among potentially many subjects. Moreover, since the main objective of the experimental design is to compare decisions made for the spouse, subject's own decisions, and predictions of the spouse's decisions, the same delay is not expected to affect our main results. To investigate whether subjects have present-biased preferences, in contrast to Andreoni and Sprenger (2012)

[4] No household declined to be interviewed.
[5] At the time of the experiment, 1 USD=6.59 CNY.

Table 1. Summary statistics

Variables	Description	Husband		Wife	
		Mean	Std. Dev.	Mean	Std. Dev.
Individual characteristics					
Age	Subject's age/years.	47.41	10.18	44.84	9.51
Education	Subject's education level/years.	6.10	3.48	3.84	3.73
Primary school	=1 if subject has obtained primary school education; otherwise zero.	0.45		0.67	
Second school	=1 if subject has obtained secondary school education; otherwise zero.	0.31		0.19	
Higher than second school	=1 if subject has obtained higher than secondary school education; otherwise zero.	0.24		0.14	
Communist	=1 if subject is communist party member; otherwise zero.	0.13		-	-
Individual attitudes					
Smoking	=1 if subject smokes; otherwise zero.	0.70		-	-
Decision maker	=1 if husband is the main decision maker in everyday life; =2 if husband and wife are the joint decision maker in everyday life; =3 if wife is the main decision maker in everyday life.	1.40	0.58	1.35	0.54
Husband financial decision maker	=1 if husband answered that he alone makes decisions on financial savings; otherwise zero.	0.53		-	
Wife or joint financial decision maker	=1 if wife answered that she alone or jointly makes decisions on financial savings; otherwise zero.	-		0.41	
Trustiness	=1 if subject does not at all trust the future experimental payment being made; =2 if subject does not quite trust the future experimental payment being made; =3 if subject neither trusts nor distrusts the future experimental payment being made; =4 if subject somewhat trusts the future experimental payment being made; =5 if subject completely trusts the future experimental payment being made.	4.61	0.66	4.58	0.74
Household characteristics					
Population	Total number of household members/persons	4.88	1.33		
Marriage	How long the couples have been married/years	24.77	10.33		
Children	The number of children 16 years old or younger	0.85	0.90		
Financial conflict	=1 if spouses experienced financial conflicts in the past two years; otherwise zero.	0.30			
Illness or death	=1 if household experienced serious illness or death in the past two years; otherwise zero.	0.43			
Log of equivalence scaled household income	Log of equivalence scaled household total gross income/yuan; Equivalence=(Adults+0.5*children)^0.75	9.03	0.60		
Experiment characteristics					
Interest rate	Experimental interest rate (r=0.05, 0.1, 0.25, 0.4, 0.6).				
Present time dummy	=1 if the experimental choice has today payment; otherwise zero.	0.50		0.50	
Prediction dummy	=1 if it is subject's predictions for spouse; otherwise zero.	0.33		0.33	
Own decision dummy	=1 if it is subject's own decisions; otherwise zero.	0.33		0.33	
Decision order_1	=1 if the decision task order is own decision, prediction for spouse, and decision for spouse; otherwise zero.	0.33		0.33	
Decision order_2	=1 if decision task order is decision for spouse, own decision, and prediction for spouse; otherwise zero.	0.33		0.33	
Decision order_3	=1 if decision task order is own decision, decision for spouse, and prediction for spouse; otherwise zero.	0.33		0.33	
Time order_1	=1 if the subject first makes the five choices between today and one month from today; otherwise zero.	0.5		0.5	
Time order_2	=1 if the subject first makes the five choices between two months and three months from today; otherwise zero.	0.5		0.5	
Experimenter gender	=1 if the experimenter is female; otherwise zero.	0.5		0.5	

and Gine et al.(2012), we use "today" instead of "tomorrow" in the experimental design. However, this could imply different transaction costs between payments today and future payments. To investigate how the credibility of a future payment affects subjects' decisions in the experiment, before subjects started to make decisions, we asked questions about to what extent they trusted they would receive the money in the future. The descriptive results in Table 1 show that both husbands and wives highly trusted that they would receive the experimental payments in the future. Also, the five interest rates we used in the experiment were tested and decided based on the results of the pilot experiment.

In the experiment, subjects were asked to allocate 20 tokens[6] between a sooner date and a later date when interest rates increased. To this end, subjects were presented with two plates: a red plate representing the sooner date (today or two months from today) and an orange plate representing the later date (one month from today or three months from today). The task was to decide how many tokens to put on each plate. In all choices each token was worth 2 yuan if allocated to the red plate and $2\times(1+r)$ yuan if allocated to the orange plate, where r is the rate of return for waiting, which increased from the first choice to the fifth choice.

Table 2. The description of 10 intertemporal choices

Sooner date	Later date	Token budget	Interest rate	Sooner value of one token	Later value of one token
0	30	20	0.05	2	2.1
0	30	20	0.1	2	2.2
0	30	20	0.25	2	2.5
0	30	20	0.4	2	2.8
0	30	20	0.6	2	3.2
60	90	20	0.05	2	2.1
60	90	20	0.1	2	2.2
60	90	20	0.25	2	2.5
60	90	20	0.4	2	2.8
60	90	20	0.6	2	3.2

Subjects were required to finish three decision tasks: they had to make their own decisions, predict what their spouses would decide, and make decisions for the spouses. As described below, the order of these tasks was randomly selected for each household. One potential concern is that the subjects could pool their income together when they made decisions for

[6] The main reason we used tokens instead of Chinese yuan is that the total amount of money varies in each decision since it depends on the interest rate and amount of money allocated to the earlier date.

themselves and for their spouses, and we have no way to control for this. However, we did stress that the money they could earn from making their own decisions would be their personal income and hence would not be paid to the household, and similarly that the money their spouses could earn from the experiment by having decisions be made for them would be their spouses' personal income and hence would not be paid to the household. Moreover, the decisions made for the spouse could also be influenced by the concern that the choices could be inferred by the spouse at the time of payment, and this concern could make subjects prone to making decisions to please the spouse in order to avoid post-experiment punishment. Again, we have no way to control for this, but we did stress that the choices made for the spouse were anonymous to the spouse.

2.3 Experimental procedure

We employed and trained ten experimenters to conduct the experiment. Among them, five were from Beijing University and five from the local university. All experiments were conducted by pairs of experimenters where one experimenter was from the local university. Once a couple agreed to participate in the whole survey, one of the experimenters gave a brief introduction of the survey (see the introduction in the Appendix B). Then the experimenters asked for the household's demographic information with both spouses present. The remainder of the experiment will be described in detail only for one of the three orders of the experimental tasks (see Section 2.4), i.e., where subjects first made decisions for themselves, then predicted what decisions their spouses had made, and finally made decisions for their spouses.

After the couples had answered the initial questions about their household, they were physically separated into two rooms where they could not hear each other. One experimenter followed the wife and the other followed the husband. The experimenter read the experimental instructions to the subject, and the subject was told that s/he could earn some money and that the amount earned depended on his/her decisions in the experiment. [7] The subject needed to make ten decisions about how to allocate the money to a sooner date and a later date, but only one of these decisions would be randomly chosen to be paid out by rolling a 10-sided die. The number that came up on the die decided which decision would determine

[7] In the experimental version where subjects first made decisions for the spouse, then own decisions and predictions, the subjects were told that their spouses would earn some money from the experiment, and that the amount earned depended on what decisions they made for their spouses. At the same time, their spouses were making decisions for the subjects in another room. The following instruction on how the spouses would be paid was similar to that for own decisions.

the subject's earnings. Hence, since each decision had an equal chance of being used in the end, the subject was motivated to carefully consider which choices were the best ones for her/himself and for the spouse. Moreover, the subject was told that s/he would get two vouchers, one for sooner payments and one for later payments, signed by the project coordinator. The voucher indicated the amount of cash and the corresponding date on which the subject could redeem the money. When the subject finished the experiment, the subject decided whether we should send the future money to them via the postal savings bank or other commercial bank.

To make sure the subject understood the instructions, s/he was asked to make two trial decisions.[8] The purpose of the trial decisions was to help subjects make more informed decisions and avoid misunderstandings of the experimental tasks. The risk is of course that this causes the experiment to take too long, and hence causes subjects to be fatigued. However, our experience from the pilot experiment was that the trial decisions were crucial for the understanding of the experiment. Once the experimenter was certain that the subject had understood the experiment, s/he was asked to make the first five independent decisions. Following the experimental design in Section 2.2, to help the subjects remember which dates the two plates represented, the experimenter put a sign in front of each plate with the corresponding date and the value of one token. The subject then decided how to allocate the 20 tokens between today and one month from today for each choice. After the decision was confirmed, the experimenter converted the number of tokens on each plate to Chinese yuan and wrote the decision on the whiteboard. The experimenter then repeated the allocation by pointing to the whiteboard, and at this point the subject had the possibility to revise the decision. If the subject did not want to change the allocation, the experimenter moved on to introduce the next choice with the second higher return rate. When the subject had finished all five decisions, the experimenter presented the outcomes on the whiteboard and asked whether s/he would like to change the allocation for any of choices, and if so which one(s). Once the subject did not want to make any more changes, the experimenter continued to the next five independent choices, i.e., regarding the allocations between two months and three months from today. The elicitation procedure was similar for the second five independent choices, yet

[8] The trial decisions were about how to allocate 10 tokens between one month from today and two months from today. Before the subject made the decisions, the experimenter asked some control questions about the meaning of the plates and the tokens. The subject started to make the trial decisions once s/he had understood the meaning of the plates and the tokens. The experimental instruction for the trial decisions was the same regardless of decision task order. See the experimental instructions for trial decisions in Appendix B.

the subject was reminded that s/he needed to wait for both the sooner payments (two months from today) and the later payments (three months from today).

After the subject had finished the first ten decisions for her/himself, s/he was asked to predict the decisions of her/his spouse in the same ten choices. The subject was monetarily motivated to make accurate predictions, i.e., if the prediction was within 5 yuan of what the spouse had actually put on the plate for the early date, the subject would be rewarded 5 yuan. So in total each subject could earn 50 yuan by predicting all ten decisions well. Once the subject had finished the predictions for the spouse, s/he was asked some questions about individual characteristics.

Finally, the subject was asked to make the same ten decisions for the spouse (but not for herself/himself). Thus, s/he needed to consider what decisions were best for her/his spouse. To incentivize the subject to put effort into the decision-making for the spouse, s/he was told that her/his spouse was making decisions for her/him in another room. Yet the subject did not know what exact decisions her/his spouse was making for her/him and vice versa. When the subject had finished all ten decisions for the spouse, one of the decisions was randomly chosen to be paid to the spouse by rolling a 10-sided dice.

On average, the whole survey lasted one and a half hours for each household. Including the rewards from the accurate predictions, the average experimental payment for each subject was 129 yuan, and the average experimental payment for each household was 258 yuan, which equals three days of non-farm wages of one local full-time worker.

2.4 Order effects

In the design, we control for two important order effects. The first one is the order between own decisions, decisions for the spouse, and predicted decisions of the spouse. Among the six possible order combinations between the three decision tasks, we control for the following three orders: 1) own decisions, predictions, decisions for spouse; 2) decisions for spouse, own decisions, predictions; and 3) own decisions, decisions for spouse, predictions. There are three reasons why we select these three orders: 1. The sample size is 122 households, which means that if we had used all six orders, we would have only about 20 households for each order combination. 2. Although predictions and own decisions are likely to be correlated, it is not the focus of this paper. 3. The major concern in this paper is the relationship between decisions for spouse and predictions, and between decisions for spouse and own decision, and

it was therefore important to control for these orders. We randomly selected one of the three orders for each household. Regardless of the order, the subjects did not know what the subsequent task was in advance. The second order effect that we control for is the order of the two parts of the time preference experiment. Half of the households first answered the five questions regarding money allocated between today and one month from today, and the other half first answered the five questions regarding money allocated between two months and three months from today.

In addition, we control for experimenter effects by varying the subject-experimenter gender combination across households, i.e., for example, if the male experimenter interviewed the husband in one household, then the female experimenter interviewed the husband in the next household.

3. Econometric framework

3.1 The difference in (im)patience

In the experiment, for a given interest rate, *r*, the subjects had to decide how to allocate a initial given amount of money between a sooner date, c_t, and a later date, $c_{t+\tau}$, where t indicates the sooner dates, i.e., t=0 or t=60 days; τ is the delay time, i.e., $\tau = 30$ days. Since the delay time is constant over the two time frames, we cannot directly estimate subjects' discount factors as Andreoni and Sprenger (2012) have done with the varying time delays. However, the monetary difference between later and sooner allocations $(c_{t+\tau} - c_t)$ reveals information about the subjects' trade-off over the two time periods. Therefore, in this paper, we instead use the difference in allocation between the later and sooner dates $(c_{t+\tau} - c_t)$ to measure subjects' patience.

