



Poverty & Equity Global Practice Working Paper 159

IMPACT OF CONFLICT ON ADOLESCENT GIRLS IN SOUTH SUDAN

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July 2018

ABSTRACT

Violent conflict and instability affect men and women in heterogeneous ways, including differentiated impacts on economic, social, physical, and mental well-being. This study assesses the impact of the post-2013 conflict in South Sudan on adolescent girls and young women. The analysis uses data from the Adolescent Girls Initiative end line survey and the Armed Conflict Location & Event Data to measure conflict exposure using constructed cluster-level, self-reported, and external conflict exposure variables. The impact of conflict exposure is then estimated on a set of socioeconomic outcomes of adolescent girls by comparing exposed and non-exposed clusters before and after the conflict. The results suggest that girls from clusters more affected by the conflict had statistically different outcomes compared with girls from less affected clusters. Specifically, there is strong evidence that the conflict negatively affected outcomes related to income opportunities, aspirations, marriage, and household characteristics, but increased self-reported empowerment and entrepreneurial potential scores. The results indicate that impacts on labor supply, personal motivation, household conditions, and other forms of victimization are important channels through which conflict negatively impacts adolescent girls.

This paper is a product of the Poverty and Equity Global Practice Group. It is part of a larger effort by the World Bank to provide open access to its research and contribute to development policy discussions around the world. The authors may be contacted at upape@worldbank.org.

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Impact of Conflict on Adolescent Girls in South Sudan

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Keywords: Conflict, Impact Evaluation, Socio-economic Well-being, Gender

JEL: D04, D74, J16, Q34

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1. Introduction

Conflict and displacement escalated dramatically after the civil war in South Sudan in December 2013. The December 2013 conflict between President Salva Kiir and former Vice President Riek Machar quickly became an ethnically-charged conflict particularly between the Dinka and Nuer ethnic groups. Skirmishes as well as brutal violence against civilians were reported in dozens of locations. In the days following the start of the conflict, incidences were more isolated with violence against Nuer civilians in Juba, attacks by Nuer on Dinka and other civilians in these areas as well as incidences of armed groups of different ethnic backgrounds launching revenge attacks on community members. The civil war with high rates of violence resulted in high mortality and displacement, as well as worsening livelihoods, poverty and food insecurity (Shankleman, 2012; World Bank, 2014a; World Bank, 2015a; World Bank, 2015b).

More than 50,000 civilians have been killed since the resurgence of conflict in December 2013, in addition to various severe crimes including extrajudicial killings, abductions, rape, and torture. More than 2.2 million people have also fled the country or have been displaced internally, and it is believed that 4.8 million are at risk of famine (FAO 2017). The conflict has severely impacted welfare indicators and cost the country an estimated 6.3 percent of its GDP (World Bank 2016).

Violent conflict and instability affect men and women in heterogeneous ways, including differentiated impacts on economic, social, physical and mental well-being. Research highlights that men and boys often confront direct, first-round effects of conflict, including death and morbidity, while conflict contributes to indirect impacts on women and girls, including as related to health (e.g. to malnutrition, exposure to disease and lack of access to health services (Buvinic et al 2013). Children's health and access to education are often severely affected by exposure to conflict.

In many countries, women and children frequently account for the majority of populations displaced by conflict; in South Sudan for example, 53 percent of the 2.43 million externally displaced due to the 2013 conflict are female while 63 percent of those displaced are children under the age of 18 (UNHCR 2018). While displacement generally contributes to a critical loss in assets, including housing, land and property and other productive assets, women confront particular constraints extending from social norms that restrict women's ownership rights over land and other assets, and contributes to their exclusion from decision-making processes (Brookings 2013). Displacement also often gives rise to or exacerbates serious protection challenges including increased exposure to gender-based violence.

Violent conflict often changes the demographic composition of households, contributing to a rise in female-headed households due to the extended absence of males either due to conflict or abnormal migration. These shifts impact traditional gendered division of tasks through its impacts on household composition, often increases women's participation in labor markets and augmenting responsibilities of women within households (Menon and Rodgers 2013; Brück, Tilman and Vothknecht 2011; Justino, Cardona, Mitchell and Müller 2012; Annan, Blattman, Mazurana, and Carlson 2009; Brück and Schindler 2009). At the same time, data on whether women's greater market participation and shifts in household responsibilities contributes to wider welfare gains and long-term social empowerment, however, is more ambiguous (Justino, et. al 2012; Bozzoli 2012). There are data to suggest that the economic and social gains women may have achieved due to the absence of men during conflict periods can erode during post-conflict periods due to a reversion in pre-conflict norms and do not always result in a comparable increase in social empowerment or improved bargaining power (Justino 2009). Non-material well-being, such as marriage outcomes and happiness, has also been negatively impacted by conflict and displacement in some cases (Wang and Zhou 2016). Robust evidence also exists on the positive correlation between rates and incidence of varying forms of gender-based violence (GBV) (including sexual and physical assault, intimate partner violence, trafficking and early and forced marriage) and exposure to conflict (Annan et. al. 2009; Dijkman, Bijleveld, Verwimp, 2014; Ostby 2016). Lastly, studies have found that women are more vulnerable to developing anxiety disorders and struggling with psychosocial distress in conflict-affected settings (Ayazi et al 2014; Luitel et al., 2013; Farhood & Dimassi, 2012; Murthy, & Lakshminarayani, 2006; Roberts et al, 2008).

The devastating nature of the recent conflict in South Sudan and the grim reality of its gendered effects provides the motivation for this study. The conflict has affected millions of South Sudanese people but the effects of this conflict on a particularly vulnerable group, such as adolescent girls, are worth identifying. Economic, social, and mental impacts at an early age tend to be long-lasting and should be addressed before they worsen and persist. Therefore, this paper aims to measure the impact of this conflict on adolescent girls across a set of welfare indicators to inform and guide appropriate intervention strategies.

There is growing consensus that studying conflict cannot be dissociated from how it is experienced and perceived by individuals affected by armed violence. Econometric research on the various channels through which conflict affects women, however, and the impact of conflict on gender dynamics is relatively nascent (Calderon 2011; Justino, Cardona, et. al. 2012). Within the literature on

the intersection between conflict and gender dynamics, there is scant research on non-combatant adolescent girls. This study contributes to this literature by offering one of the first efforts to empirically quantify the impact of violence and conflict on educational attainment, labor market behavior, and social empowerment for non-combatant adolescent girls.²

This study utilizes survey data emerging from a World Bank-administered pilot project in South Sudan to contribute to the existing conflict and gender literature on several fronts. First and foremost, it uses a cluster-level difference-in-difference analysis to identify the impact of the conflict in South Sudan on girls aged 15-24. Given the high levels of mobility in South Sudan, these surveys are repeated cross-sections. Second, the study contributes new knowledge on the impact of conflict on welfare, poverty, and aspirations by offering one of the first analyses of data on adolescent girls, a generally under-researched demographic. Finally, this research contributes to a growing body of evidence examining the impacts of earlier-life environment on later life outcomes, and is closely related to a large body of literature on subjective perceptions of well-being linked to significant and potentially traumatic life events.

The analysis builds on two rounds of survey data that were collected for an impact evaluation of an adolescent girls program. The first round of data was collected between August and October 2010 and the second round of data was collected between January and February 2015. The two surveys measure the same indicators except that the endline survey has an additional module on conflict exposure. We use the data from the conflict exposure module to obtain self-reported measures of cluster-level exposure to the conflict and examine the impact of conflict-related victimization on adolescent girls. For robustness, we also use external data on conflict events to examine the impact of the conflict exogenously. This analysis tests the hypothesis that girls exposed to the conflict had statistically different welfare outcomes than girls who were not exposed to the conflict.

The remainder of the paper is organized according to the following sections: Section 2 details literature on micro-level conflict studies and the impact of conflict on women; Section 3 provides a description of the data, followed by a description of the conflict data and how conflict treatment

² In this conflict, adolescent girls and young women did not constitute a significant number of participating combatants.

variables were constructed; Section 4 provides the theoretical model and Section 5 reports results from the difference-in-difference regression analysis. Finally, Section 6 provides a discussion and conclusion for the study.

2. Related Literature

From civil wars to riots and violent mass protests, past and present violent conflicts result in lost opportunities for human and economic development and have significant effects on the welfare, resilience and behavior of individuals, households and communities. Due in part to security studies' traditional focus on the state and state agency, research on violent conflict has until recently relied mostly on standardized macro-level measures of conflict such as the number of battle deaths per country per year. Over the last 15 years, initiatives such as the Households in Conflict Network (HiCN), housed within the Institute of Development Studies at the University of Sussex, and MicroCon (Micro Level Analysis of Violent Conflict), an EU-funded multi-institution partnership, have spearheaded micro-level conflict research. Some studies have conducted systematic empirical analysis of the mechanisms linking interactions of individual, household, and community units of analysis to processes of violent conflict (Brück, Justino, Verwimp, and Alexandra Avdeenko, 2010; Bozzoli, 2009, Bundervoet et al., 2009; Dupas and Robinson, 2012; Miguel and Roland, 2011).

Brück (2011), Justino (2012), and Bozzoli (2011) differentiate between two main approaches to using data in micro-level conflict research: (1) using purposively designed surveys; and (2) employing existing socio-economic data sets from conflict-affected regions. Of the two, the former aims to use specifically collected data to uncover causes and functions of conflict at the micro-level. This more uncommon approach so far, this includes ex-combatant surveys, genocide and atrocities surveys, displaced people surveys, surveys of civilian populations affected by conflict, and standardized conflict surveys (i.e. ICRC's People on War Surveys) (Blattman 2007; Calderón, Gáfaró and Ibáñez 2011; Justino, Gupte, and Tranchant 2012; Mvukiyehe and Samii 2008/9). The second direction uses micro-level data sets that were not explicitly collected for the analysis of conflict processes or consequences, but which can be used for that purpose when merged with conflict event data (Bozzoli and Brück 2009; Bozzoli, Brück and Muhumuza 2011; Douarin, Litchfield and Sabates-Wheeler 2011; Moya 2015; Nasir, Rockmore, and Tan 2015). Beyond these two directions, research on the causes and drivers of conflict at the individual and household level also includes qualitative and smaller scale quantitative analysis based on small samples and limited geographic locations (Boothby, Crawford, and Halperin 2006;

Wessells 2006; Dwyer and Cagoco-Guiam 2011; ICRC 2001; McKay, Robinson, Gonsalves, and Worthen 2006), which also focus on conflict processes, community structures and institutional changes at the local level.

