Stability of Preferences in a non-WEIRD context

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Abstract

Economic behaviour is determined by individual preferences and external constraints. When measuring preferences to predict behaviour and design policy, it is implicitly assumed that these preferences are stable over time. The current study probes the intertemporal stability of preferences using three waves of data over a 2-year period in an environment with significant changes in situational factors in Eastern Sierra Leone. Earlier research on stability of preferences has mostly been conducted in developed countries – we improve on this. We observe significant instability for time preferences. In contrast, social preferences appear much more stable. While we have extensive data on situational constraints, there are very few that can explain the change in preferences. It might be that conventional economic models, which require preference stability, are not as useful in a developing country context.

1. Introduction

Economic preferences interact with external constraints to determine individual's economic choices. To predict behavior, economists are therefore interested in understanding people's preferences. Unfortunately, while constraints can often be directly observed, preferences are inherently unobservable to the outsider and are typically deduced from choices and constraints. To obtain a more direct picture of people's preferences, a growing literature in economics aims to make these hidden preferences "visible" using experimental elicitation methods. In particular, investigators hope that such controlled experimental measurement may be less affected by selection issues and unobserved beliefs. Thus, an important assumption of this literature is that these measurements provide preference parameters that are stable over time and across situations, and can serve as a raw input to prediction for policy and regulation.

Because observed choices depend on both preferences and constraints, they are likely to change over time, i.e. across repeated measurements. How much of these changes can be accounted for by changes in preferences and how much can be explained by situational factors? That is the question we approach in the current study. Because changes in situational factors are important to our question, we use a subject pool in which such changes are likely and potentially significant: we observe repeated choice-based preference measurements in a large sample of Sierra Leonean villagers over a period of two years. Social conflict, fluctuation in harvest and income, or changes in cooperation are likely to have an influence on behaviour in the preference measurement tasks used by economists; however, changes implied by these environmental or situational factors do not need to be interpreted as changes in preferences as long as they do not imply deep-rooted and stable changes in attitudes that affect behaviour across a wide range of decision situations. Such deep-rooted changes are definitively possible. Exposure to traumatic experiences or to chronic stress can significantly affect people's values (e.g. Bauer et al. 2014; Buckert et al. 2014; Tedeschi and Calhoun 2004, and discussions therein). Values and attitudes may also change over time with new experiences and learning. However, many if not most effects due to situational factors over modest time periods will be short-lived, changing again if circumstances change. This includes effects caused by visceral factors, acute stress, or temporary changes in affect and emotions (Buckert et al. 2014; Hoch and Loewenstein 1991). They can therefore more efficiently be interpreted as observable changes in people's constraints rather than as unobservable changes in preferences (Stigler and Becker 1977). This was the consensus regarding stability preference for a long time. Some recent work has argued the opposite: preferences are endogenous to the surroundings. Bowles (1998) argues that preferences can actually change over time: that preferences are endogenous to the institutional environment and will thus also change with changes to markets and institutions. Over time these preferences will become internalized. Bowles thus argues that finding inconsistent preferences is not unlikely, in the case of strong changes to institutions. This is not necessarily reflected in changes in external constraints.

There are several papers related to ours. A few recent studies have looked at the stability of preferences over time. Andersen et al. (2008) find stable aggregate risk attitudes over a

repeated measurement in a sample of the Danish population, though not for all subpopulations: adults between 30-50 became more risk averse. It is conceivable that for this group income constraints and family composition changed more strongly over time. However, it may also be the case that experiences that people make in this age group lead to more conservative risk attitudes over time. Chuang and Schechter (2015) examine the correlation for experimental risk, social and time preferences in rural Paraguay. The only significant correlation they find is for time preferences and in some cases for social preferences. However, the games used to elicit these results differed across rounds, which may drive the results. More closely related to the current study, Meier and Sprenger (2015) study time preferences in a two-wave study of low-income US adults, Volk et al. (2012) study cooperation, i.e. a proxy for social preferences, in a three-wave panel of university students, and Bartos (2015) studies pro-social behaviour using a dictator game and a dictator game with punishment in rural Afghanistan. While the first two studies find that about half of the participants are categorized as consistent over time, in Bartos's case it is lower by about 30%. While Meier and Sprenger (2015) are unable to predict at the individual level who is stable and who is not, Volk et al. (2012) correctly predict 71% of the participants' category with their first choice and a personality score. For a more extensive review of studies examining stability of preferences, see Chuang and Schechter (2015).

In sum, the evidence thus far leans towards the claim that preferences are stable. Statistical power and sample sizes are relevant because stability of preferences in repeated elicitation studies is basically derived from statistical null effects of the intertemporal changes. In this respect, the above discussed studies by Andersen et al, Meier and Sprenger, and Volk et al. are based on relatively modest sample sizes of 97, 203, and 68 participants, respectively. Our sample sizes significantly improve on the above studies. Furthermore, unlike earlier studies our sample participants are non-WEIRD (Western, Educated, Industrialized, Rich and Democratic), which earlier studies have shown are particularly unusual subjects (Henrich, Heine and Norenzayan, 2010). Perhaps for these reasons our results do not completely match findings from earlier studies.

We consider two domains for preferences: the first is a measurement of attitudes toward trade-offs over time, sometimes called time-preference or impatience. The second is a measurement of social preferences regarding allocative fairness. Both domains are central to microeconomic theory. Basic utility of time preferences are important inputs to both traditional and behaviorally oriented theory and policy. To explain investment and time allocation individuals need to examine trade-offs over time. Frederick, Loewenstein and O'Donoghue (2002) even note that differences in economic growth can be partly attributed to differences in time preferences. Instable time preferences require a different approach of the policy maker when developing insurance and investment schemes. Therefore, knowledge of stability of time preferences helps in the design of poverty reducing methods. Models of social preferences have been very influential in shaping novel theories of cooperation, labor, and human resource. Social preferences are crucial in determining the success of cooperative projects. As an example, if a sufficient portion of the population is inequality averse, a standard prisoner's dilemma game converges to the social optimum, rather than the Nash equilibrium which is socially suboptimal (Bowles, 2004; pp120-122). Therefore, knowledge

of social norms or preferences is useful to determine optimum policy that requires cooperation. However, if social preferences cannot be assumed to be stable stimulating cooperation becomes harder.

We study time and social preferences in a large scale three-wave panel study in Eastern Sierra Leone. In the short run (6 months) we have around 1200 returnees, and in the long run (2 years) 800. We find time-inconsistent time preferences in the short run, even after controlling for several observable constraints. Social preferences appear stable in the short run, but in the long run some preferences shifts are present – even after controlling for external constraints.

The remainder of the paper is laid out as follows. In the next section we describe the data and give details on the design of our study, including our measures of preferences. The following section gives the results, including several robustness tests, before concluding.

2. Experimental Design

2.3 Sample

This research was undertaken in rural Sierra Leone, in 85 communities surrounding the Gola Rainforest National Park (GRNP) in the East of the country. We use data from participants in three waves of data collection spanning two years. The participants were first interviewed in 2011, during spring and later during fall, and again during the spring of 2013. From each village 30 participants were randomly selected to participate in a survey and experiments. They played several games and were asked questions about their occupation, relationships with neighbours and village life (details below). In the baseline a little over 2000 people were interviewed. Around 1200 were again present for the midline, and about 800 were present across all three waves[1]. As attrition is high the attrition analysis is very important to discern if a specific group of respondents has dropped out[2]. We refer to any comparisons between 2011 spring and fall as the short run, and to comparisons across 2011 spring and 2013 spring as the long run.

As the villages all surround a national park, they are relatively isolated from outside influences. Subsequently, the participants often face significant changes in external constraints (such as extreme whether, loss of harvest, etc). There are no formal insurance options. Since we can expect high levels of variation in external constraints we can examine the effect of changes in constraints on preferences.

Table 1 displays summary statistics for our participants. About 60 percent of participants are male, and the average age is around 40 years old. About a third owns a tin roof. They work around 6 hours per day, and they share their harvest with about 3 others. 91% attends community meetings in the village where community projects are decided upon. In the last month, respondents had a little less than 1 fight.

[1] One village fully drops out leaving us with 84 communities in the long run
[2] We discuss attrition further in the robustness section

Table 1: Descriptive Statistics

	N	mean	SD	min	max
Age	1222	39.4	13.8	4	98
Gender (male=1)	1222	0.61	0.49	0	1
Own a tin roof (yes=1)	1222	0.32	0.47	0	1
Hours worked per day	1222	5.82	2.13	0	16
Amount of households they share harvest with	1222	3.42	2.04	0	20
If they go to community meetings (yes=1)	1222	0.91	0.29	0	1
Number of fights in the last month with other households.	1222	0.60	1.21	0	11
Time preference score	1157	3.94	2.21	1	7
Selfish(=1)	1209	0.10	0.30	0	1
Generous(=1)	1209	0.21	0.41	0	1
Inequality Averse(=1)	1209	0.38	0.49	0	1
Other(=1)	1209	0.31	0.46	0	1

All results from spring 2011, for those who returned in fall 2011. Number of observations differ because some respondents did not finish the survey.

