H i C N   Households in Conflict Network

Local Economic Conditions and Participation in the Rwandan Genocide

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HiCN Working Paper 160

December 2013

Abstract: This paper uses new data on participation to examine how local economic conditions shaped within-country variation in willingness to participate in violent activities during the Rwandan genocide. It discusses and tests the predictions of three sets of theories about the causes of violence. The data provide strong evidence that higher rates of both unemployment and education among Hutu are associated with increased participation. I find no evidence that the employment or education of the Tutsi population reduce participation rates. I also find suggestive evidence of a positive association between violence and the interaction of Hutu unemployment and education both at the commune level and at the individual level. These results are consistent with theories of opportunity costs discouraging violence, and they provide additional evidence of a connection between education, unemployment, and violence.

1 Introduction

The one hundred days in 1994 in which nearly one million Rwandans were brutally killed by their neighbors is widely considered to be one of the most horrific moments of the last century. The enormous number of participants is baffling. This paper contributes to a small but growing literature exploiting subnational variation in participation in conflict in an attempt to make comprehensible such astonishing events.

This paper addresses three sets of theories about participation in violence. These categories, discussed below should be considered ideal types acknowledging that the distinctions between them are contrived. While many theories of violence incorporate elements of multiple theories, the distinctions provide a useful framework for discussion. Each of the categories below is defined by the empirical predictions of the theories it contains.

The first category will be referred to as the Opportunity Cost theories. These theories focus on the low expected value of alternative endeavors on the part of potential participants in violence. These theories have a strong tradition in many social sciences, from economics and political science focusing on explicit opportunity costs of engaging in destructive activities, to sociology, focusing on a weakened desire to continue to participate in society with rules that may not be perceived to provide any benefit to the individual. These theories predict that the lower the level of resources held by potential aggressors or the fewer the opportunities he or she has to improve this or her welfare through productive endeavors, the more likely he or she will be to participate in violence. If these theories are true, then increases in employment and education should all be associated with a reduction in participation in violence.

The next set of theories will be referred to as the Relative Wealth and Expropriation theories. These theories, which have often been combined with the first category, focus on characteristics of those towards whom violence is directed. When potential victims of violence have more, this can generate dissatisfaction with the situation or simply increase the payoff to expropriating their resources. Such theories would predict that if the target of

potential violence has either more opportunities that can generate jealousy or greater assets that can be appropriated, there is likely to be more violence observed.

The final set of theories will be referred to as the Political Participation and Unmet Expectations theories, which propose to explain observed associations between education and violence. These theories conceive of violence as a form of political participation, argue that education increases expectations of economic success that generate frustration when unmet, or claim that those who are more educated can more easily be mobilized for any type of mass action, including violence. Such theories have often been proposed in response to observed patterns of participants in violence that were inconsistent with earlier theories, most notably: support for the violent elements of the Nazi party during the Holocaust, participation in urban unrest in the US in the 1960s, and recently, participation in terrorism. These theories predict that those who are most likely to participate in violence may not be those with the fewest alternatives, but instead the most educated.

The Rwandan genocide presents both an enormous argument in support of the need to study causes of violence and a potential opportunity to do so. This paper tests the previously mentioned theories using a dataset that combines recently released data on local participation in the genocide and census data collected before the start of the genocide. The data on participation comes from records of the number of individuals accused of crimes associated with genocide, kept by Gacaca tribunals, constructed to prosecute the enormous number of individuals who were still awaiting trial ten years after the genocide. This data is combined, at the local level, with the 1991 census, which contains information on education, employment, a range of demographic characteristics, and ethnic identification.

Using this combined data, I find that participation is associated with greater education among Hutu, and lower employment among Hutu, but is not significantly associated with characteristics of the education and employment status of the Tutsi population. This is robust to the inclusion of a large set of controls, including age and migration patterns of the population, radios, and province fixed effects. I also find evidence that unemployment and education interact to produce an even greater level of participation. In particular, I find

2

that the education level of those who are unemployed (rather than those who are employed) predicts participation rates, and there is a positive and moderately significant coefficient on the interaction between education and unemployment.

The paper proceeds as follows: The next section lays out the theoretical framework, outlining predictions of the theories to be empirically tested, and situates this paper within the broader literature on causes of violence and civil conflict. Section 3 briefly describes the historical context as is relevant to this project. Section 4 outlines the data to be used and section 5 specifies the empirical strategies. Results are presented and discussed in section 6, and section 7 concludes.

2   Theoretical Framework and Literature Review

This section will outline each of the three sets of theories of causes of violence that will later be tested. Each subsection will contain a discussion of the theories, their support and challenges in earlier research, and the predictions the theories would make about who is most likely to participate in violence. In discussing these theories, this literature brings together studies of a range of types of violence, from mass murder to terrorism to riots. While the differences between these actions are important and there are clear differences in elements of the motivation, from the perspective of those who choose to participate in the type of violence near them, they may be useful similarities in the incentives. As will be seen, many of the same theories of participation appear across these types of violence, and for this reason, this study includes research from the wider literature. The final subsection will discuss related empirical research on violence.

2.1   Opportunity cost theories

The opportunity cost theories posit that those with the least to lose by doing so are the most likely to participate in violence. It is assumed that violence is anti-social and its enactment crowds out productive activities. Thus, holding other factors constant, an individual

with a low pay-off to productive work - because of low ability or limited opportunities, for example - is more likely to engage in violence.

This idea is key to models of the individual choice between production and appropriation (Haavelmo (1954), Grossman and Kim (1995), Skaperdas (1992), and Hirshleifer (1995)) and models of crime beginning with Becker's seminal work (Becker (1968)). In such models, individuals who expect little benefit from production are more likely to expropriate the resources of others or to engage in crime as a means of obtaining the resources that could not otherwise be obtained. A related theory with similar predictions arose in sociology, explaining individual willingness to participate in violence as a step away from a society whose rules do not benefit that individual. Merton (1934) is often attributed with presenting anomie, and the inability to construct well-being through legitimate means, as a cause of deviance.

More recent work has extended rational choice models to explain rebellions, empirically testing whether rebellion could be explained as a response to labor market constraints. Such theories propose that increases in income, education, and economic growth - which increase the opportunity cost of fighting - should reduce the likelihood of rebellion. Collier and Hoeffler (2002) find that at the cross-country level, higher income and higher levels of education are associated with a lower risk of rebellion through an increase in the opportunity cost of violence. They argue that in a society with more education and income, political change can happen through institutional pathways. Similarly, Fearon and Laitin (2003) find an association between weak states and political violence, arguing that weak states provide little opportunity to enact political change through non-violent channels, which can also reduce the opportunity cost of violence.

A large number of cross-country studies have found a connection between poor economic conditions and civil conflict, using a range of identification strategies (Collier and Hoeffler (2004), Fearon and Laitin (2003), Hegre and Sambanis (2006)). These studies rely on national income data and are generally unable to distinguish between variation in resources held by aggressors and victims. Miguel et al. (2004) use rainfall as an instrument for economic

growth, which presumably works through agriculture, a likely determinant of the opportunity cost of fighting among those most likely to fight.

Recent work that uses data on subnational variation in violence has supported this hypothesis that negative shocks to income among potential aggressors facilitate violence (Justino (2009)). Do and Iyer (2010) look at local correlates of violent conflict in Nepal and find that conflict intensity is associated with higher levels of poverty. Murshed and Gates (2005) also look at local-level predictors of violence intensity in Nepal and find that areas with greater landlessness and lower HDI indicators experienced greater levels of violence. Humphreys and Weinstein (2008) find that rebel organizations in Sierra Leone that rely on voluntary recruitment, individuals with limited economic options outside of joining rebel groups are most likely to join.

Fighting can also be costly for an individual who is not employed but anticipates the possibility of becoming employed by removing this option. Thus, opportunity costs can change the likelihood of participation even for those who are not at the moment employed, if they live in an area with functioning labor markets in which they plan or hope to participate, and to which they believe they will be able to gain access.

