Do Shocks of Civil War Alter Social, Risk and Time Preferences? Results from Field Experiments in Burundi

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Abstract

We study the consequences of the intensity of local violent conflict on social-, risk- and time preferences using data from a novel series of economic experiments in 35 randomly selected communities in Burundi. An important feature of our study is our ability to include villagers who had been previously surveyed in an extensive household survey. This approach enables us to investigate the relationship between civil war shocks on preferences, whilst controlling for a wide range of household and community characteristics. Econometric analysis reveals that individuals in communities which were exposed to greater levels of violence display more altruistic behaviour to their neighbours, are more risk seeking and have higher discount rates.

Keywords: civil war, preferences, field experiments, Africa

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1. Introduction

Civil wars are often associated with the destruction of capital, a breakdown of social norms and a reduced ability of people to "cope" (e.g. Collier 2003, Fearon and Latin 2003). Most analyses of the effects of conflicts so far have been based on cross-country studies, which implies obvious limitations with respect to operational guidance. There is growing body of micro level research confirming the destructive effects of conflict, pointing at deaths and injuries, destroyed infrastructure, displaced populations, and deterioration of institutions,

social cohesion and norms. Such effects may push households into poverty (see Barron, Kaiser and Pradhan 2004, Verwimp 2005, Do and Iyer 2009 amongst others).

Yet, these findings fall short in explaining the often remarkable postwar recovery experiences of a number countries after civil war (for example Rwanda, Uganda and Sierra Leone). A small economic literature is emerging that suggests exposure to conflict is not necessarily detrimental for development. Work by Blattman (2008) in Uganda and Bellows and Miguel (2006) in Sierra Leone shows that political participation is greater in areas that have experienced violence, and that community networks are more extensive there. In a companion literature in social psychology, a so called post-traumatic growth theory has emerged showing the positive responses of individuals to war trauma (see Tedeschi and Calhoun 1996) under Holocaust survivors (Carmil and Breznitz 1991), refugees in former Yugoslavia and people who survived areal attacks in Palestine (Punamaki et al 1997).

Social preferences are only one subset of the total range of preferences that is potentially affected by violence and of interest to development economists and practitioners. Exposure to war may amend risk preferences and dates of time preference also. Micro level evidence on the impact of conflict on risk and time preferences has so far been limited. One study by Deininger (2003) finds that exposure to conflict induced farmers in Uganda to shy away from developing new off farm activities. More work has been done on how other shocks, such as, natural disasters affect risk preferences. Van den Berg *et al* (2009) show that exposure to weather shocks (such as Hurricane Mitch) made individuals in Nicaragua and Peru more risk averse. Harrison *et al* (2005) find that peoples probability weighting is altered by weather shocks. Psychologists have shown that hazard experience affect peoples emotions (Cutchin et al., 2008; Weinstein, 1989) and that these in turn affect preferences (Weinstein 1989, Raghunathan and Pham, 1999). Lerner and Keltner (2001) for example show that fear and anger affect risk preferences differently in both naturally occurring and experimentally induced emotions. Where fear is correlated with risk aversion, anger makes people more risk seeking. The effect of shocks on preferences is hence not unambiguous.

We expand the existing work by systematically relating the history of violence (at the community and individual level) to a wider range of preferences, and use incentive–compatible methods to measure preferences, with a series of experiments in the field in Burundese villages. While there has been a lot of work on measuring social-, risk- and time preferences in a variety of contexts (see Carpenter and Cardenas 2008 for one review) this study is the first to apply experimental methods in a post-conflict environment to gauge the effect of violence on preferences.

Our results suggest that people in communities exposed to higher levels of violence display more altruistic behavior, are more risk seeking and less patient. Our results are robust across several specifications and alternative survey measures of preferences. We are aware of potential concerns about the endogeneity of exposure to violence and a robustness analysis based on experiments with geographically-separated siblings (see below). We hypothesize that our results may -in part- explain the pattern of recovery observed in many post-conflict settings, and sheds new light on post-war development and reconstruction as it speaks against pessimistic views on the destructive long term consequences of civil war.

2. Sample

We conduct our series of experiments in 35 randomly selected communities in Burundi. Since independence, Burundi has been the stage of nearly three decades of civil war between the country's two main ethnic groups; Hutu and Tutsi. At the outbreak of the most recent episode of violence in 1993, following the assassination of the country's first Hutu president, Melchior Ndadaye, Hutu groups targeted Tutsi in retaliation throughout the country, killing between 30.000-50.000 Tutsi within weeks. In turn, the Tutsi-dominated army responded with indiscriminate and large-scale attacks on Hutu. In the years that followed, confrontations between rebel groups and the army ravaged communities throughout the country. Burundi has only recently started to recover from this violence, which left over 300.000 Burundians dead and displaced 1.2 million people (Ngaruko and Nkurinziza 2000).

We have done an extensive household and community survey in Burundi in 2007, collecting data on local conflict, social capital and a wide range of household and community variables. Specifically, we visited 100 communities and interviewed almost 1400 households. The data form part of a panel of which the first wave was collected at the early stages of the war (in 1998) by the World Bank. This allows us also control for household specific time variant characteristics. We recorded the number of confrontations between army and rebels as well as bouts of one-sided violence hitting communities without regard of regard for the characteristics of their victims. In our sample, 62% of the communities experienced such attacks resulting the death of up to 15% of the community's inhabitants.

