The Long-Term Effects of the Rwandan Genocide on Child Labor

Yoo-Mi Chin [*] Scott Cunningham [†] Pham Hoang Van [‡]

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Abstract

We estimate the long-term effect of the Rwandan genocide in 1994 on child labor using variation in genocide intensity across communes and child labor incidence across households from the 2010 Demographic Health Survey. We instrument for the number of killings at the commune with the distance from the commune to the Ugandan border. We find robust evidence that two decades later, the genocide has caused an increase in child labor (mainly in household work outside the home) and a decrease in schooling. One log-point (2.7 fold) increase in the number killings increased the probability of a child working outside the home by 0.02. Our empirical results suggest a long-term impact of the genocide on human capital development that is likely to contribute to Rwanda's underdevelopment in the future.

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[*]Assistant Professor of Economics, Hankamer School of Business, Baylor University, Yoo-Mi_Chin_baylor.edu.

[†]Associate Professor of Economics, Hankamer School of Business, Baylor University, Scott_Cunningham@baylor.edu

[‡]Professor of Economics, Hankamer School of Business, Baylor University, Van_Pham@baylor.edu.

1 Introduction

The 1994 Rwandan genocide was a dark period in history. In just about three months, an estimated 800,000 people were systematically killed, about 20% of the population of Rwanda and 70% of the Tutsi population. HIV infection resulted from the pervasive rape and many households were left with single mothers. The larger civil conflict between the Hutu majority and the Tutsis resulted in over 2 million displaced refugees. Twenty years after this tragedy, the long-term effects on health, education are still felt in Rwanda.

In this study, we focus on one particular long-term consequence of the geno-cide. We estimate the effect of the Rwandan genocide on child labor using the 2010 Rwanda Demographic Health Survey (RDHS). With geocodes from the RDHS, we are able to match clusters to pre-genocide communes which allow us to match es-timates on the number of killings from the Genodynamics project. To address the potential endogeneity arising from other commune-level factors that could be asso-ciated with both the intensity of the genocide and the incidence of child labor, we use distance from the commune to the Ugandan border as an instrument for geno-cide intensity. The motivation for this instrument comes a historical detail of the genocide. The genocide was part of the bigger civil conflict between the Hutu ma-jority government and the minority Tutsi-led Rwanda Patriotic Front (RPF). The RPF launched an offensive from its exile base to the north in Uganda in April of 1994 and marched into Rwanda, finally toppling the Hutu government in July. The three month span resulted in a pattern where more killings occurred the further one got from the Ugandan border. Distance thus generated an exogenous varia-tion in the number of killings with which we can use to estimate its causal impact on child labor. We also use household demographics and pre-genocide commune characteristics to control for other confounding factors.

We find that the genocide caused a positive statistically significant impact on child labor. One log-point (2.7 fold) increase in the number killings increases the probability of a child working outside the home by 0.027. This increase in child labor mainly comes from household chores work. Consistent with this result, school attendance falls with the increase in genocide intensity.

There are a number of possible mechanisms consistent with our results. First, the brutality and targeted nature of the genocide destroyed social institutions that might have led to subsequent state dysfunction including corruption and instability. This is likely to depress productive investment and economic exchange which leads to underperforming local economies. The resulting lower incomes force families to send children into the workforce (Basu and Van, 1998). Second, returns to educa-tion in such low-performing economies are likely to be low which reduce incentives for investments in human capital and thus increase incentives for children to work. Third, the genocide significantly reduced the ratio of men to women in Rwanda (see (La Mattina, 2012) and (de Walque and Verwimp, 2010)). In particular, more edu-cated men were disproportionately killed. This creates a lower return to education to both women and men in the marriage matching market and would contribute to less incentive for education. Our empirical result suggests a long-term impact of the genocide on human capital development that is likely to contribute to Rwanda's underdevelopment in the future.

Our paper contributes to the small but growing literature on the economic effects of the Rwandan genocide. Research by Yanagizawa-Drott (2014) and Friedman (2010) study the various determinants of the intensity of the genocide. Papers by Ciani and Giannelli (2011), Akresh and de Walque (2008), Verpoorten and Berlage (2007), La Mattina (2012) study the effects of the genocide on health, schooling, economic mobiity and domestic violence. We also contribute to a large literature on child labor. The theoretical literature include the seminal papers by Basu and Van (1998) and Robinson and Baland (2000). Empirical papers on child labor related to this paper include Emerson and andre Portela (2008) and Ray (2000).