While such opportunity cost theories may appear broadly plausible, empirical tests are threatened because motivation for violence is not the only channel through which the re- sources of potential attackers can influence the likelihood of violence. In particular, even if more resources may decrease the motivation for violence, more resources, even those held by potential attackers, may also make violence more feasible. Mitra and Ray (2010) design a model in which greater resources on the part of the attacker both reduce the desire for conflict and increase the feasibility of conflict. The prediction of their model is thus in- conclusive regarding the sign of the effect of resources held by potential attackers on the likelihood of attacks. Collier and Hoeffler (2004) find that the availability of resources to finance conflict is associated with greater levels of violence. Berman et al. (2011) find evi- dence that is inconsistent with the opportunity cost theory of violence, showing that in their data, unemployment in Iraq and the Philippines is not associated with an increase in attacks

on government or attacks on civilians. However, another paper also using data from Iraq finds a negative relationship between quasi-random variation in employment availability in Iraq and insurgency frequency (Iyengar et al. (2011)).

Dal Band Dal Bó (2011) proposes a theory that explains both the increases and decreases in violence associated with improved economic conditions, demonstrating that a key difference is whether resources are associated with the need for labor. The theory that opportunity costs reduce willingness to participate in violence rests on the assumption that individuals cannot both work and rebel, and that what they have without rebelling is put at risk if they choose to rebel. For this reason, the time spent in employment may have a stronger deterrent effect than do the wages earned. This theory is tested by Dube and Vargas (2013), who use variation in international coffee prices and international oil prices to identify different effects of demand shocks in areas in which a labor-intensive industry (coffee) is central and areas dominated by an industry that does not rely on large labor investments (oil). They find that negative shocks to international coffee prices lead to more violence in coffee-producing areas - which is consistent with the opportunity cost theories - and that positive shocks to oil prices lead to more violence in oil-producing regions, which is consistent with the suggestion that resources to finance violence can increase violence, as well as with theories to be discussed below.

In the case of Rwanda, both coffee and tin prices fell dramatically just a few years before the onslaught of violence, and a rapidly growing population increased demand for already limited land for farming. The claim that Rwanda was the victim of a Malthusian crisis in which limited resources made the growing population unsustainable and unstable (Boudreaux (2009), Diamond (2005), Yanagizawa (2006)). Soil fertility had "fallen sharply" due to over-cultivation (Percival and Homer-Dixon (1998)). One author writes: "Of the nearly 60 percent of Rwandans under the age of twenty, tens of thousands had little hope of obtaining the land needed to establish their own households or the jobs necessary to provide for a family." (Des Forges et al. (1999)) These factors may have contributed to a reduction in the opportunity cost of violence that facilitated the high rates of participation observed:

6

"Many of these zealous killers were poor, drawn from a population 86 percent of whom lived in poverty, the highest percentage in the world. They included many young men who had hung out on the streets of Kigali or smaller commercial centers, with little prospect of obtaining either the land or the jobs needed to marry and raise families." (Des Forges et al. (1999)). Des Forges et al. (1999) describes the lure of fighting for those with few resources: "Authorities offered tangible incentives to participants. They delivered food, drink, and other intoxicants, parts of military uniforms and small payments in cash to hungry, jobless young men. They encouraged cultivators to pillage farm animals, crops, and such building materials as doors, windows and roofs. Even more important in this land-hungry society, they promised cultivators the fields left vacant by Tutsi victims. To entrepreneurs and members of the local elite, they granted houses, vehicles, control of a small business, or such rare goods as television sets or computers."

To summarize, the opportunity cost theories posit that resources and opportunities to obtain resources through productive endeavors limit the motivation for violence. If these are true, we will expect to see higher levels of education and employment on the part of potential attackers associated with lower rates of participation in the genocide.

2.2 Expropriation and Relative Deprivation theories

The next category of theories deal with the resources held by individuals who are potential victims of violence. These theories suggest that when the potential victim has more resources the likelihood of violence is higher because of either greater dissatisfaction with relative differences in wealth or opportunity, or more directly through a higher expected value of expropriated resources. Such theories are often discussed in combination with ideas from the first set of theories under the umbrella of inequality or relative deprivation theories.

The motivation for expropriation presented by more valuable resources is another key element of classic "guns or butter" models of conflict as a choice between production and appropriation (Haavelmo (1954), Becker (1968), Grossman and Kim (1995), Skaperdas (1992), Hirshleifer (1995), Collier and Hoeffler (2004), Dal Bó and Dal B (2011)). In recent work,

Mitra and Ray (2010) model inter-group conflict in which one group is predetermined as the aggressor and the other as the victim. Their model predicts that the resources of the victim should unambiguously increase the likelihood of violence between the two groups as violence is at least partially assumed to be undertaken for the purpose of extracting resources from the victim's group. These theories predict that for purely material reasons, resources held by potential victims increase the likelihood of their being attacked.

Others have focused on the role of the resources held by potential victims in generating dislike among those who have less, even when these resources cannot be appropriated. Relative deprivation theories and theories of the relationship between inequality and conflict argue that when potential victims have more than potential attackers, an increase in the resources held by potential victims can generate violence. Gurr (1970) argues that disappointing comparisons with others in the same society can inspire rebellion. Scott (1977) explains agrarian rebellions through dissatisfaction with growing inequality that did not meet norms of agricultural societies, and Sen (1973) points to inequality as a key driver of rebellions. More recently, Chua (2004) studies the role of unequal economic and political power held by "market dominant minorities" and resentment of relatively less well-off majorities in fueling ethnic conflict.

There are many studies empirically linking inequality with increased participation in violence, and inequality between the two ethnic groups has been a key element of many narratives of the Rwandan genocide. Many papers have focused on the relationship between income inequality and crime or other types of violence within US cities (blau1982cost, Kelly (2000)), within cities elsewhere (Demombynes and Özler (2005), Østby et al. (2009)), and between countries (Alesina and Perotti (1996), Fajnzlber et al. (2002)). Inequality has also been linked to civil war and political violence in part through an increase in the material gain of expropriation (Blattman and Miguel (2010), Dube and Vargas (2013), Murshed and Gates (2005)).

On the other hand, another set of studies has found no relationship between overall inequality and conflict (Lichbach (1989), Collier and Hoeffler (2004), and Fearon and Laitin (2003)) and others have argued that the studies that did find significant results rely on weak identification and suffer from problems of endogeneity (Land et al. (1990), Soares (2004)).

Still others have argued that - rather than overall inequality - between-group or horizontal inequality may be a more important predictor of civil conflict (Sen (1973), Tilly (1999)), and some have recently found empirical support for this relationship globally (Østby (2008), Cederman et al. (2010), Cederman et al. (2010)). Macours (2011) used subnational data in Nepal, and found that recruiting via youth abductions were higher in areas with increasing land inequality, arguing that relative deprivation, and not only absolute deprivation contributed to the level of conflict.

In the specific case of the Rwandan genocide, inequality has played a prominent role in many discussions. The story of the poor and downtrodden Hutu peasants overthrowing their royal Tutsi oppressors has been a standard part of the Rwandan story, or what some would call a myth, since long before the 1959 revolution in which Hutu took control of the government away from the long-standing Tutsi rulers, and it has continued to come up as a key part of the story of the genocide (Mamdani (2002), Prunier (1995), Straus (2006)). The popular press generally mentions the Belgian elevation of the Tutsi as superior and the subsequent belittling of the Hutu when discussing the genocide. Specific accounts rarely fail to mention both the possibility of looting and the existence of jealousy between groups to explain what happened in 1994 (Cramer (2003), Des Forges et al. (1999), Gourevitch (1998), Hatzfeld (2005), Hatzfeld (2013), Mamdani (2002), Prunier (1995), Straus (2006)). Still, many caution that the purely material motivation of taking Tutsi property was likely to have been minimal (Des Forges et al. (1999), Prunier (1995), Straus (2006)).

Regarding jealousy, Prunier (1995) writes: "Political power had been in Hutu hands for thirty-five years but, thanks to the Belgian social and educational favouritism towards the Tutsi for the forty years before that, the Tutsi community was still able to do well for itself socially and economically. This did not only mean the big Tutsi businessmen; it also

meant that most of the local personnel in foreign embassies and in NGOs and international agencies were Tutsi, that there were many Tutsi in the professions and even that the best and highest-priced bar girls, the ones to be encountered in the big hotels, were Tutsi. Social envy came together with political hatred to fire the Interahamwe bloodlust."