Micro-level research has made significant contributions to measuring conflict's effect on livelihood choices and poverty dynamics. One strand of the micro-level conflict literature suggests a positive correlation between violence exposure and various measures of deprivation at the household level. Mercier, Ngenzebuke, and Verwimp (2016) compare three waves of household panel data in Burundi over 1998-2012 and deduce that violence exposure seems to trap already poor and economically vulnerable households into chronic poverty. Non-poor households exposed to violence do not exhibit the same adverse impact on welfare. Douarin, Litchfield, and Sabates-Wheeler (2011) similarly find that exposure to violence has different impacts on household welfare depending on the labor and livelihood choices adopted. Households with more diverse livelihood opportunities demonstrate greater economic resilience and ease in increasing consumption levels. War-affected households in Rwanda that suffer loss of real estate or land due to conflict tend to be at greater risk of falling into chronic poverty after conflict, particularly for households accustomed to cultivation and land usage prior to the conflict (Justino and Verwimp 2013). Other studies offer evidence suggesting that the decline of infrastructure, economic opportunities, and social services due to conflict increases the likelihood of chronic poverty regardless of pre-existing assets, skills, or social capital (Bozzoli and Brück 2009; Bozzoli, Brück, and Muhumuza 2015; Bratti, Mendola, and Miranda 2016).

Analytical work linking conflict to human capital accumulation indicators finds that conflict exposure causes household trade-offs that negatively impact child schooling retention and investment in health care (Justino, Leone and Salardi 2014; Brown, Ryan, and Velásquez. 2015; Minoiu, Camelia and Shemyakina 2012; Debalen and Paul 2012). These studies echo the view that conflict induces risk aversion and short-term time preferences, which, combined with real conflict-imposed economic constraints, detracts from human capital accumulation post-conflict. Micro-level studies also explore the relationship between exposure to conflict and other behaviors, such as the impact of civilian casualties on wartime informing (Shaver and Shapiro 2016) and degrees of depression (Bratti, Mendola, and Miranda 2016).

Yet data on whether women's greater market participation and altered engagement in the domestic sphere results in welfare gains and long-term social empowerment are more ambiguous (Justino, et. al 2012; Bozzoli 2012). One strand of the literature suggests that the economic and social gains women

may have achieved due to the absence of men during conflict periods can erode in the post-conflict period and often do not result in a comparable increase in social empowerment (Justino 2009). Calderón, Gáfaró and Ibáñez (2011) look at displacement in Colombia as an indirect impact of conflict and find that despite a net increase in earnings, bargaining power of displaced women is not statistically different from the control group. In contrast, domestic violence is larger for displaced women, who in turn resort to violent punishment against their children. Wang and Zhou (2016) find that displacement in China during Mao's mass Send-Down Movement had a significantly negative effect on women and men's nonmaterial well-being, which they measure by marriage outcomes, social network, and happiness.

Incidence of gender-based violence, while a prevalent global challenge in many environments even before the onset of violence, often worsens in the context of conflict and instability (Anderlini 2010; Buvinic et al 2013; Strachan and Haider 2015). Micro-level quantitative analysis on the impact of conflict on women and girls' vulnerability to gender-based violence (GBV) is relatively robust. Ostby (2016) explores links between armed conflict and intimate partner violence and finds a significantly damaging effect of armed conflict on rates of domestic violence. Dijkman, Bijleveld, Verwimp (2014) explore the impact of conflict exposure on GBV across IDP camps, areas of return, and households of various income and education levels, where wealthier educated women had a higher likelihood of falling victim to GBV. Women in South Sudan have also experienced varying dimensions of gender-based violence (IRC and GWI, 2017; CARE, 2014; Elia, 2007; Elia, 2007). A new study highlights that rates of varying forms of violence against women and girls in South Sudan is among the highest in the world; conducted by International Rescue Committee and the Global Women's Institute (2017), the study found that 65 percent of the women surveyed experienced some form of sexual or physical violence in their lifetime, double the global average. While intimate partner violence was most commonly reported, 33 percent of women reported experiencing sexual assault from a non-partner, frequently linked to displacement, abduction or raids.

The international donor community has traditionally come forth with descriptive reports on the effect of armed conflict on the health and well-being of both women and girls, which includes sections on GBV and security (UNICEF 2005; Dwyer and Cagoco-Guiam 2011; ICRC 2001; UNFPA 2002). These studies are mostly aimed towards informing aid programming and Disarmament, Demobilization, and Reintegration (DDR) initiatives and lack the trend analysis and controlling for bias associated with quantitative analysis. Several qualitative and quantitative studies using smaller samples of respondents focus on ex-combatant motivation and reintegration (Miranda 2003; Keairns 2003;

McKay, Robinson, Gonsalves, and Worthen 2006), exploring both the positive and negative aspects of the combatant experience for adolescent girls. Yet while much of the literature on female combatants does address the experience of adolescent girls, there is little micro-level analysis of conflict's impact on labor market decisions, welfare, vulnerability to sexual violence, and behavior specific to civilian adolescent girls.

Quantitative research on the impact of conflict on women has focused on heads of households with little information on the experience of adolescent girls or other female members of the household. Conflict's impact on risk preferences and social capital accumulation have mostly been explored in adults. Welfare measurements related to children and youth tend to comprise of years of schooling and monetary investments in health care. A focus on adult respondents remains the norm. While girls have been included in surveys assessing the extent and impact of various forms of GBV and are the subjects of mostly qualitative research on ex-combatants, little systematic empirical research focuses specifically on non-combatant female adolescents.

This gap can partly be explained by the fact that challenges related to collecting data in conflict-affected areas are particularly acute when targeting adolescent girls. For purposeful surveys, sampling female adolescent respondents can be more challenging compared to male or female heads of households, particularly in the context of traditional gender norms and low levels of community trust. Existing socio-economic household data also typically relate to heads of households. Lack of personal identification, which is more common among children and underage youth than adults, is often higher in conflict affected areas and can cause discrepancy in data. Attrition is a major concern due to conflict driven displacement. These challenges can be compounded by difficulties tracking younger household members who are not always registered consistently in population databases.

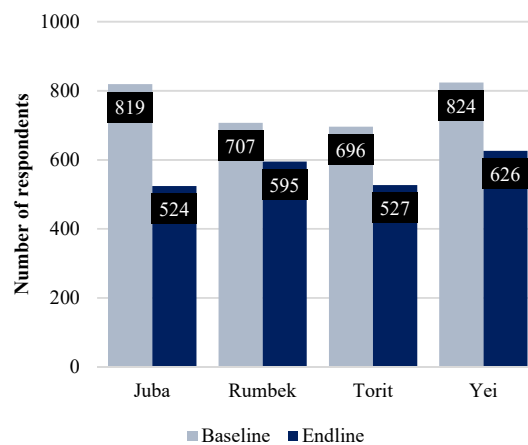
3. Data

The Adolescent Girls Initiative (AGI) was launched by the World Bank in October 2008 as a public-private partnership intended to promote the transition of adolescent girls from school to productive employment through innovative interventions that are tested, and then scaled-up or replicated if successful. The initiative was piloted in eight countries including Afghanistan, Jordan, Lao PDR, Liberia, Haiti, Nepal, Rwanda, and South Sudan. In South Sudan, the World Bank partnered with an NGO, BRAC International, to adapt and pilot its Empowerment and Livelihood for Adolescents (ELA) model which combined a range of innovative social and financial empowerment interventions

targeting 3,000 girls between the ages of 15-24 in four states. Key interventions included the establishment of adolescent girls clubs to create safe spaces for social interaction and engagement, life skills and livelihoods training, financial literacy training, access to savings and credit facilities and community and parental sensitization efforts. To assess the effectiveness of the interventions in South Sudan, a rigorous impact evaluation was built into the project.

The baseline and endline surveys for this evaluation were conducted across the four target states of Juba, Rumbek, Torit and Yei in 2010 and 2015 respectively (Figure 1). In each state, respondents were drawn based on a two-stage random selection using clusters as the primary sampling units. Given the high levels of mobility in South Sudan, these surveys were designed as repeat cross-sections. Hence no efforts were made to re-visit baseline respondents at endline.³

Figure 1: Number of observations at baseline and endline.



3.1. Self-reported conflict exposure

The eruption of violence in 2013 impacted and delayed the implementation of the endline survey to early 2015. To measure the extent of this conflict, the endline survey incorporated an additional module on conflict exposure. Getting direct household conflict exposure measures is very meaningful. This module was developed based on similar conflict exposure questionnaires and adapted to the context in South Sudan with special consideration paid to the ethical administration of surveys in

³ Five clusters, which covered 173 households, were dropped from the analysis as these clusters were not re-visited at endline.

conflict-affected populations. The conflict exposure module included key questions related to looting, household damage, and physical harm (including death) to members of the household (Table 1). A subset of these questions has already been used in the High Frequency Pilot conducted by South Sudan’s National Bureau of Statistics after comprehensive discussions of the impact of these questions on the emotions of the respondent. Understandably, several respondents chose not to answer these questions.

Table 1: Variables in the endline questionnaire measuring conflict exposure.

Variable	Description
Household looted	Was your household looted during the conflict?
Other household looted	Was any household in your neighborhood looted in the conflict?
Household damaged	Was your household damaged in the conflict?
Household member harmed	Was any member of your household harmed in the conflict?
Number of Household members harmed	How many members of your household were harmed in the conflict?
Household member died	Did any member of your household die due to the conflict?
Number of Household members died	How many members of your household die due to the conflict?
Member left	Did any member of your household leave due to the conflict?