For our experiments, we randomly selected 24 communities that experienced community level violence between 1993-2003, and selected 11 communities where no confrontations took place. In these 35 communities we re-visited all respondents of the 2007

household survey to participate in the experiments[1], creating a base sample of 300 subjects. We measure civil war shocks at both the household and community level. The indiscriminate and random nature of the violence in Burundi allows us to exploit these data to establish the casual effect of violence on post-war preferences.

Even though we believe community level violence to be exogenous with respect to individual preferences, we attempt to control for any 'selection into violence' with a second sample. We collected data on sibling pairs both of which had lived in the same household before the war, but of which one moved out of the original household and where one experienced violence and one did not.[2] The identifying assumption is that in the absence of violence siblings share similar preferences. A civil war shock may have altered these preferences and the unequal experience of violence across sibling pairs allows us to identify the effect of violence. In our data we have 15 such sibling pairs.

The experiments were conducted during March-April 2009. Following an extensive training of our local experimenters[3], we ran several pilot tests to ensure our design was fully comprehended by our participants. As many of our participants had received little or no education, we followed a relatively simple design and our experimenters used clear and visual instructions. To ensure that all participants understood the instructions, we worked through several examples with the subjects and included comprehension tests before commencing with each experiment.[4] A day before the experiments, research coordinators contacted local government officials in each research site, and asked them to invite the household heads of the 2007 survey participants. The experiments started at approximately 9 A.M. in the morning, and lasted about three hours. Following a general introduction the subjects first completed the social preference experiment followed by the risk and time preference experiments.[5] The games were implemented by three teams, each with one instructor and two research assistants. Subjects who had difficulty completing record sheets by themselves were helped by research assistants who carefully avoided giving specific instructions about how to

[1] Burundi Priority Survey 2007. The data collection was a collaborative effort between the Institut de Statistiques et d'Etudes Economiqeus du Burundi (ISTEEBU), Antwerp University, Brussels University and Wageningen University, and was implemented under the flag of MICROCON – an EU funded project focusing on household analysis of violent conflict in various regions of the world.

[2] Our 2007 data recorded the timing and extent of individual exposure to violence. The 1998 data allows us to identify the sibling pairs.

[3] The experiments were conducted in the local language Kurundi.

[4] To enhance understanding we also limited the group size to 10 participants and if needed experiments were conduced in two groups. Also, instructors we went though the experiments question by question.

[5] To minimize inter-experiment effects payoffs were determined only after all three experiments were completed.

answer. The average experimental earning for three games was about 6000 FBU (5 dollars)[6], roughly 5 to 9 days wages for casual unskilled labor.

3. Experimental design

For our series of experiments we used adapted versions of well established experimental game protocols. As education and literacy levels in rural Burundi are typically low, we used clear visual instructions to make it easier for our illiterate subjects to understand. Similarly the record sheets showed the options both numerically and graphically.

To measure social preferences we used a adapted version of a social value orientation experiment devised by Liebrand (1984).[7] In the experiment, subjects are anonymously matched to someone from their community and make 6 choices between two own-other payoff combinations; A and B. The pairs of allocations lie on a circle with the a radius of 250 FBU.[8] The horizontal axis measures the amount of money allocated to the person itself (S), and the vertical axis the amount of money allocated to the other (O). The amounts allocated form $S^2+O^2 = (250)^2$, as a result, the total amount to be allocated (S+O) is not constant over combinations. Each own-other allocation can be considered as a vector. If for each subject the preferred allocations are added, the angle of the resulting vector with the horizontal axis is a measure of the extent the individual cares about the other. Based on the angle (ranging 37.5 – 52.5 degrees) we can derive three classifications: "individualists", who try to maximize their own payoff; "cooperators", who aim to equalise the payoff to themselves and others and “altruists” aim to maximize the outcome of others. At the end of the experiments each subject’s payoff is the sum of the amounts allocated to themselves and by the other subject in each round.[9] On average the angle is 41.60 degrees indicating that most subjects tend to be more individualistic (Table 1).

For our risk preferences experiment, we used a game where subjects could choose between a simple gamble and a certain amount. At the start of the experiment, each subject was given an endowment of 2000 FBU and told that this money was theirs to keep. They were then presented with choice cards presenting them the choice between A: to receive a certain amount (*y*), and B: to participate in a game where they may either gain an amount (*s*) with probability (*p*), or gain nothing with probability (*1-p*), with (*s*) equal to 2000 FBU and (*p*)

[6] USD 1 = 1,210 FBU (20 May 2009)
[7] Originating in the social psychology literature it is now frequently applied in the economics literature as well (see Offerman, Sonnemans, and Schram 1996, Vyrastekova and van Soest 2007).
[8] See Appendix for example of record sheet and full choice pair table.
[9] The outcomes of the social value orientation game were not revealed until the end of the session.

equal to 0.1, 0.2, 0.3, 0.8 and 0.9. The experiment was played over both gains and losses. For ten questions the change in money stock presented by option A (y) equalled the expected value of the gamble B (ps).