> Regarding the possibility of looting, "There was of course also an element of material interest in the killings, even in the countryside. The killers looted household belongings and slaughtered the cattle. Meat became very cheap, and grand feasts were held, as if in celebration of the massacre. ... Villagers also probably had a vague hope that if things settled down after the massacres they could obtain pieces of land belonging to the victims, a strong lure in such a land-starved country as Rwanda." (Prunier (1995)). Des Forges et al. (1999) corroborates the description of the incentive of what could be obtained: "The killing campaign created new opportunities for getting rich as Tutsi property became available for appropriation and it generated new possibilities for acquiring power as political alliances shifted." (Des Forges et al. (1999)).
> This class of theories predict that, holding other factors constant, an increase in the

resources held by potential victims is likely to be associated with higher participation rates.

2.3   Political Participation and Unmet Expectations

The final set of theories conceive of violence as a form of political action and acknowledge that education can generate dissatisfaction. In response to dissatisfaction, individuals may respond violently in order to change the distribution of power. These theories do not dispute the above theories, but rather propose additional - and sometimes complementary - ways in which the distribution of resources between individuals can generate conflict, sometimes leading to different empirical predictions. Theories of violence as political participation typically rely on the presence of dissatisfaction and it is important to note that this dissatisfaction can be generated in part by poverty and relative deprivation. In many cases, these theories of violence as a form of political participation arose in order to explain characteristics of individuals or groups undertaking violence that did not fit the predictions of the previous models.

A common theme of stories of violence as political participation is that individuals who have reason to hope for good economic outcomes - either through investments in education or through rapid political, social, or economic advancement - are confronted with disappointing

available options - high unemployment, high poverty, or continued discrimination or political repression. One early example of this was the case of urban civil unrest in the United States during the 1960s. Previous theories had predicted that those involved in civil unrest would be the least well-off and the most-marginalized. Yet high levels of participation among well-educated and well-connected individuals called these theories into question, spawning a broad literature in sociology and political science in which researchers attempted to produce new theories to explain the surprising make-up of the participants (Mason and Murtagh (1985), Sears and McConahay (1973)). The J-Curve theory (Davies (1974), Miller et al. (1977)) was a popular version of the theory that unmet expectations contributed to increased participation in violence among those who were not least well off. The theory proposed that rapid progress followed by a decline leads people to revolt. Progress raised expectations and the decline crushed them. Gurr (1970) proposed similar explanations for rebellions more generally, arguing that unmet expectations could generate a feeling of disappointment relative to what was anticipated, leading to violence. In these conceptions, when realized welfare outcomes are more beneficial for individuals, this may reduce conflict, but when expected outcomes are higher, this could increase conflict. In particular, more education may increase expectations, and - in the absence of available employment - may lead to violence.

More recently, similar theories have been generated to explain a related and also surprising observation made about terrorism: those who belong to terrorist organizations and even those who participate in suicide bombings are often not the least educated or most marginalized. Krueger and Maleckova (2003) find that poverty and low education do not predict individual participation in terrorism. Berrebi (2007) finds that high education and income are both positively associated with participation in terrorist organization. Abadie (2006) finds that poverty does not predict cross-country levels of terrorism, but that political dissatisfaction does matter. These all present strong evidence of a stylized fact: although most models of violence or crime predict that all forms of marginalization will lead to increased participation in violence, there are many instances in which those who participate are far from the least

well-off. Kopstein and Wittenberg (2011) find evidence of an association between high levels of education and support for the Nazi party in Eastern Europe before World War II.

These correlations between increased education and participation in terrorist groups are threatened by the presence of selection. If terrorist groups only allow those who are more capable to join, then the observed patterns of membership could reflect choices made by the organization rather than the individual. Recent work has focused on disentangling selection and motivation (De Mesquita (2005)). In the case of the Rwandan genocide, selection is not an issue because there was very little or no selection: radios broadcast invitations to all to join and the tools used were those available to farmers, rather than scarce or difficult to use modern weapons.

Another way that education could generate an increase in participation in violence is if education facilitates organization, which could have facilitated larger groups of people participating in an ongoing effort. With this theory, it is not necessary that education increases tensions, but it simply increases the likelihood of collective action being taken.

In Rwanda, education - which had once been mostly a privilege of the ruling Tutsi - had been increasing dramatically among Hutu since Hutu leadership had taken control of the government in 1959 (Prunier (1995)). Economic growth was also relatively high in the 1970s, "but the prosperity was both fragile and superficial. The mass of the people stayed poor and faced the prospect of getting only poorer." (Des Forges et al. (1999)). These initial advances may have increased expectations which were disappointed.

This set of theories propose that higher levels of education among potential aggressors may in some cases be associated with greater levels of violence.

2.4   Literature on Violence and Civil Unrest in Rwanda

This project can also be situated within a small literature explaining participation in the Rwandan genocide. The empirical literature on the economics of violent conflict in the world is notably lacking in micro-studies to understand individual motivations for participation in

violence (Blattman and Miguel (2010)), and Rwanda is no exception.

Verwimp (2004) used a database of survivors and victims from a single prefecture (Kibuye) to identify individual predictors of survival, including age, sex, occupation, and actions taken after the start of the genocide. Justino and Verwimp (2008) also find high excess mortality among the wealthiest regions in Rwanda. In a separate paper, Verwimp (2005) constructs a panel of data for 350 households interviewed before and after the genocide and finds that individuals with higher off-farm income and those from households with higher incomes were more likely to participate in the genocide. This is partially in contrast with the conclusions of André and Platteau (1998) who focus on characteristics of victims. They find that those with greater land-holdings, as well as those who are considered trouble-makers, are more likely to be victims, and they conclude that the genocide was a time for the settling of scores and the undertaking of land grabs. The different findings of the two studies may be partly explained by the different samples examined, the latter using a database that is nearly exclusively Hutu. Verwimp (2005) also does find that the percent of land that a household rents is positively associated with the likelihood of participation.

Looking at 1993 massacres in Burundi, Bundervoet (2009) finds that those with more livestock and other resources were more likely to be attacked. De Walque and Verwimp (2010) use the 2000 Demographic and Health Survey to estimate excess mortality and thus correlates with the likelihood of dying during the genocide. They find that those in urban areas and with more educated backgrounds were more likely to be killed. While they do not look at characteristics of the killers, these findings contribute to the story about motivations for killing.

Yanagizawa-Drott (2010) recently took advantage of the newly released Gacaca data (described below) and the presence of mountains that can block radio signals to look at the impact of exposure to hate radio on participation rates and found large impacts. This followed an earlier paper that used more limited data and found a smaller - almost negligible - effect of exposure to radio on participation (Straus (2006)). This Gacaca data has also

been used by Verpoorten (2012) who finds that population pressure contributed to variation in violence rates. An earlier paper, Verpoorten (2011), specifically verified and proposed corrections to this data.

Another subset of this literature focuses on more personal and social dynamics to understand within communities, which individuals were the most likely to be involved. For example, McDoom (2013) finds that physical proximity and social contact with other participants were associated with greater participation. Fujii (2009) explains the large number of individuals involved in many of the killings - as she points out, often larger than necessary for the task - by exploring the social dynamics that generated decisions to take action through detailed interviews with participants.

There are many extremely important debates about causes of civil conflict and the nature of the genocide in Rwanda that this paper does not address. For example, this paper will not touch on debates about whether violence fits the pattern of a genocide or of politicide. It will take ethnic identity as pre-determined and reasonably stable. Details of recruitment methods and internal organization of fighters or the psychological factors that allow for mass violence to occur will not be addressed. It will provide empirical tests of the predictions of three models of the relationship between resources and participation in civil conflict using data from the Rwandan genocide of 1994.

3   Historical Context

Many key facts about the genocide are debated, from the number of people killed to who shot down the president's plane that set off the start of the massacres. The brief summary that follows presents key events that are necessary as background for this study. More detailed accounts can be found in Des Forges et al. (1999), Gourevitch (1998), Mamdani (2002), and Prunier (1995).