Out of 3,137 respondents, 804 respondents (around 25 percent) chose not to respond to the questions in the conflict module (Figure 2). While it seems that respondents from Juba and Yei mostly consented, there is significant variation in the rates of consent across clusters in Rumbek and Torit (Figure 3). Besides area, we find no bias in terms of age, household size, religion, and years of residence when exploring the characteristics of the non-consenting individuals (Table 2).

Figure 2: Non-consent to the conflict module.

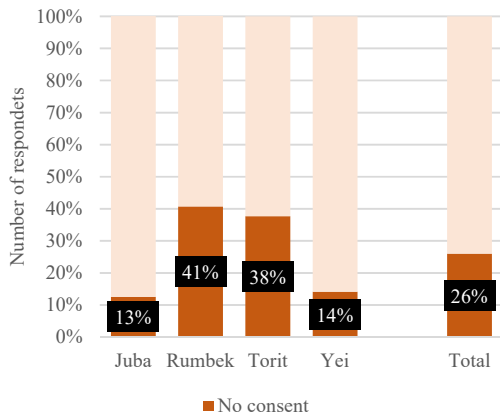


Figure 3: Density plot of consent by area.

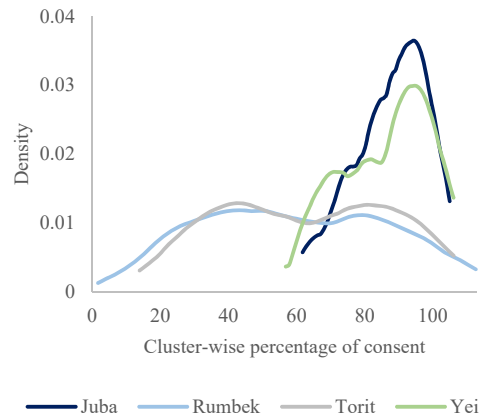


Table 2: Characteristics of consenting and non-consenting respondents.

Characteristics (mean)	Age	HH size	Years at residence	Years of education	Number of IGAs
Consenting	22.1	10.5	5.6	7.7	0.9
Non-consenting	21.7	9.8	5.5	7.6	1

About 40 percent of all consenting individuals experienced at least one conflict event (Figure 4). Additionally, about 30 percent of consenting individuals stated that a member of the household was harmed or died due to the conflict (Figure 5). The highest incidence is found in Rumbek, where about 67 percent of the consenting individuals experienced one or more conflict events, compared to less than 40 percent in the other three areas. Accordingly, Rumbek’s residents also report the majority for most conflict events such as a member dying or being harmed, while both Rumbek and Juba’s residents more often reported that members were displaced. As Rumbek also has the highest non-response rate, it is likely that the overall extent of conflict exposure is underestimated.

Figure 4: Respondents that experienced at least one conflict event.

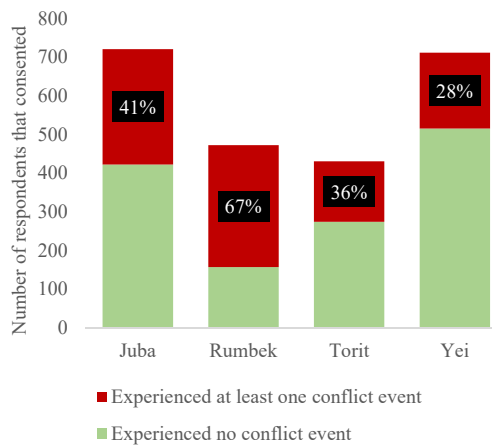
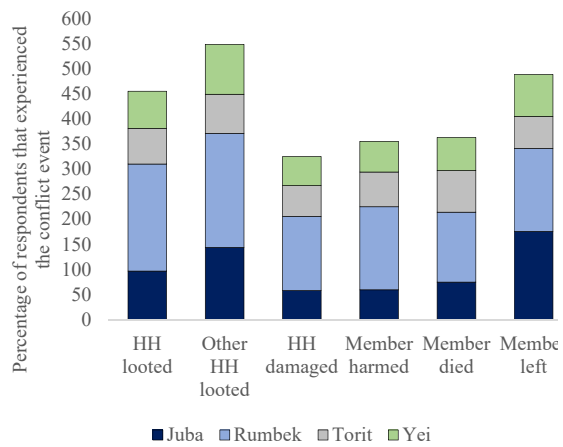
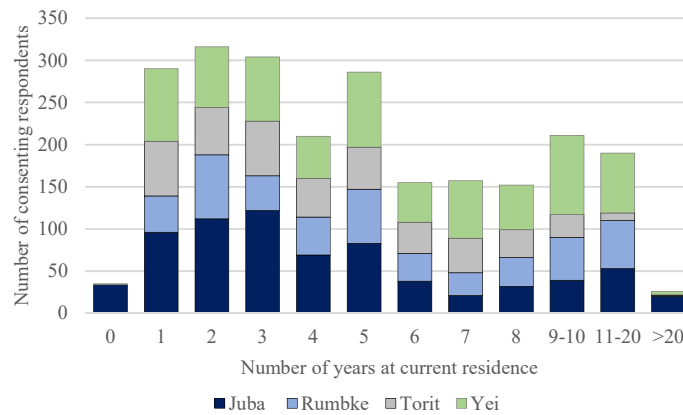


Figure 5: Conflict events by area.



Measuring the impact of the conflict in 2013 at the cluster level requires us to restrict the data set to respondents that spent at least three years at their current residence. Otherwise, the cluster indicators for conflict exposure and outcomes would be mixed between the population exposed to conflict at the selected cluster and the population being exposed to conflict in another cluster, who relocated to the selected cluster in the last three years. This excluded 640 consenting respondents, from which the majority (38 percent) were from Juba (Figure 6).

Figure 6: Number of years at current residence



The variables in the conflict exposure module of the questionnaire are used to construct a composite index to measure exposure to the conflict (see 1. Construction of self-reported conflict indicator in the Appendix for a detailed description). According to the internal

conflict indicator, 1 in 3 girls were exposed to the conflict. For ease of interpretation of the analysis results, the continuous conflict exposure indices are converted into binary values.⁴ The cut-off point to identify conflict exposure is the average of the continuous conflict exposure index. Clusters above the mean index (1.93) are categorized as having been exposed to conflict, while clusters below the mean are categorized as not having been exposed to conflict. Using this cut-off, 33 percent of all clusters were exposed to conflict, most of which are from Rumbek (Figure 7 and Figure 8).

Figure 7: Density plot of the internal conflict indicator.

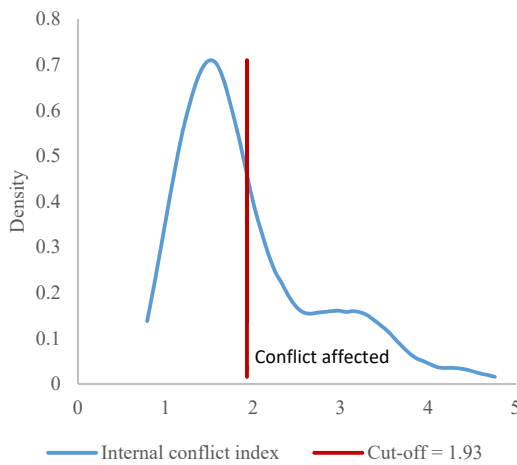
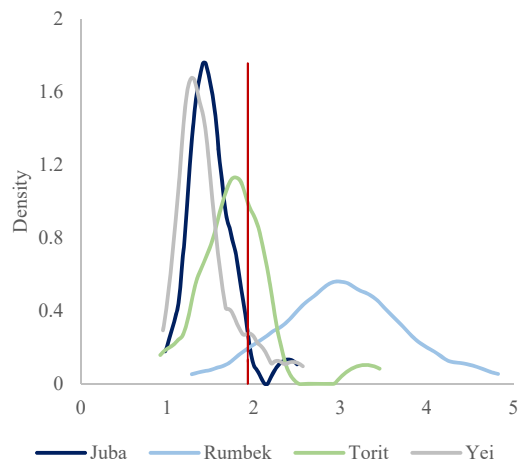


Figure 8: Density plot of the internal conflict indicator per area.



3.2. External conflict indicator

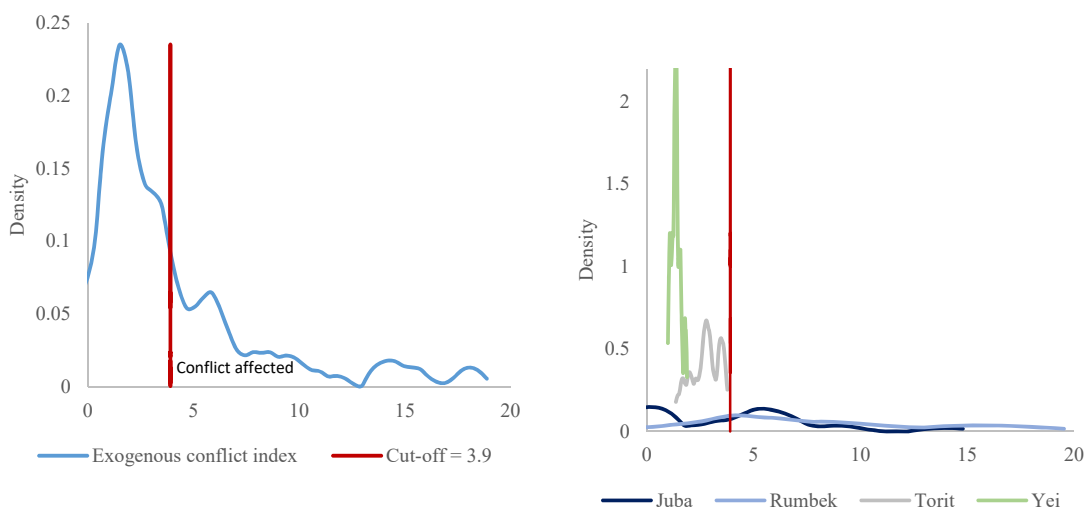
We construct an external conflict indicator using data from Armed Conflict Location & Event Data (ACLED) project in addition to a self-reported conflict index (see 4. Construction of external conflict indicator for more information on this data set). There are two reasons why the self-reported conflict exposure index might be biased. First, there could have been cases of extreme under- or over-reporting induced by fear or differences in perception. This pattern of extreme reporting is evident considering the spread of the conflict index. Secondly, only 75 percent gave consent to answering the

⁴ The binary variable is more intuitive for a difference-in-difference approach, so results using a continuous variable are reported in the Appendix.

conflict questions, potentially leading to an additional source of bias through self-selection. Thus, it could bias the estimation results from a cluster-level difference-in-difference analysis. Therefore, we also construct an external conflict indicator.