2.2 Eliciting Preferences

We elicit two types of key preferences, time and social preferences.

To elicit time preferences, we use a price list approach. The setup was identical for all survey rounds. Participants are asked to make 6 choices between an amount X to be received in the same day or an amount of X+Y in two months. X was fixed at 500 Leones (SLL) (about 0.12 US$), which represents a significant amount in these rural villages. Y varies: it starts at 0 and increases to 2500 SLL with 500 SLL increments. Each individual was paid for one randomly decided choice to make the decision incentivized. If they chose payment immediately they received their 500 SLL at the end of the activities in the village. Participants who chose later payment were visited two months later by one of our research assistants for payment. In the final round of data collection (in 2013) decisions were not incentivized, so we exclude the long run for our main analysis and relegate it to the appendix[3]. The choices can be converted into an impatience score ranging from 1 to 7. A score of 1 means extreme patience: they always prefer money later. A score of 7 means extreme impatience: even when the payoff later is a factor 6 higher they still prefer earlier payment. Table 1 shows the average time preferences score. It is around 4, which means that respondents preferred 2000 SLL in two months over 500 SLL now.

Second, we assess norms of altruism.

To elicit social preferences we ask respondents 4 allocation questions as designed by Fehr et al (2007). Respondents decided between two options for each question. Each option has a different allocation of payoffs for the participant and one other in the village, whose identity was unknown to the participant. The receiver never learned the identity of the player. Figure

[3] While we might be able to verify the validity of the hypothetical results, as in Ashraf, Karlan and Yin (2006), the problem is not validity, but consistency. We have no hypothesis on the direction of the bias for hypothetical time preferences. Any change in preferences we might find could be attributed to either instability of preferences or the bias of hypothetical preferences. Results are in table A5.

A1 in the appendix shows the four questions. These measure how people want income to be distributed. Using their allocation choices, they can be grouped into 4 groups: Selfish, Generous, Inequality Averse and Other. For our analysis we use 4 dummy variables to determine group membership. Overlap is not possible. Participants were again paid for one randomly decided decision. This was the case in all three rounds of data collection. Table 1 shows what respondents were classified as in round 1. Most participants (38%) were classified as inequality-averse. 31% could not be classified into one group, 21% was generous and 10% was selfish.

2.3 Situational Constraints

Controlling for changes in situational constraints is crucial in this research. Instability of preferences caused by changes in situational constraints does not mean that preferences are unstable – just that situational constraints matter.[4] We identify five main factors that we believe affect preferences in this context: income, social capital, public goods participation, conflict exposure and leadership quality. Reductions in the level of income can have significant effects when there are no formal insurance options. It is therefore likely to affect disposable income strongly, affecting preferences. Social capital measures the actions and beliefs regarding norms of reciprocity. Higher levels of social capital cause higher levels of sharing (Bowles, 2004). Ensuring high enough levels of cooperation in public goods is crucial in small villages where large scale projects can only be undertaken with enough people. If participation in these projects is high it might shape behaviour, as Bowles (1998) argues. Levels of conflict within villages can create feelings of distress. It might also affect the relationships within a village, again likely affecting preferences. Finally, the chief plays a crucial rule in village life. Communal projects are often managed by the chief, and he also acts as a first arbiter during conflicts and responsible for raising taxes. The quality of local leadership likely affects preferences.

To increase measurement validity, we assess if multiple survey measures can be attributed to each factor. However, since we expect that these variables are strongly correlated, we are by definition introducing collinearity in our model, thus reducing the precision of our point estimates. To prevent this, we combine the variables into five distinct factors. Confirmatory Factor Analysis (CFA) is an approach that allows the researcher to impose a predetermined structure on the data. If the fit of the model is good enough it converges to a unique solution. Then, for each observation we can calculate their 'factor score' for each factor, or situational constraint. We use this approach to calculate the factors. In section 3.3.4 we experiment with other methods. Table 2 summarises the five factors, and what variables make up each factor. Besides that, we also have several time-invariant variables that might affect preferences: age of respondent and their sex. Finally, data collection was part of a larger project that had used several treatments to distribute aid goods in a village between wave one and two. The 3 treatments are added as dummies to control for any effects of the treatment on preferences stability.

[4] Of course, it is an open question if these dimensions capture the situational factors adequately.

Table 2: Control Variables

Situational Constraints	
Factor	*Variables*
Income	Bushels of rice harvested, # of hours worked
Social Capital	Share harvest with how many others, How many others share their harvest with you
Public Goods	Do you attend community meetings, # times attended community meetings, # times worked on community projects
Conflicts	# of conflicts in HH, # of conflicts in village, # of conflicts with local leaders/police, # of fights in villages
Quality of Chief	# times asked chief for help, # times complained to chief
Time invariant Constraints	
Demographic	Age, Sex
Intervention variables	Dummies for treatments

3. Results

3.1 Aggregate Stability

We set out to examine the preference stability at the aggregate level. Overall, we find that stability is low, especially for time preferences. Figure 1 shows aggregate levels of time preferences in the short run (across spring and fall in 2011). In spring the impatience score averaged 4, meaning that respondents preferred 2000 SLL in two months over 500 SLL now. In fall average impatience dropped to just below 3 for the same participants. The error bars show that this difference is significant at the 95% confidence level.

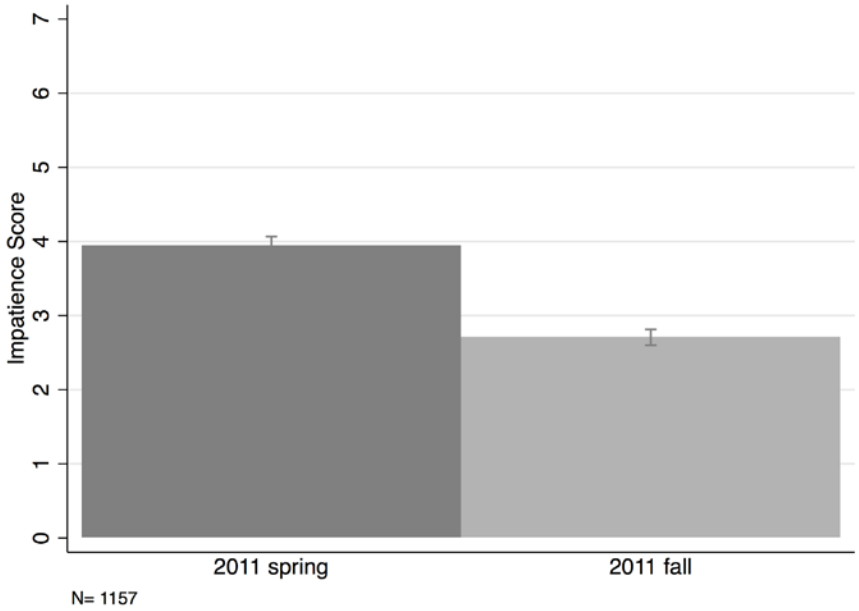

Figure 1: Aggregate Stability of Time Preferences

For aggregate social preferences the picture is less clear (Figure 2). The numbers in the bar show what percentage of people is classified as a certain group. In the short run (left panel) we have repeated observations for 1200 respondents, and in the long run (2011 spring to 2013 spring) we have about 800 repeated respondents. We see that the selfish group grows strongly in the short run, at the expense of the generous and other participants. In the long run (right panel) this effect is even more extreme. The selfish group nearly triples in size, while the generous group all but disappears. Inequality averse respondents remains stable, and those classified as other increase somewhat. Overall, we can say that time preferences exhibit high instability at the aggregate level, and to a lesser extent so do social preferences.