At the time of independence from Belgium, the Rwandan population was almost entirely

comprised of two ethnic groups, the Tutsi and the Hutu. The nature of the distinction between these two groups before colonization is heatedly debated. Early accounts argued that pastoralist Tutsi were the descendants of Hamitic migrants coming from either Egypt or Ethiopia and that the Hutu were Bantu agriculturalists who had lived in the area for much longer. Others have since argued that the physical differences in height and facial features between the two groups noticed by the colonizers were simply the result of different diets - one rich in milk and the other relying exclusively on agricultural produce - and that the two groups shared a common ancestry. There seems to be universal agreement that the Belgian colonizers at least accentuated and hardened these differences by identifying the Tutsi as a superior race of outsiders born to rule over the Hutu peasants. Although some have argued that the differences between the ethnic groups were small before the genocide, despite having a common language (Kinyarwanda), a common religion (Christianity), and common neighborhoods (the proportion of Tutsi in a commune is never more than forty percent), the intermarriage rate was low before the genocide - 28.6 percent of Tutsi were married to Hutu and 2.5 percent of Hutu were married to Tutsi - and it had not increased in a generation. Of those in the census, 26.8 percent of Tutsi parents were married to Hutu and 2.4 percent of Hutu parents were married to Tutsi. [1]

In 1959, Tutsi leadership was overthrown in a "democratic" revolution that installed a Hutu government. After this and later small massacres, many Tutsi began living in exile in Burundi, Uganda, and Zaire/the Democratic Republic of the Congo. Some of these exiles formed the Rwandan Patriotic Front in Uganda in 1987, which agitated, along with Tutsi within Rwanda, for representation in the government. At the same time, many other opposition parties within Rwanda began to fracture with some branches supporting "Hutu Power." In 1993 an agreement in Arusha was reached to incorporate opposition parties and the RPF into the Rwandan government, but the existing government, led by President Juvenal Habyarimana, was slow to implement the accords.

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[1]The difference between the intermarriage rates for those of each group comes from the different sizes of the populations of each ethnic group within the country.

On April 6, 1994, Juvenal Habyarimana boarded a plane to Kigali with the President of Burundi, coming from a meeting with other East African leaders to encourage the President to implement the protocols from the Arusha accords which outlined the construction of a new government that would incorporate the RPF leadership and representatives from other opposition political parties. Immediately before landing in Kigali, the plane was shot down and landed in the president's compound.

That evening, killings of Tutsi and moderate Hutu leaders began and massacres of Tutsi and moderate Hutu quickly began across the country, lasting for 100 days. Estimates of the number killed range from 500,000 to more than 1 million.[2] Estimates of the number of participants in the violence are similar or even larger, with the majority of the killings having been committed with machetes and clubs.

Those accused of the highest levels of crimes - organization of massacres - are being tried in the International Criminal Tribunal for Rwanda in Arusha, Tanzania. However, those accused of lower level crimes - including killing and smaller-scale organizing - are tried in local courts, known as Gacaca tribunals, which are based on a traditional system of justice in Rwanda. These courts are set up at the sector level and involve those who are prosecuted confessing their crimes to the community. These tribunals keep very detailed records, and it is the numbers of accused in each sector that provide the basis for this analysis.

4   Data

The data is taken primarily from two sources. First, participation rates come from records produced by local-level tribunals, or Gacaca courts. These records give the number of individuals accused of committing each of three levels of crimes during the genocide in each sector (village). Three other primary sources of data at different geographical levels or

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[2]The Government of Rwanda generally uses 1.2 million and most major international media outlets (including Al Jazeera, BBC, New York Times, Time Magazine, the Times (of South   Africa))   use   800,000.

for smaller numbers of sectors are used to test the validity of this data. Second, pre-genocide education and employment information is taken from the 1991 census in Rwanda, available through IPUMS International.

4.1 Participation Rates

I will use the number of people accused by Gacaca courts in a sector as a proxy for the number of people who participated in the genocide in that sector. These decentralized courts were established, based on a traditional system of participative justice, in order to expedite the process of trying the enormous number of people accused of committing acts of genocide who were still awaiting trial years later. In 2005, at the local level, detailed lists were constructed of those to be prosecuted. The accused can be prosecuted for one of three categories[3] defined by the Government of Rwanda below.

1. 1st category: 77,420 total, 0-1145 per sector

   ° Planners, supervisors, leaders, murderers with excessive "zeal", those who committed rape or sexual torture

2. 2nd category: 430,552 total, 0-2807 per sector

   ° Those who killed, including those who killed unintentionally and those who attempted but failed

3. 3rd category: 309,645 total, 0-1919 per sector

   ° Those accused of property crimes

Those accused of the highest level of crimes are tried by the International Criminal Tribunal for Rwanda (ICTR) in Arusha. The rest are tried by Gacaca courts. The data

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[3]A previous categorization scheme contained four levels of crimes, splitting the second category into two separate levels of crimes.

released is the number of individuals accused of each of the three lower levels of crimes, in each of the 1513 sectors, who are still alive and living in Rwanda.[4] The detailed and disaggregated nature of the data provide obvious benefits, and the information about the number of perpetrators, rather than another measure of conflict intensity, is particularly appropriate for this project.

Still the data has limits. The most important is that it is not a measure of those who participated but a measure of those who are being prosecuted. There are a few ways in which these numbers could differ. For an individual to be included on these lists, somebody else in the area must have publicly claimed that he or she participated in the genocide. First, it is possible, and there are allegations of specific instances, that these accusations can be used politically or to settle old scores, and false accusations can be made. Conversely, it is very possible that many who participated were never accused, perhaps because all of the witnesses and friends and relatives of those they killed are not around to tell the story or are afraid to speak up. This bias is likely to be stronger than the first and thus we would expect that in areas where there are fewer survivors, the number of accusations may be differentially lower than the number of participants. Still, the Gacaca courts have been very thorough in investigating, and reports of those afraid to speak are rare, so this data is likely to be a good proxy for the number of participants in each area. Specific concerns will be addressed in the analysis.

I aggregate these sector-level participation numbers to the level of a commune and combine them with the population by commune from the 1991 census. The population numbers are likely to be a very good approximation of the 1994 population. This is because 1991 is only three years earlier so population change from births is likely consistent across regions

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[4]Although not reported, these records are highly correlated with other measures of intensity of conflict based on either fewer numbers of communes or more aggregated administrative areas. These include a 1996 report from the Ministry of Higher Education, Scientific Research, and Culture (Kapiteni (1996)); the PRIO/Uppsala data on violent conflicts (Gleditsch et al. (2002)); and a database of timing and lethalty of conflict from Davenport and Stam (2009).

and also largely irrelevant because the new additions would be too young to participate. Mobility, the other source of population change, within the country was limited, requiring official approval to change residences (Prunier (1995)), and heavy restrictions on buying and selling land (André and Platteau (1998)). One possible alternative measure would be to use the population of adult men as the denominator, instead of the entire population, since perpetrators were nearly exclusively from this group. This, however, would require choosing an appropriate cut-off for ages and ignoring the small number of women who did participate, particularly at lower levels of crimes. Using the entire population reduces any threat of bias from the researcher choosing the cut-off. I will repeat the analysis using men age 18-50 as the denominator to be sure that the results do not qualitatively change. Figure 1 presents the observed variation in participation rates across communes.

4.2 Baseline Local Economic Conditions

These are constructed using the 1991 Census available through IPUMS International.

Ethnicity: The 1991 Census includes a variable for ethnicity. Before the genocide, all citizens were required to carry an identity card in which his or her ethnicity was clearly marked. In general, children of mixed marriages took the ethnicity of their father, but there are a few exceptions to this rule that show up in the Census (less than five percent of those whose parents are of different ethnicities). I limit the sample to only those who are either Hutu or Tutsi. The remainder of the observations in the Census includes the approximately one percent of the population that is Twa, naturalized Rwandans from other origins, and foreigners living in the country. Ignoring the others does not significantly change population numbers.

Human Capital: The human capital variable is presented as a score based on self-reports of the highest level of education completed. The codes for values of this variable were unavailable at higher levels. The lower numbers are coded to represent years of primary school and then years of secondary school, but values of the higher codes were hidden. This

19

means that if these numbers were to be translated into years of schooling, then those with the most education would be dropped from the analysis. Therefore, the codes themselves are included directly as a human capital score. This is imperfect but does appear to reflect increases in human capital.

Employment: In an agricultural setting, virtually nobody reports being unemployed as those without formal sector jobs work on farms. For a measure of formal sector employment, I construct a binary variable that is one if the person reports that they are an employee or an employer, and zero if he or she reports being unemployed or self-employed. Using this, I construct a measure of the percent of Hutu employed and the percent of Tutsi employed in the formal sector. This is similar to other measures of "off-farm income" used in the literature.