Similar to the internal conflict indicator, slightly over a third of the girls were exposed to conflict according to the external indicator. Like the binary internal indicator, the average of the continuous external indicator is used to identify clusters exposed to conflict. Based on this cut-off, 34 percent of all girls were exposed to conflict (Figure 9). This measure only categorized clusters in Juba and Rumbek as conflict exposed (Figure 10).

Figure 9: Density plot of external conflict indicator. **Figure 10: Density plot of external conflict indicator by area.**



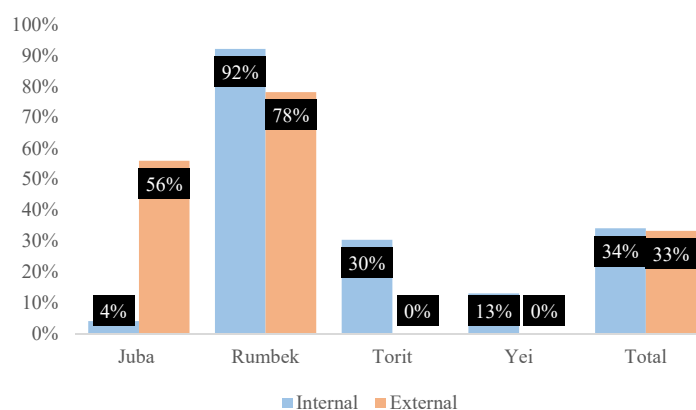
Except for education, average characteristics for girls exposed to conflict and those not exposed are similar for both the internal and external indicator. On average, girls exposed to conflict were slightly younger, had more household members, had lived in their residence longer, and participated in more Income Generating Activities (IGAs) than girls not exposed to the conflict (Table 3). Most of the differences are statistically significant but minor, except the household size, with girls exposed to conflict were from much larger households than girls who were not exposed to conflict. Household size is also correlated with poverty, so girls exposed to conflict may also be poorer (World Bank 2016). On average, conflict exposed girls are less educated when using the internal indicator but more educated when using the external indicator.

Table 3: Characteristics of girls exposed and not exposed to conflict.

	Characteristics (mean)	Years at		Years of education	Number of IGAs	
		Age	HH size			residence
Internal	Not exposed	22.4	8.7	5.4	7.9	0.8
	Conflict exposed	21.5	12.6	5.9	7.3	1.1
External	Not exposed	22.3	8.8	5.4	7.4	0.9
	Conflict exposed	21.5	12.5	6.0	8.4	1.0

While both indicators have some caveats, they are both complementary. According to both indicators, about 1 in 3 girls were exposed to the conflict. Rumbek had the highest percentage of conflict exposed clusters (92 and 78 percent respectively) and the highest percentage of non-consent to conflict questions (Figure 11 and Figure 2). Therefore, households that were most affected may also have been unwilling to respond to conflict questions. The correlation between the internal and external indicator is significant and positive ($P < 0.1$). The moderate correlation coefficients further warrant the claim that the self-reported index measured the self-perceived exposure to conflict while the external index provides a more objective but also less nuanced indication of conflict exposure.

Figure 11: Percentage of clusters categorized as conflict-affected.



3.3. Outcome Indicators

The dependent variables for the analysis are individual level outcome indicators. These variables cover a range of economic, social, and household condition indicators. A total of 27 outcome variables are

selected from categories such as education, income generating activities, savings, marriage, aspirations, empowerment and household characteristics (Table 8 in the Appendix).⁵

We apply the one-way ANOVA test, to check if means for all 27 outcome variables are statistically different across clusters (Table 9 to Table 22 in the Appendix). Means being similar implies that there is low variability in the outcome variable across all clusters, which prevents us from significantly evaluating the impact of conflict on outcome variables. The test is applied to both the baseline and endline outcomes.⁶ We observe that all outcome means are statistically and significantly different from each other.⁷

4. Methodology

We apply a difference-in-difference approach to compare outcomes for girls exposed to the conflict versus girls who were not. This method is appropriate when there are before-and-after time periods and two groups: one that is subject to the treatment, and another which is subject to all the other influences on the treatment group except the actual treatment itself (Meyer 1995). This eliminates pretreatment differences in the outcome variable and controls for anything that also changes over time and affects both groups. Therefore, the difference-in-difference estimates we report rely on the assumption that the differences in the outcomes between girls would be similar across conflict-affected and non-affected clusters had the conflict not happened.

More specifically, the difference-in-difference estimator β_3 in equation 1 is computed by comparing the first-differenced values of the outcome for the treatment and control groups. The treatment

⁵ Only those indicators were chosen which were present in both the endline and the baseline data sets. While most of the indicators were directly recorded through the questionnaire, some of the indicators have been derived through algebraic manipulations of other variables.

⁶ For each variable, an analysis of variance is performed on the absolute deviations of values from the respective group means. If the P-value is less than 0.05, the hypothesis of homogeneous means is rejected. In addition to the ANOVA F statistic, we also report the Levene's test for equality of variances and the Brown-Forsyth test statistic, where the ANOVA is performed on the deviations from the group medians.

⁷ The discrepancy between the Levene's statistic and Brown-Forsythe statistic can be explained by the fact that the Brown-Forsythe analysis assumes a non-normal distribution as it takes into account the cluster medians rather than the means.

group in this case are the girls exposed to the conflict C while the control group are the girls who were not exposed to the conflict NC . The average outcome \bar{y} in period 0 is subtracted from its average value in period 1 for both groups. The outcome differences for the control group are then differenced from the treatment group, which gives us the difference-in-difference estimate. The purpose of a difference-in-difference approach is to analyze whether the estimate β_3 is statistically and significantly different from zero.

To estimate the difference-in-difference effect of self-reported conflict exposure, we use an ordinary least squares (OLS) regression model:

$$Y_{it} = \beta_0 + \beta_1 \text{post}_t + \beta_2 \text{conflict}_i + \beta_3 \text{post}_t * \text{conflict}_i + \varepsilon_{it} \quad [1]$$

where Y_{it} is the outcome variable of adolescent girl i at time t . post_t is a binary variable indicating time period t (pre- or post-conflict) and conflict_i is the binary or continuous treatment variable, indicating conflict exposure of cluster i . ε_{it} is the error term.

β_1 is the expected mean change in outcome from before to after the conflict among the control group. The coefficient of the treatment variable, β_2 , is the estimated mean difference in the outcome between the treatment and control groups prior to the conflict: it represents whatever baseline differences existed between the groups before the group was exposed the conflict. β_3 by itself is the difference-in difference estimator, and hence, the coefficient of interest.

However, the baseline model might still suffer from omitted variable bias as there are other confounding factors affecting the given outcome variables besides time-period and conflict exposure. Therefore, the following model is estimated:

$$Y_{it} = \beta_0 + \beta_1 \text{post}_t + \beta_2 \text{conflict}_i + \beta_3 \text{post}_t * \text{conflict}_i + \beta_4 X_{it} + \beta_5 \text{cluster} + \varepsilon_{it} \quad [2]$$

where X_{it} is a vector of control variables for girl i at time t and cluster is a cluster-level fixed effect to control for variation within clusters.

5. Results

The regression model formulated in equation [2] is used to analyze the effect of conflict exposure on various socio-economic outcomes at the individual and household level. We run the regression for each of the 27 outcome variables presented earlier using the self-reported and external conflict exposure indices (results from continuous variables are reported in Table 23 to Table 29 in the

Appendix). An overview of the regression coefficients for the binary self-reported and external conflict variable is provided (Table 4).

Table 4: Overview of regression results for each outcome indicator and conflict variable.

Dimension	Outcome	Internal conflict indicator	External conflict indicator
Education	Enrolled	-0.03	-0.05
	Dropped out	0.01	-0.02
	Years education	0.24	1.13*
	Years before dropping out	-0.04	1.07*
Household Characteristics	Current savings	-0.08*	-0.16**
	Savings from 2 weeks	-0.02	-0.01
	Total savings	-0.23	-0.24
	People per room	0.73**	-0.133
	Food scarcity index	0.58*	-0.34
	Household asset index	-3.59***	-1.33
	Toilet	-0.16**	-0.30***
	Good walls	-0.08**	-0.10***
	Good roof	-0.01	0.04
	Household monthly income	0.26	-0.32
Income generating activities (IGAs)	Number of IGAs	0.13	-0.35***
	Individual monthly income	-0.12	0.24
	Control index	0.15	-0.03
	Entrepreneurial potential	1.01***	1.01**
	Satisfaction	0.056	0.02
Marriage	Empowerment	0.14	0.60***
	Married	0.07*	0.20***
	Pregnant	-0.09***	-0.12**
	Daughter optimist	-0.03	-0.07
	Lost pregnancy	-0.05**	-0.12***
Aspirations	Children	-0.01	0.06
	General anxiety	0.52*	0.97***
	Ladder position	-1.38***	-1.13***

*** p<0.01, ** p<0.05, * p<0.1

Conflict had a significant positive effect on the number of years in education and the number of years before dropping out. Transient education outcomes such as enrollment were not significantly impacted by the conflict, as both are often only affected in the short-term after a conflict event. However, conflict had a significant positive effect on the number of years in education and the number of years before dropping out. Specifically, girls in conflict affected areas completed an additional year of education than girls who were not in conflict affected areas. Juba is the only area for which the conflict significantly increased years of education (Table 5). A sorting effect is a likely explanation as most of the girls who had spent less than 3 years at the current residence were from Juba (Table 5). Additionally, most girls that reported a member leaving due to the conflict were also from Juba (Figure

5). Thus, families with higher education may have recently migrated to Juba and lower educated girls might have left due to the conflict, resulting in an overall average increase in girls' education after the conflict.