The varying probabilities were represented using combinations of black and white balls. For each gamble the corresponding number of black and white balls was entered into a bag, shaken and then one ball was drawn. The choice cards displayed the options both numerically and graphically with each change in money stock represented by an equivalent number of banknotes. The probabilities for each gamble were presented using pictures of the corresponding black and white balls.[10] For example, for a 30% chance of gaining 2000 FBU option B shows three black and seven white balls above the change in money stock.[11] As a rationally check we also include four questions in which the certain gain (loss) is lower ($y < ps$) and higher ($y > ps$) than the expected value of the gamble. For example if a subject chose the gamble for a 30% chance of winning 2000 FBU, then it would be irrational to choose the gamble if the certain gain was above 600 FBU. At the end of all experiments one question was selected for payment. The experimenter then placed 14 numbered balls into a bag to randomly select one question. Then the corresponding number of black and white balls was placed in the bag to determine the final payoff. Table 1 summarizes the responses to our risk preference questions. On average the gamble was chosen 63% of the time, indicating that the mean subject was risk loving.

In order to elicit individual discount rates, we presented subjects with a set of nine simple pair wise choices between two options, A: receive x BFU in one day, and B: receive $(1+ d)x$ FBU in two weeks and one day, with (x) equal to 1000 FBU and (d) equal to 0.00, 0.01, 0.02, 0.05, 0.10, 0.40, 0,70 and 1.00.[12] Subsequently, at the highest interest rate subjects earn an additional 1000 FBU by waiting two weeks. In the experiment subjects were asked to identify their switching point from preferring B to A. Gradually increasing the interest rate d over the nine decisions, allows us to observe the rate at which a subject switches from x today to $(1 + d)x$ in two weeks. The earlier people switch from A to B the more patient they are. Therefore, this switching point serves as a measure of the bounds of a subject's discount rate. After subjects completed all questions, we determined which pair wise choice was to be paid. The option chosen for that question (i.e. A or B) then determined how much money was delivered, and when. The experiment pay-off was then placed in a sealed envelope and

[10] See Appendix for record sheet and full choice pair table.
[11] We chose to present gambles in frequency rather than a probability format. Work by Harries and Harvey (2002) shows that presenting risks as frequencies yields more accurate results.
[12] See Appendix example of record sheets and full choice pair table.

handed over to a representative of the regional office of a local non-governmental organization.[13] The subject was given a receipt. At the respective date, the representative returns to the community to deliver the envelope to the respective individual. We choose to provide subjects with two future options rather than one "instant income" option and one future income option, as this removes the uncertainty confound over the prospective delivery and avoids possible differential transition costs of the future income option (see Harrison *et al* 2002).

In our sample the mean subject had a discount rate of 39% (Table 1), similar to other developing countries (see Barr and Packard 2000).[14] There is however a high concentration of subjects at the two extremes (27% of subjects have d = 0% and 26% of subjects have d = 100%) indicating that half of the respondents are either very patient or very impatient.

4. Conflict and preferences

The descriptive statistics showed considerable heterogeneity in our preference parameters. In this section we investigate whether preferences vary with exposure to conflict. We recorded the exposure to violence both at the household and community level (Table 1). At the household level we recorded experiences of damage to property (homes and crops), theft of assets and money and loss of ownership of land parcels. The community questionnaire recorded the intensity of violence resulting from confrontations between the army and rebel groups as well as one sided violence be either group. We recorded the date and severity of the attacks, including the number of civilian killed and injured over the period 1993-2003. In some communities these attacks were severe, when the army targeted whole communities in their search for rebels, arms and loyalists (HRW 1998, Krueger and Krueger 2007). Similarly, rebels often did not discriminate between individuals and targeted entire communities in search for supplies. The random and indiscriminate nature of violence allows us to identify the effect of conflict on preferences. Later we carry out several test to check whether any selection into violence is driving the results (section 4.3).

A simple t-test on whether there are any systematic differences between communities that were exposed to violence and those that were not is presented in Table 2. We document that individuals that experienced violence display more altruistic behaviour to their

[13] For this study we work together with a Burundian non-governmental organization. The organization was chosen based on its solid reputation as a trustworthy organization amongst Burundians. The organizations long history of operation in Burundi and nation wide coverage enabled us to forgo for potential bias to our results due to distrust in the delivery of the time preference payments.

[14] Who report discount rates of 43%.

neighbours, are more risk seeking and have higher discount rates. To further explore the issue we next run a series of regressions of social, risk and time preference parameters on violence and include several household individual (age, gender, literacy, total land holdings, access to credit, income growth between 1998-2007 and ethnicity) and community controls (land inequality, distance to main output markets, presence of land conflicts, ethnic build up, density and community level income) as well as regional fixed effects.[15] We focus primarily on the relationship between exposure to violence at the community level and individual level preferences. Our motivation is that while only some individuals experienced acts of violence directly, their consequences are felt throughout the community, inducing behavioral responses of family members and neighbors. Our main measure of violence comprises the total number of dead during 1993-2007 relative to population size. We include an index of individual level exposure to violence. We cluster standard errors at the community level to account for intra-community correlation.