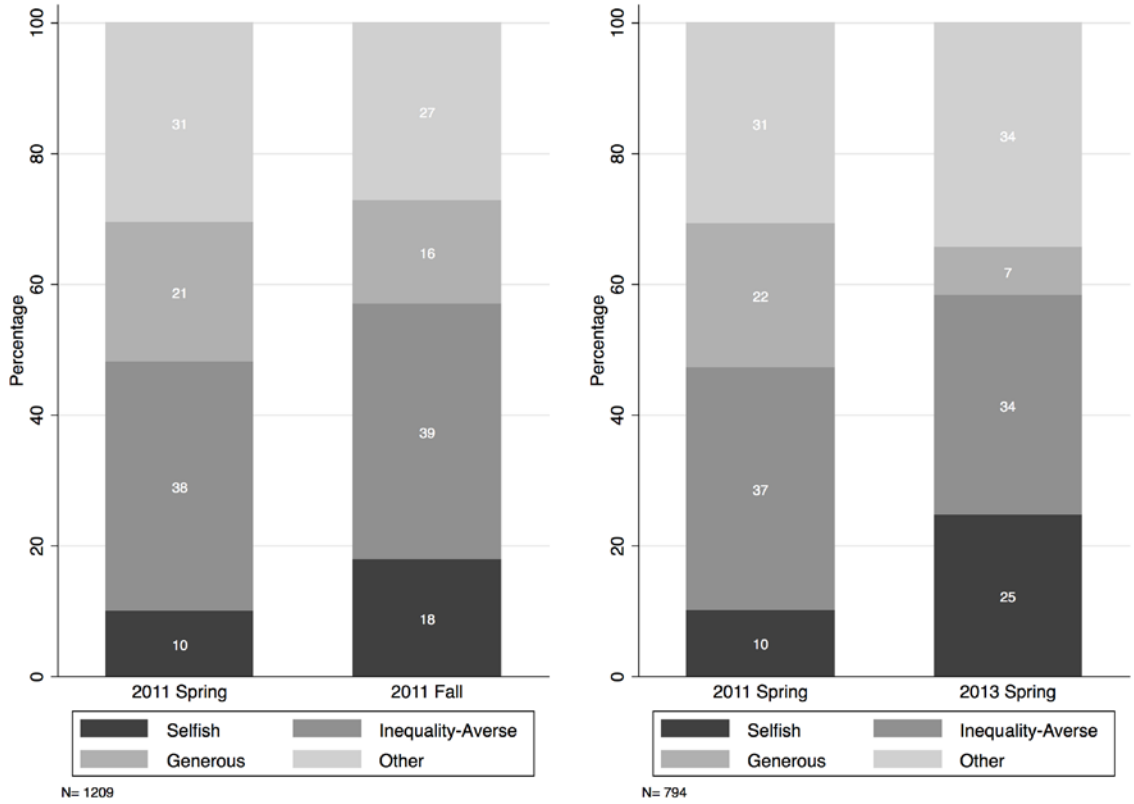

Figure 2: Aggregate Social Preferences, Short and Long Run

3.2 Individual Stability

Next, we turn to the individual level. A crude measure to examine this is to examine correlations of preferences across rounds. Positive and significant correlations point to stability. These results are shown in Table 3. We see that for time preferences the correlation coefficient is positive, but very low and insignificant. This contrasts the results by both Chuang and Schechter (2015) and Meier and Sprenger (2015), who find significant correlation coefficients around 0.4 for time preferences. The short run results for social preferences also show instability. All the correlation coefficients for the short run are very low, some are even negative. In no cases is the correlation significant. The same holds for the correlations in the long run. These results point to strong instability of preferences. However, correlations are a very crude way to measure this: it is not possible to control for situational

constraints. The next analysis allows for a more complete examination of stability of preferences.

Table 3: Correlations over time

	Short Run				Long Run			
	rho	SE	p-value	N	rho	SE	P-value	N
Time Preferences	0.024	0.054	0.662	1157				
Dummy Selfish	-0.012	0.024	0.614	1209	0.070	0.046	0.132	794
Dummy Generous	0.034	0.048	0.486	1209	-0.066	0.046	0.156	794
Dummy Inequality Averse	0.013	0.037	0.726	1209	0.032	0.046	0.485	794
Dummy Other	-0.008	0.033	0.808	1209	0.016	0.037	0.673	794

Robust standard errors clustered at the village level (# clusters=85 SR, 84 LR).
Weighted for probability to be sampled

To assess stability of choices more closely, we next examine the direction of changes in preferences. Figure 4 shows a histogram of the difference in impatience score. A value of zero means that the person has the exact same level of preferences, positive values mean a participant became more impatient, and vice versa. We see that about 25% of participants show completely stable preferences. Furthermore, the distribution is skewed to the left, implying that participants became more patient. These results differ from other studies. Meier and Sprenger (2015) find that about 50% of participants exhibit fully stable time preferences, and find no skewedness.

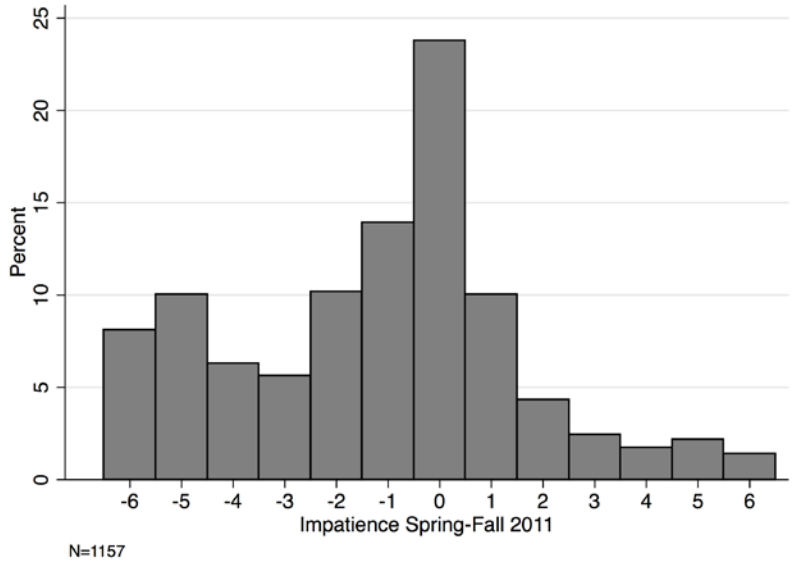

Figure 3: Short Run Individual changes in Time Preferences

To examine stability of preferences more precisely, we can also regress the difference in impatience score, on our level and changes in situational constraints. This approach is shown in model 1 and 2

$$\Delta \boldsymbol{Y}_i = \beta_0 + \beta_1 \boldsymbol{X}_i + \beta_2 \boldsymbol{Z}_i + \varepsilon_{ij} \quad (1)$$

$$\Delta \boldsymbol{Y}_i = \beta_0 + \beta_1 \boldsymbol{X}_i + \beta_2 \boldsymbol{Z}_i + \beta_3 \Delta \boldsymbol{Z}_i + \varepsilon_{ij} \quad (2)$$

The column vector $\mathbf{Y_i}$ contains our measures of stability. We examine the change in preferences, as shown by the Δ. $\mathbf{X_i}$ is a row vector of our control variables (age, gender, treatment dummies). $\mathbf{Z_i}$ is a row vector of the states of nature. These are added as level effects. For model 2, they are also added as difference values (Δ). Depending on the analysis, Δ can refer to the short run (6 months) or the long run (2 years). The coefficient of interest here is β_0. If the controls, level situational factors and changes in situational constraints do not capture enough of the change in preferences, β_0 will be significant which indicates instable preferences.

This is done in Table 4. Regression 1 only has level values of situational constraints. The constant is negative and very strongly significant. This reflects the reduction in impatience we have consistently found thus far. Regression 2 introduces changes in situational constraints. Only changes in public goods provision enter significantly: an increase in public goods provision lowers impatience. This makes sense if it can be assumed that a higher public goods provision decreases available time for leisure and work. It is puzzling that this is then not reflected in changes in income. The constant remains strongly significant and negative. Again, this contrasts with Meier and Sprenger (2015) who find an insignificant constant in a very similar regression. Like Meier and Sprenger (2015), we find no significant effect for age, sex or income. We can conclude that individual level time preferences exhibit high instability.

Table 4: Differences across rounds, Time Preferences Short Run

	(1) Δ Impatience	(2) Δ Impatience
Age	0.004 (0.009)	0.003 (0.009)
Sex (male=1)	0.061 (0.198)	0.148 (0.198)
Income	0.003 (0.129)	0.009 (0.175)
Social Capital	-0.064 (0.081)	-0.063 (0.154)
Public Goods	0.219 (0.136)	-0.020 (0.171)
Conflict	-0.015 (0.189)	0.210 (0.445)
Chief Quality	-0.120 (0.157)	-0.222 (0.361)
Δ Income		0.035 (0.137)
Δ Social Capital		-0.031 (0.149)
Δ Public Goods		-0.249** (0.124)
Δ Conflict		0.248 (0.420)
Δ Chief Quality		-0.113 (0.312)
Constant	-1.671*** (0.449)	-1.703*** (0.446)
Observations	1157	1157
Number of Clusters	85	85
Treatment Dummies	Yes	Yes

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Next, we examine social preferences. Figure 5 plots the changes in social preference classification. The left panel describes the short run changes (around 6 months), while the right panel shows long run changes (2 years). Because social preferences are not ordinal the difference values are hard to interpret, though a value of 0 still means stable preferences. We see that both in the short and long run around 30% of participants show stable preferences. While no preference stability study has measured social preferences in this way, Bartos (2015) uses a dictator game, which also examines allocation decisions, and also finds that

around 30% of participants displays identical preferences. Overall, preferences stability appears somewhat higher for social preferences than time preferences, and interestingly there are no differences between the short and long run.