To investigate whether and to what extent the decisions made for the spouse are more or less patient than the predictions of the spouse's decisions and the subject's own decisions, we pool the data of sooner and later allocations in the three decision tasks for husbands and wives respectively, and estimate the following model:[9]

[9] An alternative method to model the relationship between the three decision tasks is $({c_{t+\tau}}^S - {c_t}^S)_{ik} = \alpha + \varphi^O \cdot ({c_{t+\tau}}^O - {c_t}^O)_{ik} + \varphi^P \cdot ({c_{t+\tau}}^P - {c_t}^P)_{ijk} + \varepsilon_{ik}$, where $({c_{t+\tau}}^S - {c_t}^S)_{ijk}$, $({c_{t+\tau}}^O - {c_t}^O)_{ik}$, and $({c_{t+\tau}}^P - {c_t}^P)_{ijk}$ denotes the decision for the spouse, subject's own decision, and the prediction of spouse's decision, respectively. We would thus investigate to what extent the decision for the spouse is correlated with subject's own decision and the prediction of spouse's decision. However, in this paper, we are in particular interested in whether and to what extent the decision for the spouse is different from subject's own decision and the prediction of spouse's decision. In addition, we can indirectly infer the correlation between the three decision tasks from equation (1).

$$(c_{t+\tau} - c_t)_{ikd} = \alpha_1 + \beta_1 \cdot r_{ik} + \beta_2 \cdot T_{ik,t=0} + \beta_3 \cdot Prediction\ dummy_{ik} + \beta_4 \cdot\ Own\ decision\ dummy_{ik} + \varepsilon_{ik} \quad (1)$$

where i represents the subject in the experiment (husband or wife); k represents each of the experimental choice situations; and d indicats the decision task, i.e., subject's own decisions, predictions of spouse's decisions, and decisions for the spouse. Since each subject made ten choices in each decision task, we have 30 choice observations for the husband and wife respectively in each household. For subject i, r_{ik} is the interest rate in choice situation k and $T_{ik,t=0}$ is a present time dummy that equals one if choice k involves a payment today. $Prediction\ dummy_{ik}$ is a dummy variable that equals one if subject i made predictions for the spouse at choice situation k. $Own\ decision\ dummy_{ik}$ is a dummy variable that equals one if subject i made decisions for him/herself at choice situation k. The decision for spouse is thus taken as the reference decision task in equation (1). α_1 is a constant and ε_{ik} is a disturbance term. Since the dependent variable $(c_{t+\tau} - c_t)$ is censored when the subject allocates all tokens to the sooner dates or the later dates, we employ a censored model with varying limits to estimate equation (1).[10]

In equation (1), β_3 and β_4 reveal the relationship between the decisions made for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively. Thus, when $\beta_3 = 0$, the decisions made for the spouse are in line with the subject's predictions of the spouse's decisions. If $\beta_3 \neq 0$, the decisions made for the spouse do not fully reflect the subject's perception of the spouse's preferences (Daruvala, 2007). In particular, $\beta_3 < 0$ means that the subject's decisions for the spouse are more patient than the predicted corresponding decisions of the spouse, and $\beta_3 > 0$ means that decisions made for the spouse are more impatient than the predicted corresponding decisions of the spouse. For the *Own decision dummy*, the three cases of $\beta_4 = 0$, $\beta_4 < 0$, and $\beta_4 > 0$ are similar in interpretation and thus indicate whether the decisions made for the spouse are similar to, more patient, or more impatient, respectively, than the subject's own decisions.

To examine whether subjects are more or less patient for their spouses compared with their own decisions and their predictions of the spouses' decisions when the choice involves an immediate payment, we estimate one additional model where we interact the present time dummy with both the *Prediction dummy* and the *Own decision dummy* in equation (1).

[10] The lower limit is -40 when subjects allocated all tokens to the sooner dates; the higher limits are varying with the five different interest rates when subjects allocated all tokens to the later dates, i.e., 42, 44, 50, 56, and 64 when the interest rate equals 0.05, 0.1, 0.25, 0.4, and 0.6, respectively.

$$(c_{t+\tau} - c_t)_{ikd} = \alpha_1{}' + \beta_1{}' \cdot r_{ik} + \beta_2{}' \cdot T_{ik,t=0} + \beta_3{}' \cdot Prediction\ dummy_{ik} + \beta_4{}' \cdot\ Own\ decision\ dummy_{ik} + \beta_{23} \cdot Prediction\ dummy_{ik} \cdot T_{ik,t=0} + \beta_{24} \cdot Prediction\ dummy_{ik} \cdot T_{ik,t=0} + \varepsilon_{ik}{}' \quad (2)$$

In equation (2), $\beta_3{}'$ and $\beta_4{}'$ reveal the relationship between the decisions made for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively, when the choice involves two delayed options (two months and three months from today). $(\beta_3{}' + \beta_{23})$ and $(\beta_4{}' + \beta_{24})$ reveal the relationship between the decisions made for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively, when the choice involves an immediate (today) option. Thus, the interpretation for the corresponding three cases of $\beta_3{}'$ and $\beta_4{}'$ is similar to β_3 and β_4, and indicates that whether the decisions made for the spouse are similar to, more patient, or more impatient than the predictions of the spouse's decisions and the subject's own decisions , respectively, when the choice involves two delayed options. The interpretation is similar for the corresponding three cases of $(\beta_3{}' + \beta_{23})$ and $(\beta_4{}' + \beta_{24})$, and indicates that whether the decisions made for the spouse are similar to, more patient, or more impatient than the predictions of the spouse's decisions and the subject's own decisions, respectively, when the choice involves an immediate (today) option.

3.2 The difference in time-(in)consistency

Although present-biased time preference is widely referred to as time-inconsistency in the literature, increasing experimental studies have also found that people are patient when there is an immediate option, whereas they become impatient when there are only delayed options (Sayman and Önculer, 2009; Shapiro, 2010; Takeuchi, 2011; Gine et al., 2012). This phenomenon is referred to as future-biased, and it could be caused by the short delay or uncertainty about future consumption. In this paper, we analyze time-inconsistency by considering both the present bias and future bias.

In the experiment, subjects were asked to make ten decisions over the two time frames with different starting points but the same delay: today vs. one month from today and two months from today vs. three months from today. We can separate the subjects' decisions into five pairs, one for each interest rate; the elements of a pair differ only in when the sooner date is (today vs. two months from today). In this paper, we define a choice as present-biased if the allocation is larger when the sooner date is today than when it is two months from today. Similarly, the choice is future-biased if the allocation is larger when the sooner date is two months from today than when it is today. The choice is time-consistent if the allocations are

the same regardless of when the sooner date is. We use the absolute difference between monetary allocations when the sooner date is today and when it is two months from today to measure the extent of time-inconsistency: $|c_0 - c_{60}|$.

To investigate whether and to what extent the decisions made for the spouse are more or less time-consistent than the predictions of the spouse's decisions and the subject's own decisions, we estimate the following model:

$$|c_0 - c_{60}|_{ijd} = \alpha_2 + \gamma_1 \cdot r_{ij} + \gamma_2 \cdot Prediction\ dummy_{ij} + \gamma_3 \cdot\ Own\ decision\ dummy_{ij} + \varepsilon_{ij} \quad (3)$$

where j indicates the choice pair. To deal with the censoring issue of the dependent variable, we use a censored model with two limits to estimate equation (3).[11] γ_2 and γ_3 reveal the relationship between the implied time-inconsistency (present-biased preferences) in the decisions made for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively. Thus, $\gamma_2 = 0$ means that the subjects' decisions for their spouses are equally time-(in)consistent as the decisions they predict the spouses would make. $\gamma_2 < 0$ implies that the decisions made for the spouse are more time-inconsistent than the spouse's predicted decisions, and $\gamma_2 > 0$ implies that the subjects' decisions for their spouses are more time-consistent than the spouses' predicted decisions. Similar to the implications of γ_2, the three cases of $\gamma_3 = 0$, $\gamma_3 < 0$, and $\gamma_3 > 0$ indicate whether the decisions made for the spouse are similar to, more time-inconsistent, or more time-consistent than the subject's own decisions.

4. Husbands' and wives' allocation decisions

Figure 1 depicts husbands' and wives' average allocations, in Chinese yuan, to the sooner dates in the decisions made for themselves, the decisions made for their spouses, and the decisions they predict their spouses would make. As we can see, for own decisions, predictions, and decisions made for the spouse, the sooner allocations decrease as the rates of return increase, which indicates that subjects understand the trade-offs involved in each choice.[12] Figure 2 describes the distribution of the average fraction of present-biased, future-biased, and time-consistent choice pairs. For both husbands and wives, we can observe that

[11] The lower and higher limits are 0 and 40, respectively.

[12] If the local credit market functions well, subjects should allocate all the money to the sooner dates when the market interest is higher than the experimental rate of return and vice versa. However, we find that a number of subjects made the allocations between the two time periods (interior allocations) although there is a quite high share of corner allocations in each of the three decision tasks. This indicates that the local credit market is not perfect, or the subjects have not realized that they have the opportunity to smooth income over time (Gine et al., 2012).

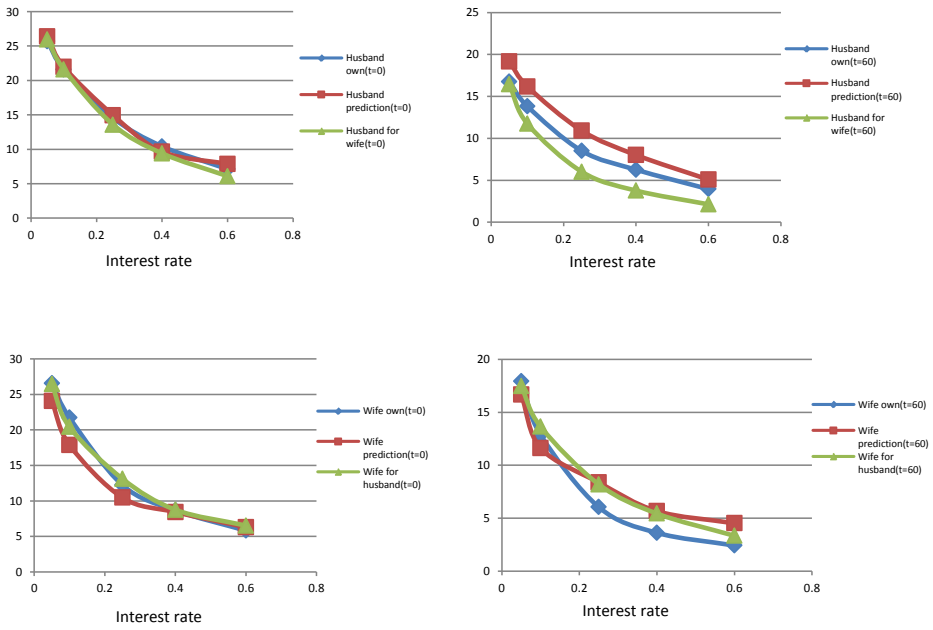

Figure 1. Husbands' and wives' average allocations to the sooner dates in the three decision tasks (in Chinese yuan)

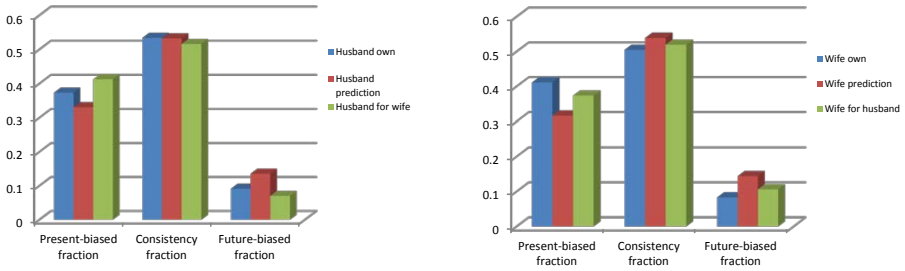

Figure 2. The distribution of the average fraction of present-biased, future-biased, and time-consistent choice pairs

around 50% of choice pairs are time-consistent in own decisions, predictions, and decisions for the spouse. The results confirm the coexistence of present-biased and future-biased time discounting, but the fraction of present-biased pairs is much higher than that of future-biased pairs.

In addition, using the difference between later and sooner allocations as the dependent variable ($c_{t+\tau} - c_t$), we estimate a censored regression model on the rates of return (r), present dummy variable ($T_{t=0}$) and a set of individual and household characteristics (see description of the variables in Table 1). The standard errors are clustered at the household level, and the average marginal effects for the husbands' and wives' own decisions, predictions, and decisions for the spouse are shown in Table A1 in Appendix A. As expected, the rate of return is positive and statistically significant in all regressions. The coefficient of the present time dummy variable is statistically significant and negative, which indicates that on average both husbands and wives exhibit present-biased time preferences. Wives who highly trusted they would receive the future experimental payments are more patient in their own decisions and decisions made for husbands, yet the trustiness on future experimental payments does not affect husbands' allocation decisions. In addition, we find that husbands with higher education are more patient than those with lower education, both when making decisions for themselves and when predicting their spouses' decisions. This is in line with Becker and Mulligan (1997), Harrison et al. (2002), and Bauer and Chytilova (2010), who find that higher education can increase an individual's patience. However, wives with only primary education make more patient decisions in all the three decision tasks. Old wives are less patient than young wives when they make decisions for their husbands. We also find that wives in high-income households make more patient decisions for their husbands. However, husbands in high-income households are less patient in both own decisions and predictions for their wives. In addition, we do not find any significant decision or time order effects on allocation decisions, i.e., this means that the decisions made for the spouse are not affected by whether the subject makes own decisions or decisions for the spouse first.

5. Regression results

5.1 The difference in (im)patience and time-(in)consistency

In this section, we investigate whether and to what extent the decisions made for the spouse are more or less patient and time-consistent than the predictions of the spouse's decisions and the subject's own decisions, respectively. We estimate separate models for both husbands and

wives by pooling the choice observations of decisions for the spouse, the predictions of the spouse's decisions, and own decisions. We cluster the standard error at the household level, and the average marginal effects are reported in Table 3.

Regarding the difference in (im)patience, in column (1) the coefficient for the *Prediction dummy* is negative and statistically significant, which means that the husbands' decisions for their wives are more patient than their predictions of their wives' decisions. On average, compared with the predictions for wives, husbands increase the later allocations by around seven yuan when they make decisions for their wives. However, the husbands' decisions for their wives are similar to their decisions for themselves. In column (3), the results for wives show that neither the *Prediction dummy* nor the *Own decision dummy* is statistically significant at conventional level. This indicates that there is no significant difference between wives' decisions for their husbands and wives' own decisions and their predictions of their husbands' decisions.