Table 5: Impact of the external conflict indicator on years of education by area.

Dimension	Outcome	Rumbek	Juba
Education	Years education	0.148	1.321**
	Years before dropping out	1.324	1.491***

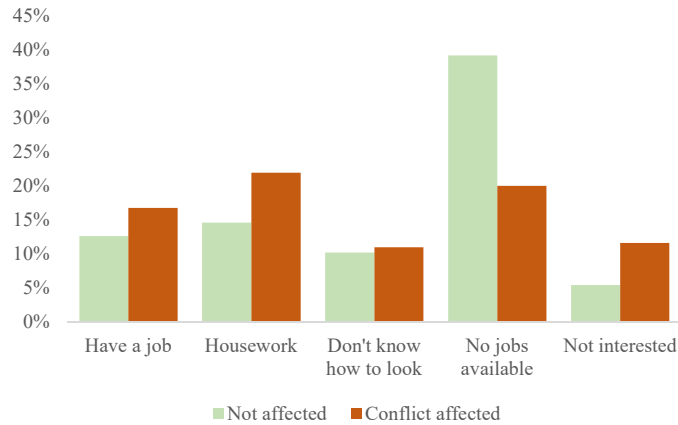
We find a significant negative effect of conflict on current savings. Girls exposed to the conflict were about 10 percent less likely to report any current savings compared to girls who were not exposed to conflict. This finding is consistent for both the internal and external conflict indicator. In the context of violence, looting and damage to households, savings can be used to complement consumption or repair the damage. However, the impact on total savings is not statistically significant although large and negative.

The conflict negatively affected household's socioeconomic indicators such as food security, assets and the physical condition of the house. The effect on household income is uncertain. Specifically, girls in conflict affected areas lost assets, toilets and good walls while they had to use fewer rooms for more people, and suffered from increased food scarcity after the conflict. The negative impact of conflict on food security is widely documented (Cohen and Per Pinstrup-Andersen 1999). The effect on toilets and walls is consistent for both the internal and external indicator. The losses of assets, the increased number of people per room and increased food scarcity are only impacted by the internal conflict indicator, potentially as it measured conflict exposure in a more nuanced way than battles but includes looting.

Engagement of girls in income generating activities (IGAs) is significantly negatively impacted by the conflict. In this case, being exposed to a conflict event resulted in girls participating in fewer IGAs. No statistically significant estimate was found for the impact on individual monthly income. Heightened insecurity might have constrained girls' mobility and ability to conduct paid work outside the home, resulting in more time spent on domestic tasks. Girls in conflict affected areas mostly reported housework as the reason for not having a job (23 percent) whereas girls in areas not affected by the

conflict mostly reported the unavailability of jobs (38 percent) (Figure 12).⁸ Thus, it is likely that an increase in housework may have substituted income generating activities for girls in conflict affected areas.

Figure 12: Most common reasons for being unemployed.



The entrepreneurial potential index increased for girls in conflict-affected areas for both the internal and external conflict variables. The index is a score from 1 to 10 and comprises of self-perceived scores related to various future business opportunities.⁹ On average, conflict increased girls’ entrepreneurial potential index by about 10 percent. Conflict may lead to girls perceiving greater business opportunities and to consider entrepreneurial activities as a resilience mechanism. However, the negative impact of conflict on IGAs indicates that the entrepreneurial potential is – currently – not activated. A tension between expectation and reality can explain this disconnect, such that the expectation and interest in taking up employment opportunities increase but the ability and opportunity to undertake income generating activities decrease.

Conflict increased the likelihood of girls being married. Conflict increases uncertainty and insecurity, thereby incentivizing either voluntary or forced marriage as families marry off daughters or girls engage in marriage to increase safety and economic security. This is common practice in the context

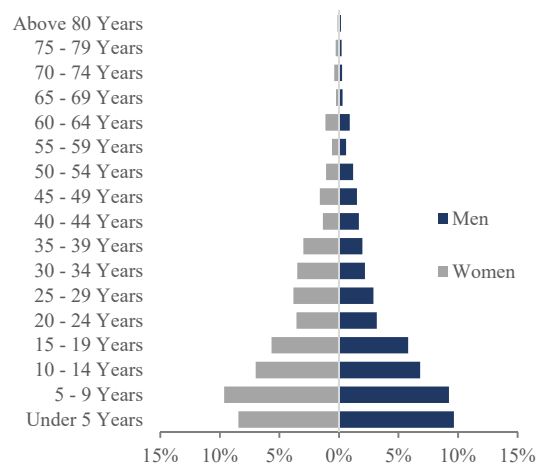
⁸ An accurate comparison cannot be made as the baseline and endline surveys had different questions and answer options regarding unemployment. Furthermore, these responses are the top five most common responses from a range of many.

⁹ For more details, consult 6. Entrepreneurial potential index in the Appendix.

of displacement (IRC 2015). In some circumstances, women and girls who are sexually assaulted are forced to marry their perpetrators to avoid social stigma (Elia 2007). In South Sudan, sexual assault and abduction have been used as a means to initiate marriage while circumventing high bride prices (Amnesty International 2017). While the questionnaire does not capture indicators of gender-based violence due to ethical concerns, the conflict increased gender-based violence (Scott et al 2013).

Conflict affected girls were less likely to be pregnant than girls not affected by conflict. In the context of South Sudan, high rates of male mortality or morbidity due to conflict, the general absence of men from home areas due to abnormal migration or engagement in combat are contributing factors. Population statistics indicate the absence of men in the respective age groups (Figure 13). Additionally, fertility rates may be impacted by additional factors, including poor nutritional status and maternal stress, which serve to lower fecundity and increase spontaneous abortions (Blanc 2004).

Figure 13: Population distribution, 2016.



Source: High Frequency Survey South Sudan Wave 4, 2016.

Conflict affected girls had higher empowerment scores.¹⁰ With the absence of men, girls might have recently assumed responsibility as head of household and responsibility for household decision making. Similarly, men may be spending most of their time outside the house fighting or looking for sources of income, which may have resulted in women taking more control of the household. This

¹⁰ The empowerment score considers 7 questions relating to gender roles within the household, such as ‘Who should earn money for the household? – Men, Women, Both?’.

result is consistent with girls exposed to the conflict reporting higher entrepreneurial scores. Even though girls took up fewer employment activities and faced a reduction in savings and household assets, they may have felt more accountable due to the added responsibilities they face after conflict. Lastly, the conflict increased general anxiety and lowered the expected ladder position in 5 years by at least 1 level.¹¹ These results are consistent for both the internal and external conflict variable. Women are often more vulnerable than men to Post-Traumatic Stress Disorder (PTSD) and anxiety disorders when exposed to the same traumatic event (Ayazi et al 2014). Similarly, the lowered aspirations could be driven by psychosocial impacts including trauma. As conflict leads to an increase in anxiety levels, this in turn may decrease an individual's expected ladder position standing in the next 5 years. Additionally, conflict increases uncertainty about the future and increases expectations of future conflict, which can also explain lowered aspirations.

6. Conclusion

This study contributes to available empirical evidence on micro-level impacts of conflict by analyzing the effects of the 2013 conflict on adolescent girls in South Sudan. Our analysis provides evidence on the negative effect of conflict exposure on various outcomes for girls such as employment opportunities, marriage-related outcomes, and the physical household condition. These results provide some perspective on both economic and social costs of the conflict, which can ideally be leveraged to inform design and evaluation of policies and programming intending to remediate the negative effects of conflict.

About half of the results were consistent when using self-reported and external conflict indicators. Here, it is important to revisit the caveats in both indicators. The self-reported indicator uses self-reported measures to assess exposure to traumatic events, where inconsistencies in recall and exaggerated responses can produce a bias (Southwick et al., 1997). Additionally, the political climate may have contributed to respondents not fully trusting interviewer intentions. Given the renewed conflict in some of the border areas of South Sudan and the recent independence, it is possible that

¹¹ Anxiety was measured by constructing an index that incorporates if a girl worries about her job, husband, money and violence. Ladder position here indicates (on a 1 to 10) the scale of how good or bad one's life is, so the 10th ladder is the best possible life scenario while the 1st one is the worst. In this case, the question asked about what the assumed ladder position would be 5 years later.

heightened caution within communities affected responses among those surveyed. This is consistent with the fact that Rumbek has the highest self-reported and external conflict exposure measure and also the lowest consent rate from the other three counties. While the external indicator is used to mitigate these biases, it may be an underestimated indicator of conflict exposure as it only includes deadly events that were reported. The self-reported conflict variable is relatively more precise as it is comprised of a wide range of micro-level conflict exposure variables and captures specific types of damage which are not reflected in the ACLED data. For these reasons, we use both external and self-reported indicators to inform our analysis.

The impacts of the ongoing conflict are overwhelming, and action must be taken immediately to prevent them from escalating. One important policy implication from this study is that adolescent girls and young women are an important resource for economic engagement and empowerment and that economic and business development initiatives should include criteria for targeting and incentivizing participation of this particular demographic in economic activities. Adolescent girls exposed to conflict reported higher empowerment and entrepreneurial index scores, indicating willingness to work and start businesses in the future. Creating such opportunities for girls would, in turn, have the potential to contribute to economic growth and poverty reduction, as well as address pervasive conditions of income inequality among the poor and among the overall population (Acharya 2008). Targeted programming to support and incentivize girls' economic engagement further improves household food security and economic welfare. Depending on the types of activities in which girls choose to engage, an integrated approach that enables a school-to-work transition through both livelihoods and skills development, as well as with cognitive and non-cognitive skills training interventions would prove especially useful.