In the next section we discuss the data and empirical methodology. We discuss the results in the subsequent section. That is followed by the conclusion.

2 Background

During the last half of the twentieth century, the number of countries that expe-rienced civil conflicts has steadily increased especially in developing countries. In the mid-1990s, for example, a third of all the countries in sub-Saharan Africa had armed conflicts. Despite its prevalence, persistence and critical role in economic development, armed conflict had long been a peripheral issue, and only recently has it become a part of mainstream interests in development economics (Blattman and Miguel, 2010). A growing interest in the consequences of wars and armed conflicts led to a multitude of research, but results are still inconclusive.

Studies based on macroeconomic perspectives generally find that devastating effects of wars and armed conflicts are temporary and quickly disappear over time. Economic growth is resilient to a large-scale shock such as bombing (Brakman, Garretsen and Schramm, 2004; David and Weinstein, 2002; Miguel and Roland, 2011), and a country recovers fast in the aftermath of wars as long as the end of the war intersects with the beginning of a lasting peace (Chen, Loayza and Reynal-Querol, 2008).

Microeconomic studies that investigate the effects of armed conflict on human capital accumulation generally find a direct negative effect on health and educa-tion. Most studies use a difference-in-differences estimation method by exploiting geographic variations in timing and intensity of conflicts and differential exposure to conflicts by birth cohort. A study on Rwandan genocide finds that children who were exposed to armed conflicts have lower height for age Z scores than non-exposed children (Akresh, Verwimp and Bundervoet, 2007). The same finding was made in studies on the Eritrean-Ethiopian conflict (Akresh, Lucchetti and Thirumurthy, 2012) and a civil war in Burundi (Bundervoet, Verwimp and Akresh, 2009) as well as in Cote d'Ivoire (Minoiu and Shemyakina, 2014). Using the same identification strategy, others find that exposure to armed conflicts leads to lower years of school-ing in Rwanda (Akresh and de Walque, 2008) and Guatemala (Chamarbagwala and Morán, 2011), or a lower likelihood of school completion in Tajikistan (Shemyakina, 2011) and Burundi (Verwimp and Bavel, 2014).

While macroeconomic studies suggest that a large-scale negative shock driven

by armed conflicts is transitory, some microeconomic evidence implies that conflicts can have lingering effects. A loss in human capital especially at an early age is irreversible and its detrimental effect persists in the adulthood. Leon (2012) finds that children who were exposed to political violence in Peru could catch up with early loss in schooling and ended up having lower years of schooling when reaching the adulthood. Kesternich et al. (2014) find that World War II adversely affected late-life socioeconomic status and health outcomes of the elderly Europeans who experienced the war when young. Similarly, Akbulut-Yuksel (2014) finds that dam-aging effects of World War II on health, education, and labor market outcomes of children who were exposed to the war persisted even 40 years after the war in Germany.

This paper contributes to the existing literature by investigating how persistent and far reaching an adverse effect of an armed conflict can be. Specifically, we look at the effect of Rwandan genocide on child labor of the next generation. As summarized above, there are microeconomic studies that verify long-term effects of armed conflicts on individuals who were exposed to them. However, there has not been a study on an intergenerational effect of armed conflicts on human capital outcomes of the next generation.[1] Further, our study differentiates itself from other studies by focusing on child labor which has rarely been investigated in the existing economic literature on armed conflicts.[2] Child labor, which is essentially negatively associated with both the quantity and the quality of schooling that a child receives, can interfere with human capital formation of children. A close investigation of the effect of armed conflicts on child labor, therefore, is warranted.

[1]Eder (2014) finds that displaced parents during the Bosnian war invest less in the education of their children years after the war than non-displaced parents. While his study attempts to confirm an intergenerational effect, the outcome variable is essentially a change in parents' investment decisions, not a change in children's actual educational attainment. They acknowledge that a short time lapse between the end of the war and the data collection does not allow them to directly investigate children?s educational outcomes.

[2]We find only one study that investigates the effect of armed conflict on labor market outcomes of exposed children in Columbia (Rodriguez and Sanchez, 2012).