Following equation (2), we examine whether subjects are more or less patient for their spouses compared with their own decisions and their predictions of the spouses' decisions when the choice involves an immediate (today) option. As shown in column (2), for husbands, the significant and negative coefficient of the *Prediction dummy* indicates that husbands are more patient when making decisions for their wives compared with their predictions of their wives' decisions when the choice involves two delayed options (two months and three months from today). The Wald test on the sum of the coefficients of the *Prediction dummy* and its interaction term with the present time dummy is statistically insignificant (p-value=0.237), which means that the decisions made for wives are similar to the husbands' predictions of their wives' decisions when the choice involves an immediate (today) option. Similarly, husbands make more patient decisions for their wives than for themselves when the choice involves two delayed options, but the decisions for the wives are similar to husbands' own decisions when the choice involves an immediate (today) option.[13] Hence, the comparison between the decisions for the wives and the husbands' own decisions is not in line with what Pronin et al. (2008) and Albrecht et al. (2011) found, i.e., that the decisions made for others are similar to the decisions for themselves in the future, but different from the decisions for themselves in the present. For wives, as shown in column (4), neither for the choice involving two delayed options nor for the choice involving an immediate (today) option are there any

[13] The p-value=0.555 for the Wald test on the sum of the coefficients of *Own decision dummy* and its interaction term with present time dummy.

Table 3. The difference in (im)patience and time-(in)consistency between subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively

	(Im)patience: dependent variable is $(c_{t+\tau} - c_t)$				Time-(in)consistency: dependent variable is $(\lvert c_0 - c_{60} \rvert)$	
	Husband		Wife		Husband	Wife
	(1)	(2)	(3)	(4)	(5)	(6)
Interest rate(r) (β_1, β_1' *or* γ_1)	85.573***	85.653***	84.450***	84.541***	-12.560***	-14.580***
	(5.426)	(5.437)	(4.534)	(4.547)	(1.591)	(1.678)
Present time dummy(1=today) (β_2 *or* β_2')	-13.766***	-17.659***	-12.781***	-12.954***		
	(1.525)	(2.392)	(1.581)	(2.150)		
Prediction dummy (β_3, β_3' *or* γ_2)	-6.841***	-11.001***	1.806	0.040	-1.140	-0.564
	(2.015)	(2.338)	(1.942)	(2.040)	(0.882)	(0.695)
Own decision dummy (β_4, β_4' *or* γ_3)	-3.282	-5.060*	1.133	2.685	-0.712	0.217
	(2.405)	(2.583)	(2.003)	(2.217)	(0.913)	(0.737)
Prediction dummy × *Present time dummy*		8.044***		3.425		
(β_{23})		(2.667)		(2.181)		
Own decision dummy × *Present time dummy*		3.368		-2.933		
(β_{24})		(2.576)		(2.419)		
Observations	3660	3660	3660	3660	1830	1830

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. Decision order, time order, experimenter gender and village dummies are included in all the regressions.
4. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

significant differences between wives' decisions for their husbands and wives' own decisions and their predictions of their husbands' decisions, respectively. [14]

Regarding the difference in time-(in)consistency, as shown in columns (5) and (6), we do not find any evidence that either husbands or wives are significantly more or less time-consistent when making decisions for their spouses compared with their own decisions and their predictions of the spouses' decisions. We also investigate what other factors could influence the difference in (im)patience and time-(in)consistency between decisions for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively. We interact *prediction dummy* and *own decision dummy* with interest rates and a set of individual and household characteristics in equation (1) and equation (3), respectively. The average marginal effects are shown in Table A2 in Appendix A. For the difference in (im)patience, we find that husbands make more patient decisions for their wives compared with their own decisions and their predictions of their wives' decisions when the interest rates increase. For both husbands and wives, few individual and household characteristics are significantly related to the difference between the decisions for the spouse and the predictions of the spouse's decisions and the subject's own decisions, respectively. For example, older husbands are less patient in their decisions for their wives than their predictions of their wives' decisions, and husbands who have obtained higher education are less patient in their decisions for their wives than in their own decisions. Compared with own decisions, wives who are older or who answered that the financial decisions in everyday life are made jointly or by themselves, make less patient decisions for their husbands than for themselves. However, in high-income households, wives are more patient in the decisions they make for their husbands than in their own decisions. Again, few individual and household characteristics have significant influence on the difference in the time-(in)consistency. For example, husbands with only primary school education are less time-consistent when making decisions for their wives compared with the decisions they predict their wives would make. Older wives are less time-consistent in their decisions for their husbands than both their own decisions and their predictions of their husbands' decisions.

5.2 The difference in (im)patience and time-(in)consistency for subjects who are impatient/patient and time-inconsistent/-consistent in own decisions

[14] The p-value=0.149 for the Wald test on the sum of the coefficients of *Prediction dummy* and its interaction term with present time dummy, and p-value=0.919 for the Wald test on the sum of the coefficients of *Own decision dummy* and its interaction term with present time dummy.

As has been discussed, we do not find significant differences between the decisions made for the spouse and subjects' own decisions even when the choice involves an immediate option. However, for subjects who have made extreme decisions for themselves, they may make less extreme decisions for their spouses compared with their own decisions. Therefore, in this section, we investigate whether highly impatient and time-inconsistent subjects make less impatient and less time-inconsistent decisions for their spouses compared with their own decisions. In addition, we investigate whether patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions. Besides the present-biased and future-biased choice defined in Section 3.2, we define a choice as impatient when the later allocations are smaller than the sooner allocations, i.e., $c_{t+\tau} - c_t < 0$. Similarly, we define a choice as patient when the later allocations are larger than the sooner allocations, i.e. $c_{t+\tau} - c_t > 0$.[15] We estimate the similar models by following equations (1), (2), and (3), and report the average marginal effects for the difference in (im)patience and time-(in)consistency in Table 4 and Table 5, respectively.[16]

Regarding the difference in (im)patience, as can been seen in column (1) and column (3) in Table 4, for both impatient husbands and impatient wives, we find that the decisions made for the spouse are statistically and significantly more patient than their own decisions. The degree of the difference in impatience is large as well. For impatient husbands, on average, they increase the later allocations by around 31 yuan when making decisions for their wives compared with their own decisions. Similarly, on average, impatient wives increase the later allocations by around 24 yuan when making decisions for their husbands compared with their own decisions. Again, as shown in column (2) and column (4), for both impatient husbands and impatient wives, they are more patient for the spouse than for themselves when the choice involves two delayed options. The Wald test on the sum of the coefficients of the *Own decision dummy* and its interaction term with the present time dummy is statistically significant for both husbands and wives (p-value=0.000), which means that the impatient subjects are also more patient for the spouse than for themselves when the choice involves an immediate option. In columns (5) and (7), we can see that both patient husbands and patient wives make less patient decisions for the spouse compared with their own decisions. On average, they decrease the allocations to the later dates by around 5 yuan and 6 yuan, respectively, when they make decisions for their spouses compared with their own decisions.

[15] There is no observation for $c_{t+\tau} - c_t = 0$ based on our experimental design.
[16] In this section, of particular interest is to compare the difference between decisions made for the spouses and subjects' own decisions.

Table 4. The difference in (im)patience between impatient/patient subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively; dependent variable is ($c_{t+\tau} - c_t$)

	If own decision is impatient: $(c_{t+\tau} - c_t < 0)$				If own decision is patient: $(c_{t+\tau} - c_t > 0)$			
	Husband		Wife		Husband		Wife	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Interest rate(r) (β_1 *or* β_1')	62.909***	62.976***	40.436***	40.410***	56.645***	56.678***	52.348***	52.370***
	(11.137)	(11.165)	(12.099)	(12.066)	(3.266)	(3.271)	(2.929)	(2.935)
Present time dummy(1=today)	-9.790***	-15.070***	-7.431***	-7.994*	-8.061***	-11.830***	-5.550***	-6.971***
(β_2 *or* β_2')	(2.574)	(5.193)	(2.470)	(4.183)	(1.187)	(2.235)	(0.942)	(1.694)
Prediction dummy (β_3 *or* β_3')	-0.264	-6.027	3.213	5.364	-7.353***	-9.864***	1.175	-0.653
	(4.830)	(6.601)	(4.195)	(6.265)	(2.601)	(2.670)	(2.447)	(2.595)
Own decision dummy	-31.075***	-35.638***	-23.526***	-28.227***	4.558*	1.677	6.152***	6.043**
(β_4 *or* β_4')	(5.218)	(6.944)	(4.550)	(6.809)	(2.490)	(2.493)	(2.323)	(2.494)
Prediction dummy × Present		8.956		-3.135		5.270*		3.966*
time dummy (β_{23})		(6.495)		(6.109)		(2.927)		(2.307)
Own decision dummy × Present		7.123		6.770		5.987**		0.257
time dummy (β_{24})		(6.603)		(5.948)		(2.521)		(2.162)
Observations	861	861	747	747	2799	2799	2913	2913

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. Decision order, time order, experimenter gender and village dummies are included in all the regressions.
4. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 5. The difference in time-(in)consistency between time-inconsistent/-consistent subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively; dependent variable is: ($|c_0 - c_{60}|$)

	If own decision is time-inconsistent: ($c_0 - c_{60} >$ or < 0)		If own decision is present-biased: ($c_0 - c_{60} > 0$)		If own decision is future-biased: ($c_{60} - c_0 > 0$)		If own decision is time-consistent: ($c_0 - c_{60} = 0$)	
	Husband	wife	Husband	wife	Husband	wife	Husband	wife
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Interest rate(r) (γ_1)	-10.322***	-10.856***	-11.204***	-11.736***	-6.244*	-8.561**	-4.790***	-4.843***
	(1.837)	(2.399)	(2.220)	(2.719)	(3.606)	(3.495)	(1.065)	(1.161)
Prediction dummy (γ_2)	-2.786***	-1.014	-3.368***	-1.352	-0.453	0.655	-0.214	-0.014
	(1.072)	(0.830)	(1.284)	(0.938)	(1.049)	(1.375)	(0.875)	(0.649)
Own decision dummy (γ_3)	4.721***	5.163***	5.575***	5.900***	1.461	1.493	-4.553***	-3.761***
	(1.119)	(0.866)	(1.312)	(0.934)	(1.436)	(1.798)	(0.882)	(0.650)
Observations	852	906	684	753	168	153	978	924

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. Decision order, time order, experimenter gender and village dummies are included in all the regressions.
4. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

In column (6), for patient husbands, the *Own decision dummy* is not statistically significant. This means that there is no significant difference between the decisions made for wives and husbands' own decisions when the choice involves two delayed options. In contrast, as shown in column (8), wives make significantly less patient decisions for husbands compared with their own decisions when the choice involves two delayed options. For both patient husbands and patient wives, the Wald test on the sum of the coefficients of the *Own decision dummy* and its interaction term with the present time dummy is statistically significant.[17]

Regarding the difference in time-(in)consistency, as shown in Table 5, both time-inconsistent and present-biased husbands and wives make significantly more time-consistent decisions for their spouses compared with their own decisions. On average, for both husbands and wives, the degree of time-inconsistency decreases by around 5 yuan when making decisions for the spouse compared with their own decisions. However, for both husbands and wives who are future-biased, there is no significant difference in the time-inconsistency between decisions made for the spouses and their own decisions. In contrast, for both time-consistent husbands and time-consistent wives, the decisions made for the spouse are less time-consistent than their own decisions. On average, the degree of time-inconsistency increases by around 5 yuan for husbands and 4 yuan for wives when they make decisions for the spouse compared with their own decisions.

5.3 Order effects

One important concern is whether there are spillover effects between different decision tasks (order effects). For example, the decisions made for the spouse could depend on whether they are preceded by own decisions or predictions. To investigate whether there are significant order effects on the decision-making, we interact the three decision order dummies with *prediction dummy* and *own decision dummy* in equation (1) and equation (3), respectively (see Table 1 for a description of the three decision order dummies). We take the third decision order as the reference, and report the estimated results in Table 6 and Table 7 for the difference in (im)patience and time-(in)consistency, respectively.

[17] P-value=0.013 for husbands, and p-value=0.017 for wives.