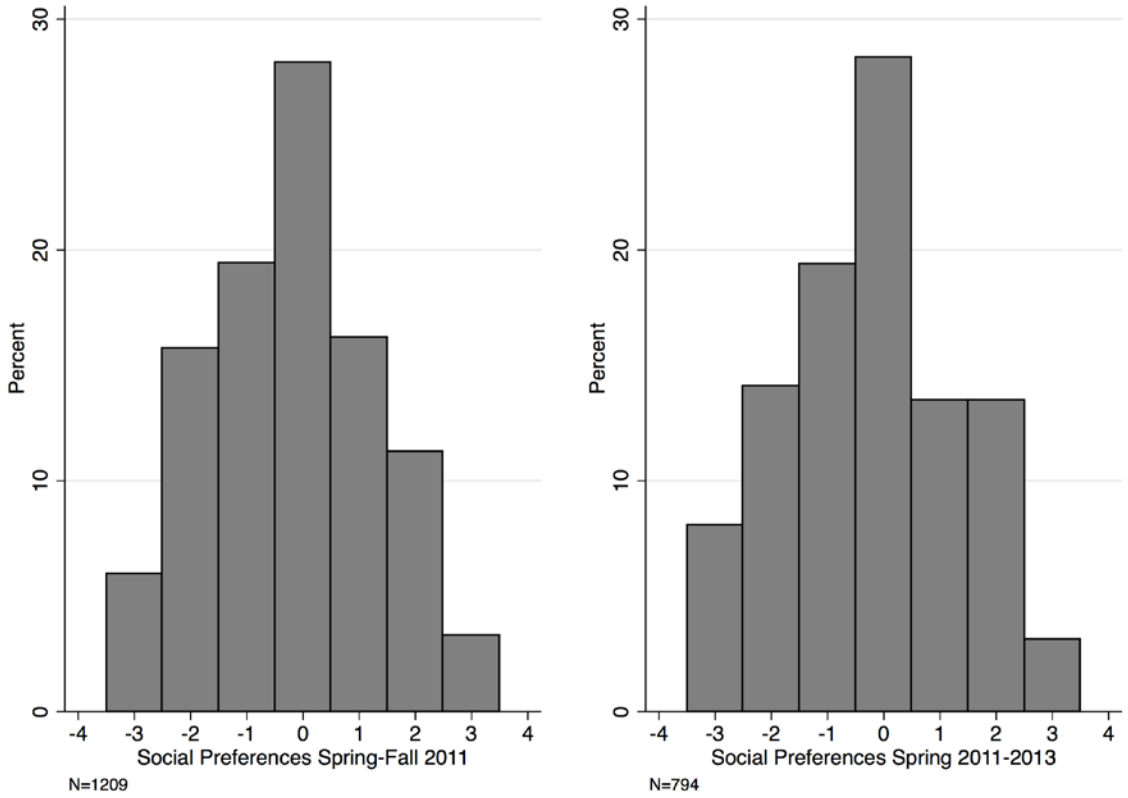

Figure 4: Individual changes in Social Preferences

To examine this more precisely we again use model 1 and 2. Overall, we find that social preferences are more stable, with the exception of generous participants in the long run. We first focus on table 5a, which shows the short run effects (6 months). The main dependent variable is difference in classification of one of the social types. A significant constant means a change in the classification. We see that the constant never enters significantly in table 5a, indicating that preferences have remained stable. While we see some isolated cases of level effects entering significantly, changes in situational constraints never have a significant effect.

Table 5b shows the same analysis for the long run (2 years). In regression 3 and 4 we see that the constant enters significant and negative for generous participants, meaning that generous participants have shifted preferences in the long run. Furthermore, in regression 4 we see that increases in income increase the likelihood to become generous. Increases in public goods provision and social capital decrease the likelihood to become generous, a puzzling result. It might be that high levels of social capital and public goods provision are governed by strong social norms, and that when these social norms are not present (as in our game), participants act differently. Changes in situational constraints are not sufficient to explain all changes in

generous classifications, as the constant still enters significant in regression 4. The other classifications (Selfish, Inequality Averse and Other) also display preferences stability in the long run. Overall, we see strong evidence that social preferences are more stable than time preferences, especially in the short run. In the long run only generous participants appear sensitive to changes in situational constraints.

Table 5a: Differences across rounds, Social Preferences Short Run

	(1) Δ Selfish	(2) Δ Selfish	(3) Δ Generous	(4) Δ Generous	(5) Δ Inequality Averse	(6) Δ Inequality Averse	(7) Δ Other	(8) Δ Other
Age	-0.001	-0.001	0.001	0.001	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Sex (male=1)	0.014	0.010	0.013	0.010	-0.038	-0.029	0.011	0.009
	(0.032)	(0.033)	(0.041)	(0.043)	(0.049)	(0.050)	(0.051)	(0.053)
Income	-0.009	0.002	-0.011	0.030	0.037	0.001	-0.017	-0.033
	(0.019)	(0.033)	(0.022)	(0.036)	(0.032)	(0.046)	(0.031)	(0.036)
Social Capital	-0.014	-0.053	-0.016	-0.020	-0.009	0.033	0.039	0.041
	(0.016)	(0.034)	(0.017)	(0.030)	(0.031)	(0.050)	(0.031)	(0.039)
Public Goods	-0.044*	-0.037	0.055***	0.034	0.018	0.010	-0.029	-0.007
	(0.026)	(0.040)	(0.020)	(0.028)	(0.026)	(0.034)	(0.024)	(0.032)
Conflict	0.012	-0.019	0.011	0.009	-0.026	0.060	0.004	-0.050
	(0.032)	(0.088)	(0.029)	(0.087)	(0.033)	(0.119)	(0.049)	(0.116)
Chief Quality	-0.040	0.002	0.005	-0.002	0.042	-0.005	-0.007	0.004
	(0.024)	(0.067)	(0.024)	(0.064)	(0.031)	(0.085)	(0.034)	(0.082)
Δ Income		0.010		0.054		-0.042		-0.022
		(0.025)		(0.034)		(0.041)		(0.022)
Δ Social Capital		-0.041		-0.012		0.046		0.007
		(0.029)		(0.025)		(0.038)		(0.028)
Δ Public Goods		0.004		-0.021		-0.009		0.025
		(0.029)		(0.022)		(0.027)		(0.021)
Δ Conflict		-0.017		-0.005		0.085		-0.063
		(0.077)		(0.075)		(0.108)		(0.089)
Δ Chief Quality		0.038		-0.005		-0.046		0.013
		(0.060)		(0.054)		(0.079)		(0.063)
Constant	0.129*	0.125*	-0.075	-0.065	0.010	-0.002	-0.064	-0.059
	(0.067)	(0.067)	(0.063)	(0.065)	(0.118)	(0.122)	(0.093)	(0.095)
Observations	1209	1209	1209	1209	1209	1209	1209	1209
Number of Clusters	85	85	85	85	85	85	85	85
Treatment Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table 5b: Differences across rounds. Social Preferences Long Run

	(1) Δ Selfish	(2) Δ Selfish	(3) Δ Generous	(4) Δ Generous	(5) Δ Inequality Averse	(6) Δ Inequality Averse	(7) Δ Other	(8) Δ Other
Age	-0.001	-0.000	0.002	0.002	-0.002	-0.001	0.000	0.000
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Sex (male=1)	0.029	0.026	0.019	0.020	-0.030	-0.029	-0.017	-0.017
	(0.040)	(0.040)	(0.047)	(0.048)	(0.058)	(0.061)	(0.057)	(0.061)
Income	0.002	-0.014	-0.045*	0.127**	0.029	0.029	0.015	-0.143
	(0.023)	(0.121)	(0.025)	(0.063)	(0.044)	(0.135)	(0.034)	(0.159)
Social Capital	-0.028	-0.022	0.011	-0.100**	0.028	0.035	-0.011	0.087
	(0.022)	(0.061)	(0.025)	(0.043)	(0.039)	(0.073)	(0.032)	(0.079)
Public Goods	-0.037	-0.064	-0.012	-0.106**	0.019	-0.004	0.031	0.174*
	(0.031)	(0.073)	(0.026)	(0.050)	(0.033)	(0.093)	(0.031)	(0.104)
Conflict	0.048*	0.078	-0.001	0.017	-0.026	0.055	-0.022	-0.150*
	(0.026)	(0.078)	(0.031)	(0.062)	(0.040)	(0.104)	(0.031)	(0.082)
Chief Quality	-0.057*	-0.045	0.006	-0.005	0.073	0.067	-0.022	-0.017
	(0.032)	(0.034)	(0.037)	(0.036)	(0.046)	(0.051)	(0.037)	(0.044)
Δ Income		-0.017		0.180**		-0.001		-0.162
		(0.119)		(0.070)		(0.135)		(0.157)
Δ Social Capital		0.011		-0.118***		0.009		0.098
		(0.061)		(0.039)		(0.061)		(0.076)
Δ Public Goods		-0.030		-0.093**		-0.024		0.147
		(0.069)		(0.043)		(0.087)		(0.100)
Δ Conflict		0.025		0.013		0.080		-0.118
		(0.072)		(0.058)		(0.094)		(0.077)
Δ Chief Quality		0.027		-0.015		-0.001		-0.012
		(0.021)		(0.018)		(0.024)		(0.024)
Constant	0.157*	0.145	-0.225**	-0.218**	-0.027	-0.034	0.095	0.107
	(0.093)	(0.090)	(0.098)	(0.094)	(0.085)	(0.087)	(0.082)	(0.087)
Observations	794	794	794	794	794	794	794	794
Number of Clusters	84	84	84	84	84	84	84	84
Treatment Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

3.3 Robustness

To examine the stability of these results, we do several robustness checks. First, we investigate if attrition is non-random. Second, we see if our results are driven by the time of

the year that our surveys were taken. Third, we test for learning effects. Finally, we see if varying the calculation of our situational constraints affects the results.