That said, increasing economic opportunities alone are not enough to improve the well-being of girls. The findings in this paper also help improve our understanding of the longer-term psychosocial consequences of conflict. For example, lowered aspirations and high anxiety during early years have been linked to worsening economic outcomes in adulthood (Powell and Butterfield 2003; Reigle-Crumb, Moore, and Ramose 2011). Additionally, the issue of early and likely forced marriage is a prevalent feature of South Sudan, as are other dimensions of gender-based violence (IRC and GWI, 2017). These challenges highlight the need for interventions that focus on increasing access to education services in part to enable improved employment opportunities, building capacity for provision of psychosocial and mental health services, and wider prevention programming addressing pervasive and challenging social norms that perpetuate among other issues violence or harmful

practices impacting in particular women and girls. In terms of addressing issues of trauma and PTSD, currently, despite enormous need, there are few providers for psychosocial or mental health services in South Sudan, with the exception of select services provided by non-governmental organizations. The principal delivery mechanism of health services in South Sudan is through a basic package of health services funded by the Government of South Sudan and international donors and provided by non-governmental organizations (Robert, Guy, Sondorp and Lee-Jones 2008). Besides scaling up these services, training of health care staff and community workers to provide basic psychosocial care or mental health support, and also to train up and enable community-based self-help support groups should also be explored (van Ommeren, Saxena and Saraceno 2005).

Without improved services and protections, it is likely that the impacts of conflict will continue to be severe particularly for vulnerable groups such as adolescent girls and young women, with dire implications for social and economic functioning of the girls themselves, as well as for their family. Immediate aid and targeting during the ongoing conflict is needed, but so is the protection of marginalized groups and long-term efforts to secure future outcomes for the people of South Sudan.

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Appendix

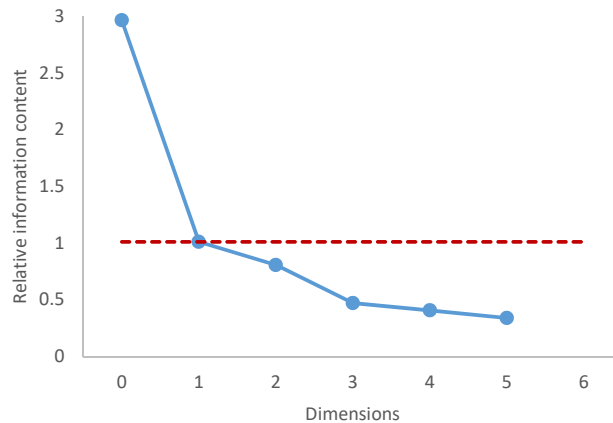
1. Construction of self-reported conflict indicator

The variables in the conflict exposure module of the questionnaire are used to construct a composite index to measure exposure to the conflict, using principal component analysis (PCA).¹² Constructing an index is useful as it captures key dimensions of multiple variables and makes it easy to use and interpret in regression analyses. As there are six conflict exposure variables of interest, PCA can identify key dimensions with the most variability.¹³ For the PCA, the endline sample is restricted to respondents who provided consent to answer the questions in the conflict exposure module, and have stayed at their current residence for at least 3 years. The scree plot shows a break after the steepness at the second component, where it is evident that the first component captures the most variability. The first component of the PCA is chosen as it captures about half the variation (Figure 14). The resulting index obtained for each household is normalized, and standardized to a scale of 1 to 10.

¹² The central idea of principal component analysis (PCA) is to reduce the dimensionality of a data set consisting of a large number of interrelated variables, while retaining as much as possible of the variation present in the data set. For more information please read I. T. Jolliffe, *Principal Component Analysis* (Springer-Verlag, New York, 1989).

¹³ The PCA produced 6 components. The first component has an eigenvalue of close to 3, and captures 49.4% of the total variation, while the second component has an eigenvalue of approximately 1, and captures 16.9% of the total variation.

Figure 14: Relative Information in PCA dimensions.



2. Analysis of Variance (ANOVA) results for conflict variables

We use a one-way Analysis of Variance (ANOVA) to test whether conflict index means and input variable means are statistically significant across clusters (Table 6).^{14,15} The results suggest a significantly larger variation between clusters than within clusters for each of the measured variables.¹⁶ Thus, the conflict exposure indicators are able to reflect the geospatial exposure of conflict where nearby households are usually co-exposed to conflict. Given that the conflict affected some areas a lot more than others, this is not surprising. In addition, this is encouraging for a cluster-level difference-in-difference approach.

A simple one-way ANOVA does not specifically indicate which clusters display significant differences with the within and between cluster variability. Post hoc tests reported at the cluster level identify the

¹⁴ ANOVA uses the F-test to statistically test the equality of means. The F statistic is based on the ratio of the variation between cluster means against the variation within the clusters. In order to reject the null hypothesis that the cluster means are equal, a high F-value or a P-value below 0.05 is needed. If the cluster means do not vary, or do not vary by more than random chance allows, then we cannot be confident about the means being different.

¹⁵ Since we restricted the sample to a set of households who consented to respond to the survey module on conflict exposure, and had stayed at the current place of residence for at least 3 years, there are unequal number of clusters in each area, and unequal number of households in each cluster.

¹⁶ The results are confirmed by a simulation where the cluster is randomly assigned to respondents. The simulation retrieved non-significant p-values.

clusters with significant difference in the within and between cluster variability, and the respective levels of significance (Table 7).¹⁷ About 40 percent of all the clusters show a statistically significant difference in the within and between cluster variability and most of these clusters are in Rumbek.

Table 6: Results of one-way ANOVA for Conflict Index and other input variables.

	W/t Group Squared Sum (SS)	W/t Group Degrees of Freedom (DOF)	B/w Group Squared Sum (SS)	B/w Group Degrees of Freedom (DOF)	F Stat	P Value
Conflict Index	840.76	90	2548	1601	5.868	<0.01
Household Looted	54.807	90	196.49	1601	4.962	<0.01
Other Household Looted	64.954	90	218.45	1601	5.289	<0.01
Household Damaged	31.553	90	156.13	1601	3.595	<0.01
Number of Members Harmed	1.562	90	10.088	1601	2.754	<0.01
Number of Members Died	1.231	90	9.13	1601	2.398	<0.01
Members Left	40.639	90	221.32	1601	3.266	<0.01

¹⁷ The cluster ID's have been codified, with numerical ID's for each cluster. The cluster ID's from 10000+ are correspond to clusters in Juba province, those with ID's 20000+ are in the Rumbek province, those with ID's 30000+ are in Torit province, and those with ID's 40000+ are in the Yei province.

Table 7: Post hoc results of ANOVA for Conflict Index, grouped by clusters.

CLUSTER ID	COEFFICIENT	STANDARD ERROR
10002	-0.416	0.316
10003	0.586*	0.307
10004	-0.244	0.299
10005	-0.314	0.307
10006	-0.296	0.322
10007	-0.037	0.313
10008	-0.354	0.303
10009	-0.386	0.299
10010	-0.484	0.299
10011	-0.203	0.299
10012	-0.376	0.297
10013	-0.114	0.326
10014	-0.242	0.299
10015	0.029	0.313
10016	-0.604**	0.307
10017	-0.097	0.313
10018	-0.120	0.326
10019	-0.095	0.299
10020	0.040	0.305
10021	1.322***	0.333
10022	-0.270	0.299
10023	-0.062	0.305
10024	0.030	0.310
20001	1.541***	0.393
20002	0.915***	0.343
20003	1.383***	0.307
20004	0.894***	0.329
20005	0.553*	0.301
20006	0.933**	0.431
20007	0.117	0.297
20008	1.237***	0.338
20009	1.488***	0.568
20010	0.805**	0.319
20011	0.303	0.297
20012	1.799***	0.326
20013	1.495***	0.333
20014	0.892**	0.374
20015	0.919***	0.319
20016	0.978**	0.448
20017	1.078**	0.431
20018	1.793***	0.383
20019	1.294***	0.374
20020	0.976**	0.383
20021	0.560	0.404
20022	1.216***	0.307
20023	-0.204	0.307
30001	0.151	0.305
30002	-0.225	0.416
30003	0.212	0.303