3 Empirical Methodology and Data

We estimate the effect of the Rwandan genocide on child labor using variation in genocide intensity across communes and child labor incidence across households. The main data for our study come from the Rwanda Demographic and Health Survey (RDHS) 2010. This survey of 12,540 households includes a set of questions about child work including hours worked outside the home over the last seven days, the type of work that was done and whether or not the work was for pay. The types of work done include household chores (cooking, fetching, water/firewood, washing clothes, house cleaning, baby sitting, etc), cultivating and harvesting, mining and quarrying, selling goods in the markets or streets. We dropped work in fisheries, prostitution and selling alcohol, cigarettes and drugs due to lack of observations. For our analysis, a child was defined as being ages 5-14 whereas a laboring child is one who did any kind of work for someone who is not a member of this household during the past week.

The RDHS was the source for household data including basic information on the age, sex, education, of the household head. The survey data also includes a household wealth index reported that is based on ownership of durable goods and housing characteristics. This wealth index is computed using a principal component analysis with values following a standard normal distribution of mean zero and standard deviation one.

The households in the 2010 RDHS each reside in one of 492 clusters. The survey provides geocodes (latitude and longitude) for each cluster which we use to match a cluster with a pre-genocide commune. Using a shape file of Rwandan communes prior to the genocide, we identified 142 communes. Three of these communes did not have data on the number of victims, and two communes did not contain any clusters leaving 137 communes in the final analysis.

We use as our measure of the commune's intensity of genocide using an estimate of the number of killings by the Genodynamics project.[3]. Estimates of the number of killings come from a report by the Ministry of Local Administration and Department of Information and Social Affairs in Rwanda. Victims were people identified and declared

[3]For a detailed description on the methodology used for these killings estimates, see `http://genodynamics.com/`

dead by survivors who were interviewed over a period between July 2000 to November 2002. This measure of genocide has shortcomings the chief among which was the likely reluctance of the those interviewed to give honest answers for fear of repercussions. This counting of victims occurred around the time of the post-genocide Gacaca tribunals that attempted to find justice for the victims and their families. Witnesses might not answer the interviews truthfully since they could perceive possibly affecting the Gacaca trials. It is unclear, however, whether the responses would bias the count high or low as a result of these concurrent trials. Interviewees could also fear retribution from genocide perpetrators or sympathizers. Those interviewed could also merely have forgotten the details given the number of years that had passed since the genocide.

There are several challenges to estimating genocide's effect on child labor. First, there are factors associated with a commune that make it more likely to experience more killings during the genocide, which, at the same time, cause child labor to occur. To address this issue, we include in our regressions a number of pre-genocide commune level aggregates from the Rwanda 1991 census to control for wealth, edu-cation and demographic information that might confound the relationship between the genocide and child labor. The percentage of individuals with radio ownership, average grade completed, and percentage of Hutu being employer or employed are matched with pre-genocide communes maps based on commune names, and then matched with 2010 RDHS clusters.

Second, there could still be commune-level factors unobserved in the data that are associated with both the intensity of the genocide and the incidence of child la-bor. To deal this endogeneity, we also use an instrumental variable approach. The Rwandan genocide of the (mainly) Tutsi population was part of the civil conflict between the Hutu government and the Tutsi-led Rwandan Patriotic Front (RPF) exiled in Uganda. In the spring and summer of 1994, as the Hutu government executed the genocide against the Tutsis, the RPF launched an offensive from Uganda in April 1994, advancing through Rwanda and would eventually overthrow the Hutu gov-ernment in July 1994. Figure 1 shows a map depicting the path of the RPF during this offensive while figure 2 shows a map of the genocide sites in Rwanda. Because the Tutsi-led RPF offensive was the main force resisting

the genocide and lasted over a period of months, there is likely variation in genocide intensity generated by the path of the RPF. In particular, communes farther away from the Rwandan border probably experienced a higher number of killings because the genocide lasted longer there. We exploit this episode of history by using the commune's distance to the Uganda border as an instrument for the number of killings. This instrumental variable allows us to use only the variation in genocide intensity generated by phys-ical distance in determining estimating the genocide's causal effect on child labor. Later, we also do a number of falsification exercises to rule out the possibility that other factors could be correlated with this distance variable that could in turn be correlated with child labor.