Table 6. The decision order effects on the difference in (im)patience between subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively; dependent variable is ($c_{t+\tau} - c_t$)

	Husband	Wife	If husband own decision is impatient	If wife own decision is impatient	If husband own decision is patient	If wife own decision is patient
	(1)	(2)	(3)	(4)	(5)	(6)
Interest rate(r)	85.745***	84.482***	63.574***	40.805***	56.688***	52.325***
	(5.430)	(4.534)	(11.032)	(12.047)	(3.277)	(2.925)
Present time dummy(1=today)	-13.772***	-12.786***	-9.788***	-7.468***	-8.056***	-5.552***
	(1.528)	(1.583)	(2.548)	(2.518)	(1.188)	(0.943)
Prediction dummy	-8.328**	0.547	1.990	0.254	-9.849**	0.659
	(4.108)	(3.031)	(9.211)	(6.978)	(4.868)	(4.445)
Own decision dummy	-0.448	-0.351	-19.379**	-30.526***	5.155	5.252
	(3.951)	(3.742)	(8.768)	(7.300)	(4.450)	(4.063)
Prediction dummy × Decision order_1	2.658	-1.741	0.733	-1.616	2.675	-1.426
	(5.297)	(4.718)	(12.759)	(10.185)	(6.478)	(6.069)
Prediction dummy × Decision order_2	1.774	5.286	-8.446	7.274	4.575	3.391
	(5.082)	(4.545)	(11.077)	(9.733)	(6.450)	(6.024)
Own decision dummy × Decision order_1	-8.632	1.731	-19.876	5.163	-3.572	0.075
	(6.117)	(5.276)	(12.589)	(10.084)	(5.947)	(5.662)
Own decision dummy × Decision order_2	0.293	2.568	-15.053	12.430	1.646	2.828
	(5.341)	(4.786)	(11.634)	(10.512)	(6.254)	(5.485)
Observations	3660	3660	861	747	2799	2913

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. Decision order, time order, experimenter gender and village dummies are included in all the regressions.
4. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table 7. The decision order effects on the difference in time-(in)consistency between subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively; dependent variable is: ($|c_0 - c_{60}|$)

	Husband	Wife	If husband own decision is time-inconsistent	If wife own decision is time-inconsistent	If husband own decision is time-consistent	If wife own decision is time-consistent
	(1)	(2)	(3)	(4)	(5)	(6)
Interest rate(r)	-12.532***	-14.589***	-10.320***	-10.855***	-4.786***	-4.839***
	(1.587)	(1.677)	(1.839)	(2.400)	(1.063)	(1.161)
Prediction dummy	-0.150	-0.370	-1.768	-0.296	0.610	-0.934
	(1.408)	(1.260)	(1.457)	(1.274)	(1.367)	(1.116)
Own decision dummy	1.362	0.998	5.201***	4.923***	-3.087***	-3.189***
	(1.320)	(1.183)	(1.723)	(1.544)	(1.065)	(0.983)
Prediction dummy × Decision order_1	0.018	0.605	0.354	-0.016	-0.887	1.035
	(2.009)	(1.818)	(2.271)	(1.705)	(2.028)	(1.623)
Prediction dummy × Decision order_2	-2.800	-1.113	-4.081	-2.250	-1.435	1.640
	(2.143)	(1.610)	(2.769)	(2.197)	(2.091)	(1.551)
Own decision dummy × Decision order_1	-0.743	-0.249	0.183	1.141	-1.281	-1.625
	(2.124)	(1.946)	(2.643)	(2.142)	(1.902)	(1.716)
Own decision dummy × Decision order_2	-5.375***	-2.024	-1.967	-0.484	-2.779	-0.101
	(2.056)	(1.598)	(2.764)	(2.170)	(1.811)	(1.191)
Observations	1830	1830	852	906	978	924

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. Decision order, time order, experimenter gender and village dummies are included in all the regressions.
4. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Regarding the (im)patience, for both husbands and wives in the full sample and for the impatient/patient husbands and wives in the subsample, the differences between decisions made for the spouse and subject's own decisions and the predictions about the spouse's decisions, respectively, are not significantly different between the first and the third decision order and between the second and the third decision order. The Wald tests also show that there is no significant difference between the first and the second decision order in the differences between decisions made for the spouse and subject's own decisions and the spouse's predicted decisions, respectively.

Regarding time-(in)consistency, for wives, we do not find any order effects on the differences between decisions made for their husbands and their own decisions and their husbands' predicted decisions, respectively. For husbands, the difference between decisions made for their wives and their wives' predicted decisions is not significantly influenced by the ordering of decisions tasks. However, compared with own decisions, husbands make more time-inconsistent decisions for their wives when the decisions are made following the second decision order than when they are made following the first or third decision order.[18] This could be influenced by the learning effects that make husbands more time-consistent with respect to their wives when the decisions for their wives are made after the husbands' own decisions. For the subsample of husbands and wives who are time-inconsistent/time-consistent in their own decisions, there are no any order effects on the difference in time-(in)consistency.

6. Conclusions

In this paper, we have investigated the differences between subjects' decisions for a spouse, and their own decisions and the decisions they predict spouses to make when faced with intertemporal choices. We conduct an artefactual field experiment with 122 married couples in rural China, and use the convex time budget (CTB) experimental method to elicit subjects' time preferences regarding own money and their spouses' money. In addition, the subjects were asked to predict their spouses' decisions in the same choice situation.

We find that husbands' decisions for their wives are more patient than the decisions they predict their wives to make, whereas their decisions for their wives are more patient than their own decisions when the choice only involves delayed options. However, there is no

[18] P-value=0.045 for the difference between second and first decision order.

significant difference in (im)patience between wives' decisions for their husbands and their own decisions and the decisions they predict their husbands to make, respectively. In addition, we do not find any evidence that either husbands or wives are significantly more or less time-consistent for their spouses compared with their own decisions and their predictions of the spouses' decisions. Therefore, in general, we do not find a significant difference between the decisions made for a spouse and subjects' own decisions, even when the choice involve an immediate option. This indicates that subjects base decisions made for their spouses on their own preferences to a large extent. This could be caused by subjects' paternalistic preferences when making decisions for their spouses. The feeling of paternalism can make individuals believe that their decisions are more "correct" or "better" than those of others regardless of the others' preferences. In addition, if subjects are not paternalistic, the decisions they make for their spouses should reflect the spouses' preference, or to be more precise their expectation of the spouses' preferences. However, we find that husbands' decisions made for their wives significantly deviate from the decisions they predict their wives to make. Besides the possible influence of paternalism, the other possible explanation is that husbands could not be sure about their wives' preferences, and the decisions made for wives are thus less based on their predictions of their wives' preferences. This explanation could be plausible since we do find that husbands have much less accurate predictions of their wives' preferences than do wives.

However, highly impatient and time-inconsistent subjects make less impatient and time-inconsistent decisions for their spouses compared with their own decisions. In contrast, patient and time-consistent subjects make less patient and less time-consistent decisions for their spouses compared with their own decisions. Our results indicate that subjects who have made extreme decisions for themselves would make less extreme decisions for their spouses. In other words, not only for the subjects who are impulsive or who have self-control problem, but also for the subjects who are patient or time-consistent, they could make more moderate decisions for the spouse compared with their own decisions. However, our results could be influenced by the concern that some subjects view the decision for the spouse as a decision on household income but not on individual income available only to their spouses.

In general, different from the decisions made for oneself, the decisions made for others could depend on the specific decision procedure or strategy (Beisswanger et al., 2003; Albrecht et al., 2011). As the first attempt to investigate the decisions-making for others (spouse) within the household, our results could be dependent on the specific context or specific experimental

elicitation method. Therefore, additional future research is needed, and more attention should be given to why the decisions could or could not be different when making decisions for others compared with subjects' own decisions and beliefs regarding others' preferences.

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Appendix A:

Table A1. The determinants of subjects' own decisions, predictions and decisions for the spouse; dependent variable is the difference between later and sooner allocations: ($c_{t+\tau} - c_t$)

	Husband			Wife		
	Own decision	Prediction	Decision for wife	Own decision	Prediction	Decision for husband
Interest rate (r)	83.262***	88.767***	88.638***	96.114***	75.251***	88.594***
	(6.348)	(6.422)	(6.373)	(6.348)	(5.628)	(6.293)
Present time dummy (1=today)	-14.382***	-10.401***	-16.882***	-16.381***	-9.287***	-13.478***
	(2.252)	(2.077)	(2.380)	(2.145)	(1.912)	(2.282)
Trustiness	1.804	-1.746	1.888	7.916**	-1.255	6.644*
	(3.833)	(3.006)	(2.534)	(3.409)	(2.494)	(3.758)
Age	0.049	0.351	-0.180	0.178	-0.140	-0.417*
	(0.255)	(0.242)	(0.212)	(0.254)	(0.243)	(0.253)
Primary school	6.943	-2.308	0.491	14.502***	11.165**	16.556***
	(5.644)	(5.458)	(4.812)	(5.349)	(4.701)	(4.897)
Higher than second school	17.647***	10.480*	7.049	6.183	7.960	2.320
	(6.516)	(5.762)	(5.549)	(7.594)	(8.489)	(7.836)
Communist member	11.292	7.103	4.219			
	(7.635)	(7.168	(6.892)			
Smoking	-0.894	-9.822**	-0.775			
	(4.789)	(4.791)	(4.334)			
Log of equivalence scaled household income	-6.810*	-7.459*	-5.922	1.373	3.144	10.045**
	(4.009)	(4.163)	(3.816)	(3.623)	(3.656)	(4.227)
Children	0.925	2.737	-0.756	-0.507	-0.805	-3.137
	(2.551)	(2.744)	(2.242)	(2.240)	(2.724)	(3.078)
Decision order_1	-2.470	8.436	5.962	4.552	-0.259	3.835
	(5.390)	(5.515)	(4.907)	(4.393)	(4.779)	(5.255)
Decision order_2	3.997	3.822	3.070	-3.241	-1.648	-6.898
	(5.270)	(5.296)	(4.810)	(4.674)	(5.055)	(4.704)
Time order_1	7.192	-1.311	-2.335	-5.302	-0.084	3.093
	(4.454)	(4.437)	(3.900)	(4.029)	(4.266)	(4.507)
Experimenter gender(1=female)	-3.653	-2.812	0.220	-4.597	-4.026	-8.758*
	(4.262)	(4.564)	(4.097)	(4.036)	(4.479)	(4.570)
Village dummy	yes	yes	yes	yes	yes	yes
Observations	1220	1220	1220	1220	1220	1220

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All the regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Table A2. The determinants of the difference in (im)patience and time-(in)consistency between subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively

	(Im)patience: dependent variable is $(c_{t+\tau} - c_t)$		Time-(in)consistency: dependent variable is $(\lvert c_0 - c_{60} \rvert)$	
	Husband	Wife	Husband	Wife
Interest rate(r)	94.298***	86.601***	-14.948***	-15.686***
	(6.599)	(6.118)	(2.396)	(2.844)
Present time dummy(1=today)	-17.943***	-13.209***		
	(2.434)	(2.196)		
Prediction dummy	-10.027	5.819	-8.076	-2.347
	(31.782)	(33.476)	(11.317)	(11.268)
Own decision dummy	-5.871	24.909	-17.671	5.392
	(39.017)	(34.338)	(12.848)	(11.888)
Prediction dummy × Present time dummy	8.223***	3.771*		
	(2.707)	(2.233)		
Own decision dummy × Present time dummy	3.518	-3.030		
	(2.636)	(2.504)		
Prediction dummy × Interest rate	-11.857*	-9.986	4.710	0.296
	(6.130)	(6.974)	(2.988)	(3.720)
Own decision dummy × Interest rate	-9.832*	8.101	2.310	2.652
	(5.034)	(6.898)	(3.149)	(3.363)
Prediction dummy × Age	0.380*	0.3682	0.052	-0.152*
	(0.197)	(0.226)	(0.094)	(0.080)
Prediction dummy × Primary school	-1.159	-2.526	-3.309*	-0.205
	(5.363	(5.149)	(2.011)	(1.741)
Prediction dummy × Higher than second school	0.150	6.370	-0.585	-4.496
	(5.617)	(7.822)	(2.334)	(3.351)
Prediction dummy × Communist	-0.447		1.531	
	(6.536)		(2.344)	
Prediction dummy × Husband financial decision maker	-0.354		0.179	
	(4.098)		(1.651)	
Prediction dummy × Wife or joint financial decision maker		4.338		0.015
		(3.969)		(1.361)
Prediction dummy × Financial conflict	-5.077	4.507	-2.192	0.024
	(4.600)	(4.457)	(1.724)	(1.569)
Prediction dummy × Log of equivalence scaled household income	-1.525	-2.935	0.643	1.027
	(3.296)	(3.726)	(1.130)	(1.269)

(continued)

Table A2. The determinants of the difference in (im)patience and time-(in)consistency between subjects' decisions made for the spouse and their own decisions and the predictions for the spouse, respectively (continued)

	(Im)patience: dependent variable is $(c_{t+\tau} - c_t)$		Time-(in)consistency: dependent variable is $(\lvert c_0 - c_{60} \rvert)$	
	Husband	Wife	Husband	Wife
Prediction dummy × *Children*	1.536	3.505	-1.349	0.811
	(2.110)	(2.427)	(0.949)	(0.750)
Prediction dummy × *Illness or death*	-3.230	2.365	1.411	-1.288
	(4.219)	(3.568)	(1.757)	(1.437)
Own decision dummy × *Age*	0.153	0.496**	-0.030	-0.169*
	(0.257)	(0.221)	(0.100)	(0.087)
Own decision dummy × *Primary school*	6.574	-2.397	-0.587	-2.019
	(5.980)	(5.477)	(2.228)	(1.857)
Own decision dummy × *Higher than second school*	11.602*	0.114	-1.642	-3.763
	(6.002)	(7.300)	(2.406)	(2.734)
Own decision dummy × *Communist*	5.473		-1.432	
	(8.247)		(2.721)	
Own decision dummy × *Husband financial decision maker*	-2.259		2.106	
	(4.680)		(1.797)	
Own decision dummy × *Wife or joint financial maker*		8.080*		0.135
		(4.266)		(1.465)
Own decision dummy × *Financial conflict*	4.283	1.028	0.911	0.817
	(5.317)	(4.371)	(2.112)	(1.475)
Own decision dummy × *Log of equivalence scaled household income*	-0.839	-5.958*	1.855	0.367
	(3.809)	(3.482)	(1.276)	(1.283)
Own decision dummy × *Children*	-0.476	3.096	0.927	0.704
	(2.207)	(2.451)	(0.931)	(0.836)
Own decision dummy × *Illness or death*	-5.439	5.635	-1.135	-1.135
	(4.698)	(4.081)	(1.951)	(1.390)

Notes: 1. The results reported in table are average marginal effects based on the censored regression model.
2. All regressions are clustered at household level. Figures in the parentheses are robust standard errors.
3. The level form of individual and household characteristics are also included in all the regressions.
4. Decision order, time order, experimenter gender and village dummies are also included in all the regressions.
5. *, **, and *** represent significance at the 10%, 5%, and 1% level, respectively.

Appendix B: Experimental Instructions

[Welcome announcement]

Good morning / Good afternoon,
We are from Beijing University, and we are conducting a survey and an economic experiment where you can earn some money. It is important that both the husband and wife can participate at the same time.
Would you like to participate?
[If Yes, continue]
[If No] Ok I understand, thank you very much.

Fine, are you both at home at this time so that we can conduct the survey now? It will take around one and a half hours.
[If Yes, continue]
[If No] Could we make an appointment later today?
……. Time and date
[If they cannot make an appointment, end the interview] I'm sorry but we need both spouses to be present during the survey, so we cannot include your household. Thank you very much.