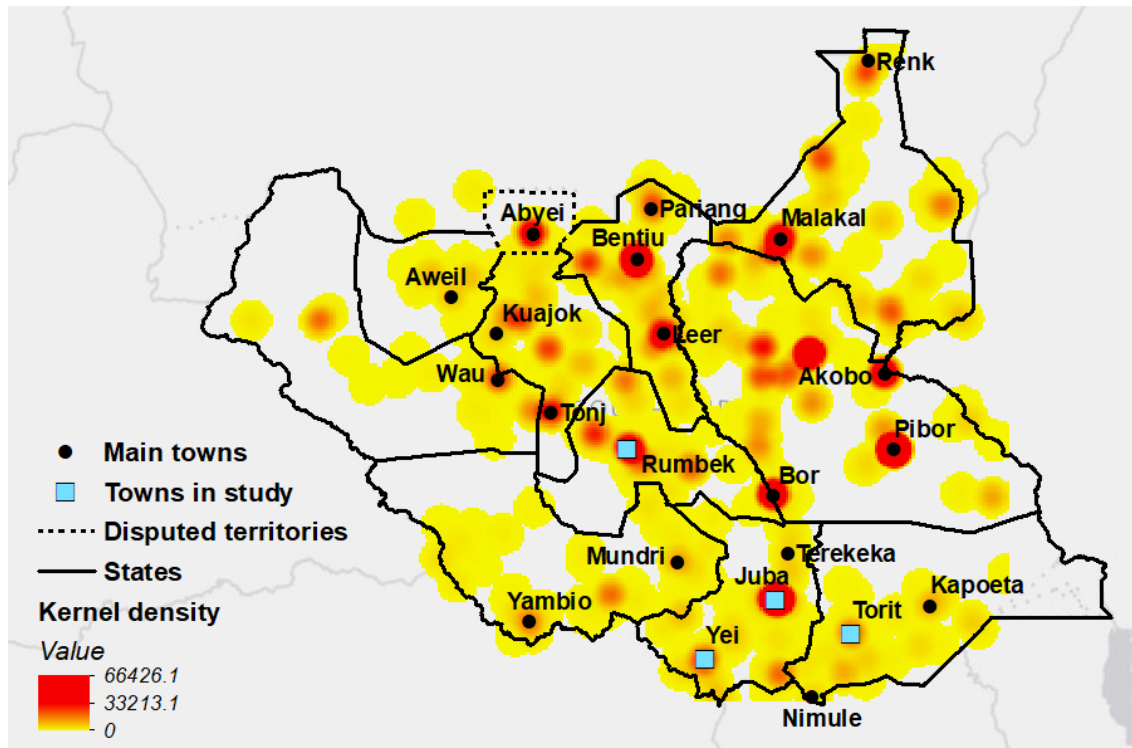
30004	0.612*	0.354
30005	-0.034	0.374
30006	-0.119	0.301
30007	-0.356	0.305
30008	0.325	0.431
30009	0.177	0.343
30010	0.133	0.338
30011	-0.151	0.319
30012	-0.537*	0.313
30013	0.197	0.367
30014	-0.124	0.367
30015	-0.151	0.305
30016	0.026	0.448
30017	0.104	0.404
30018	-0.306	0.316
30019	0.051	0.307
40001	-0.400	0.393
40002	-0.142	0.299
40003	-0.587*	0.303
40004	-0.456	0.322
40005	0.098	0.301
40006	0.064	0.297
40007	-0.542*	0.297
40008	-0.740**	0.297
40009	-0.240	0.322
40010	-0.049	0.305
40011	-0.510*	0.305
40012	-0.502*	0.301
40013	-0.499*	0.301
40014	-0.593*	0.338
40015	-0.284	0.305
40016	0.534*	0.307
40017	-0.348	0.333
40018	-0.068	0.316
40019	0.529	0.333
40020	-0.434	0.310
40021	-0.361	0.299
40022	-0.095	0.303
40023	-0.654**	0.322
40024	-0.254	0.322
40025	-0.291	0.305
cons	1.782***	0.221

(*** $P < .01$, ** $P < .05$, * $P < 0.1$)

3. Construction of external conflict indicator

The external indicator is based on conflict event data from the ACLED Project between December 2013 and January 2015. The data set codes the exact location of all political violence incidents that were reported during this time period.¹⁸ For the selected time period there were 1,200 reported conflict events in South Sudan with a total of 9,209 fatalities. Most of the conflict is concentrated in the Northern part of South Sudan, particularly around Rumbek (Figure 15). This is consistent with Rumbek's high conflict exposure index average.

Figure 15: Location of conflict events in South Sudan between December 2013 and January 2015.

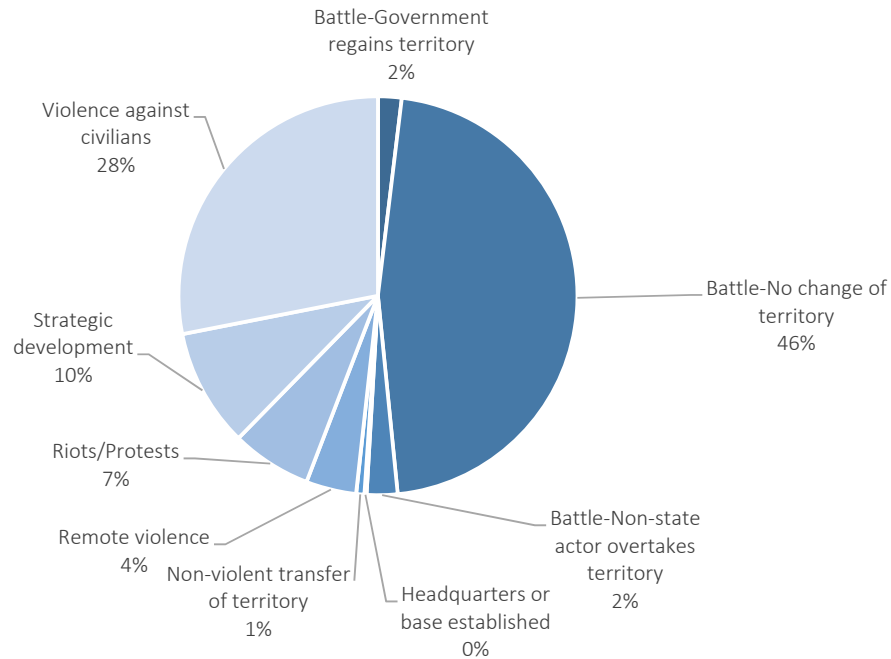


The ACLED data show that 465 of the reported conflict events (36 percent) were deadly and resulted in at least one fatality. Almost half of all reported conflict events (48 percent) were battles between

¹⁸ Political violence is the use of force by a group with a political purpose or motivation. ACLED defines political violence through its constituent events, the intent of which is to produce a comprehensive overview of all forms of political conflict within and across states. A politically violent event is a single altercation where often force is used by one or more groups to a political end, although some instances - including protests and non-violent activity - are included in the data set to capture the potential pre-cursors or critical junctures of a conflict.

the government and non-government forces. Violence against civilians was committed in 28 percent of all events (Figure 16).

Figure 16: Conflict events by type



Distance to a deadly conflict event is used to generate an external conflict exposure variable. The averages of latitude and longitude of all households in a cluster in the AGI survey are used to compute cluster GPS coordinates. By merging the girls' households GPS coordinates with the conflict event GPS coordinates, the distance between each cluster-conflict event pair is calculated. The continuous indicator is the normalized sum of the distances of all fatal conflict events within a radius of 5 km from the cluster.

4. Outcome variables

Table 8: Outcome variables

Variable	Description
Education	
Enrolled	Whether respondent is currently enrolled in school
Dropped out	Whether respondent dropped out from school
Years dropped out	Number of years of schooling completed by those in school
Years Education	Number of years of education completed by respondent
IGA	
Number of IGAs	Number of income generating activities currently being undertaken
Individual monthly income	Log of total income from all IGA's in the last month for the individual
Savings	
Current savings	Whether respondent has current savings
Savings from 2 weeks	Whether respondent has savings from the past 2 weeks
Total savings	Log of total savings at multiple locations
Marriage	
Empowerment	Standardized index of empowerment post marriage
Married	Whether respondent is currently married
Pregnant	Whether respondent is currently pregnant
Daughter optimist	Whether respondent sees a better future for their daughter
Lost pregnancy	Whether respondent has lost a pregnancy
Children	Whether respondent has a child
Aspirations	
General anxiety	Summative index of respondents to variables related to feelings of anxiety
Ladder position	Standardized index of difference between ladder position now vs. expected position 5 years in future
Empowerment	
Control Index	First dimension of MCA of variables relating to control over resources
Entrepreneurial potential	Summative index of binary variables relating to entrepreneurial potential
Satisfaction	Summative index of ordinal variables relating to level of satisfaction with status quo
Household Characteristics	
People per room	Number of occupants per room in household
Food scarcity index	Standardized index of food scarcity in household
Household asset index	First dimension MCA of household asset ownership variables
Toilet	Quality of toilet facilities
Good walls	Quality of walls' construction material
Good roof	Quality of roof construction material
Household monthly income	Log of total income from all IGA's in the last month for the household

5. Analysis of Variance (ANOVA) results for outcome variables

Table 9: Education outcome indicators in the baseline survey.

	W/t Group SS	W/t Group p DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown- Forsythe P Value
Enrolled	110.081	95	654.855	3070	5.432	0.01	0.01	0.01
Dropped Out	145.844	95	617.229	3070	7.636	0.01	0.01	0.01
Years Dropped out	1345.189	94	8974.607	1050	1.674	0.01	0.01	0.66
Years Education	5176.14	95	83146.01	2526	1.655	0.01	0.01	0.01

Table 10: Education outcome indicators in endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown- Forsythe P Value
Enrolled	36.679	90	568.977	3046	2.182	0.01	0.01	0.01
Dropped Out	66.276	90	327.884	1488	3.342	0.01	0.01	0.054
Years Dropped out	2699.402	90	16236.45	1587	2.932	0.01	0.06	0.568
Years Education	2809.585	90	23010.52	2407	3.265	0.01	0.117	0.368

Table 11: Income generating outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown- Forsythe P Value
Number of IGAs	259.78	95	1728.461	3123	4.941	0.01	0.01	0.01
Log of Last Month Income (Ind)	1775.793	95	14014.28	3115	4.155	0.01	0.01	0.01

Table 12: Income generating outcome indicators in the endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown- Forsythe P Value
Number of IGA	415.69	90	1643.674	3046	8.559	0.01	0.01	0.01
Log of Last Month Income (Ind)	4304.374	90	19612.96	3028	7.384	0.01	0.01	0.01

Table 13: Savings outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown- Forsythe P Value
Log of Total Savings	1523.374	95	12453.6	2913	3.751	0.01	0.01	0.01
Savings	76.855	95	604.839	3035	4.059	0.01	0.01	0.01
Saved (last 2 Weeks)	55.314	95	191.983	903	2.739	0.01	0.01	0.428

Table 14: Savings outcome indicators in the endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levene's P Value	Brown- Forsythe P-Value
Log of Total Savings	2094.889	90	23342.35	3046	3.037	0.01	0.01	0.126
Savings	74.481	90	700.718	3046	3.597	0.01	0.01	0.043
Saved (last 2 Weeks)	54.076	90	666.052	3046	2.748	0.01	0.01	0.001

Table 15: Marriage related outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes Value	P	Brown- Forsythe P Value
Empowerment Index	1549.454	95	10211.77	3123	4.988	0.01	0.01		0.01
Married	96.578	95	619.706	3050	5.003	0.01	0.01		0.01
Loss of Pregnancy	5.162	95	75.652	3055	2.194	0.01	0.01		0.01
Children	90.438	95	596.643	3063	4.887	0.01	0.01		0.01
Pregnant	29.498	95	291.167	2765	2.949	0.01	0.01		0.01
Daughter's Future	50.101	95	706.791	3123	2.33	0.01	0.01		0.005