Third, as we described above, the estimate of the the number of killings is likely to have measurement error do to the incentives those interviewed and also lapses in memory. Using this same instrumental variables approach could address the biases in the estimation coming from classical measurement error.

Table 1 shows summary statistics for variables used in our study. In our sample of 15,000 observations, about 8% of children aged 5-14 worked outside of their homes. Of this group, 22% worked for pay while 72% did household work and about 8%worked in cultivation. The mean number of genocide killings in the sample was 0.12. About 88% of sample are rural while the mean age was 9.

4 Results and Discussion

Table 2 show results from ordinary least squares and instrumental variable regressions of a binary variable equal to one if a child worked. We use three definitions of a child: ages 5-14, ages 5-9 and ages 10-14. Column 1 reports an OLS regression result using the full sample (age 5-14). One log point increase in killings increases the probability of a child working outside home by 0.008, which is significant at the ten percent level. Once instrumented, the effect of genocide becomes larger by more than three folds. One log point increase in genocide killing increases the probability of child working by 0.027 significant at the one percent level. For children aged 5-9 and 10-14, OLS results are very small and insignificant and the IV regressions report the effect of 0.043 and 0.052, respectively.

In the bottom panel of Table 2, we report the first stage regressions of genocide as measured by log the number of victims on the distance to the Ugandan border and a number of controls variables. Estimates on distance are all positive and significant at the one percent level. The result is in line with the fact that genocide was more intense the farther a commune was from the Ugandan border. The F-statistic all exceed 40 when distance is the only control. The F-statistic becomes significantly smaller, once the regressions include individual demographic characteristics, as well as pre-genocide commune variables such as the percentage of households with radio, average adult education level, percentage of Tutsi relative to Hutus, and percentage of Hutus that were formally employed. Since the F-statistic is smaller than 10, which is the rule of thumb threshold for a weak instrument, we perform Anderson-Rubin tests and report the p-values.

To check the exclusion restriction of our identification strategy, we also regress child labor pre-genocide against distance to the Ugandan border as a falsificaition exercise. The results are reported in Table 3. If distance is correlated with pre-genocide child labor, this pre-existing correlation would be evidence of a violation of the exclusion restriction. In Table 3, estimates of the coefficient of the distance variable are all zeros and statistically insignificant, suggesting that there was no pre-existing correlation between distance and child labor.

In Tables 4 and 5, we estimate the effects of genocide on household size and whether a household has an extended family. While OLS results on household size is negative and significant at ten percent level, the instrumental variable regressions report insignificant results. But for a presence of an extended family member in a household, both OLS and IV results report a significant positive effect, suggesting that a loss of family members due to genocide is mitigated possibly through a unification of relatives.

In Table 6, we distinguish between the different types of work that the child does outside the home. But there is no statistical evidence that genocide has differential effect on the types of work that a child is involved.

We report in Tables 7 the effect of genocide on schooling. There is a negative effect of genocide on schooling for children aged 5 to 14. Both OLS and IV results report significant negative effect, but the IV estimates are larger by more than three folds. A one log-point increase in genocide lowers the probability of attending school in 0.047.

This decrease is mainly driven by younger children. For children aged between 5 and 9, one log point increase in genocide lower their likelihood of attendance by 0.08, while the negative effect is small and statistically not significant for older children (column 6). Column 7 and 8 report the effect on the net school enrollment (enrollment of children in a grade that corresponds to their age), and the effects are still negative.

In sum, there is robust evidence that two decades after the actual event, the genocide has caused an increase in child labor (mainly in household work outside the home) and a decrease in schooling, suggesting a long-lasting detrimental effect of genocide on human capital accumulation of the next generation.

5 Concluding Remarks

In this study, we use the 2010 Rwanda Demographic Health Survey (RDHS) for data on child labor and household data matched to estimates on genocide intensity from the Genodynamics project to estimate the long term causal effects of the Rwandan genocide on child labor. We instrument for the number of killings using distance from the commune to the Ugandan border. We find that the genocide caused a positive statistically significant impact on child labor. Consistent with this result, school attendance falls with the increase in genocide intensity.

Our empirical result suggests a long-term impact of the genocide on human capital development that is likely to contribute to Rwanda's underdevelopment in the future.