4.1 Regressing conflict on preferences

- Conflict and Social Preferences

We set out by exploring correlations between conflict and our measure for social preferences (Table 3). Across all specifications we record a significant and positive correlation between conflict intensity and altruistic behavior both at the community (column 1) and household level (columns 2-7). This is in line with some earlier empirical survey work by Bellows and Miguel (2006) and Blattman (2008) who report an increase in political activity following the war in Sierra Leona and Uganda respectively. The authors speculate that in these samples political participation and increased social cohesion dominate communities which suffered from violence and may partially explain the observed rebuilding capacity of communities affected by conflict. Our findings also resonate with psychological studies into the effect of traumatic experiences on peoples attitudes. Post traumatic positive attitudes have been found under victims of a wide range of tragedies such as rape, cancer, heart attacks, disasters, combat and the Holocaust and identify changes in peoples self-perception, interpersonal relationships and life attitude (see Tedeschi and Calhoun 1996). For example, Malinak et al (1979) document that people who had recently lost their parents augmented the value placed on people around them. In addition, Collins et al (1990) show that the *recognition of one's vulnerability*' may motivate people to tap into social support networks that had previously

[15] See appendix for variable definitions.

been ignored. An attack on communities by rebels or the army may invoke similar feelings under the survivors. In this light, the positive correlation in our findings may not be surprising.

Our results are robust to including a series of household and community controls (column 3) as well as regional fixed effects (column 4). Altruism responds to observed household and community characteristics and increases with literacy, land holdings and ethnicity. Apparently, Tutsi are more altruistic to their community members than Hutu, though this effect is smaller in communities where the Hutu form a greater share of the population. To further investigate the effect of individual level exposure to violence on preferences we include a victimization index[16] (column 5). We again find a positive correlation with altruism, indicating that both individual as well as community level violence induced altruistic behaviour. To corroborate our findings in column (6) we replace our experimental measure of social preferences with a survey based social capital index. The measure follows seminal work by Narayan and Pritchett (1999) who report positive correlations between social capital and income in villages in Tanzania. Our index comprises a weighted (and normalized) scale of social participation of individuals in community organisations and the degree of membership. Similar to our experimental responses we find a positive correlation with exposure to violence.

- Conflict and Risk Preferences

Regression results on risk preferences are presented in Table 4. Throughout we document a positive correlation between community level conflict intensity and risk seeking and find that this result is robust to including common controls and fixed effects (columns 1 – 4). What may explain these findings? Though work by economist on the issue so far has been limited (Dercon 2008), psychological literature does offer some clues on how preferences are effected by shocks. The core message is that human emotions and behaviour are effected by traumatic shocks (Cutchin et al. 2008) even when the experience is not first hand (Weinstein 1989). These emotions in turn effect peoples risk evaluations even in situations subsequent and unrelated to the traumatic event (Lerner and Keltner 2001). Specifically when people feel angry they are found to make optimistic risk evaluations and take risk seeking choices (Lerner and Keltner 2000) Key insight from the work by Kahneman and Tversky was that people

[16] Our victimization index is an additive scale of household experiences of damage to property (homes and crops), theft of assets and money and loss of ownership of land parcels. Since the absolute scale of this variable is arbitrary it is normalized to have a mean of zero and standard variation of one.

evaluate choices over risky alternative over gains and losses differently. Specifically, people are found to be risk seeking for gambles over losses and risk averse for gambles over gains. In other words, sure gains are sought and sure losses avoided. In column (5) and (6) we separate out the choices over gains and losses and find that conflict induces risk seeking behaviour over gains, while risk behaviour over losses is unaffected, a result which is thus in contrast with prospect theory.

Contrary to community level violence, individual exposure to conflict is correlated with more risk aversion. The explanation appeals to common sense, traumatic experiences may instil a feeling of fear. If people feel frightened they may reduce investment and adjust crop choice to low cost low yielding varieties (Dercon 2008). In laboratory experiments feelings of anxiety and fear have also been associated with risk aversion (Lerner and Keltner 2001).

- Conflict and Time Preferences

Table 5 summarizes the results for the impact of conflict on inter-temporal choices and find that exposure to conflict both at the community and individual level increased peoples discount rates: exposure to conflict makes people less patient. One frequently observed characteristic of trauma is that the experience increases people perception of the risk of reoccurrence (Lerner and Keltner 2001). Also, Weinstein (1989) showed that the experience of a shock induced self-protective behavior in survivors. Similarly, exposure to conflict may induce hazard preparedness in people, skewing asset portfolios towards assets that can easily be hidden or moved. Hence, it becomes likely that people sought to secure immediate cash in our experiment. Experiences for Rwanda and Colombia mirror this finding. Verpoorten (2009) and Grun (2008) for example show that households both during and after the civil war depleted their fixed asset stocks (such as cattle and homes) in exchange for immediate mobile assets (chickens, bicycles, etc) and cash.

The included controls show a revealing story as well. In places with higher per capita income growth over 1998-2007 people are more impatient. This may reflect opportunistic behaviour of some of the respondents with access to more profitable investment options. It is an often sited feature of development that higher rates of income growth go hand in hand with increased opportunities for investment. On the other hand, in places that had higher levels of land conflicts and land inequality, people choose the delayed option. Communities characterised by higher levels of uncertainty over land ownership may have less (immediate)

options to invest and hence might have considered it better to leave the money with us for a while.

4.2 Other type shocks and preferences

It is conceivable that shocks other than conflict may influence our results. In Table 6 we include wide range of community level shocks alongside conflict in our estimation. We find that high input prices, drought and NGO activities effect individual social and risk preferences. There are no effects on time preferences, even when upcoming ceremonies are included. In all regressions our conflict coefficients remain significant, with only minor changes in magnitude. This suggests that our violence variables do not "proxy" for other type shocks.