Table 16: Marriage related outcome indicators in the endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levene's Value	P	Brown- Forsythe P-Value
Empowerment Index	1693.787	90	12830.28	3046	4.468	0.01	0.01		0.003
Married	48.409	90	717.224	3045	2.284	0.01	0.01		0.514
Loss of Pregnancy	14.202	90	192.946	3046	2.491	0.01	0.01		0.01
Children	44.175	90	715.71	3045	2.088	0.01	0.01		0.844
Pregnant	11.423	90	268.735	3045	1.438	0.005	0.01		0.005
Daughter's Future	26.717	90	290.427	3046	3.113	0.01	0.01		0.01

Table 17: Aspirations outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown-Forsythe P Value
Ladder position	1860.859	95	16113.65	3078	3.742	0.01	0.01	0.01
Anxiety Index	1799.872	95	8487.459	3123	6.971	0.01	0.01	0.01

Table 18: Aspirations outcome indicators in the endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levene's P Value	Brown-Forsythe P-Value
Ladder position	2491.977	90	14846.88	3045	5.679	0.01	0.01	0.01
Anxiety Index	1146.942	90	8140.725	3046	4.768	0.01	0.01	0.006

Table 19: Empowerment outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown-Forsythe P Value
Control Index	4324.301	95	38185.11	3084	3.676	0.01	0.01	0.01
Entrepreneurial potential	1728.217	95	11119.66	3080	5.039	0.01	0.01	0.01
Satisfaction Index	4582.776	95	11335.69	3034	12.911	0.01	0.01	0.01

Table 20: Empowerment outcome indicators in the endline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levene's P Value	Brown-Forsythe P-Value
Control Index	3673.948	90	42138.6	3046	2.951	0.01	0.01	0.01
Entrepreneurial potential	2833.924	90	8990.101	3045	10.665	0.01	0.01	0.01
Satisfaction Index	1942.864	90	5928.676	3045	11.087	0.01	0.01	0.01

Table 21: Household characteristics outcome indicators in the baseline survey.

	W/t Group SS	W/t Group DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levenes P Value	Brown-Forsythe P Value
People per room	1567.146	95	7182.065	2702	6.206	0.01	0.01	0.01
Good Roof	177.802	95	490.126	3051	11.651	0.01	0.01	0.01
Good Walls	52.282	95	370.449	3056	4.54	0.01	0.01	0.01
Toilet	83.993	95	533.509	3062	5.074	0.01	0.01	0.01
Food Scarcity Index	5724.042	95	34024.02	3041	5.385	0.01	0.01	0.01
HH Asset Index	57028.213	95	98049.49	3110	19.041	0.01	0.01	0.01
Log of Household monthly income	2784.587	95	18911.19	3109	4.819	0.01	0.01	0.01

Table 22: Household characteristics outcome indicators in the endline survey.

	W/t Group SS	W/t Group p DOF	B/w Group SS	B/w Group DOF	F Stat	P Value	Levene's P Value	Brown- Forsyth e P- Value
People per room	3827.57	90	19328.79	3040	6.689	0.01	0.01	0.01
Good Roof	228.645	90	550.473	3044	14.048	0.01	0.01	0.01
Good Walls	28.638	90	328.48	3044	2.949	0.01	0.01	0.01
Toilet	217.427	90	545.5	3044	13.481	0.01	0.01	0.01
Food Scarcity Index	7568.646	90	39438.33	3043	6.489	0.01	0.01	0.01
HH Asset Index	4996.458	90	5524.153	3044	30.591	0.01	0.01	0.01
Log of Household monthly income	4304.374	90	19612.96	3028	7.384	0.01	0.01	0.01

6. Entrepreneurial potential index

Read aloud: "Now we will talk about different tasks. You will rank your ability on how well you can do these activities on a scale of 0 to 10? 0 means you cannot do this activity and 10 is you definitely can"

1. Run your own business
2. Identify business opportunities to start up new business
3. Obtain credit to start up new business or expand existing business
4. Save in order to invest in future business opportunities
5. Make sure that your employees get the work done properly
6. Manage financial accounts
7. Bargain to obtain cheap prices when you are selling anything for business (outputs)
8. Bargain to obtain high prices when selling
9. Protect your business assets from harm by others
10. Collecting the money someone owes you

The index is a simple average of the answer.

7. Regression results

Table 23: Impact of conflict on education.

Variables	Enrolled	Dropped out	Years education	Years dropped out
Internal binary	-0.0259 (0.0378)	0.0112 (0.0548)	0.244 (0.355)	-0.0416 (0.455)
	3,358	2,235	4,107	2,195
Internal continuous	-0.0410* (0.0227)	0.0510 (0.0341)	0.147 (0.287)	-0.00931 (0.323)
	3,358	2,235	4,107	2,195
External binary	-0.0510 (0.0415)	-0.0225 (0.0605)	1.127* (0.638)	1.070* (0.573)
	2,365	1,569	1,808	1,160
External continuous	-0.00752 (0.00503)	0.00397 (0.00784)	0.107 (0.0810)	0.151** (0.0757)
	2,365	1,569	1,808	1,160

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 24: Impact of conflict on savings.

Variables	Current savings	Saved two weeks ago	Total savings
Internal binary	-0.0837* (0.0450)	-0.0236 (0.0528)	-0.237 (0.171)
	4,165	2,557	1,453
Internal continuous	-0.0410* (0.0227)	-0.0212 (0.0342)	-0.186* (0.107)
	4,165	2,557	1,453
External binary	-0.163** (0.0619)	-0.0128 (0.0854)	-0.236 (0.255)
	1,847	1,356	896
External continuous	-0.0137 (0.00883)	-0.00155 (0.0100)	-0.0110 (0.0257)
	1,847	1,356	896

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 25: Impact of conflict on household conditions.

Variables	People per room	Food scarcity index	Household asset index	Toilet	Good walls	Good roof	Monthly household income
Internal binary	0.729** (0.304) 4,908	0.584* (0.347) 5,235	-3.593*** (0.664) 5,303	-0.159** (0.0734) 4,687	-0.0807** (0.0376) 4,716	-0.00499 (0.0363) 4,713	0.257 (0.301) 4,719
Internal continuous	0.502*** (0.178) 4,908	0.284 (0.222) 5,235	-2.372*** (0.332) 5,303	-0.154*** (0.0414) 4,687	-0.0455** (0.0222) 4,716	0.00842 (0.0249) 4,713	0.201 (0.168) 4,719
External binary	-0.133 (0.430) 2,336	-0.341 (0.456) 2,428	-1.330 (0.929) 2,454	-0.302*** (0.0571) 4,687	0.0958*** (0.0349) 4,716	0.0428 (0.0379) 4,713	-0.322 (0.186) 2,272
External continuous	0.0194 (0.0435) 2,336	-0.0568 (0.0458) 2,428	-0.198** (0.0893) 2,454	0.0261*** (0.00566) 4,687	0.00947** (0.00457) 4,716	0.00764* (0.00438) 4,713	0.0659*** (0.0180) 2,272

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 26: Impact of conflict on Income Generating Activities (IGAs).

Variables	Number of IGAs	Individual monthly income
Internal binary	0.134 (0.0933) 2,277	-0.123 (0.181) 2,277
Internal continuous	0.0327 (0.0518) 2,277	-0.0715 (0.115) 2,277
External binary	0.352*** (0.0835) 1,192	0.237 (0.227) 1,065
External continuous	-0.0217 (0.0136) 1,192	0.0240 (0.0290) 1,065

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 27: Impact of conflict on aspirations.

Variables	General	
	anxiety	Ladder position
Internal binary	0.521*	-1.378***
	(0.285)	(0.344)
	2,420	2,416
Internal continuous	0.476***	-0.882***
	(0.124)	(0.222)
	2,420	2,416
External binary	0.973***	-1.134***
	(0.251)	(0.378)
	2,420	2,416
External continuous	0.0914***	-0.106**
	(0.0319)	(0.0408)
	2,420	2,416

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 28: Impact of conflict on empowerment.

Variables	Control	Entrepreneurial	
	index	potential	Satisfaction
Internal binary	0.153	1.014***	0.0563
	(0.303)	(0.272)	(0.211)
	4,092	4,100	4,065
Internal continuous	0.150	0.643***	-0.000584
	(0.194)	(0.195)	(0.135)
	4,092	4,100	4,065
External binary	-0.0340	1.011***	0.0183
	(0.360)	(0.279)	(0.302)
	1,806	1,805	1,791
External continuous	-0.0156	0.0657	-0.0301
	(0.0423)	(0.0453)	(0.0330)
	1,806	1,805	1,791

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1

Table 29: Impact of conflict on marriage related outcomes.

Variables	Empowerment	Married	Pregnant	Daughter optimist	Lost pregnancy	Children
			-			
Internal binary	0.141 (0.242)	0.0726* (0.0383)	0.0864*** (0.0299)	-0.0342 (0.0359)	-0.0455** (0.0223)	-0.00444 (0.0424)
	4,209	4,201	4,010	4,250	4,210	4,216
			-			
Internal continuous	0.235* (0.128)	0.0678*** (0.0257)	0.0621*** (0.0180)	-0.0309* (0.0184)	-0.0475*** (0.0124)	0.00830 (0.0259)
	4,209	4,201	4,010	4,250	4,210	4,216
External binary	0.603*** (0.212)	0.197*** (0.0576)	-0.123** (0.0513)	-0.0730 (0.0506)	-0.117*** (0.0294)	0.0618 (0.0601)
	4,209	1,843	1,752	1,854	1,836	1,840
					-	
External continuous	0.0476** (0.0230)	0.0201*** (0.00594)	-0.0149** (0.00661)	0.00357 (0.00847)	0.00949*** (0.00306)	0.00230 (0.00525)
	4,209	1,843	1,752	1,854	1,836	1,840

Robust standard errors in parentheses

Number of observations below standard errors

*** p<0.01, ** p<0.05, * p<0.1



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