Thank you for participating in our survey today. The survey includes an economic experiment and a short survey about your household. The whole interview will last for around one and a half hours. If you think you cannot stay during the whole survey, please let us know now. If you stop the survey before it is completed, we cannot give you any compensation according to our project requirement. We want to know how households make economic decisions. Your answers are anonymous – no one outside can ever find out what an individual household answers.

Firstly, we want to ask you some questions about your household characteristics.
[Then start the experimental instruction]
We will now conduct the economic experiment, but you will make separate choices. Therefore one of us will go to another room.
[Go to separate room, one interviewer goes with the husband and the other one goes with the wife].

[Trial decisions]

First, let me explain what you are going to do and then you will make some practice choices in order to understand the experiment well before you make your actual decisions. You will not be paid for these practice examples, but they will help you understand how the procedure works when you do make decisions for payment.

Here are two plates. The red plate represents money you can get one month from tomorrow [indicate the exact date] and the orange plate represents money you can get two months from tomorrow [indicate the exact date]. If you get the money one month from tomorrow or two months from tomorrow, you will collect it in the same way by redeeming the voucher for cash.
[Take out 10 tokens]

These tokens will represent money. However, they will be worth one amount of money if you choose to redeem them one month from tomorrow and a larger amount if you choose to redeem them two months from tomorrow. For example, in the first choice, each token you put on the red plate is worth 2 yuan one month from tomorrow, and each token you put on the orange plate is worth 2.4 yuan two months from tomorrow. Let me show you three examples.

Example 1: If you put all 10 tokens on the red plate, you will get 20 yuan one month from tomorrow, but nothing two months from tomorrow.
[Put all 10 tokens on the red plate, and write 10 tokens and 20 yuan for one month from tomorrow on the whiteboard. Write 0 tokens and 0 yuan for two months from tomorrow on the whiteboard]

Example 2: If you put 4 tokens on the red plate, you will get 8 yuan one month from tomorrow and 14.4 yuan two months from tomorrow.
[Erase the records for example 1 on the whiteboard]
[Put 4 tokens on the red plate, and write 4 tokens and 8 yuan for one month from tomorrow on the whiteboard. Put 6 tokens on the orange plate, and write 6 tokens and 14.4 yuan for two months from tomorrow on the whiteboard]

Example 3: If you put all 10 tokens on the orange plate, you will get 24 yuan two months from tomorrow, but nothing one month from tomorrow.
[Erase the records for example 2 on the whiteboard]
[Put all 10 tokens on the orange plate, and write 10 tokens and 24 yuan for two months from tomorrow on the whiteboard. Write 0 tokens and 0 yuan for one month from tomorrow on the whiteboard]
[Erase the records for example 3 on the whiteboard]

[Control questions to test whether the subjects understand the meaning of the plates and the tokens]

I have shown three examples, so now I would like to know whether you have understood the meaning of the plates and the tokens.
1) If I put one token on the red plate, what does it mean?
_____when you receive how much_____(yuan)
If I put one token on the orange plate, what does it mean?
_____when you receive how much_____(yuan)

[If subject answers correctly, increase one more token on each plate and ask again; if subject does not answer correctly, introduce the meaning of plates and tokens and the three examples again.]
[Increase one more token on the plates two more times, and ask three control questions in total. If subject can answer all the three questions correctly, then move on to the practice decisions]

You can divide the 10 tokens however you want to between one month from tomorrow and two months from tomorrow. However, the amount of money you can get one month from tomorrow and two months from tomorrow depends on how you divide the tokens. Do you have any questions? [Wait for a response and clarify the questions]

Now you can practice by dividing the 10 tokens the way you prefer.
[Wait for subject to make decision, calculate the corresponding money she/he can receive according to her/his decision on the two points in time.]

I will write your decision on the whiteboard so you can see clearly how much money you would receive one month from tomorrow and two months from tomorrow.
[Write the number of tokens and corresponding amount of money for one month from tomorrow and two months from tomorrow on the whiteboard. Write down the answers on the sample record sheet at S1 as well]

Now we will move on to another practice decision with different values of the tokens. The tokens you redeem one month from tomorrow are still worth 2 yuan each. Remember that those are the tokens you put on the red plate. But the tokens you redeem two months from tomorrow are now worth 2.8 yuan. Remember again that those are the token you put on the orange plate. For example, if you put 5 tokens on the red plate, you will get 10 yuan one month from tomorrow and 14 yuan two months from tomorrow. In the previous case, when one token was worth 2.4 yuan in two months from tomorrow, you would have got 12 yuan two months from tomorrow instead.

You can divide the 10 tokens however you want to between one month from tomorrow and two months from tomorrow. However, the amount of money you can get one month from tomorrow and two months from tomorrow depends on how you divide the tokens. Do you have any questions? [Wait for a response and clarify the questions]

Now you can practice again by putting the 10 tokens the way you prefer.
[Wait for subject to make decision, calculate the corresponding money s/he can receive according to her/his decision on the two points in time.]
Now I will write your decision on the whiteboard, so you can see clearly how much money you would receive one month from tomorrow and two months from tomorrow.
[Write the number of tokens and corresponding amount of money for one month from tomorrow and two months from tomorrow on the whiteboard. Write down the answers on the sample record sheet at S2 as well]

Now, we have finished the practice decisions. Do you think you understand how to make the decision on dividing the money between the two time periods? [Wait for a response and clarify any questions]

Before you make your decisions involving actual money, I will show you how to roll the die to decide which decision will be implemented for the real voucher. This die has 10 sides, with the numbers ranging from 1 to 10. The number that comes up when you roll the die will decide which decision will be used to determine the real payment.

[Give the subject the die, and let her/him roll it]
Let's say that the die shows a 2 [take die and show the side with the 2], then your second decision will be chosen as the actual decision. The values of the vouchers will then depend on what decisions you had made. Now, you made two practice decisions. Let's say that it was the second one that was the real one.
[Check response to the second practice on record sheet]

I would then give you a voucher for …… yuan that you can redeem one month from tomorrow and a voucher for …. yuan that you can redeem two months from tomorrow.

Therefore, it's important for you to make careful decisions since any decision you make can be chosen as the actual decision that will determine the real money received.

Paper IV

Positional Concern, Gender, and Household Expenditures

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Abstract: This paper uses a survey-based experiment to investigate Chinese farmers' positional concerns and their determinants. We also examine the correlation between degree of positionality and household expenditures on a set of visible goods. On average, respondents have strong positional concerns for income. In particular, respondents from high-income households are more concerned with their relative position than others. We find a difference between males and females with respect to correlation between degree of positionality and household expenditures on visible goods. For females, there is a positive correlation between degree of positionality and household expenditures on clothes, restaurants, and mobile phones, respectively. For males, there is a positive correlation between degree of positionality and household expenditures on mobile phones. No significant correlation is found for either gender between degree of positionality and household expenditures on vehicles or housing.

Key words: positional concern; gender; household expenditures; visible goods; rural China

JEL classification: C93, D12, D63

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1. Introduction

People may prefer not only to have a high income and consumption level, but also to have more than others. This phenomenon of positional concern has long been discussed by many prominent economists in the past, including Adam Smith, Karl Marx, Arthur Pigou, and Thorstein Veblen. The early empirical contributions regarding the importance of positional concern date back to Easterlin (1974), who observed that the average happiness within a country has been constant over time in spite of significant income growth. Since then, a large body of empirical evidence has found a positive relationship between relative income or consumption and reported individual happiness or subjective well-being (see, e.g., Easterlin, 1995, 2001; Clark and Oswald, 1996; McBride, 2001; Ferrer-i-Carbonell, 2005; Luttmer, 2005; Dynan and Ravina, 2007; Fafchamps and Shilpi, 2008; Guillen-Royo, 2011). Furthermore, using a survey-based experimental approach, where the marginal degree of positionality can be elicited by asking individuals to make hypothetical choices among alternative states with varying absolute and relative income,[1] a number of studies have found that people do care about their relative position (see, e.g., Solnick and Hemenway, 1998, 2005; Johansson-Stenman et al., 2002; Alpizar et al. 2005; Carlsson et al., 2007a; Solnick et al., 2007; Andersson, 2008; Carlsson et al., 2009; Carlsson and Qin, 2010). From a policy perspective, the presence of positional concerns implies a conflict between individual and social welfare since it imposes a negative externality on others (Frank, 2005, 2008). Therefore, optimal income taxation has been discussed as a policy recommendation to mitigate the efficiency cost induced by positional concern for income (Boskin and Sheshinski, 1978; Ireland, 2001).

In general, existing empirical findings in support of positional concern are based on studies on relatively rich people, using either reported happiness or an experimental method. It seems that positional concern can be taken as a "normal good," and that people are more likely to care about their relative position when their income increases, or is above the subsistence level (Frey and Stutzer, 2002; Clark et al., 2008). In light of this, the poor could have lower positional concerns than the rich (Carlsson et al., 2007b; Ravallion and Lokshin, 2010; Akay and Martinsson, 2011; Akay et al., 2012). However, a number of studies have found that also

[1] The marginal degree of positionality indicates the fraction of marginal utility of income or consumption that is due to an increase in relative income or consumption. Henceforth, for simplicity, except for some special cases, we use the degree of positionality to indicate the marginal degree of positionality.

people in poor countries are concerned about their relative position (see, e.g., Alpizar et al., 2005, in Costa Rica; Fafchamps and Shilpi, 2008, in rual Nepal; Carlsson and Qin, 2010, in rural China; Guillen-Royo, 2011, in rural Peru). In particular, Carlsson et al. (2009) found that individuals in India care more about their own relative position within the reference groups than the position of their reference groups in relation to other groups. In contrast, other studies found that increased income or consumption in reference groups has produced a positive effect on individuals' subjective well-being (Senik, 2004; Kingdon and Knight, 2007; Bookwalter and Dalenberg, 2009; Knight et al., 2009). The possible explanation for this is that individuals can take the income increase of their reference groups as a promising indication for themselves in the future.[2]

As the first objective of this paper, following the experimental design of Carlsson and Qin (2010), we use a survey-based experiment to measure the degree of positional concern for income among farmers in a rural province of China.[3] China has experienced rapid and unbalanced economic growth since the economic reform, and the drastic rural-urban income inequality in recent decades could have challenged farmers' prior perceptions of "equality". Yet, there have only been a few studies on positional concerns among Chinese farmers. Knight et al. (2009) investigated the determinants of farmers' subjective well-being; Brown et al. (2011) studied farmers' positional spending for status seeking; and Sun and Wang (2012) examined the effects of relative position on household consumption rates in rural China. With the exception of Carlsson and Qin (2010), using a survey-based experiment to measure the degree of Chinese farmers' positionality is quite scarce. In the present paper, we conduct an experiment in a province characterized by diverse minorities and strong social ties among farmers in the village. We elicit the marginal degree of positionality by asking respondents to make repeated choices between two hypothetical states of the world for an imagined future relative. The main advantage of this method is that it tries to liberate respondents from their current circumstances, and that the positional preferences can be revealed by making choices about large hypothetical incomes. The second objective of this paper is to investigate what socio-demographic and economic characteristics could influence respondents' degree of positionality. We mainly focus on whether the respondents from low-income households are concerned with their relative position (Frey and Stutzer, 2002; Clark et al., 2008), and how the concern for relative position is correlated with specific village characteristics such as village

[2] This phenomenon was referred as "tunnel effect" by Hirschman and Rothschild (1973).
[3] Rather than following Carlsson and Qin's (2010) design, which used average township income as comparison group, we choose average village income as reference group in this experiment.

size, distance to the market, and level of social capital (Senik, 2004; Fafchamps and Shilpi, 2008; Carlsson and Qin, 2010; Ravallion and Lokshin, 2010).

Positional concern for income could affect individuals' or households' expenditures on various goods with varying degrees of visibility or positionality (Veblen, 1898; Duesenberry, 1949). In order to pursue higher social status or to "keep up with the Joneses," individuals or households tend to over-consume some types of visible or positional goods that have strong demonstration effects (Hirsch, 1976; Frank, 1985a, 1985b; Abdel-Ghany et al., 2002; Charles et al., 2009; Brown et al., 2011; Heffetz, 2011; Jin et al., 2011; Sun and Wang, 2012). Alpizar et al. (2005) investigated individual concern for both relative income and relative consumption. They demonstrated that the marginal degree of positionality for income is the weighted sum of marginal degree of positionality for all the goods that an individual consumes. An important contribution of the present paper is that we investigate whether there is a significant correlation between the degree of respondents' positional concerns for income and household expenditures on a set of visible goods. If people with strong positional concerns for income spend more on visible goods than on other goods, it indicates that people do care about their status.

Since it is not practical to elicit degree of positionality for all household members, we use the subsample that only includes respondents who are household heads or spouses of the household heads. Both of these groups are assumed to have a potentially strong influence on household expenditure decisions.[4] To further investigate whether there is a significant difference between males and females with respect to the correlation between degree of positionality and household expenditures on visible goods, we focus on the subsample with male household heads and female spouses of household heads.[5] Empirically, it is not easy to distinguish non-positional goods from positional goods, which to some extent depend on the context of the study. Our analysis is therefore mainly based on goods commonly recognized as visible or positional in previous studies, e.g., clothes, housing, cars (Alpizar et al., 2005; Solnick and Hemenway, 2005; Carlsson et al., 2007a; Charles et al., 2009; Sun and Wang, 2012), and restaurants (eating outside) (Sun and Wang, 2012). In addition, our household expenditure data allows us to test whether there is any correlation between degree of positionality and household expenditure on mobile phones, which is visible but has not been well studied in the existing literature.

[4] Unfortunately, we did not ask about who mainly made decisions on household expenditures in the survey.
[5] Males and females indicate male household heads and female spouses of household heads, respectively.