3.3.1. Attrition

A common problem with panel studies is attrition as respondents drop out of the study sample. This can be problematic if attrition is correlated with individual characteristics and as a result bias the estimates of interest. To examine this, we do an analysis to see if the people that dropped out had particular individual characteristics, using a probit regression (Fitzgerald et al, 1998). The dependent variable for all these analyses is 1 if a person dropped out of the study after the first visit. These results are shown in Table 6. The first form of attrition we examine is the short run, shown in Column 1. About a third of participants we interviewed in 2011 spring were absent during the fall. Older participants and those with a higher social capital were more likely to be present. In Column 2 we add our variables of interest: the preference variables. We see no differences in the initial level of preferences for returnees and non-returnees. For the long run (column 3) attrition is even higher, at almost 50%. Again age and social capital are correlated with attrition. Furthermore, those with a higher public goods provision are also more likely to drop out. We again see no relation to our variables of interest. In our analysis we dropped all participants who were non-monotonic in their time preferences. Only 3% of participants was non-monotonic, indicating high understanding of the game. We cannot predict non-monotonicity using observable characteristics.

While it is reassuring that there are no clear selection effects on the initial values of our variables of interest, we cannot be certain that the group of non-returnees would display similar *dynamics* in our variables of interest. Since there is no way to test for this, we cannot confidently extrapolate our results out of sample. It is therefore not certain if our results also apply in other environments.

Table 6: Sources of Attrition

	(1) Attrition Short run	(2) Attrition Short run	(3) Attrition Long Run	(4) Attrition Long run	(5) Attrition Non-Monotonicity
Age	-0.005**	-0.005**	-0.006**	-0.005**	-0.005
	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)
Sex (male=1)	-0.098	-0.089	-0.041	-0.032	-0.041
	(0.074)	(0.073)	(0.062)	(0.065)	(0.137)
Income	0.023	0.021	-0.017	-0.014	-0.101
	(0.016)	(0.016)	(0.014)	(0.014)	(0.064)
Social Capital	-0.050**	-0.047**	0.040***	0.036***	0.063
	(0.022)	(0.021)	(0.015)	(0.014)	(0.057)
Public Goods	0.015	0.016	0.139**	0.126**	0.077
	(0.062)	(0.061)	(0.059)	(0.057)	(0.066)
Conflict	0.007	0.023	-0.096	-0.105*	0.015
	(0.059)	(0.060)	(0.063)	(0.062)	(0.078)
Chief Quality	-0.045	-0.064	-0.005	0.015	-0.020
	(0.111)	(0.108)	(0.072)	(0.070)	(0.128)

Impatience score		-0.013 (0.017)		0.000 (0.018)	
Selfish (yes=1)		-0.238 (0.156)		-0.173 (0.113)	
Generous (yes=1)		-0.158 (0.100)		-0.132 (0.102)	
Inequality Averse (yes=1)		-0.126 (0.088)		-0.097 (0.081)	
Constant	-0.062 (0.140)	0.084 (0.196)	0.553*** (0.111)	0.604*** (0.157)	-1.762*** (0.255)
Percentage Attrited	0.33		0.48		0.031
Observations	2077	2005	2077	2005	2068
Number of Clusters	90	90	90	90	90

Probit regression. Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

3.3.2. Calendar effects

For the short run analysis, data was collected at different points in the year (spring and fall). Any changes we might find could be caused by the context at that time in the year. To see if there are any such calendar effects, we can exploit the fact that data collection for round 1 took about a month. We can see if our variables of interest vary over time. These results are displayed in table 7. We only find that the likelihood to be classified as Other decreases as time passes. While it is strongly significant, the magnitude of the effect is very low. The number of observations for this analysis is much higher because we can look at all participants who were present in 2011 spring, which increases the chance we find an effect. We conclude that there is no evidence that our results are driven by calendar effects.

Table 7: Calendar effects

	(1) Time Preferences	(2) Selfish	(3) Generous	(4) Inequality Averse	(5) Other
Days since first day of data collection	0.019 (0.031)	-0.000 (0.005)	0.003 (0.005)	0.009 (0.008)	-0.012** (0.005)
Days since first day of data collection^2	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Constant	3.513*** (0.186)	0.132*** (0.036)	0.167*** (0.026)	0.273*** (0.056)	0.428*** (0.031)
Observations	2020	2061	2061	2061	2061
Number of Clusters	90	90	90	90	90

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled.

* p < 0.10, ** p < 0.05, *** p < 0.01.

3.3.3. Learning Effects and Trust in Researcher

It might also be the case that any instability of preferences is caused by participants understanding the game better in the second round, which changes their results and will appear to indicate instability of preferences. To see if this is a problem, we can compare the results of returnees with new participants in round 2. Since this is again a cross-sectional approach we can exploit a higher number of observations, increasing power. Differences we find between these groups can be attributed to the fact that returnees already know the game: 'learning effects'. We examine this in Table 8. We find no strong learning effects. Table 8a shows the short run effects. There are no significant differences between returnees and new participants in the short run, as the new participant variable never enters significantly. Table 8b shows the long run effect. In regression 1 we see that new participants were less likely to be selfish. It is strange that learning effects were not present in the short run but they do show up in the long run. It is possible that it is simply a statistical fluke. Regardless, the result would only be worrying if we would have found that selfish respondents were instable in their preferences. They are not.

Another way to read these are results are in terms of researcher reliability. It could in part be attributed to that participants trusted our research team more in later visits, as they had seen that payment actually took place. In the case of time preferences, this would lead to more patient answers, as they knew that the later pay-out would actually take place. This matches our findings: in the short run participants did become more patient. We can examine this effect because new participants should trust the research team less as well. While it might be that tales of our reliability spread within the village and new participants thus already trusted us more, this is not very likely. Since we did not find any differences across new and returning participants, we are reasonably confident that higher trust in our research team does not drive the results.

Table 8a: Learning effects Short Run

	(1) Time Preferences	(2) Selfish	(3) Generous	(4) Inequality Averse	(5) Other
New Participant (Yes=1)	-0.096 (0.180)	-0.156 (0.314)	-0.033 (0.217)	0.038 (0.162)	0.083 (0.152)
Constant	2.671*** (0.081)	-1.563*** (0.112)	-1.642*** (0.111)	-0.380*** (0.104)	-1.053*** (0.076)
Observations	1939	1979	1979	1979	1979
Number of Clusters	89	89	89	89	89

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table 8b: Learning effects Long Run

	(1) Selfish	(2) Generous	(3) Inequality Averse	(4) Other
New Participant (yes=1)	-0.527** (0.230)	0.489 (0.323)	-0.008 (0.209)	0.192 (0.158)
Constant	-1.130*** (0.137)	-2.549*** (0.153)	-0.736*** (0.109)	-0.578*** (0.098)
Observations	1371	1371	1371	1371
Number of Clusters	87	87	87	87

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

3.3.4. Calculating situational constraints

Situational constraints are generally considered very important when examining stability of preferences. We calculated factors combining several variables using the Confirmatory Factor Analysis approach. To ensure that the results we find are not driven by how we estimated our situational constraints, we consider two alternative approaches here. The first is a user-written program in Stata called WMEANEFFECTS. It linearly combines variables into factors. The second approach is to forgo factorisation altogether, and simply enter all variables separately. This might lead to high levels of collinearity, and lowers the statistical power.

To save space these tables are in the appendix. Table A1 and A2 mirror tables 4 and 5, but now use WMEANEFFECTS instead of Confirmatory Factor Analysis. The results are very similar. The significance and direction of the constant does not change. There are some small changes in what factors enter significantly, but the sign is the same in all cases. Overall, the alternative approach does not lead to new conclusions. Next, we examine the results when we drop factorisation altogether. This is shown in table A3 and A4, which again mirror table 4 and 5. Table A3 and A4 also report the Variance Inflation Factors (VIF), a measure for collinearity, for the most collinear variable. VIFs larger than 5 are considered problematic. We see that collinearity is not as large of a problem as we expected. However, interpretation of results is much easier when expressed in terms of factors, so we stuck to it for our main effects. While we cannot compare the significance values of the individual values, we can look at the overall conclusion by comparing the values of the constant. The conclusion remains the same: time preferences are instable in the short run, social preferences are stable in the short and long run, except for generous participants in the long run.