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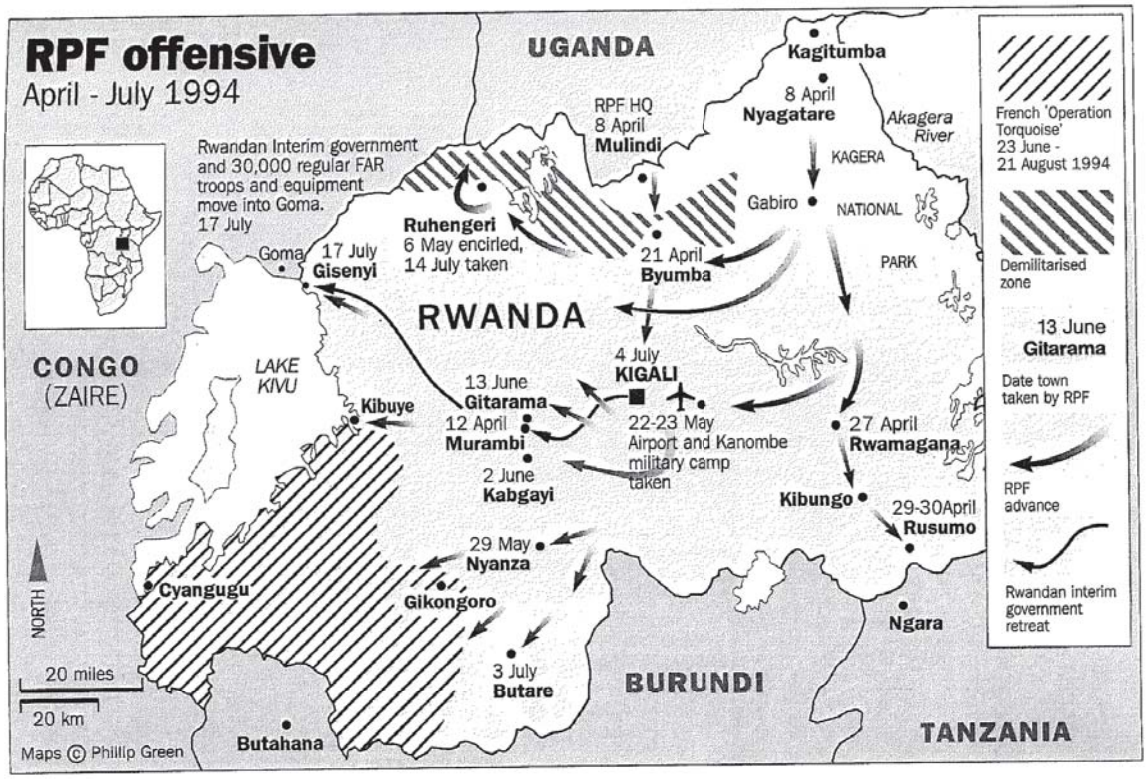

Figure 1 Path of the Rwandan Patriotic Front Offensive. Source: Kuperman (2001, page 43)