4.3 Endogeneity

The identifying assumption in our regression analysis is that violence hit communities irrespective of any household and community characteristics. We used a sophisticated sampling frame in the field to deal with the potential problem of selection bias that, if present, would invalidate our identification strategy. We invited geographically-separated siblings to participate in the experiments. These sibling pairs both lived in the same household before violence reached their community. Later, one of the siblings moved out of the original household and one experienced violence while the other did not.[17] The identifying assumption is that in the absence of violence, siblings share similar preferences, hence changes in preferences are then only explained through violence, controlling for standard individual characteristics. In columns (1)-(3) we re-run our main model on the restricted sample to see whether the unequal experience of violence across sibling pairs altered preferences. We find results consistent with our main regressions in Table 3 and conclude that selection into violence is not driving our results.

We additionally tested the assumption of random violence based on available (pre-war) data. We run several regressions of the incidence and number of attack between 1993-2007 on a set of pre-war community variables including, subjective income levels within communities, distance to Bujumbura and altitude as well as some controls (columns (4) and

[17] Our 2007 data recorded the timing and extent of individual exposure to violence. The 1998 data allows us to identify the sibling pairs.

(5), Table 7).[18] We find no significant relationship to suggest that violence was selectively targeted along any of these dimensions. We have also explored whether there exists a significant relation between 1998 income (data from 1998 survey by World Bank) and post-1998 conflict, and again find no evidence of any systematic relationship between income and the incidence or frequency of attacks (results available on request).

5. Conclusions

The literature on the consequences of civil wars has often highlighted its detrimental effects on households restricting peoples ability to cope. As such civil way may institute a poverty trap. These finding are mainly based on macro level cross country analysis, though there is some interesting micro level evidence as well. However, this pessimistic view on development has come under new scrutiny from a few recent careful micro level studies suggesting that exposure to conflict is not necessarily detrimental for development (see Bellow and Miguell 2008, Blattman 2008). Yet, social preferences are but one of a set of preferences likely affected by conflict and of interest to development economists and practitioners. We extend upon earlier work and include risk and time preferences in our analysis as well. Though micro level evidence on the impact of conflict on risk and time preferences has so far been limited, there is some evidence that these preferences respond to conflict as well (Deininger 2003).

In this paper we set out to investigate the impact of conflict on social, risks and time preferences and use data from a novel series of economic experiments under 300 respondents in 35 randomly selected communities in Burundi. We find that conflict is robustly correlated with preferences. Econometric analysis reveals that individuals in communities which were exposed to greater levels of violence display more altruistic behavior to their neighbors, are more risk seeking and have higher discount rates. These results may partially explain the pattern of recovery observed in many post-conflict settings, and thereby provides new evidence against pessimistic views on the destructive legacies of civil war.

[18] See Voors en Bulte (2008) for a more elaborate discussion, including several tests on selection into violence for Burundi.

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Table 1 Descriptives

Variable	obs household level	obs community level	mean	std. dev.	min	max
Panel A: Preferences						
Social preferences (angle)	298	35	41.55	4.11	37.46	52.54
Risk preferences (fraction times gamble chosen)	299	35	0.63	0.31	0	1
Discount rate (%)	285	35	39.67	41.26	0	100
Panel B: Conflict variables						
Relative number of dead in attacks (%)	299	35	2.35	4.48	0	15.63
Relative number of wounded in attacks (%)	299	35	0.69	1.88	0	9.46
Number of times colline was attacked (PRIO)	299	35	0.29	0.70	0	3
Individual victimization index	299	35	0	1	-0.49	2.95
Panel C: Household control variables						
Respondent is literate	296	35	0.52	0.50	0	1.00
Respondent age	298	35	44.91	15.76	14.00	90.00
Respondent is male	298	35	0.61	0.49	0	1.00
Total land holdings per capita (ha^2)	292	35	5.43	5.08	0.10	34.25
Respondent has access to credit	299	35	0.44	0.50	0	1.00
Growth in total expenditure	299	35	2.25	5.26	-0.99	45.45
Respondent is Tutsi	299	35	0.22	0.42	0.00	1.00
Social capital index	299	35	0	1	-0.47	4.49
Panel D: Community control variables						
Land Gini coefficient	299	35	0.30	0.20	0	0.54
Distance to market	299	35	2.85	0.72	1.38	4.22
Conflict over land	299	35	0.25	0.15	0	0.60
Percentage Hutu	299	35	87.59	14.92	30.00	100.00
Density (log)	299	35	5.79	0.44	4.50	6.49
Per capita total expenditure	299	35	9.24	0.47	8.09	10.40

Table 2 T-test mean difference preferences over violence and non-violence groups

	angle	risk	time
	mean	mean	mean
Community level violence			
Below mean violence (0-70 dead)	41.42 (0.24)	0.59 (0.02)	3.96 (0.21)
Above mean violence (70-560 dead)	42.18 (0.46)	0.73 (0.03)	4.44 (0.34)
Mean difference	-0.76*	-0.13***	-0.48*