Our findings are in line with previous studies in that Chinese farmers do have a strong concern for relative income. Moreover, respondents from high-income households are more concerned with their relative position than others. We also find that respondents who live in a larger village or a village more isolated from the market have less positional concerns. The positional concern is also lower in households with a member who has ever participated in a village cooperative association. Furthermore, we find a difference between males and females with respect to the correlation between degree of positionality and household expenditures on visible goods. For females, there is a positive correlation between degree of positionality and household expenditures on clothes, restaurants, and mobile phones, respectively. For males, there is a positive correlation between degree of positionality and household expenditures on mobile phones. No significant correlation is found for either gender between degree of positionality and household expenditures on vehicles or housing.

The rest of this paper is organized as follows. Section 2 introduces the experimental design and the household survey. Section 3 summarizes the descriptive results. We present and discuss regression results in Section 4. Finally, Section 5 concludes the paper.

2. Household survey and experimental design

2.1 Household survey

The survey and experiment were conducted in the Yunnan province in southwest China in August of 2011. The experiment was a part of a follow-up survey designed primarily to obtain information about the collective forest tenure reform. The first household survey was conducted in 2006 and covered five randomly selected counties. Two townships from each county and three villages from each township were randomly selected. In each village, twenty households were randomly selected from the registration list provided by the village authority. Hence, a total of 600 households participated in the original survey. Since some households were not at home at the time of the survey or had moved from the village, around 5% of the sampled households were missing in the follow-up survey in 2011. Also, around 40 farmers in the two villages did not participate in the experiment.[6] In the end, 527 households participated in both the household survey and the experiment.

[6] As the two villages are quite far apart, the enumerators were unable to finish both the household survey and the experiment in one day.

Yunan is the most southwest region of China bordering the countries of Vietnam, Laos, and Burma. It is highly mountainous and is characterized by diversified minorities. The respondents were interviewed at their homes for about two hours. There was no show-up fee, but the respondents were paid 30 Chinese yuan at the end of the survey. Before the respondents started to make their choices, they were given verbal information and instructions about the experiment, and all questions were read aloud. All alternatives in the experiments were shown on paper as well.

2.2 Experimental design

In the literature, positional preferences can be modeled by a ratio comparison utility function, $u(x, x/\bar{x})$ (Layard, 1980; Persson, 1995), or an additive comparison utility function, $u(x, x-\bar{x})$, where x is the individual's income and $\bar{x}$ is the average income in the society (Knell 1999; Ljungqvist and Uhlig, 2000). For simplicity, in this paper we assume the additive comparison utility function, $u=(1-\gamma)x+\gamma(x-\bar{x})=x-\gamma\bar{x}$, where γ reflects the marginal degree of positionality, i.e., the fraction of the marginal utility of income that is due to the increase in relative income. This means that for a small income change, there are two effects on utility: an absolute income effect and a relative income effect. For example, if γ is 0.2, then 80 percent of the utility increase is due to the increase in absolute income and the remaining 20 percent is due to the increase in relative income.

To elicit the marginal degree of positionality, similar to Johansson-Stenman et al. (2002) and Carlsson and Qin (2010), we designed a survey-based hypothetical experiment and asked respondents to make repeated choices between two hypothetical states of a world for an imagined future grandchild. If the respondents had their own children, we asked them to think of their children's grandchildren. If they did not have children, we asked them to imagine their future grandchildren. The underlying assumption of this scenario is that the respondents use their own preference for the future grandchild. Since the respondents have limited conceptions of their future grandchildren's preferences, it is cognitively easy to expect their future grandchildren to be like them. However, this assumption is not without problems. Psychological and economic literature has found that individuals make different decisions for strangers and people in general compared with their own preferences (Daruvala, 2007; Pronin et al., 2008; Albrecht et al., 2011; Chakravarty et al., 2011). It is thus possible that respondents could make more moderate decisions for their future grandchildren if they

believe that they have extremely positional preferences. If this is the case, we could overestimate the influence of own preferences on future grandchildren. In contrast, in a household time preference experiment conducted in rural China, Yang (2012) found that subjects made similar decisions for their spouses and for themselves. Therefore, the decisions made for the grandchildren could to a large extent reflect respondents' own preferences compared with decisions made for any random person.

In the experiment, the respondents were asked to make six choices between two alternatives with different future grandchild's incomes and average village incomes. In all other respects, the alternatives were identical (see experiment instruction in Appendix B). For simplicity, we call the two alternatives alternative A and alternative B. We use the average village income as reference income since the village is the basic unit where people interact with others in rural China (Knight et al., 2009).[7] In all the six choices, the average village income was kept unchanged in both alternative A (40,000 yuan per year) and alternative B (22,000 yuan per year).[8] In three of the choices, the future grandchild's income is below the average village income in alternative A; in the other three choices, the future grandchild's income is above the average village income in both alternatives. The reason for this experimental design is that we want to test whether the degree of positionality depends on whether the grandchild's income is below or above the average village income (Duesenberry, 1949; Andersson, 2008). To control for the possible order effects on decision-making, for 295 randomly selected respondents we first asked the three choices where the future grandchild's income is below the average village income in alternative A; for 232 randomly selected respondents we first asked the three choices where the future grandchild's income is above the average village income in both alternatives.[9] For simplicity, the following experimental procedure is described based on the former choice order. In the first three choices, alternative A was fixed with an average village income of 40,000 yuan per year and the grandchild's income being 36,000 yuan per year. This alternative was compared with three different alternative B's that featured a fixed average village income (22,000 yuan per year) but varying income for the

[7] Frank (2005) also pointed out that local rank matters most.
[8] At the time of the survey, 1 USD=6.413 CNY.
[9] According to our experimental design, in principle, the respondents should be divided equally between the two choice orders. There could be one plausible reason for the unbalanced sample observations between the two choice orders. In each sampled village, the enumerators firstly implemented the first choice order for the respondents who were available at the time of the survey. Hence, if some respondents were not at home at the time of the survey or had moved from the village, the enumerators were not able to implement the second choice order for these missing respondents. Therefore, we have more sample observations for the first choice order than the second choice order.

future grandchild. Let us look at an example where the grandchild's income is 31,500 yuan per year in alternative B to illustrate how we estimate the marginal degree of positionality. If a respondent is indifferent between the two alternatives in the first choice, then

$$x_A - \gamma \bar{x}A = x_B - \gamma \bar{x}B \rightarrow \gamma = \frac{x_A - x_B}{\bar{x}A - \bar{x}B} = \frac{36{,}000 - 31{,}500}{40{,}000 - 22{,}000} = 0.25 \ .$$

If a respondent chooses alternative A in the first choice, he/she has a marginal degree of positionality of less than 0.25, and vice versa.

In the second set of three choices, the implicit marginal degrees of positionality are the same as in the first three choices, except that the grandchild's income was above the average village income in both alternatives. In alternative A, the average village income and the grandchild's income were kept constant at 40,000 and 42,000 yuan per year, respectively. In alternative B, the average village income was the same as before (22,000 yuan per year), but the grandchild's income was higher in the second three choices than in the first three choices. More details about the six experimental choices can be found in Table 1, and the experimental instructions for one choice are shown in Appendix B.

2.3 Household expenditures

The household survey included detailed information about, e.g., household's socio-demographic and economic characteristics, household income composition, durable and fixed assets holdings, household expenditures, and village characteristics. Of particular importance to our analysis, the household survey asked respondents to recall and report the amount of household expenditures on each of the categories in 2010 (one year recalled data) including food (purchased and own-production), clothing, restaurant (eating outside home), alcohol, tobacco, personal care, utilities, recreation, furnishing, children education, and health. One issue is that if the recalled data is not properly collected (recall bias), this could lead to biased estimates. In order to mitigate this issue, we carefully designed the survey questionnaire by including as many expenditure categories as possible, and provided the enumerators with intensive training to ensure that the questions were clearly expressed. In contrast to annual household expenditures on, e.g., clothes and restaurants, which have been considered visible goods in the existing literature, household expenditures on durable goods occurred in lumps and only in some years. Since we only have one-year data on respondents' positional preferences and such preferences could dynamically change over time, we do not use the

prices households paid when they purchased the durable goods. Instead, we choose to use the market values in 2010 estimated by the respondents to represent the household expenditures on visible durable goods such as vehicles (cars and motorcycles)[10], housing,[11] and mobile phones.[12] Although the estimated market values can to some extent reflect the household holdings of durable goods, respondents might estimate market values of durable goods inaccurately. This is especially true for respondents who have few interactions with the market in their everyday life. This inaccuracy could bias the regression results, in particular if the extent of inaccurate estimates is correlated with respondents' positional concerns. However, we have no reason to believe that a recall bias or an inaccuracy is correlated with respondents' positional concerns.

Table 1. Description of hypothetical experiment

Choices	Alternatives	Average income	Grandchild's income	Degree of positionaity if indifferent(γ)	Share respondents
(1)	A	40,000	36,000	0.25	0.51
	B	22,000	31,500		0.49
(2)	A	40,000	36,000	0.5	0.54
	B	22,000	27,000		0.46
(3)	A	40,000	36,000	0.75	0.60
	B	22,000	22,500		0.40
(4)	A	40,000	42,000	0.25	0.56
	B	22,000	37,500		0.44
(5)	A	40,000	42,000	0.5	0.60
	B	22,000	33,000		0.40
(6)	A	40,000	42,000	0.75	0.66
	B	22,000	28,500		0.34

[10] Since there are too few observations for households with cars, we use the sum of cars and motorcycles to represent vehicles.
[11] In this paper, we take housing as the durable good.
[12] In the survey, the respondents were asked "Can you estimate how much this durable good is worth at the end of 2010?"

3. Descriptive results

3.1 Degree of positionality

Of the 527 responses, 6.5 percent were inconsistent, meaning that they chose alternative A when the relative advantage in income is high but switched to alternative B when the relative advantage in income is low, which violates the monotonicity assumption of the utility function. The inconsistency could be caused by learning and fatigue effects, or an alternative utility function form.[13] The share of inconsistent responses is similar to that in Alpizar et al. (2005), Carlsson et al. (2009), and Carlsson and Qin (2010). We drop these responses and summarize the experimental results in Table 1.[14]

As can be seen in Table 1, a large proportion of respondents care about their relative position. The responses follow a bimodal distribution. For the first three choices, 51% of the respondents always choose alternative A and have a marginal degree of positionality smaller than 0.25, and 40% of the respondents always choose alternative B and have a marginal degree of positionality larger than 0.75. Similarly, for the next three choices, 56% of the respondents always choose alternative A and 34% always choose alternative B. This means that only around 10% of the responses fall in between the two extreme cases of not positional and very positional. This overrepresentation of extreme responses is consistent with the general pattern found by Johansson-Stenman et al. (2002), Alpizar et al. (2005), Carlsson et al. (2009), Carlsson et al. (2007b), and Carlsson and Qin (2010). A plausible explanation for this phenomenon is that respondents applied cognitively easy strategies when making the decisions in the experiment.[15] In addition, the experimental design could have a limitation in that it largely reflects respondents' attitudes regarding relative position but less the strength of the relative differences.

[13] We do not find that there is any order effects on the occurrence of inconsistency. This means that the inconsistent choices could not be caused by the learning effects. For the first and second three choices, further tests show that 62% and 50% of inconsistency happened in making the last choice, respectively. This implies that the inconsistency could be to some extent affected by the fatigue effects.

[14] The simple probit model regression results show that the probability of inconsistent responses are not significantly correlated with any individual characteristics such as the relation to household head, gender, age, education, etc.

[15] For example, if respondents initially considered absolute income as more important than relative income, then they would simply and consistently make the same choices for the rest of the questions without making tradeoffs in each case. Similarly, respondents could initially consider relative income as more important than absolute income.

The mean value of the marginal degree of positionality is 0.46 for the first three choices and 0.42 for the second three choices.[16] The Wilcoxon signed rank test shows that the difference in marginal degree of positionality between the first and second three choices is significant (p-value=0.012). This means that the respondents have a stronger upward-comparison when the grandchild's income is below the average village income than the downward-comparison when the grandchild's income is above the average village income (Andersson, 2008; Carlsson and Qin, 2010).[17] In sum, many of the respondents show strong positional concerns at levels comparable to those found in other similar studies. For example, the mean value of positionality is in the range of 0.59-0.71 for a random sample of the Swedish population (Carlsson et al., 2007a); 0.50-0.52 for Indian students (Carlsson et al., 2009); 0.45 for Costa Rican university students (Alpizar et al., 2005), and 0.47 for Chinese farmers in the Guizhou province (Carlsson and Qin, 2010).

3.2 Socio-demographic and economic characteristics

In Table 2, we present the summary statistics of all the explanatory variables to be used in the regressions for both the full sample and the subsample without the inconsistent responses. The t-tests show that all explanatory variables are similar between the full sample and the subsample. For the full sample, we can see that a large fraction of respondents are household heads (61%) or spouses of household heads (20%), and 62% of the respondents belong to minorities. The average age of respondents is 46 years and the average education is 6 years (primary school). 92% of the household heads are male, and the average household has 5 members. The total household income per capita was 10,684 Chinese yuan in 2010. [18] Regarding village characteristics, in rural China, the administrative village is comprised of several small village communities. In this paper, we use the number of village communities to represent village size. In addition, we use distance to the nearest bank to indicate the intensity of market interaction. Again, in rural China the local bank is always located in the township that is the center of the market activities for the nearby villages. On average, our sample villages have 9 communities, and the distance to the nearest bank is 9 kilometers. Moreover, we use different (binary) variables to measure the degree of social

[16] For the non-extreme responses, we calculate the mean of positionality by using the mid-value in each interval. For the extreme responses such as γ <0.25 or γ > 0.75, we set the value equal to 0.125 and 0.875, respectively. Due to the bimodal distribution, the estimated means are a bit sensitive to the extreme-case assumptions.
[17] We also conduct the Kolmogorov-Smirnov test on the degree of positionality between the two choice orders. We do not find any order effects for the first three choices (*p*-value=0.661) or for the second three choices (*p*-value=0.779). Nor are there any order effects on the choices between the two alternatives.
[18] This is the sum of all income from household income-generating activities.