Assets: The census includes categorical variables for characterization of a set of physical assets (number of rooms per person; wall, floor, and roof materials; water, light and fuel sources; and type of toilet). Unfortunately, these measures can only generate a very rough measure of wealth or income in a way that reflects economic opportunity. For this reason, the analysis relies more heavily on employment.

Density: The census separately reports the area of each commune, which I use with the raw data to construct the population density.

Proportion Hutu: I construct a variable to represent the proportion of the population in a commune that is Hutu. In a country with two ethnic groups and enough tension between them to facilitate such a bloody history, the two ethnic groups are surprisingly dispersed which generates a proportion Hutu that ranges from 0.65 to 0.99. One explanation for the dispersion of Tutsi is that animal-keeping, the historical occupation of many Tutsi, is an offshoot of agriculturalist societies and depends on proximity to agriculturalists for nutrients. While animals provide milk, and occasionally meat, most herding societies use these products to trade for a dominant portion of their calories. Regardless of the origin, the current ratio of the ethnic groups can change the incentives of potential participants. As

the proportion Tutsi increases, the potential reward of expropriation increases. However, if it gets high enough, the likelihood of success declines. Thus we expect, and find, that the highest level of participation comes when there are sufficient Tutsi for participation to be profitable. It should be noted that this relationship may be somewhat mechanical as one would expect there to be low participation when there is simply nobody to attack. Figure 2 plots participation rates as a function of the proportion of the population that is Hutu.

Young men: Participants in violent conflict are often young men. Young men are also likely to be relatively more educated with relatively fewer assets when compared with their elders. Thus if there is variation in the age distribution in communes, this could be an important omitted variable. We may also expect that different populations due to temporary migration may have different impacts on participation rates. I construct four variables to control for their presence: 1) The proportion of the population that is between 18 and 30, 2) The proportion of the population that is male, 3) the proportion of the population currently in the commune which was born elsewhere, and 4) the proportion of the population that was born in the commune that currently lives somewhere else.

There may be reason to think that the young male population was not as important in this conflict as in others. Based on first-hand accounts, all men were asked to participate, and where there were high levels of participation, men of all ages joined the ranks. Figure 3 presents the age distribution in Kibuye Prefecture of those in the Census and the victims. While we would not expect the age distribution of those who participated to match that of the victims, the similarities in the distribution may still support a claim that this war was not one simply between young men. Also, there are many accounts in which women participated. They were not generally taking part in killing squads, but they were often responsible for looting and were sometimes credited with encouraging their male relatives (Hatzfeld (2005), Hatzfeld (2013)).

Radio: Recent research has convincingly shown that the presence of radios contributed enormously to the number of participants in the genocide as propaganda on the radio co-

21

ordinated individuals (Yanagizawa-Drott (2010)). As radio-ownership may be associated with education and resources, it is included as a control variable. The census asks individuals whether their household owns a radio and the commune-level variable is the percent of Hutu and the percent of Tutsi who own a radio. These are included separately since radio ownership among Hutu is what has been previously associated with violence.

Table 1 presents a selection of summary statistics, split by ethnicity.

Table 1 about here.

4.3 Combining Data

The administrative boundaries in Rwanda have shifted multiple times since the 1991 census, which means that matching the two data sources is not perfectly straight-forward. Gacaca records are reported by current prefecture and district, and by the pre-2005 sector. Census records are reported by province and commune, and limited information about population is presented with the sector. The analysis requires the use of information only available in the census at the commune level, and thus the sectors in the Gacaca records need to be matched with their former communes. The sectors correspond reasonably well, but different spellings and multiple sectors in different parts of the country with the same name complicate the process. The method used took two stages. In the first stage, sectors were matched automatically based on names and, in the absence of evidence to the contrary, a sector in one data set with a single correspondingly named sector in the second dataset was considered matched. In the second stage, the set of sectors that shared names in either dataset or that did not match a name in the other dataset were matched by hand. This involved using 1) the locations of the previous eleven provinces and the current four prefectures, 2) records from ICTR cases in which home sectors and communes of the accused were listed, and 3) any other mentions of the sector and commune and province available on the Internet. In the end, nearly 95 percent of sectors were matched. In cases in which sectors

were not matched, I assume the participation rate in the unmatched sectors is equivalent to that in the matched sectors within the same commune.

5   Empirical Strategy

The general form of the estimating equation will be as follows:

$$P\,articipationRate_j = a + b_1 * Employment(T\,utsi)_j + b_2 * Employment(Hutu)_j$$
$$+ b_3 * M\,eanEducation(T\,utsi)_j + b_4 * M\,eanEducation(Hutu)_j + b_{ij} * X_{ij} + e_j$$

where $P\,articipationRate_j$ is the participation rate measured by the number prosecuted divided by the Hutu population in a commune. The variable $Employment(T\,utsi)_j$ represents the percent of Tutsi who are formally employed, while $M\,eanEducation(T\,utsi)_j$ represents the mean education score for individuals in commune j. Finally, X_{ij} is a vector of controls. Thus the empirical predictions are as follows:

- If the opportunity cost theories are true, then we would expect b_2 and b_4 to be negative.

- If the relative deprivation and expropriation theories are true, then we would expect b_1 and b_3 to be positive.

- if the theories of violence as political participation are true, then b_4 may be positive.

Due to data constraints, I estimate all equations at the commune level, with 145 communes. A few variables are available at the sector level, including participation. It would be possible to use the sector as the unit analysis and cluster the standard errors at the level of the commune, but as the key independent variables are not available at the level of the sector, this would not change the statistical power. All equations are estimated controlling for density, the proportion Hutu, and the square of the proportion Hutu, the population of

the commune, and province fixed effects for each of the 11 provinces.[5] In one specification, I include a commune-level mean asset-score for each ethnicity to broaden the story about employment. I also present estimates that control for the proportion of the population that is young and the proportion of the population that is male, as well as for the proportion that immigrated and that emigrated, the presence of radios among each ethnic group, and with all controls in the same specification. In all specifications, I aggregate the individual data by using the mean of the individual variables within a commune. Results are reported using all levels of crimes as outcomes, as well as using only the first two and only the third levels as the outcome. [6]

6 Results and Discussion

6.1 Estimates

Table 2 presents estimates using the overall participation rate as a percentage (0 to 100) as the dependent variable. All estimates include controls for the population of the commune, the proportion of the population that is Hutu, and the square of this, as well as the population density, and a full set of province fixed effects. Column 1 contains the basic specification with only these controls and education and employment for each ethnic group. The coefficient on Hutu education is positive and significant. The standard deviation of mean human capital scores at the commune level is 1.9, so a one standard deviation increase in the communes level of education is associated with an increase in the participation rate of 2.5 percentage points. The mean participation rate is 14 percent and the average Hutu population in a commune is approximately 45,000, so this represents an increase in participation of 18 percent or approximately 1125 participants per commune. The coefficient on Hutu employment is -

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[5]There are now only 5 provinces, but there were 11 at the time of the genocide in 1994 and in 1991 when the census was collected.

[6]All estimates are also repeated using the medians in place of the means or weighting each observation by the population of the commune, which do not qualitatively change the results.

44.09, which is significant at the 1 percent level. Here a one standard deviation change in the commune's employment rate would generate a reduction in the participation rate of 4 percentage points, a change of 29 percent and approximately 1800 participants per commune. The coefficients for human capital and employment for Tutsi are both small and insignificant.

Table 2 about here.

The size of this effect, may be in part driven by the social spill-overs in participation demonstrated in previous research. If individuals chose to participate independently of those around them, then the magnitude of the association between economic conditions and participation may have been smaller. Yet the geographic variation in participation rates is very high, and this is likely explained at least in part by the correlation in participation within areas as demonstrated by McDoom (2013).

Column 2 controls for the population that is young and the proportion of the population that is male. One concern is that young people have higher education, lower assets, and a higher propensity to participate in violence and thus their presence could independently generate similar correlations. Neither of these is statistically significant, but the estimates are sufficiently imprecise that it is not possible to rule out some meaningful relationship with the participation rate. Interestingly, their inclusion does not substantially change the strong and statistically significant coefficients on Hutu human capital and employment. The third column controls for the proportion of the population that was born elsewhere and the proportion born there which had emigrated from the commune. Neither of these is statistically significant and their inclusion also does not change the strength of the previously identified coefficients. The fourth column includes controls for radio ownership among each ethnic group and again, the main results do not change. The final column includes all controls, and again, the results remain stable.