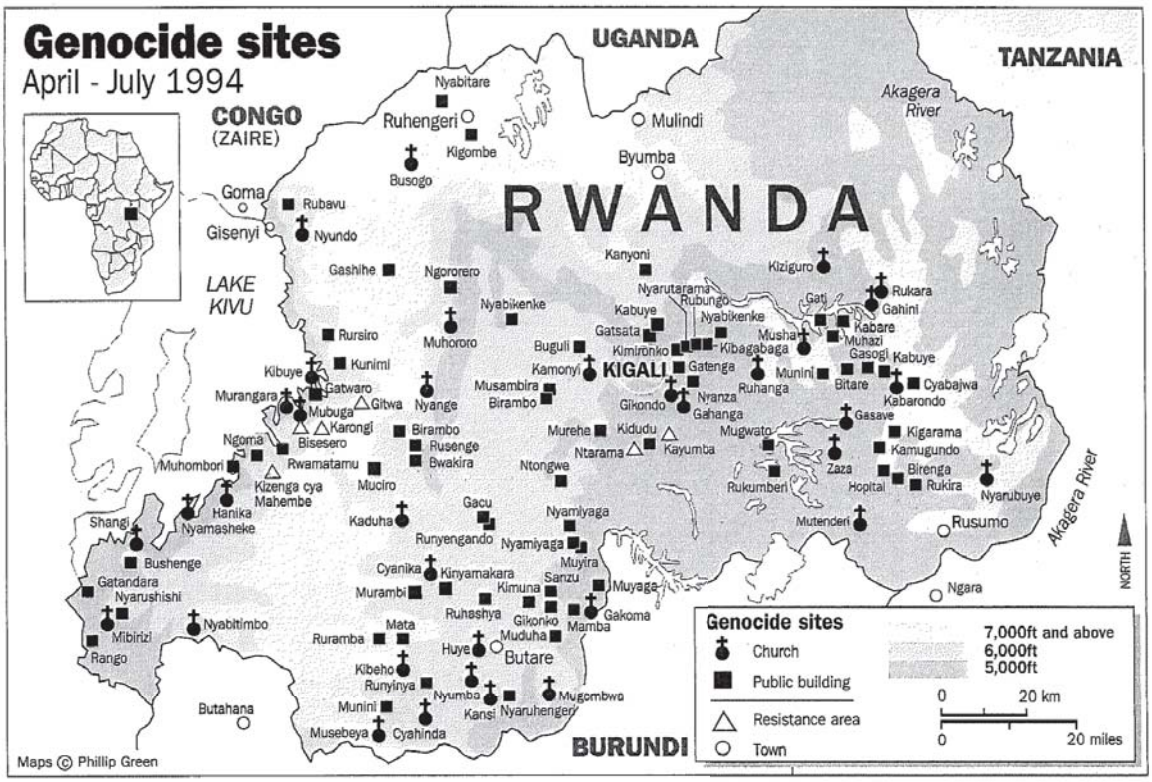

Figure 2 Rwandan Genocide Sites. Source: Melvern (2004, page vii)

Table 1 Summary Statistics

	Observation	Mean	S.D.
Outcomes			
Work Outside	14,991	0.0831	0.2761
Type of work (unconditional)			
Paid	14,991	0.0191	0.1367
Chores	14,991	0.0598	0.2371
Cultivate	14,991	0.0069	0.0826
Plantation	14,991	0.0013	0.0357
Mining	14,991	0.0034	0.0580
Street Vending	14,991	0.0004	0.0210
Type of work (conditional on working)			
Paid	1,262	0.2292	0.4205
Chores	1,262	0.7189	0.4497
Cultivate	1,262	0.0826	0.2754
Plantation	1,262	0.0154	0.123
Mining	1,262	0.0406	0.1974
Street Vending	1,262	0.0053	0.0726
Attend	15,052	0.7903	0.4071
Injured	14,945	0.0643	0.2452
Independent Variables			
Genocide	15,059	-2.144	1.3879
Distance (km)	15,059	71.5287	40.5802
Age	15,059	9.1859	2.8484
Female	15,059	0.4996	0.5
Mother Alive	15,020	0.9541	0.2092
Father Alive	15,020	0.8809	0.3240
Urban	15,059	0.1204	0.3255
Wealth	15,059	-0.0688	0.8679
Radio	15,059	0.3477	0.1060
Education	15,059	8.8971	1.1129
Hutu Formal Employment	15,059	0.08626	0.0826

Means are weighted by probability weights provided in the household module.

Table 2 OLS and 2SLS regressions of Ln(Murders per capita) on Child Labor

Dependent variable	**Work outside**							
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
ln(Murders per capita)	0.008*	0.027***	0.001	0.043**	0.004	0.036**	-0.003	0.052*
	(0.004)	(0.007)	(0.005)	(0.020)	(0.005)	(0.017)	(0.007)	(0.027)
Ages	5-14yo	5-14yo	5-14yo	5-14yo	5-9yo	5-9yo	10-14yo	10-14yo
Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Instrument								
Distance to Uganda border (km)		0.020***		0.009***		0.009***		0.009***
Robust standard error		0.003		0.003		0.003		0.003
F statistic for IV in first stage		40.967		8.808		8.445		9.165
Anderson-Rubin test		0.00		0.00		0.02		0.01
N	14,991	14,991	14,825	14,825	7,998	7,998	6,827	6,827
Mean Dependent Variable	0.083	0.083	0.083	0.083	0.061	0.061	0.108	0.108
Std. Dev. Dependent Variable	0.276	0.276	0.276	0.276	0.240	0.240	0.310	0.310