Some caveats remain. While we have extensive data on situational constraints, we were not able to control for all relevant factors. For example, agricultural shocks, the availability of credit and diseases are all likely to affect preference stability. Because of data limitations it is not possible to control for these factors. It might be that when controlling more extensively for situational constraints the significant change in preferences goes away. However, we find

this somewhat unlikely. Our situational constraints control for a very broad range of variables, but their predictive power is limited. Analogously, more situational constraints would probably have only limited predictory power as well.

4. Conclusion

In order to effectively predict the effects of economic policy, a key assumption is the stability of preferences. Especially in a developing country context, where situational constraints have considerably higher variation, understanding the interaction between situational constraints and behaviour is crucial. In a large scale study in Eastern Sierra Leone where we control the consistency of experimental methods, we find that time preferences display high levels of instability in the short run (6 months) at the individual level. Social preferences, on the other hand, display very high levels of stability, especially in the short run, and less so in the long run (2 years). Interestingly, preference stability cannot be predicted using changes in situational constraints such as Income, Social Capital, Public Goods Provision, Conflict and Chief Quality. This implies that preferences are not governed by changes in situational constraints, at least in the current context.

These results contrast earlier work on the topic. Preference stability at the aggregate and individual level is much higher in almost all studies (Meier and Sprenger, 2015; Anderson et al, 2008; Volk et al, 2012). However, most of this research has been done in a WEIRD context (Western, Educated, Industrialized, Rich, Democratic) (Henrich et al, 2010). Our sample differs strongly: respondents are poor, rural and subject to large environmental changes. The assumption that preferences are stable does not appear to hold in a non-WEIRD context, at least for time preferences. Conventional economic models that assume preference stability might be useful in a WEIRD context, but less so otherwise. Additional empirical work in non-WEIRD contexts is required to verify that time preferences are instable. If that conclusion remains, more theoretical work that explicitly deals with instable preferences is necessary.

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6. Appendix

	*Please choose between the following two options, how you want money to be allocated to you **and somebody else in the village**:*			
	Option A		Option B	
	You get:	Other gets:	You get:	Other gets:
1	1,000 Le	1,000 Le	1,000 Le	2,000 Le
2	2,000 Le	0 Le	1,000 Le	1,000 Le
3	1,000 Le	0 Le	1,000 Le	1,000 Le
4	2,000 Le	3,000 Le	1,000 Le	1,000 Le

Figure A1: Allocation Questions

Table A1: Differences across rounds, Time Preferences Short Run. Alternative factorisation

	(1) Δ Time Preferences	(2) Δ Time Preferences
Age	0.004 (0.009)	0.003 (0.009)
Sex (male=1)	0.019 (0.198)	0.096 (0.198)
Treatment 1	0.564* (0.291)	0.575** (0.287)
Treatment 2	0.447 (0.311)	0.518 (0.314)
Treatment 3	0.325 (0.358)	0.326 (0.356)
Income	0.106 (0.110)	0.119 (0.147)
Social Capital	-0.088 (0.094)	-0.134 (0.112)
Public Goods	0.154 (0.116)	-0.028 (0.153)
Conflict	0.032 (0.118)	0.112 (0.149)
Chief Quality	-0.130 (0.099)	-0.150 (0.129)
Δ Income		0.029 (0.107)

Δ Social Capital		-0.070 (0.099)
Δ Public Goods		-0.182* (0.098)
Δ Conflict		0.098 (0.130)
Δ Chief Quality		-0.034 (0.101)
Constant	-1.650*** (0.459)	-1.586*** (0.465)
Observations	1157	1157
Number of Clusters	85	85

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled. Factors calculated using the program WMEANEFFECTS

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A2a: Differences across rounds, Social Preferences Short Run. Alternative Factorisation

	(1) Selfish	(2) Selfish	(3) Generous	(4) Generous	(5) Inequality Averse	(6) Inequality Averse	(7) Other	(8) C
Age	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0 (0
Sex (male=1)	0.017 (0.033)	0.013 (0.033)	0.008 (0.041)	0.002 (0.043)	-0.035 (0.045)	-0.025 (0.046)	0.011 (0.047)	0 (0
Treatment 1	-0.003 (0.058)	-0.009 (0.054)	-0.032 (0.048)	-0.040 (0.047)	0.013 (0.093)	0.021 (0.092)	0.022 (0.075)	0 (0
Treatment 2	-0.029 (0.064)	-0.030 (0.062)	-0.047 (0.044)	-0.054 (0.045)	-0.005 (0.113)	0.009 (0.114)	0.081 (0.081)	0 (0
Treatment 3	-0.155** (0.067)	-0.146** (0.065)	-0.025 (0.061)	-0.029 (0.057)	0.136 (0.132)	0.140 (0.130)	0.045 (0.080)	0 (0
Income	-0.010 (0.020)	0.006 (0.027)	-0.009 (0.020)	0.037 (0.026)	0.025 (0.029)	-0.007 (0.035)	-0.006 (0.026)	-0 (0
Social Capital	-0.023 (0.021)	-0.061** (0.027)	-0.031 (0.026)	-0.035 (0.028)	0.016 (0.040)	0.034 (0.048)	0.038 (0.043)	0 (0
Public Goods	-0.038 (0.023)	-0.034 (0.030)	0.051*** (0.017)	0.038 (0.025)	0.019 (0.025)	0.003 (0.029)	-0.031 (0.021)	-0 (0
Conflict	-0.019 (0.021)	-0.012 (0.032)	0.016 (0.019)	0.003 (0.032)	0.006 (0.021)	0.019 (0.038)	-0.002 (0.029)	-0 (0
Chief Quality	-0.024 (0.018)	0.002 (0.028)	0.007 (0.015)	-0.000 (0.020)	0.016 (0.025)	0.034 (0.029)	0.000 (0.020)	-0 (0
Δ Income		0.020 (0.019)		0.060** (0.024)		-0.039 (0.032)		-0 (0

Δ Social Capital		-0.043**		-0.011		0.024		0
		(0.020)		(0.016)		(0.025)		(
Δ Public Goods		0.003		-0.012		-0.019		0
		(0.020)		(0.018)		(0.020)		(
Δ Conflict		0.018		-0.011		0.013		-(
		(0.022)		(0.025)		(0.032)		(
Δ Chief Quality		0.027		-0.008		0.021		-(
		(0.021)		(0.016)		(0.024)		(
Constant	0.129*	0.134*	-0.072	-0.040	0.009	-0.009	-0.065	-(
	(0.069)	(0.071)	(0.064)	(0.070)	(0.122)	(0.126)	(0.096)	(
Observations	1209	1209	1209	1209	1209	1209	1209	1
Number of Clusters	85	85	85	85	85	85	85	8

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled.
Factors calculated using the program WMEANEFFECTS

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A2b: Differences across rounds. Social Preferences Long Run. Alternative Factorisation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8
	Selfish	Selfish	Generous	Generous	Inequality Averse	Inequality Averse	Other	C
Age	-0.001	-0.000	0.002	0.002	-0.002	-0.002	0.001	0
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(
Sex (male=1)	0.024	0.023	0.010	0.009	-0.010	-0.013	-0.024	-(
	(0.041)	(0.041)	(0.048)	(0.049)	(0.059)	(0.062)	(0.056)	(
Treatment 1	0.064	0.068	-0.031	-0.041	0.052	0.054	-0.085	-(
	(0.100)	(0.099)	(0.077)	(0.073)	(0.100)	(0.100)	(0.084)	(
Treatment 2	-0.029	-0.024	0.034	0.037	0.094	0.098	-0.098	-(
	(0.083)	(0.083)	(0.075)	(0.073)	(0.079)	(0.078)	(0.063)	(
Treatment 3	-0.083	-0.068	-0.057	-0.064	0.073	0.084	0.067	0
	(0.092)	(0.091)	(0.077)	(0.075)	(0.090)	(0.092)	(0.107)	(
Income	0.010	0.009	-0.023	-0.002	-0.011	-0.011	0.024	0
	(0.023)	(0.029)	(0.021)	(0.020)	(0.039)	(0.042)	(0.028)	(
Social Capital	-0.046	-0.030	-0.008	-0.079*	0.073	0.087	-0.018	0
	(0.029)	(0.044)	(0.035)	(0.040)	(0.048)	(0.065)	(0.041)	(
Public Goods	-0.025	-0.048*	-0.011	-0.012	0.015	0.001	0.022	0
	(0.024)	(0.026)	(0.020)	(0.028)	(0.028)	(0.043)	(0.026)	(
Conflict	0.009	0.040	-0.008	-0.000	0.018	0.061	-0.019	-(
	(0.012)	(0.042)	(0.017)	(0.032)	(0.017)	(0.052)	(0.014)	(
Chief Quality	-0.027	-0.021	0.021	0.019	0.004	0.004	0.003	-(
	(0.026)	(0.027)	(0.024)	(0.025)	(0.030)	(0.034)	(0.026)	(
Δ Income		-0.004		0.027**		-0.003		-(