This shows consistent estimates of the relationship between the participate-rate and Hutu education and employment. The coefficients on Tutsi human capital and employment are

consistently of small magnitude and not statistically significant.

Tables 3 and 4 present the same estimates but split between types of crime. The participation rates used as the independent variable in Table 3 include only crimes in categories 1 and 2, which are necessarily violent, and Table 4 includes crimes that may have only dealt with property. Because the participation rate is the sum of these two types of crimes, the coefficients in Tables 3 and 4 sum to give the coefficients in Table 2, thus they are necessarily of smaller magnitude. The first two categories make up 62 percent of the total number of participants. The results in these two tables appear quite similar. One interpretation of the similarity is that the same motivations generate the two types of crimes. Alternatively, the two types of crimes were very correlated within the genocide and more violence may have made more property crime possible.

Table 3 about here.

Table 4 about here.

6.2   Discussion

6.2.1   Opportunity Costs

Opportunity cost theories predict that communes in which potential aggressors had the greatest level of available resources outside of conflict would be the least likely to have high participation rates. The consistently large negative coefficient on Hutu employment fits very well with this theory. The level of employment in an area reflects more than whether potential participants have jobs. It also reflects the degree to which labor markets function and the degree to which an individual can anticipate that they would be able to become employed. Such hope of a job would presumably be hurt by participation, while in areas where this hope does not exist, there is less to lose. Thus, while these findings cannot disentangle

26

between the impact of actual and anticipated employment, they suggest an important role for opportunity costs in changing participation rates.

Repeating the analysis with a score for assets in place of employment (available upon request) generates qualitatively similar results, but with less precision due to measurement error in the asset measure.

6.2.2   Expropriation and Relative Deprivation

Expropriation and relative deprivation theories predict that the more resources that are held by potential victims of an attack, the more likely that attack is to occur. In this case, these would predict that communes with high levels of employment, and education among Tutsi would see the highest levels of violence. In Tables 2, 3, and 4, these relationships are all consistently insignificantly different from zero. It is important to note that this lack of a significant result does not conflict with other findings that - within a single area - the most likely to be killed are those that are well-off (Bundervoet (2009), André and Platteau (1998), De Walque and Verwimp (2010)), as the results are at the commune level.[7]

This paper then does not provide evidence in favor of the theories of looting and relative deprivation generating violence, although it also cannot conclusively say that these factors have no effect.

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[7]Classical measurement error may pose another threat to conclusions about the coefficients on Tutsi resources. In some communes, the number of Tutsi households is low enough that the mean levels are estimated by aggregating over a small number of observations. This means that the imprecise estimate of the local level of employment and education, especially in areas with small Tutsi populations, could generate classical measurement error in the independent variable and resulting attenuation bias in the coefficients. To check whether this is the case, I used an instrumental variables specification to reduce measurement error. This was done by splitting the sample of Tutsi households in half in each commune and using the estimated mean in one half as an instrument for the mean in the other half. These estimates, which are not presented, provide similarly insignificant coefficients on Tutsi employment and human   capital.

6.2.3 Political Participation and Unmet Expectations

The unique prediction of the theories of violence as political participation was that education among potential aggressors can increase the likelihood of violence. With a robust significant positive estimate of the relationship between Hutu education and participation, this paper provides evidence that is consistent with these theories.

Previous studies that have found a link between education and violence are often threatened by selection into violence. Terrorist organizations may choose the most educated members or those who have the most education within an area may find themselves leading action, even if their support for it is not greater than those they lead. In the Rwandan case, these threats are not such worries. First, everybody was encouraged to participate and thus selection is much less of a concern than in any context in which fighters are screened by the organization for which they are fighting. Second, this study relies on the aggregation of individual observations to the level of the commune, which can complicate the findings of some results, but in this case, it may strengthen them. The findings do not imply that those who are the most educated within their areas are the most likely to fight, but that in those areas where many are educated, some individuals are more likely to fight.

6.3 Further Analysis

Many of the theories that predict a positive association between education and violence include a link with unemployment or other factors that lead to dissatisfaction. If this is true, then one should expect that education and unemployment do not act separately to influence violence but instead interact. To test whether this is true, I interact the two using two different methods.

In the first specification, the two variables are interacted at the local level. Unemployment is used instead of employment for ease of interpretation of the coefficients. This is defined as one minus the employment rate previously used. Then both this variable and the variable for Hutu education are normalized to have a mean of zero and a standard deviation of one.

This is done so that the un-interacted terms can be interpreted as the effect at the mean of a change of one standard deviation. Then the usual specifications are repeated including the normalized unemployment and education variables and the interaction between the two. If education and unemployment combine to generate greater violence, then one expects a positive coefficient on the interaction term. This is presented in Table 5.

Table 5 about here.

The coefficients on the un-interacted terms are still strong and significant in the same directions as before. The interaction term has a positive coefficient, which is only statistically significant in two of the five models. Still the magnitude of the coefficients is large. If we choose the coefficient from column 5, the coefficient is 0.665, which means that a one standard deviation increase in education increases the impact of unemployment on participation by 0.665 percentage points or 292 individuals.

The second specification looks at differences in education levels of individuals by employment status. Although the data must be aggregated to the level of the commune, the rich census data allows for the inclusion of many more statistics, beyond simple means. In this specification, the mean education among Hutu is included separated for those who are formally employed and those who are not formally employed. This is presented in Table 6. Based on the coefficients, the predictive power is largely driven by the mean education of those who are unemployed, rather than those with formal-sector employment. An F-test of the difference between these two coefficients is provided in each column. The differences are nearly significant at the ten percent level, but not quite.

Table 6 about here.

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7 Conclusion

This paper provides evidence that is consistent with models of violence as political partic-ipation and with opportunity costs reducing participation, but is not consistent with theories of relative deprivation and looting as key determinants of violence. A few caveats must be presented along with these findings.

First, this is only one case. Cramer (2003) pointed out that in the case of inequality in violence, one important explanation for variation in findings across conflicts or inconclusive cross-national results is that the causes of violence are extremely complex and that patterns that do exist may be stronger or weaker in different contexts. Still, a study of the variation in violence at the sub-national level contributes to a growing story about causes of conflict broadly. This case is also particularly interesting and broadly relevant. In only 100 days, nearly one million individuals were killed, mostly with tools used in farming. A similar number of people participated in this violence. The incredible magnitude of this cannot be ignored and it has understandably piqued the interest of a broad range of scholars attempting to understand or come to terms with it. Its applicability may also come from the scope and the nature of the participants. Very few or no other conflicts involved as many (partially) voluntary participants and thus this provides an obvious case in which to investigate causes of individual participation.

Second, the aggregation to the level of the commune introduces the possibility of ecolog-ical fallacy, because individual actions cannot be linked to individual circumstances. This may call for a broader interpretation. For example, the results for employment may reflect an impact of living in an area with a functioning labor market in which there is the possibility of a job, even if the individual is not employed at the moment. This hope of employment based on substantial employment among co-ethnics could be what drives the observed difference in behavior.

This paper contributes to a greater understanding of the causes of violence by exam-ining local economic conditions associated with variation in participation rates during the

Rwandan genocide. It exploits recently released data on crimes during the genocide, in combination with individual-level economic information from before the violence. The findings - that increases in education and decreases in employment among potential attackers are associated with greater levels of violence and the resources of potential victims are not associated with violence levels - are consistent with opportunity cost theories of violence and theories of violence as political participation, but not with theories of relative deprivation and looting. Although still limited, to my knowledge, this is the best available data to quantitatively address causes of participation in the Rwandan genocide, and one of the best sources of sub-national data on civil conflict. This paper provides a new addition to the still limited set of quantitative, sub-national studies of violence.

The findings about a link between violence and the combination of relatively high levels of education with high levels of unemployment fit within a much larger discussion of the origins of participation in rebellions and political violence, in particular the discussion surrounding the Arab Spring. This leads to two different conclusions. First, it provides an argument in favor of recognizing that participation in the genocide in Rwanda ought to be conceived of as a form of political violence and not simply arbitrary violence. Second, his provides an additional piece of evidence to confirm that this link exists, showing that education alone is not enough to create a peaceful society, and it encourages much more research and investment into creating employment for the enormous number of newly educated young people in the developing world.