Data is broken up into a full sample of 5-14 year olds (columns 1-4), 5-9 year olds (columns 5-6) and 10-14 year olds (columns 7-8). Demographic controls include age, gender, whether parents are alive, sex ratio, ademployed urban wealth radiow education hfemploy Robust standard errors adjusted for within-commune serial correlation in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Table 3 Falsification: Reduced form effect of distance to Uganda border on pre-Genocide child labor

Dep var:	Work outside		
Distance to Uganda border (km)	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Ages	10-14yo	10-14yo	10-14yo
Demographic Controls	No	Yes	Yes
Other Controls	No	No	Yes
N	87,809	86,833	86,833
Mean of dependent variable	0.28	0.28	0.28

Models control for county and year fixed effects as well as county population. Robust standard errors clustered within county in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Table 4 OLS and 2SLS regressions of Ln(Murders per capita) on Family Size

Dependent variable	**Household size**					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
ln(Murders per capita)	-0.090*	0.294	-0.081*	0.233	-0.100	0.363
	(0.049)	(0.237)	(0.043)	(0.184)	(0.062)	(0.308)
Ages	5-14yo	5-14yo	5-9yo	5-9yo	10-14yo	10-14yo
Controls	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Instrument						
Distance to Uganda border (km)		0.009***		0.009***		0.009***
Robust standard error		0.003		0.003		0.003
F statistic for IV in first stage		8.808		8.445		9.165
Anderson-Rubin test		0.10		0.09		0.14
N	14,892	14,892	8,047	8,047	6,845	6,845
Mean Dependent Variable	6.134	6.134	6.070	6.070	6.208	6.208
Std. Dev. Dependent Variable	1.998	1.998	1.887	1.887	2.118	2.118

Robust standard errors adjusted for within-commune serial correlation in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Table 5 OLS and 2SLS regressions of Ln(Murders per capita) on Extended Family lives in the Home

Dependent variable	**Extended family in the home**					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
ln(Murders per capita)	0.019**	0.058**	0.018*	0.044	0.020**	0.075**
	(0.009)	(0.030)	(0.009)	(0.027)	(0.009)	(0.038)
Ages	5-14yo	5-14yo	5-9yo	5-9yo	10-14yo	10-14yo
Controls	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Instrument						
Distance to Uganda border (km)		0.009***		0.009***		0.009***
Robust standard error		0.003		0.003		0.003
F statistic for IV in first stage		8.808		8.445		9.165
Anderson-Rubin test		0.02		0.09		0.01
N	14,892	14,892	8,047	8,047	6,845	6,845
Mean Dependent Variable	0.287	0.287	0.255	0.255	0.323	0.323
Std. Dev. Dependent Variable	0.452	0.452	0.436	0.436	0.468	0.468

Robust standard errors adjusted for within-commune serial correlation in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Table 6 OLS and 2SLS regressions of Ln(Murders per capita) on Type of work performed

Dependent variable	**House chores**		**Harvest**		**Plantation**		**Mine**		**Street vending**		**Paid work**	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
ln(Murders per capita)	-0.001	0.022	-0.001	-0.003	-0.000	-0.000	0.000	0.002	-0.000	-0.000	-0.003	0.006
	(0.005)	(0.014)	(0.001)	(0.003)	(0.000)	(0.001)	(0.001)	(0.003)	(0.000)	(0.000)	(0.002)	(0.006)
Ages	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo	5-14yo
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Instrument												
Distance to Uganda border (km)		0.009***		0.009***		0.009***		0.009***		0.009***		0.009***
Robust standard error		0.003		0.003		0.003		0.003		0.003		0.003
F statistic for IV in first stage		8.808		8.808		8.808		8.808		8.808		8.808
Anderson-Rubin test		0.08		0.26		0.80		0.41		0.21		0.30
N	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825
Mean Dependent Variable	0.060	0.060	0.007	0.007	0.001	0.001	0.003	0.003	0.000	0.000	0.019	0.019
Std. Dev. Dependent Variable	0.237	0.237	0.082	0.082	0.035	0.035	0.058	0.058	0.021	0.021	0.136	0.136

Robust standard errors adjusted for within-commune serial correlation in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Table 7 OLS and 2SLS regressions of Ln(Murders per capita) on Schooling