		(0.018)		(0.011)		(0.022)		(0
Δ Social Capital		0.023 (0.037)		-0.076** (0.030)		0.019 (0.041)		0 (0
Δ Public Goods		-0.024 (0.015)		0.001 (0.020)		-0.016 (0.033)		0 (0
Δ Conflict		0.032 (0.038)		0.004 (0.026)		0.045 (0.050)		-0 (0
Δ Chief Quality		0.015 (0.013)		-0.006 (0.011)		0.006 (0.015)		-0 (0
Constant	0.161* (0.094)	0.149 (0.094)	-0.221** (0.098)	-0.219** (0.093)	-0.031 (0.084)	-0.035 (0.082)	0.091 (0.080)	0 (0
Observations	794	794	794	794	794	794	794	7
Number of Clusters	84	84	84	84	84	84	84	8

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled.
Factors calculated using the program WMEANEFFECTS

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A3: Differences across rounds, Time Preferences Short Run. No factorisation

	(1) Time Preferences	(2) Time Preferences
1 is_age	0.005 (0.009)	0.005 (0.008)
1 is_sex	0.082 (0.207)	0.162 (0.202)
treat2	0.567* (0.288)	0.578** (0.280)
treat3	0.446 (0.291)	0.521* (0.297)
treat4	0.342 (0.355)	0.326 (0.353)
1 is_hrswrk	0.079** (0.039)	0.082 (0.070)
1 is_bshlhrvst	-0.007 (0.022)	-0.008 (0.025)
1 is_youshare	-0.089 (0.071)	-0.091 (0.081)
1 is_theyshare	0.080 (0.075)	0.067 (0.085)
1 is_meetyn	-0.417	-0.062

	(0.326)	(0.522)
1 is_hlpchf	-0.096*	-0.101
	(0.052)	(0.072)
1 is_cmpln_chf	-0.011	-0.039
	(0.063)	(0.124)
1 is_plv_ohh	-0.095	-0.045
	(0.095)	(0.139)
1 is_plv_ownhh	0.005	0.012
	(0.085)	(0.100)
1 is_plv_lead	0.130	0.150
	(0.181)	(0.287)
1 is_fights	0.042	0.110
	(0.084)	(0.231)
1 is_work_cp	0.063	0.071
	(0.046)	(0.062)
1 is_no_mtngs	0.033	-0.054
	(0.037)	(0.042)
is_hrswrk_dift2t1		0.008
		(0.053)
is_bshlhrvst_dift2t1		0.003
		(0.021)
is_youshare_dift2t1		-0.012
		(0.031)
is_theyshare_dift2t1		-0.015
		(0.047)
is_meetyn_dift2t1		0.373
		(0.420)
is_hlpchf_dift2t1		-0.008
		(0.053)
is_cmpln_chf_dift2t1		-0.028
		(0.097)
is_plv_ohh_dift2t1		0.043
		(0.112)
is_plv_ownhh_dift2t1		0.019
		(0.079)
is_plv_lead_dift2t1		0.055
		(0.231)
is_fights_dift2t1		0.064
		(0.218)
is_work_cp_dift2t1		0.004
		(0.035)
is_no_mtngs_dift2t1		-0.087***
		(0.031)
Constant	-1.817***	-1.905***
	(0.442)	(0.581)

Most Collinear Value	is_youshare1	is_fights_dift2t1
VIF value	2.309	4.714
Observations	1157	1157
Number of Clusters	85	85

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A4a: Differences across rounds, Social Preferences Short Run. No Factorisation

	(1) Selfish	(2) Selfish	(3) Generous	(4) Generous	(5) Inequality Averse	(6) Inequality Averse	(7) Other	(8) O
1 is_age	-0.001	-0.001	0.001	0.001	-0.000	0.000	-0.000	-0
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0
1 is_sex	0.013	0.015	0.011	0.009	-0.038	-0.030	0.013	0
	(0.032)	(0.032)	(0.040)	(0.042)	(0.047)	(0.047)	(0.050)	(0
treat2	0.005	-0.004	-0.041	-0.048	0.035	0.040	0.001	0
	(0.056)	(0.049)	(0.050)	(0.049)	(0.092)	(0.089)	(0.077)	(0
treat3	-0.032	-0.038	-0.050	-0.054	0.008	0.024	0.075	0
	(0.063)	(0.061)	(0.045)	(0.046)	(0.114)	(0.113)	(0.085)	(0
treat4	-0.151**	-0.143**	-0.030	-0.037	0.148	0.155	0.033	0
	(0.067)	(0.063)	(0.059)	(0.056)	(0.130)	(0.125)	(0.082)	(0
1 is_hrswrk	-0.001	0.016*	-0.000	0.024**	0.000	-0.018	0.001	-0
	(0.008)	(0.009)	(0.007)	(0.010)	(0.011)	(0.014)	(0.012)	(0
1 is_bshlhrvst	-0.001	-0.003	-0.002	-0.001	0.006	0.005	-0.003	-0
	(0.003)	(0.004)	(0.003)	(0.005)	(0.005)	(0.007)	(0.005)	(0
1 is_youshare	-0.023**	-0.024**	-0.004	-0.010	-0.015	-0.019	0.042***	0
	(0.010)	(0.012)	(0.013)	(0.014)	(0.016)	(0.017)	(0.013)	(0
1 is_theyshare	0.015	-0.000	-0.008	-0.001	0.025	0.034	-0.031	-0
	(0.012)	(0.017)	(0.015)	(0.017)	(0.019)	(0.023)	(0.020)	(0
1 is_meetyn	0.017	-0.078	0.053	0.106	0.003	0.079	-0.073	-0
	(0.047)	(0.123)	(0.046)	(0.138)	(0.078)	(0.139)	(0.073)	(0
1 is_hlpchf	0.007	0.016	0.002	-0.001	-0.012	0.005	0.003	-0
	(0.012)	(0.016)	(0.008)	(0.011)	(0.018)	(0.019)	(0.015)	(0
1 is_cmpln_chf	-0.031***	-0.028*	0.004	-0.003	0.027	0.001	0.000	0
	(0.010)	(0.016)	(0.012)	(0.022)	(0.017)	(0.026)	(0.017)	(0
1 is_plv_ohh	0.054***	0.047**	0.009	0.022	-0.027	0.008	-0.036	-0
	(0.017)	(0.023)	(0.018)	(0.024)	(0.018)	(0.030)	(0.024)	(0

1 is_plv_ownhh	-0.017 (0.014)	-0.013 (0.026)	0.011 (0.014)	-0.003 (0.018)	-0.014 (0.018)	-0.012 (0.025)	0.020 (0.018)	0 (
1 is_plv_lead	-0.054 (0.033)	-0.032 (0.048)	0.021 (0.039)	0.030 (0.045)	0.046 (0.043)	-0.008 (0.076)	-0.013 (0.028)	0 (
1 is_fights	-0.044** (0.019)	-0.036 (0.038)	-0.030* (0.018)	-0.068* (0.034)	0.043** (0.018)	0.109** (0.055)	0.032 (0.026)	- (
1 is_work_cp	-0.005 (0.008)	-0.006 (0.010)	0.004 (0.008)	0.003 (0.011)	0.004 (0.011)	-0.002 (0.012)	-0.003 (0.008)	0 (
1 is_no_mtngs	-0.009 (0.007)	-0.005 (0.011)	0.014** (0.006)	0.010 (0.009)	0.003 (0.007)	0.004 (0.010)	-0.008 (0.006)	- (
is_hrswrk_dift2t1		0.020*** (0.006)		0.029*** (0.009)		-0.021* (0.011)		- (
is_bshlhrvst_dift2t1		-0.003 (0.003)		0.002 (0.005)		-0.001 (0.005)		0 (
is_youshare_dift2t1		-0.001 (0.006)		-0.005 (0.006)		-0.004 (0.007)		0 (
is_theyshare_dift2t1		-0.016 (0.011)		0.004 (0.007)		0.011 (0.013)		0 (
is_meetyn_dift2t1		-0.085 (0.126)		0.062 (0.123)		0.060 (0.130)		- (
is_hlpchf_dift2t1		0.011 (0.009)		-0.003 (0.009)		0.023** (0.011)		- (
is_cmpln_chf_dift2t1		0.003 (0.014)		-0.007 (0.016)		-0.025 (0.018)		0 (
is_plv_ohh_dift2t1		-0.006 (0.016)		0.013 (0.016)		0.036 (0.022)		- (
is_plv_ownhh_dift2t1		0.008 (0.016)		-0.015 (0.015)		0.003 (0.019)		0 (
is_plv_lead_dift2t1		0.036 (0.038)		0.015 (0.033)		-0.074 (0.067)		0 (
is_fights_dift2t1		0.011 (0.030)		-0.036 (0.028)		0.063 (0.056)		- (
is_work_cp_dift2t1		-0.001 (0.006)		-0.002 (0.007)		-0.009 (0.007)		0 (
is_no_mtngs_dift2t1		0.004 (0.009)		-0.003 (0.009)		0.002 (0.007)		- (
Constant	0.214** (0.095)	0.241 (0.166)	-0.144 (0.087)	-0.276* (0.162)	-0.077 (0.136)	-0.094 (0.170)	0.008 (0.132)	0 (
Most Collinear Value	is_theyshare1	is_fights_dift 2t1	is_theyshare1	is_fights_dift 2t1	is_theyshare1	is_fights_dift 2t1	is_theyshare1	is 2