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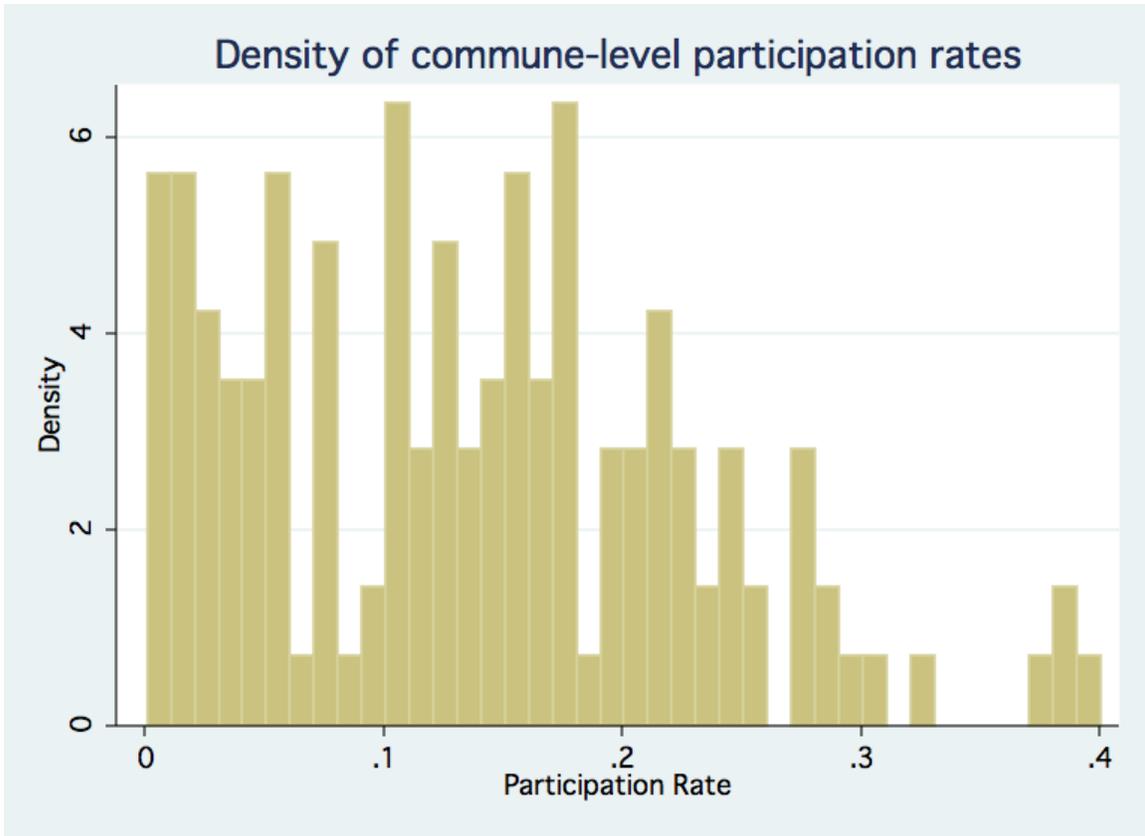
Figure 1: This is the distribution of participation rates at the commune level. The partici-
pation rate is measured as the number of people accused in the Gacaca records, divided by
the Hutu population in 1991 from the census.
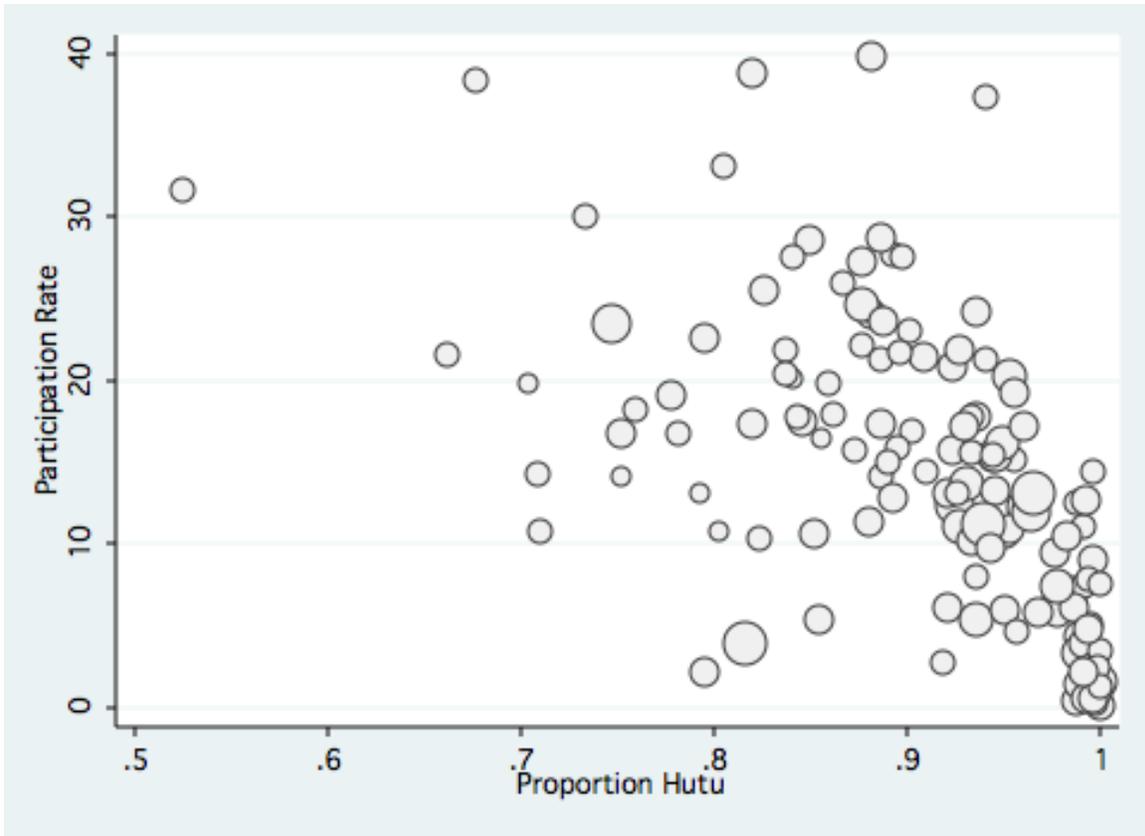
Figure 2: Commune-level participation rates as a function of the proportion Hutu. Each dot represents one commune, and the size is in proportion to the population of that commune.
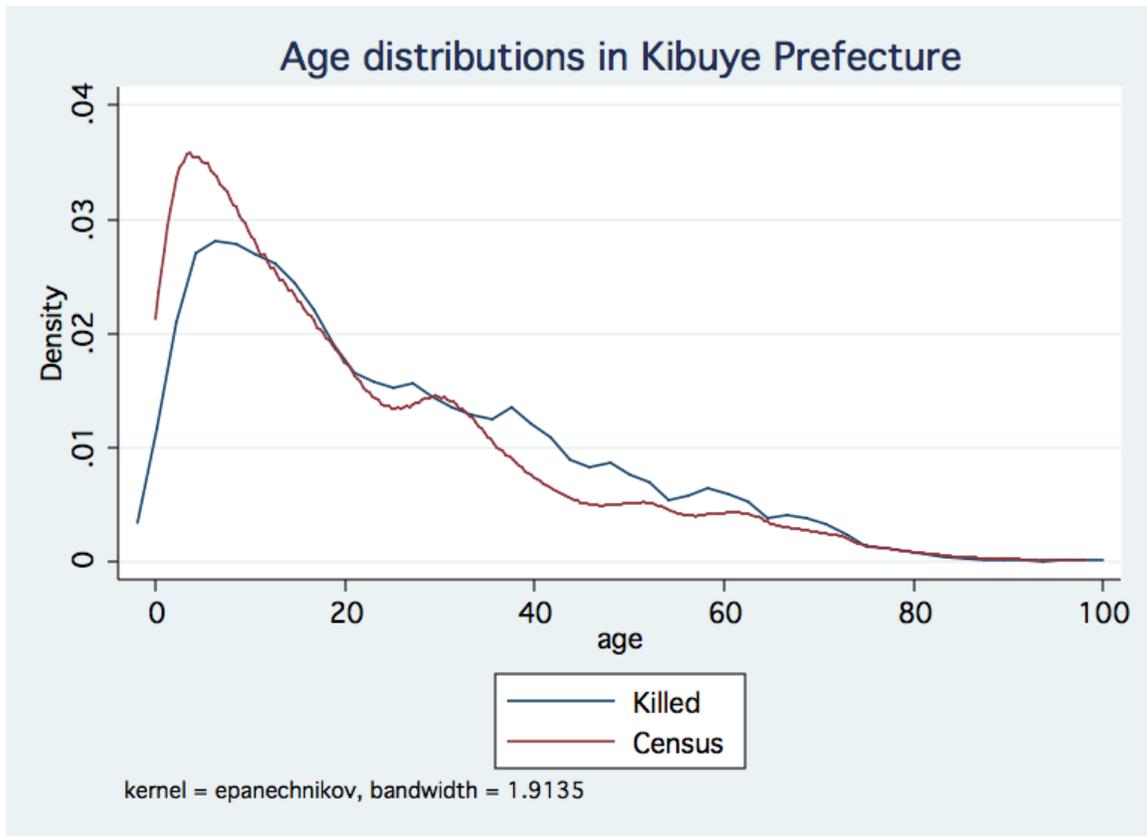
Figure 3: This plots the distribution of ages reported to have been killed in the Verwimp (2004) data from Kibuye on top of the distribution of all ages reported in the 1991 census.