Dependent variable			**Attendance**				**Net enrollment**		**Injury**	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
ln(Murders per capita)	-0.015*	-0.047*	-0.029**	-0.080*	0.001	-0.004	-0.011	-0.037*	0.003	0.027
	(0.009)	(0.026)	(0.014)	(0.043)	(0.005)	(0.013)	(0.008)	(0.021)	(0.005)	(0.018)
Ages	5-14yo	5-14yo	5-9yo	5-9yo	10-14yo	10-14yo	5-14yo	5-14yo	5-14yo	5-14yo
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First Stage Instrument										
Distance to Uganda border (km)		0.009***		0.009***		0.009***		0.009***		0.009***
Robust standard error		0.003		0.003		0.003		0.003		0.003
F statistic for IV in first stage		8.808		8.445		9.165		8.808		8.808
Anderson-Rubin test		0.02		0.02		0.75		0.03		0.07
N	14,885	14,885	8,044	8,044	6,841	6,841	11,557	11,557	14,780	14,780
Mean Dependent Variable	0.791	0.791	0.657	0.657	0.948	0.948	0.688	0.688	0.064	0.064
Std. Dev. Dependent Variable	0.407	0.407	0.475	0.475	0.222	0.222	0.463	0.463	0.245	0.245

Robust standard errors adjusted for within-commune serial correlation in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

6 Data Appendix

1. Pre-genocide commune level data come from Rwanda 1991 census. Commune level aggregates (percentage of individuals with radio ownership, average grade completed, percentage of Hutu being employer or employed) are matched with pre-genocide commune maps based on commune names, and eventually matched with 2010 RDHS clusters.

2. Pre-genocide Child labor data for falsification test

   Pre-genocide child labor is based on a questionaire asked to a person at least 10 years old. This child labor variable thus measures work for persons aged 10 to 14. The 1991 census also only allows a respondent to choose between being a "worker" or "student". In the 2010 RDHS, respondents can choose both "working" while "attending school."

3. Variable explanations. (unless otherwise noted, the variables come from the 2010 Rwanda Demographic Health Survey)

   - Work Outside: A dummy that indicates whether a child (aged between 5 and 14) did any kind of work for someone who is not a member of this household during the past week.
   - Paid: A dummy that indicates whether a child who worked for someone who is not a member of this household was paid in cash or in kind.
   - Chores: A dummy that indicates whether a child did household chores (cooking, fetching, water/firewood, washing clothes, house cleaning, babysitting, etc) for someone who is not a member of this household during the past week.
   - Cultivate: A dummy that indicates whether a child did cultivating/harvesting in garden or field for someone who is not a member of this household during the past week.
   - Plantation: A dummy that indicates whether a child was in plantation (tea, rice, coffee, other) for someone who is not a member of this household during the past week.
   - Mining: A dummy that indicates whether a child was in mine/quarries

(breaking stones, molding bricks, loading truck, other) for someone who is not a member of this household during the past week.

- Street Vending: A dummy that indicates whether a child did selling goods on the markets/street/shop for someone who is not a member of this household during the past week.
- Family size: Total number of household members
- Extended family: A dummy that indicates whether a child lives in an extended family. An extended family is defined by a family in which the household head lives with his/her daughter/son in law, grandchild, parent, parent-in-law, siblings, relatives, niece or nephew by blood or marriage household with extended family member.
- Distance_km: a linear distance between the centroid of a pre-genocide commune and the Ugandan border in km. It is computed using a nearest neighbor analysis plugin of QGIS.
- Age: age of a child in years
- Female: a dummy that indicates whether a child is a female
- Mother alive: a dummy that indicates whether the mother of a child is alive
- Father alive: a dummy that indicates whether the mother of a child is alive
- Urban: a dummy that indicates a child resides in an urban area.
- Wealth: household wealth index reported by 2010 RDHS based on households? ownership of durable goods and housing characteristics. It is computed using principal component analysis and the resulting scores have a normal distribution with mean 0 and standard deviation of 1.
- Hutu formal employed: Percent of Hutu who is an employer or employed in a commune before genocide (from 1991 census). This is a definition of formal employment used by Friedman (2010).
- Radio: percent of individuals with radio at home in a commune before genocide (from 1991 census)

- Education: Average last grade completed in a commune before genocide (from 1991 census)