VIF value	2.311	4.476	2.311	4.476	2.311	4.476	2.311	4
Observations	1209	1209	1209	1209	1209	1209	1209	1
Number of Clusters	85	85	85	85	85	85	85	8

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A4b: Differences across rounds. Social Preferences Long Run. No Factorisation

	(1) Selfish	(2) Selfish	(3) Generous	(4) Generous	(5) Inequality Averse	(6) Inequality Averse	(7) Other	(8) O
1 is_age	-0.000	-0.000	0.002	0.002	-0.002	-0.002	0.000	-0
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0
1 is_sex	0.017	0.020	0.018	0.012	-0.015	-0.013	-0.021	-0
	(0.042)	(0.040)	(0.047)	(0.048)	(0.060)	(0.063)	(0.059)	(0
treat2	0.065	0.061	-0.025	-0.035	0.049	0.064	-0.089	-0
	(0.095)	(0.090)	(0.080)	(0.076)	(0.099)	(0.097)	(0.086)	(0
treat3	-0.031	-0.030	0.037	0.041	0.082	0.093	-0.087	-0
	(0.079)	(0.076)	(0.073)	(0.070)	(0.075)	(0.073)	(0.063)	(0
treat4	-0.093	-0.085	-0.061	-0.061	0.091	0.093	0.063	0
	(0.090)	(0.087)	(0.077)	(0.074)	(0.087)	(0.087)	(0.105)	(0
1 is_hrswrk	0.006	-0.003	0.005	0.015	-0.017	-0.029	0.007	0
	(0.010)	(0.014)	(0.009)	(0.012)	(0.014)	(0.018)	(0.011)	(0
1 is_bshlhrvst	0.001	0.003	-0.008*	-0.007*	0.005	0.007	0.003	-0
	(0.004)	(0.005)	(0.004)	(0.004)	(0.007)	(0.007)	(0.005)	(0
1 is_youshare	-0.012	-0.019	-0.017	-0.005	0.016	-0.012	0.013	0
	(0.015)	(0.020)	(0.014)	(0.023)	(0.018)	(0.023)	(0.016)	(0
1 is_theyshare	-0.008	0.005	0.016	-0.026	0.011	0.054*	-0.020	-0
	(0.017)	(0.023)	(0.017)	(0.025)	(0.022)	(0.030)	(0.025)	(0
1 is_meetyn	0.006	-0.013	0.048	0.075	-0.104	0.037	0.050	-0
	(0.061)	(0.135)	(0.073)	(0.156)	(0.063)	(0.168)	(0.085)	(0
1 is_hlpchf	0.005	0.004	0.017	0.019	-0.040***	-0.040**	0.017	0
	(0.016)	(0.016)	(0.013)	(0.015)	(0.013)	(0.019)	(0.014)	(0
1 is_cmpln_chf	-0.037**	-0.032*	-0.001	-0.002	0.054***	0.053**	-0.016	-0
	(0.018)	(0.018)	(0.017)	(0.016)	(0.019)	(0.024)	(0.017)	(0
1 is_plv_ohh	0.057**	0.083***	0.003	0.006	-0.017	-0.064*	-0.043**	-0
	(0.023)	(0.030)	(0.018)	(0.029)	(0.026)	(0.037)	(0.019)	(0
1 is_plv_ownhh	0.000	0.004	0.008	0.013	0.013	0.036	-0.022	-0
	(0.013)	(0.021)	(0.017)	(0.026)	(0.018)	(0.026)	(0.020)	(0

1 is_plv_lead	0.028	-0.072	0.032	0.064	-0.103**	0.038	0.043	-0
	(0.046)	(0.078)	(0.043)	(0.065)	(0.048)	(0.079)	(0.039)	(0
1 is_fights	-0.039**	0.086	-0.027	-0.060	0.035*	-0.004	0.032**	-0
	(0.019)	(0.059)	(0.023)	(0.066)	(0.018)	(0.083)	(0.016)	(0
1 is_work_cp	-0.001	-0.006	-0.012	-0.014	0.010	0.011	0.004	0
	(0.013)	(0.015)	(0.013)	(0.014)	(0.012)	(0.014)	(0.014)	(0
1 is_no_mtngs	-0.007	-0.007	0.002	0.001	0.005	0.003	-0.001	0
	(0.013)	(0.013)	(0.010)	(0.012)	(0.012)	(0.013)	(0.014)	(0
is_hrswrk_dift3t1		-0.009		0.011		-0.015		0
		(0.009)		(0.008)		(0.015)		(0
is_bshlhrvst_dift3t1		0.002		0.002		0.002		-0
		(0.003)		(0.002)		(0.003)		(0
is_youshare_dift3t1		-0.004		0.012		-0.031		0
		(0.018)		(0.019)		(0.022)		(0
is_theyshare_dift3t1		0.014		-0.044**		0.042*		-0
		(0.018)		(0.018)		(0.022)		(0
is_meetyn_dift3t1		-0.018		0.028		0.145		-0
		(0.127)		(0.139)		(0.166)		(0
is_hlpchf_dift3t1		-0.000		-0.000		0.002		-0
		(0.007)		(0.006)		(0.010)		(0
is_cmpln_chf_dift3t1		0.013*		-0.004		-0.003		-0
		(0.008)		(0.008)		(0.013)		(0
is_plv_ohh_dift3t1		0.024		0.003		-0.045		0
		(0.015)		(0.026)		(0.028)		(0
is_plv_ownhh_dift3t1		0.008		0.004		0.023		-0
		(0.015)		(0.020)		(0.019)		(0
is_plv_lead_dift3t1		-0.110*		0.036		0.137**		-0
		(0.056)		(0.045)		(0.068)		(0
is_fights_dift3t1		0.125**		-0.033		-0.039		-0
		(0.053)		(0.061)		(0.080)		(0
is_work_cp_dift3t1		-0.005		-0.001		-0.001		0
		(0.007)		(0.009)		(0.010)		(0
is_no_mtngs_dift3t1		-0.003		-0.001		-0.004		0
		(0.006)		(0.008)		(0.009)		(0
Constant	0.206*	0.223	-0.241**	-0.240*	0.002	-0.113	0.032	0
	(0.112)	(0.147)	(0.101)	(0.139)	(0.139)	(0.205)	(0.123)	(0
Most Collinear Value	is_no_mtngs1	is_fights1	is_no_mtngs1	is_fights1	is_no_mtngs1	is_fights1	is_no_mtngs1	is
VIF value	2.853	22.54	2.853	22.54	2.853	22.54	2.853	2
Observations	794	794	794	794	794	794	794	7

Number of Clusters	84	84	84	84	84	84	84	8

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.

Table A5: Differences across rounds, Time Preferences Long Run

	(1) Time Preferences	(2) Time Preferences
Age	-0.005 (0.010)	-0.005 (0.010)
Sex (male=1)	-0.193 (0.282)	-0.197 (0.303)
Treatment 1	0.646 (0.473)	0.619 (0.485)
Treatment 2	0.215 (0.441)	0.180 (0.441)
Treatment 3	0.701 (0.484)	0.657 (0.487)
Income	-0.253** (0.123)	-1.403* (0.755)
Social Capital	-0.069 (0.130)	0.237 (0.387)
Public Goods	0.513** (0.195)	1.392*** (0.476)
Conflict	-0.446*** (0.160)	-0.294 (0.354)
Chief Quality	0.013 (0.181)	0.009 (0.190)
Δ Income		-1.160 (0.784)
Δ Social Capital		0.309 (0.402)
Δ Public Goods		0.894* (0.461)
Δ Conflict		0.111 (0.347)
Δ Chief Quality		0.032 (0.138)
Constant	-0.503 (0.495)	-0.465 (0.513)
Observations	737	737
Number of Clusters	84	84

Robust standard errors in parentheses clustered at the village level. Weighted for probability to be sampled

* p < 0.10, ** p < 0.05, *** p < 0.01.