Table 2. Summary statistics of individual, household, and village characteristics

	Full sample	Without the inconsistency for below average income in alternative A	Without the inconsistency for above average income in both alternatives
Individual characteristics			
Dummy if respondent is household head (=1)	0.611	0.615	0.606
Dummy if respondent is spouse (=1)	0.195	0.191	0.197
Dummy if respondent is son or daughter (=1)	0.116	0.118	0.120
Dummy if respondent is other household member (=1)	0.078	0.077	0.077
Dummy if respondent is minority (=1)	0.622	0.621	0.629
Respondent's gender (1=male)	0.734	0.738	0.738
Respondent's age (years)	45.681 (13.265)	45.684 (13.308)	45.619 (13.288)
Respondent's education (years)	6.088 (3.165)	6.044 (3.198)	6.046 (3.198)
Dummy if respondent is Communist party member (=1)	0.150	0.150	0.148
Household characteristics			
Household head gender (1=male)	0.920	0.923	0.925
Dummy if household head is minority (=1)	0.624	0.619	0.627
Household head age (years)	49.292 (11.869)	49.394 (11.816)	49.243 (11.699)
Household head education (years)	5.664 (3.103)	5.631 (3.108)	5.671 (3.106)
Dummy if household head is Communist party member (=1)	0.249	0.249	0.245
Household population (persons)	4.657 (1.475)	4.657 (1.496)	4.663 (1.473)
The number of boys 16 years old or younger (persons)	0.512 (0.667)	0.505 (0.668)	0.519 (0.670)
The number of girls 16 years old or younger (persons)	0.463 (0.645)	0.475 (0.655)	0.465 (0.645)
The number of adults 60 years old or older (persons)	0.647 (0.778)	0.647 (0.779)	0.637 (0.776)
Total household income per capita (in 1 000 yuan)	10.684 (10.157)	10.566 (9.949)	10.649 (9.774)
The value of household total assets (in 1 000 yuan)	124.078 (237.938)	118.675 (230.311)	122.922 (241.718)
Dummy if household had a child in school (1=yes)	0.531	0.525	0.525
Dummy if household experienced serious illness (1=yes)	0.112	0.112	0.116
Dummy if household experienced big occasions (1=yes)	0.137	0.132	0.136
Village characteristics			
The number of village communities	9.143 (6.857)	9.143 (6.857)	9.143 (6.857)
Village distance to nearest bank (km)	9.270 (12.119)	9.270 (12.119)	9.270 (12.119)
Dummy if relatives and friends have helped with the weddings and funerals (=1)	0.611	0.613	0.615
Dummy if any household member has attended clan halls (=1)	0.204	0.204	0.204
Dummy if any household member has participated in village cooperative associations (=1)	0.162	0.162	0.159
Observations	527	493	493

Note: 1.Total asset is the sum of fixed assets and housing.
2. The figures shown in the parentheses are standard deviation.

capital: if relatives and friends have helped with weddings and funerals, if any household member has attended clan halls, which are the temples where people come to worship, and if any household member has participated in village cooperative associations.[19] Table 2 shows that 61% of the respondents reported that relatives and friends have helped with weddings and funerals. In 20% of the households, at least one member has attended clan halls, and in 16% of households, at least one member has participated in a village cooperative association.

4. Regression results

4.1 Determinants of degree of positionality

In this section we investigate what factors influence the degree of positionality. We mainly test four hypotheses. First, respondents from low-income households are less concerned with their relative position (Frey and Stutzer, 2002; Clark et al., 2008). Second, respondents are more likely to compare themselves with others in a smaller community or group (Johansson-Stenman and Martinsson, 2006; Carlsson et al., 2009; Carlsson and Qin, 2010). Market interaction could intensify people' competition with peers (Scott, 1976; Fehr and Falk, 2002), and hence the third hypothesis is that the respondents who live more distant from the market have lower positional concerns. Fourth, a higher degree of social capital can increase altruism among villagers, and thus mitigate the extent to which farmers care about their relative position (Hirschman and Rothschild, 1973; Senik, 2004; Ravallion and Lokshin, 2010).

We employ an interval regression model to account for the fact that the marginal degree of positionality is an interval-censored value. Furthermore, we classify households into quartiles based on total household income per capita, and take the highest income group as the reference in model specification. To control for order effects, we also add a binary variable that equals one if respondents first made the three choices where the grandchild's income is below the average village income in alternative A. We estimate two separate models for the experiment where the grandchild's income was below the average village income in alternative A and where the grandchild's income was above the average village income in

[19] During the follow-up survey in 2011, we realized that a large number of respondents gave very similar answers to the social capital questions that were also asked in the original survey in 2006. To save time, we did not ask the social capital questions for the rest of respondents, and thus use the social capital data in 2006 for our analysis in this paper.

both alternatives, respectively. The standard errors are clustered at the village level, and the estimated results are presented in Table 3.[20]

In models (1) and (2), for the experiment where the grandchild's income was below the average income in alternative A, the respondents in the two lowest income groups are significantly less concerned with their relative position than are those in the highest income group.[21] The joint test on the difference between the second highest income group and the two lowest income groups is also statistically significant at the 5% level. The results are in contrast to previous similar studies; e.g., Carlsson et al. (2007b) and Akay et al. (2012) did not find a significant effect of household income on the degree of positional concern. Carlsson et al. (2009) and Carlsson and Qin (2010) found that the degree of positionality decreases with household income. However, the significance of the income dummies disappears in models (3) and (4) for the experiment where the grandchild's income was above the average income in both alternatives. Hence, the results are to some extent consistent with the first hypothesis; that is, the respondents in the higher income group care more about relative position only when their income is below the average village income. Yet one potential concern is that respondents who are motivated by strong positional concern might work harder to generate more income. In such case, the estimated results could be biased due to this endogenous issue. However, our results mainly focus on the correlation rather than the causality between household income and degree of positionality.

With the exception of number of younger girls in the household, no other individual or household characteristics are significantly related to the degree of positionality. Respondents from households with many young girls are more concerned about their relative position. One plausible explanation for this is that a relatively higher status can attract socially desirable marital partners for the girls in the future (Anderson, 2007). In addition, in models (3) and (4), we find that both number of village communities and distance to the market have a significant and negative effect on the degree of positionality. This is consistent with the second and third hypotheses that respondents who live in a larger village or a village distant from the market

[20] As discussed in Section 3.1, to account for the substantial fraction of respondents who always choose alternative A or always choose alternative B, we classify the responses into three ordinal categories. The first category equals one if the degree of marginal positionality is lower than 0.25 in all the first/second three choices; the second category equals two if the degree of marginal positionality is in between 0.25 and 0.75; and the third category equals three if the degree of marginal positionality is larger than 0.75 in all the first/second three choices. We then estimate the Ordered Probit Model on the same covariates as what are used in the interval regression model. The results in the significance are quite similar to what we present in Table 4, which are available upon request.

[21] A joint test of the sum of all three lower income groups is significantly smaller than zero at the 5% level.

Table 3. Interval regression estimates of the degree of positionality

	Below average income in alternative A		Above average income in both alternatives	
	(1)	(2)	(3)	(4)
Dummy for bottom 25% of households in household total income per capita	-0.132***	-0.133***	-0.022	-0.024
	(0.039)	(0.039)	(0.043)	(0.043)
Dummy for 25%-50% of households in household total income per capita	-0.117**	-0.121**	-0.046	-0.048
	(0.049)	(0.049)	(0.048)	(0.048)
Dummy for 50%-75% of households in household total income per capita	-0.020	-0.020	-0.020	-0.021
	(0.048)	(0.048)	(0.044)	(0.044)
Dummy if respondent is spouse (=1)	-0.027	-0.021	-0.012	-0.010
	(0.044)	(0.046)	(0.050)	(0.047)
Dummy if respondent is son or daughter (=1)	-0.024	-0.024	-0.060	-0.062
	(0.047)	(0.046)	(0.058)	(0.057)
Dummy if respondent is other household member (=1)	0.033	0.026	0.019	0.011
	(0.064)	(0.064)	(0.058)	(0.060)
Dummy if respondent is minority (=1)	-0.016	-0.019	0.017	0.018
	(0.029)	(0.029)	(0.034)	(0.035)
Dummy if respondent is male (=1)	-0.024	-0.014	-0.016	-0.009
	(0.046)	(0.044)	(0.051)	(0.049)
Respondent's age (years)	0.000	0.001	0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.002)
Respondent's education (years)	0.004	0.005	0.002	0.003
	(0.006)	(0.006)	(0.006)	(0.006)
Dummy if respondent is Communist party member (=1)	0.001	0.000	0.024	0.021
	(0.044)	(0.044)	(0.044)	(0.045)
The number of boys 16 years old or younger (persons)	0.020	0.022	-0.025	-0.024
	(0.025)	(0.025)	(0.023)	(0.023)
The number of girls 16 years old or younger (persons)	0.044*	0.048*	0.024	0.028
	(0.025)	(0.026)	(0.022)	(0.023)
The number of adults 60 years old or older (persons)	0.003	0.008	-0.020	-0.016
	(0.025)	(0.026)	(0.022)	(0.023)
The value of total household assets (in 1 0000 yuan)	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Village distance to nearest bank (km)	0.001	0.001	-0.002**	-0.002**
	(0.002)	(0.001)	(0.001)	(0.001)
The number of village communities	-0.004	-0.004	-0.005**	-0.004*
	(0.003)	(0.004)	(0.002)	(0.003)
Dummy if relatives and friends have helped with the weddings and funerals (=1)		0.057		0.028
		(0.124)		(0.083)
Dummy if any household member has attended clan halls (=1)		0.089		0.153
		(0.194)		(0.180)
Dummy if any household member has participated in village cooperative associations (=1)		-0.174*		-0.176**
		(0.101)		(0.083)
Choice order dummy	0.034	0.034	0.041	0.039
	(0.034)	(0.033)	(0.035)	(0.035)
Constant	0.483***	0.431***	0.433***	0.387***
	(0.128)	(0.158)	(0.131)	(0.143)
Ln(sigma)	-1.072***	-1.074***	-1.094***	-1.096***
	(0.014)	(0.014)	(0.015)	(0.015)
No. of observations	493	493	493	493

Notes: 1. All the regressions are clustered at village level. The figures shown in the parentheses are robust standard errors.
2. *, **, and *** represent the significance at 10%, 5%, and 1%, respectively.

are less positional. The result is contrary to Fafchamps and Shilpi (2008), who found that market interactions reduce people's tendency to compare themselves with their neighbors. Furthermore, in regard to the degree of social capital, consistent with the fourth hypothesis, if any household member has participated in a village cooperative association, the respondents are significantly less concerned with relative position. This is consistent with Carlsson et al. (2007b), who found that respondents from a household where at least one household member was a member of the Peasant Association have a lower degree of positionality. Different from Akay et al. (2012), who found that people who frequently attended church have less positional concern, we do not find a significant correlation between degree of positionality and the dummy variable if a household member has attended clan halls.

4.2 Degree of positionality and household expenditures on visible goods

In this section, we investigate how the respondents' marginal degree of positionality is correlated with household expenditures on a set of visible goods. As discussed, we use the subsample of household heads and spouses of household heads who are assumed to have a potentially strong influence on household expenditures. In this subsample, 94% of household heads are male and 92% of household heads' spouses are female. To investigate whether there is a significant difference between males and females, we drop additional 28 observations for the household head is female and the spouse of household head is male. In total, we therefore have 397 observations with male household heads and female spouses of household heads.[22] After dropping the inconsistent experimental responses, we have 371 sample observations for the experiment where the grandchild's income was below the average income in alternative A, and 370 sample observations for the experiment where the grandchild's income was above the average income in both alternatives.[23] Table 4 depicts the summary statistics of household expenditures per capita on visible goods. We can see that there is a large variation among households for all of the visible goods, and that a few households in fact do not spend anything on the visible goods except housing. For example, the fraction of zero expenditure on restaurants is 76%, which reflects the fact that farmers in rural areas mainly eat at home. We therefore employ a Tobit model to account for the non-negligible fraction of zero expenditure on the visible goods, and estimate three models for each of them. Degree of positionality is measured by the mean value of the interval of the marginal degree of

[22] Henceforth, for simplicity, we use males and females to indicate male household heads and female spouses of household heads, respectively.

[23] Table 1A in Appendix A presents the summary statistics for the subsample of males and females. Except for respondents' and household heads' age, all the other variables are similar to those in the full sample in Table 2.

Table 4. Summary of visible goods (in 1,000 Chinese yuan)

Visible goods	Subsample of males and females			Without the inconsistency for below average income in alternative A			Without the inconsistency for above average income in both alternatives		
	Obs.	Mean	Fraction of zero expenditure	Obs.	Mean	Fraction of zero expenditure	Obs.	Mean	Fraction of zero expenditure
Clothes	394	0.262 (0.266)	6%	368	0.260 (0.269)	6%	367	0.260 (0.267)	6%
Restaurant	397	0.077 (0.534)	76%	371	0.077 (0.550)	77%	370	0.081 (0.552)	76%
Mobile phone	397	0.083 (0.110)	10%	371	0.081 (0.110)	10%	370	0.082 (0.112)	10%
Vehicle	397	0.753 (5.180)	42%	371	0.762 (5.334)	41%	370	0.776 (5.364)	42%
House	390	27.128 (86.329)	0	364	26.336 (88.155)	0	364	27.277 (89.208)	0

Note: 1.The figures in parentheses are standard deviation.
2. Males and females indicate male household heads and female spouses of household heads, respectively.

positionality.[24] Since we do not have any controls in the first and second model specification, we use the per capita amount of household expenditures on visible goods as dependent variable to account for the concerns that higher spending on visible goods could be caused by large household population.