Table 3 Conflict and social preferences

	(1) Angle	(2) Angle	(3) Angle	(4) Angle	(6) Angle	(7) Social Capital
Relative number of dead in attacks (%)	0.143*	0.136*	0.225***	0.237***	0.235***	0.0370**
	(0.0792)	(0.0687)	(0.0707)	(0.0766)	(0.0790)	(0.0159)
Individual victimization index					0.618**	
					(0.233)	
Respondent is literate			1.337**	1.325**	1.398**	0.354**
			(0.548)	(0.541)	(0.535)	(0.145)
Respondent age			-0.0296*	-0.0285*	-0.0330*	-0.00117
			(0.0157)	(0.0156)	(0.0165)	(0.00395)
Respondent is male			0.841	0.866*	0.816*	-0.159
			(0.509)	(0.503)	(0.478)	(0.149)
Total land holdings per capita			0.108***	0.0911**	0.0967**	0.0264*
			(0.0385)	(0.0377)	(0.0370)	(0.0143)
Respondent has access to credit			0.485	0.603	0.628	0.188
			(0.453)	(0.465)	(0.472)	(0.161)
Growth in total expenditure			0.0156	0.0171	0.0185	-0.0123***
			(0.0561)	(0.0571)	(0.0576)	(0.00441)
Respondent is Tutsi			1.846***	1.530**	1.515**	0.0248
			(0.555)	(0.584)	(0.594)	(0.186)
Land Gini coefficient			-1.002	-0.670	-0.0158	0.146
			(1.458)	(1.340)	(1.316)	(0.395)
Distance to market			-0.771*	-0.752*	-0.661	-0.0743
			(0.391)	(0.394)	(0.400)	(0.0910)
Conflict over land			-3.587**	-3.121**	-3.144**	-1.006**
			(1.678)	(1.445)	(1.399)	(0.478)
Percentage Hutu			0.0414**	0.0471***	0.0406**	0.000457
			(0.0164)	(0.0164)	(0.0157)	(0.00747)
Density			0.753	0.837	0.923	0.0356
			(0.644)	(0.803)	(0.789)	(0.172)
Per capita total expenditure			0.0570	0.0533	-0.0888	-0.246
			(0.469)	(0.572)	(0.576)	(0.148)
Constant	41.19***	41.23***	34.85***	34.31***	35.47***	2.055
	(0.356)	(0.338)	(6.660)	(6.622)	(6.618)	(1.818)
Regional FE	no	no	no	yes	yes	yes
N	35	298	288	288	288	283
adj. R^2	0.063	0.019	0.135	0.134	0.152	0.032

Dependent variable: angle with horizontal axis.
t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 Conflict and risk preferences

Fraction of gambles chosen over:	(1) all gambles	(2) all gambles	(3) all gambles	(4) all gambles	(5) gains gambles	(6) loss gambles	(7) all gambles
Relative number of dead in attacks (%)	0.0183***	0.0157***	0.0125**	0.0115*	0.0137**	0.00933	0.0116*
	(0.00627)	(0.00431)	(0.00639)	(0.00707)	(0.00698)	(0.00793)	(0.00695)
Individual victimization index							-0.0356**
							(0.0138)
Respondent is literate			-0.0634	-0.0640	-0.0470	-0.0810*	-0.0677
			(0.0409)	(0.0404)	(0.0469)	(0.0437)	(0.0405)
Respondent age			0.000954	0.000999	0.00130	0.000695	0.00126
			(0.00122)	(0.00119)	(0.00107)	(0.00172)	(0.00121)
Respondent is male			-0.0733**	-0.0665**	-0.0832**	-0.0498	-0.0638*
			(0.0334)	(0.0324)	(0.0397)	(0.0383)	(0.0329)
Total land holdings per capita			-0.00202	-0.00324	-0.00129	-0.00520	-0.00366
			(0.00441)	(0.00468)	(0.00485)	(0.00528)	(0.00443)
Respondent has access to credit			0.0590	0.0648	0.0703	0.0593	0.0637
			(0.0492)	(0.0437)	(0.0437)	(0.0498)	(0.0437)
Growth in total expenditure			-0.000901	-0.000585	-0.00180	0.000626	-0.000662
			(0.00315)	(0.00303)	(0.00503)	(0.00314)	(0.00293)
Respondent is Tutsi			0.123**	0.105**	0.114**	0.0964*	0.106**
			(0.0566)	(0.0463)	(0.0519)	(0.0543)	(0.0466)
Land Gini coefficient			-0.0767	-0.0308	-0.117	0.0556	-0.0673
			(0.127)	(0.144)	(0.149)	(0.157)	(0.144)
Distance to market			0.00417	0.0144	0.0152	0.0136	0.00904
			(0.0385)	(0.0379)	(0.0372)	(0.0410)	(0.0366)
Conflict over land			0.000119	0.0531	0.0297	0.0765	0.0536
			(0.229)	(0.234)	(0.247)	(0.237)	(0.232)
Percentage Hutu			0.00216	0.00215	0.00133	0.00296*	0.00252*
			(0.00167)	(0.00135)	(0.00161)	(0.00160)	(0.00135)
Density			0.0469	0.00397	-0.00888	0.0168	-0.00178
			(0.0550)	(0.0664)	(0.0637)	(0.0777)	(0.0631)
Per capita total expenditure			-0.0402	-0.0258	-0.0180	-0.0336	-0.0176
			(0.0371)	(0.0398)	(0.0418)	(0.0466)	(0.0405)
Constant	0.579***	0.591***	0.516	0.632	0.694*	0.569	0.569
	(0.0282)	(0.0320)	(0.362)	(0.376)	(0.370)	(0.480)	(0.381)
Regional FE	no	no	no	yes	yes	yes	yes
N	35	299	289	289	289	289	289
adj. R^2	0.178	0.047	0.107	0.114	0.089	0.083	0.123

Dependent variable: fraction of gambles chosen
t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Conflict and time preferences

	(1)	(2)	(3)	(4)	(6)
Relative number of dead in attacks (%)	0.0607 (0.0721)	0.0411** (0.0165)	0.0604** (0.0271)	0.0601** (0.0269)	0.0621** (0.0275)
Individual victimization index					0.223** (0.0929)
Respondent is literate			-0.210 (0.223)	-0.194 (0.227)	-0.165 (0.233)
Respondent age			-0.00482 (0.00773)	-0.00509 (0.00767)	-0.00701 (0.00810)
Respondent is male			-0.312 (0.235)	-0.350 (0.233)	-0.356 (0.232)
Total land holdings per capita			0.00335 (0.0185)	0.0131 (0.0176)	0.0166 (0.0174)
Respondent has access to credit			0.00210 (0.297)	-0.111 (0.284)	-0.107 (0.283)
Growth in total expenditure			0.0316* (0.0175)	0.0323* (0.0171)	0.0324* (0.0178)
Respondent is Tutsi			-0.652** (0.303)	-0.423 (0.311)	-0.435 (0.311)
Land Gini coefficient			-2.601*** (0.753)	-3.276*** (1.004)	-3.087*** (0.981)
Distance to market			0.288 (0.201)	0.328 (0.243)	0.359 (0.242)
Conflict over land			-1.891 (1.179)	-2.540** (1.245)	-2.591** (1.199)
Percentage Hutu			-0.0203 (0.0136)	-0.0269** (0.0127)	-0.0289** (0.0119)
Density			0.0273 (0.288)	0.167 (0.367)	0.217 (0.355)
Per capita total expenditure			0.502 (0.367)	0.454 (0.308)	0.408 (0.311)
Constant	3.989*** (0.324)				
Regional FE	no	no	no	yes	yes
N	35	285	276	276	276
adj. R^2	-0.009				
pseudo R^2		0.003	0.052	0.062	0.066

Ologit regression. Dependent variable: question number switching point
t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Other type shocks and preferences

	(1) Social preferences	(2) Risk preferences	(3) Time preferences
Relative number of dead in attacks (%)	0.193***	0.0161***	0.0480*
	(0.0603)	(0.00491)	(0.0288)
Excessive rainfall	0.144	-0.0315	0.321
	(0.838)	(0.0709)	(0.845)
Drought 2007-2009	-0.736	-0.186*	-1.002
	(1.209)	(0.0967)	(0.654)
Plant diseases (Manioc, Banana)	-1.171	0.0275	-0.798
	(1.323)	(0.0862)	(1.174)
High input prices	-2.552*	-0.205**	0.0274
	(1.264)	(0.0831)	(0.663)
Participation in an NGO project	0.342	0.109*	0.376
	(0.808)	(0.0626)	(0.671)
Future (costly) events			0.0198
			(1.172)
Constant	45.27***	0.919***	
	(1.909)	(0.142)	
Regional FE			
N	298	299	285
adj. R^2	0.037	0.104	
pseudo R^2			0.022

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 Identifucation

	(1) Angle	(2) Gamble	(3) Discount rate	(4) Attack during 1993-2007	(5) Relative number of dead 1993-2007
Victimization index	1.609*	-0.108*	1.658**		
	(0.939)	(0.0832)	(0.794)		
Respondent is literate	-0.940	-0.0586	-2.676**	-2.217	-6.950
	(1.222)	(0.108)	(0.963)	(1.462)	(4.055)
Respondent Age	-0.102	-0.0163*	-0.0414	-0.0351	0.0967
	(0.101)	(0.00898)	(0.0818)	(0.0480)	(0.132)
Respondent is male	2.708**	0.0639	-1.548	0.629	2.413
	(1.166)	(0.103)	(0.935)	(2.053)	(6.007)
Respondent is Tutsi	0.947	0.149	-2.409		
	(2.542)	(0.225)	(3.048)		
Density in 1990 (log)				-0.289	0.551
				(0.694)	(2.043)
Distance to Bujumbura (log)				-0.737	-0.873
				(1.336)	(3.837)
Prewar income (1993)				-0.532	0.294
				(0.719)	(1.983)
Constant	42.72***	1.067***	7.130***	.	-7.690
	(2.838)	(0.251)	(2.319)		(26.10)
Regional FE	no	no	no	yes	yes
N	30	30	30	35	35
adj. R^2	0.220	0.021	0.230	.	0.057

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Table A1 Choice Pairs Task 1

	A		B	
Question	Self	Other	Self	Other
1	0	250	60	240
2	60	240	120	220
3	120	220	180	180
4	180	180	220	120
5	220	120	240	60
6	240	60	250	0

Table A2 Choice Pairs Task 2

	Certain	gamble	
Question	gain/loss	*p*	gain/loss
1	200	0.1	2000
2	400	0.2	2000
3*	600	0.3	2000
4*	600	0.3	2000
5*	600	0.3	2000
6	1600	0.8	2000
7	1800	0.9	2000
8	-200	0.1	-2000
9	-400	0.2	-2000
10*	-600	0.3	-2000
11*	-600	0.3	-2000
12*	-600	0.3	-2000
13	-1600	0.8	-2000
14	-1800	0.9	-2000