In the first model, we only include marginal degree of positionality as explanatory variable. The coefficient of this variable thus reflects the average correlation between both males' and females' degree of positionality and household expenditures on the visible goods. To investigate whether there are gender differences regarding the correlation between degree of positionality and household expenditures on the visible goods, we estimate separate impacts of degree of positionality for males and females in the second model. In the third model, we add individual characteristics of the males and females respectively (note that for each household we only have information about the individual characteristics of the respondent). In addition, we control for household characteristics such as number of boys 16 years old or younger, number of girls 16 years old or younger, number of adults 60 years old or older, total household income per capita, household fixed assets, whether household had a child in school, whether the household experienced serious illness, and whether the household experienced a big occasion such as a wedding or a funeral. All models include village fixed effects. Furthermore, we estimate separate models for the two different experiments, and cluster the standard errors at the village level. We report the average marginal effects for clothes and restaurants in Table 5 and for vehicles, housing, and mobile phones in Table 6.[25] We also report the joint tests on the differences between the marginal effects of males' and females' degree of positionality.

Table 5 shows that for males, there is no statistically significant correlation between degree of positionality and household expenditures on clothes and restaurants, respectively. However, for females, there is a statistically significant and positive correlation. The joint tests on the differences between the marginal effects of males' and females' degree of positionality are statistically significant. This means that females' degree of positionality has a stronger correlation with household expenditures on clothes and restaurants than males'. For visible durable goods, as can been seen in Table 6, there is no statistically significant correlation for

[24] Alternatively, we construct two dummy variables to measure the degree of positionality. The first dummy equals one if the marginal degree of positionality is larger than 0.5 and the second dummy equals one if the marginal degree of positionality is smaller than 0.5. The estimated results are similar to what we present in this paper, and are available upon request.

[25] To save space, we do not report the individual and household characteristics in the tables. All results are available upon the request.

Table 5. The degree of positionality and visible goods: clothes and restaurants

	Clothes			Restaurants		
	Grandchild's income is below average income in alternative A					
Positionality	0.033			-0.028		
	(0.041)			(0.050)		
Males' positionality		0.000	0.019		-0.020	-0.057
		(0.035)	(0.044)		(0.052)	(0.055)
Females' positionality		0.153*	0.118		-0.057	0.246*
		(0.081)	(0.104)		(0.079)	(0.132)
Joint test on the difference between males' and females' positionality (p-value)		0.032	0.350		0.638	0.070
Obs.	368	368	368	371	371	371
	Grandchild's income is above average income in both alternatives					
Positionality	0.048			-0.019		
	(0.033)			(0.057)		
Males' positionality		0.011	0.015		-0.008	-0.041
		(0.032)	(0.032)		(0.061)	(0.058)
Females' positionality		0.181**	0.181***		-0.067	0.174*
		(0.081)	(0.065)		(0.082)	(0.094)
Joint test on the difference between males' and females' positionality (p-value)		0.051	0.023		0.478	0.105
Obs.	367	367	367	370	370	370
Individual characteristics	No	No	Yes	No	No	Yes
Housheold characteristics	No	No	Yes	No	No	Yes
Village dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 1. Males and females indicate male household heads and female spouses of household heads, respectively.
2. Individual characteristics include respondent's ethnicity, age, education, communist party membership; Household characteristics include number of boys 16 years old or younger, number of girls 16 years old or younger, number of adults 60 years old or older, total household income per capita, household fixed assets, if household had a child in school, if household experienced serious illness, and if household experienced big occasions.
3. The results reported in table are average marginal effects based on the tobit model.
4. All the regressions are clustered at village level. The figures shown in the parentheses are robust standard errors.
5. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

Table 6. The degree of positionality and visible goods: vehicles, housing, and mobile phones

	Vehicles			Housing			Mobile phones		
	Grandchild's income is below average income in alternative A								
Positionality	-0.370			-12.200			0.033***		
	(0.455)			(8.562)			(0.012)		
Males' positionality		-0.387	-0.523		-11.655	-16.792		0.023*	0.020*
		(0.490)	(0.536)		(8.667)	(10.573)		(0.013)	(0.012)
Females' positionality		-0.310	-0.220		-14.324*	-8.374		0.066***	0.076***
		(0.450)	(0.613)		(8.473)	(6.722)		(0.018)	(0.015)
Joint test on the difference between males' and females' positionality (p-value)		0.842	0.681		0.287	0.302		0.033	0.004
Obs.	371	371	371	364	364	364	371	371	371
	Grandchild's income is above average income in both alternatives								
Positionality	-0.344			-8.748			0.034***		
	(0.426)			(7.053)			(0.013)		
Males' positionality		-0.395	-0.509		-8.060	-9.296		0.023*	0.024*
		(0.463)	(0.478)		(6.868)	(6.002)		(0.014)	(0.013)
Females' positionality		-0.0162	0.554		-11.405	-5.381		0.073***	0.079***
		(0.393)	(0.410)		(8.203)	(5.198)		(0.024)	(0.028)
Joint test on the difference between males' and females' positionality (p-value)		0.502	0.124		0.277	0.429		0.031	0.082
Obs.	370	370	370	364	364	364	370	370	370
Individual characteristics	No	No	Yes	No	No	Yes	No	No	Yes
Housheold characteristics	No	No	Yes	No	No	Yes	No	No	Yes
Village dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 1. Males and females indicate male household heads and female spouses of household heads, respectively.
2. Individual characteristics include respondent's ethnicity, age, education, communist party membership; Household characteristics include number of boys 16 years old or younger, number of girls 16 years old or younger, number of adults 60 years old or older, total household income per capita, household fixed assets, if household had a child in school, if household experienced serious illness, and if household experienced big occasions.
3. The results reported in table are average marginal effects based on the tobit model.
4. All the regressions are clustered at village level. The figures shown in the parentheses are robust standard errors.
5. *, **, and *** represent significance at 10%, 5%, and 1%, respectively.

either gender between degree of positionality and household expenditures on vehicles. For females, in the experiment where the grandchild's income was below average income in alternative A, we find that there is a statistically significant and negative correlation between degree of positionality and household expenditures on housing, yet the significance disappears when we control for individual and household characteristics. Previous studies have identified vehicles and housing as important status-signal goods, yet we do not find evidence that there is a significant correlation between degree of positionality and household expenditures on vehicles and housing, respectively. One possible explanation for this is that since household expenditures on vehicles and housing are generally large, the decisions to purchase these goods are more likely made jointly by family members rather than mainly made by the household head or the spouse of household head. This thus can lower the correlation between degree of positionality and household expenditures on vehicles and housing, respectively. Finally, for both males and females, there is a statistically significant and positive correlation between the degree of positionality and household expenditures on mobile phones in all model regressions. The joint tests on the differences between the marginal effects of males' and females' degree of positionality are statistically significant as well. [26]

5. Conclusions

In this paper, we conducted a survey-based experiment to investigate Chinese farmers' positional concerns. In the experiment, the respondents were asked to make repeated choices between two hypothetical states of a world for an imagined future grandchild. Our findings that many people have strong positional concerns are in line with previous findings in other countries. The strong attention paid to relative position could reflect the traditional values rooted in Chinese society that are associated with competitive and self-oriented goals such as "social status, power and wealth" (Yang, 1996).

We find that respondents from high-income households are more concerned with relative position, which is consistent with evidence from rich countries. It indicates that positional concern is a "normal good," and that people are more concerned with relative position when their income increases. This would possibly call for a redistribution policy through an optimal income tax (Boskin and Sheshinski, 1978; Ireland, 2001). We also find that the village

[26] For each of visible goods, the results are robust in significance when we drop the outlier observations in all model regressions.

characteristics have a significant influence on the degree of positionality. Respondents who live in a larger village or a village more isolated from the market have lower positional concerns. As an important indicator of social capital, if a household member has ever participated in a village cooperative association, it can decrease the extent to which respondents compare themselves with other villagers.

We also investigated the correlation between respondents' positional preferences and household expenditures on a set of visible goods. Given the assumption that household heads or spouses of household heads have more influence on household expenditures, we find a difference between males and females with regard to the correlation between degree of positionality and household expenditures on visible goods. For females, there is a positive correlation between degree of positionality and household expenditures on clothes, restaurants, and mobile phones, respectively. For males, there is a positive correlation between degree of positionality and household expenditures on mobile phones. Although we cannot provide a direct test on the degree of positionality for each of the visible goods, our results indicate that clothing, restaurants, and mobile phones are positional goods for females and mobile phones are positional good for males. However, we do not find a significant correlation between degree of positionality and household expenditures on vehicles or housing. In summary, our findings imply that people do care about their status, and spend more household resources to acquire goods and services that are more positional (Charles et al., 2009; Brown et al., 2011). A relevant policy recommendation would thus be to impose a consumption tax on the more positional goods.

Consequently, this paper has shed light on the importance of positional concerns using a survey-based experimental approach in rural China. However, as has been discussed in the literature, eliciting preferences using the hypothetical method is by no means without problems. In addition to the potential bias that has been discussed, the degree of positionality may be under-estimated if respondents do not consider positionality as a favorable trait and thus end up making more equitable choices for their future grandchildren (Johansson-Stenman et al., 2002; Carlsson et al., 2009). In addition, by which channel to incorporate positional concerns into the individual utility function and whether positional concerns interact with other unobserved factors in the utility remain questions for future studies. Furthermore, if household expenditures are not primarily made by the household head or the spouse of the household head, or the expenditure decisions are made jointly in the family, we may have under-estimated the correlation between degree of positionality and household expenditures

on visible goods. Future studies should pay more attention to who are the main decision makers regarding household expenditures. To provide further evidence on the potential link between positional preference and household expenditures on visible goods, panel data of both positionality and household expenditures is highly suggested in order to mitigate the potential measurement errors in the one-year cross-sectional data as used in this paper.

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Appendix A:

Table 1A. Summary statistics for subsample of males and females

	Males and females	Without the inconsistency for below average income in alternative A	Without the inconsistency for above average income in both alternatives
Individual characteristics			
Dummy if respondent is minority (=1)	0.625	0.617	0.630
Respondent's gender (1=male)	0.761	0.765	0.759
Respondent's age (years)	47.058	47.159	47.095
	(11.082)	(11.068)	(10.989)
Respondent's education (years)	5.807	5.761	5.774
	(3.019)	(3.040)	(3.056)
Dummy if respondent is Communist party member (=1)	0.169	0.167	0.168
Houshold characteristics			
Dummy if household head is minority (=1)	0.620	0.612	0.627
Household head age (years)	47.594	47.714	47.630
	(10.879)	(10.861)	(10.798)
Household head education (years)	5.924	5.881	5.919
	(2.886)	(2.906)	(2.914)
Dummy if household head is Communist party member (=1)	0.247	0.245	0.243
Household population (persons)	4.516	4.518	4.516
	(1.454)	(1.475)	(1.447)
The number of boys 16 years old or younger (persons)	0.516	0.515	0.524
	(0.673)	(0.679)	(0.675)
The number of girls 16 years old or younger (persons)	0.484	0.496	0.481
	(0.657)	(0.667)	(0.655)
The number of adults 60 years old or older (persons)	0.569	0.569	0.559
	(0.731)	(0.737)	(0.731)
Total household income per capita (in 1 000 yuan)	11.014	10.791	11.118
	(10.258)	(9.925)	(10.495)
The value of household total assets (in 1 000 yuan)	115.898	109.051	117.088
	(227.055)	(213.491)	(234.016)
Dummy if household had a child in school (1=yes)	0.544	0.539	0.541
Dummy if household experienced serious illness (1=yes)	0.101	0.097	0.103
Dummy if household experienced big occasions (1=yes)	0.136	0.129	0.135
Village characteristics			
The number of village communities	9.143	9.143	9.143
	(6.857)	(6.857)	(6.857)
Village distance to nearest bank (km)	9.270	9.270	9.270
	(12.119)	(12.119)	(12.119)
Dummy if relatives and friends have helped with the weddings and funerals (=1)	0.619	0.620	0.623
Dummy if any household member has attended clan halls (=1)	0.203	0.203	0.202
Dummy if any household member has participated in village cooperative associations (=1)	0.167	0.167	0.164
Observations	397	371	370

Note: 1. Males and females indicate male household heads and female spouses of household heads, respectively.
2. Total asset is the sum of fixed assets and housing.
3. The figures in parentheses are standard deviation.

Appendix B: the instruction for one experimental choice

We will now ask you some questions about future generations. We will ask you to make choices for a person who lives two generations into the future. So if you have children, think of your children's grandchildren. If you do not have children, think of your future grandchildren. If you have grandchildren, think of your grandchildren's grandchildren.

The difference between the alternatives is the income of your grandchild and the average income of others in the same village. Prices are the same in the two alternatives, and the same amounts of goods are available. Assume that the prices are the same as today. Your grandchild has the same type of job in both alternatives. The government provides education, healthcare, and social security for all people. The income distribution is the same in the two alternatives, which means that there are equally many poor and rich people in the two alternatives.

We want you to focus on what is the best for your future grandchild. There is no right or wrong answer.

Question 1. *(show card)*

Choose between alternative A and B for your future grandchild.

Alternative A:	Your grandchild's income is 36,000 yuan per year The average income in the village is 40,000 yuan per year
Alternative B:	Your grandchild's income is 31,500 yuan per year The average income in the village is 22,000 yuan per year

Your grandchild earns 4,500 yuan more in alternative A than in alternative B. This means that the grandchild can eat better food, live in a better house, and buy more things in alternative A. In alternative A your grandchild earns 4,000 yuan less than the average income in the village. In alternative B, your grandchild earns 9,500 yuan more than the average income in the village.

Everything else is the same in the two alternatives. Choose the alternative that you consider to be the best for your future grandchild.

□ Alternative A
□ Alternative B

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