* rationality check questions

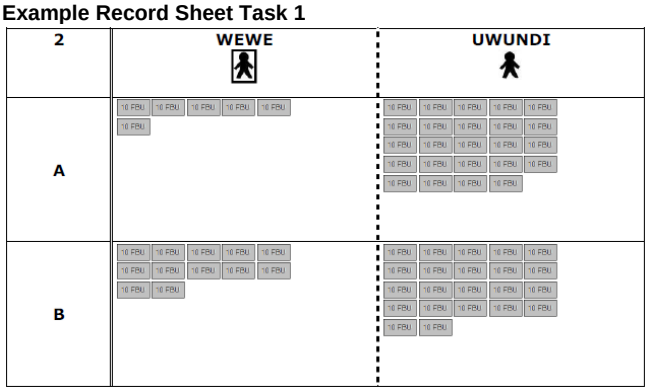
**implies certain gain/loss does not equal expected value

Table A3 Choice Pairs Task 3

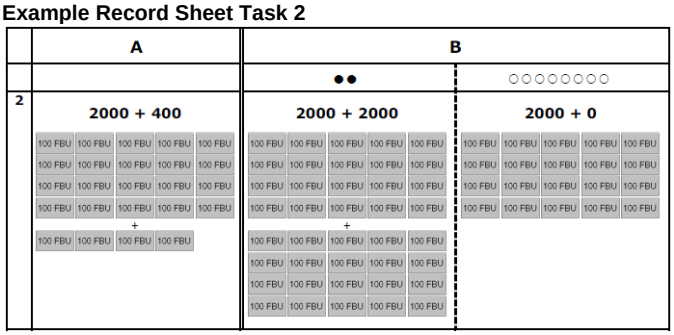
Question	Tomorrow	In two weeks	d
1	1000	1000	0
2	1000	1010	0.01
3	1000	1020	0.02
4	1000	1050	0.05
5	1000	1100	0.1
6	1000	1400	0.4
7	1000	1700	0.7
8	1000	2000	1

Participants were not shown (d).

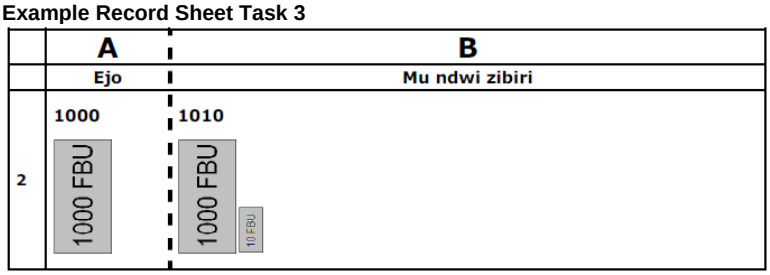
Example Record Sheet Task 1



Example Record Sheet Task 2



Example Record Sheet Task 3



Data Appendix

Community level violence variables

- Number of times colline was attacked: Variable counts number of attacks by army and rebels as well as the occurrence of one-sided violence (PRIO).
- Number of dead in community attacks relative tot population size Reports number of dead on *colline* as a consequence of confrontations between rebels and army as well as one sided violence between 1993-2007 divided by population size, as stated by local administrators (BCS).
- Number of wounded in community attacks relative tot population size Reports number of wounded on *colline* as a consequence of confrontations between rebels and army as well as one sided violence between 1993-2007 divided by population size, as stated by local administrators (BCS).

Household control variables

- Age: *Age of head of household*, measured in years (BPHS).
- Respondent is male: *Gender of head of household*. In household level regressions variables is dummy variable taking unity if head of household is male, zero else. In community level regressions, variable household dummy's are averaged over number of households per community (BPHS).
- Respondent is literate: *Literacy of head of household*. In household level regressions variables is dummy variable taking unity if head of household is literate, zero else In community level regressions, variable household dummy's are averaged over number of households per community (BPHS).
- Land size per capita (m^2): Total land size of household i in square meters, divided by number of adult equivalents present in household i (BPHS).
- Income growth: variable is the growth in household level per capita expenditure between 1998 and 2007. Income levels were created by summing all goods purchased over a 15 day period valued at local market prices and divided by the adult equivalents of household i (BPHS).
- Access to credit. Dummy variable taking unity if household currently obtains credit from an '*Association de Credit Cummunautaire*' (COOPEC) (BPHS).
- Ethnicity: Dummy variable, taking unity if respondent is Tutsi.

Community control variables

- Population density: Number of people in community per square kilometer in 2008 (MPDRN).
- Distance to market: Distance to main agricultural market where food and non-food items are traded, measured in time intervals of 15 minutes, where $t = 1,...,5$ (BCS).
- Land Gini coefficient: Variable based on household land holdings. Community level Gini coefficient is created by $G = 1 - 2\int_0^1 L(X)dX$ (BPHS).
- Prewar income (1993). Variable for the j-th community created by averaging i-th household indication of perceived level of wealth in 1993 on a scale, ranging 1 (very rich)-6 (very poor) (BPHS).
- Vote in favor of president Ndadaye: Percentage of votes in favor of Ndadaye at the commune level during the presidential elections in 1993.
- Distance to Bujumbura. Distance to capital in kilometers.
- Altitude. Log of average altitude of j-th community (MPDRN).
- Land conflicts: Dummy taking unity if there are land conflicts in community (BPHS).

- Ethnic build up: Percentage of Hutu population in community.
- Community Income: variable is the aggregated income of per capita expenditure for all goods purchased over a 15 day period valued at local market prices and divided by the adult equivalents of household i (BPHS).