Table 1: Summary Statistics

Variable	Hutu	Tutsi
Population share	0.871	0.081
	(0.335)	(0.273)
Human Capital Score	9.313	12.818
	(8.910)	(9.789)
Literate	0.517	0.673
	(0.500)	(0.469)
Employed	0.074	0.113
	(0.262)	(0.317)
Asset Score	-0.024	0.214
	(0.920)	(1.279)
Owns a radio	0.286	0.349
	(0.452)	(0.477)
Has electricity	0.021	0.046
	(0.143)	(0.210)
Owns land	0.928	0.905
	(0.258)	(0.294)
Observations	647010	60096

Means from 1991 Census data. Standard
deviations in parentheses.

Table 2: Basic specifications

VARIABLES	(1) part rate	(2) part rate	(3) part rate	(4) part rate	(5) part rate
Mean Education (Tutsi)	-0.0597	-0.0850	-0.0644	0.0752	0.0497
	(0.0941)	(0.0976)	(0.107)	(0.118)	(0.128)
Mean Education (Hutu)	1.331**	1.202**	1.488**	1.253**	1.302*
	(0.523)	(0.536)	(0.603)	(0.601)	(0.693)
Percent formally employed (Tutsi)	0.0491	0.399	0.226	-0.117	0.207
	(2.455)	(2.651)	(2.916)	(2.216)	(2.703)
Percent formally employed (Hutu)	-44.09***	-49.84***	-46.20***	-43.65***	-48.24***
	(11.50)	(12.83)	(12.69)	(11.26)	(12.59)
Percent 18-30		40.99			37.29
		(37.23)			(41.57)
Percent male		14.77			4.498
		(64.26)			(70.85)
Percent born away			-1.716		1.351
			(7.038)		(8.299)
Percent left			13.07		13.03
			(12.61)		(12.96)
Radio ownership (Tutsi)				-3.738*	-3.951*
				(2.139)	(2.257)
Radio ownership (Hutu)				1.233	1.872
				(10.83)	(11.49)
Observations	137	137	137	135	135
R-squared	0.689	0.692	0.692	0.684	0.689

Robust standard errors in parentheses

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

All specifications include controls for density, population, proportion Hutu, and provincial fixed effects

Table 3: Only categories 1 and 2

VARIABLES	(1) part rate12	(2) part rate12	(3) part rate12	(4) part rate12	(5) part rate12
Mean Education (Tutsi)	-0.0417	-0.0658	-0.0427	0.0302	0.0145
	(0.0544)	(0.0593)	(0.0652)	(0.0674)	(0.0773)
Mean Education (Hutu)	0.712**	0.615*	0.809**	0.670*	0.692
	(0.329)	(0.337)	(0.383)	(0.382)	(0.439)
Percent formally employed (Tutsi)	-0.0259	0.390	0.0967	-0.157	0.154
	(1.347)	(1.566)	(1.728)	(1.302)	(1.708)
Percent formally employed (Hutu)	-22.11***	-27.79***	-25.38***	-21.60***	-27.37***
	(7.178)	(8.648)	(8.159)	(6.718)	(8.226)
Percent 18-30		28.69			21.98
		(24.53)			(28.06)
Percent male		27.37			14.90
		(44.17)			(47.54)
Percent born away			-3.984		-1.936
			(5.361)		(6.123)
Percent left			10.06		9.506
			(8.310)		(8.637)
Radio ownership (Tutsi)				-2.111	-2.274
				(1.369)	(1.450)
Radio ownership (Hutu)				0.478	0.918
				(7.038)	(7.264)
Observations	137	137	137	135	135
R-squared	0.687	0.692	0.693	0.681	0.690

Robust standard errors in parentheses

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

All specifications include controls for density, population, proportion Hutu, and provincial fixed effects

Table 4: Only category 3

VARIABLES	(1) part rate3	(2) part rate3	(3) part rate3	(4) part rate3	(5) part rate3
Mean Education (Tutsi)	-0.0180	-0.0192	-0.0217	0.0450	0.0352
	(0.0477)	(0.0462)	(0.0499)	(0.0641)	(0.0640)
Mean Education (Hutu)	0.619***	0.587**	0.679**	0.583**	0.610*
	(0.235)	(0.243)	(0.266)	(0.267)	(0.310)
Percent formally employed (Tutsi)	0.0750	0.00834	0.129	0.0406	0.0526
	(1.244)	(1.224)	(1.308)	(1.083)	(1.148)
Percent formally employed (Hutu)	-21.98***	-22.05***	-20.82***	-22.05***	-20.88***
	(5.674)	(5.658)	(5.965)	(6.281)	(6.452)
Percent 18-30		12.31			15.31
		(17.02)			(18.43)
Percent male		-12.60			-10.40
		(27.55)			(30.41)
Percent born away			2.268		3.286
			(2.519)		(3.011)
Percent left			3.003		3.526
			(5.688)		(5.786)
Radio ownership (Tutsi)				-1.627	-1.677
				(1.034)	(1.056)
Radio ownership (Hutu)				0.755	0.954
				(5.550)	(5.914)
Observations	137	137	137	135	135
R-squared	0.627	0.629	0.629	0.623	0.627

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
All specifications include controls for density, population, proportion Hutu, and provincial fixed effects

Table 5: Interaction of education and unemployment within commune

VARIABLES	(1) part rate	(2) part rate	(3) part rate	(4) part rate	(5) part rate
Hutu Mean Ed (normalized)	2.665***	2.171**	2.711**	2.326**	2.285*
	(1.004)	(1.004)	(1.128)	(1.140)	(1.289)
Hutu Unemployment (normalized)	3.351***	3.548***	3.365***	3.075***	3.500***
	(1.080)	(1.185)	(1.186)	(1.055)	(1.151)
Mean Ed*Unemployment (Hutu)	0.279	0.703*	0.525	0.532	0.665*
	(0.226)	(0.362)	(0.372)	(0.352)	(0.385)
Mean Education (Tutsi)	-0.0540	-0.0802	-0.0525	0.0882	0.0581
	(0.0932)	(0.0972)	(0.106)	(0.112)	(0.121)
Percent formally employed (Tutsi)	-0.0690	-0.0867	-0.268	-0.566	-0.301
	(2.508)	(2.753)	(2.993)	(2.218)	(2.737)
Percent 18-30		51.22			46.22
		(38.22)			(41.91)
Percent male		23.68			14.16
		(64.95)			(71.09)
Percent born away			-3.240		0.350
			(7.434)		(8.506)
Percent left			11.72		10.79
			(12.60)		(13.04)
Radio ownership (Tutsi)				-3.800*	-3.980*
				(2.057)	(2.165)
Radio ownership (Hutu)				1.366	2.075
				(10.82)	(11.45)
Observations	137	137	137	135	135
R-squared	0.689	0.697	0.694	0.686	0.693

Robust standard errors in parentheses

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

All specifications include controls for density, population, proportion Hutu, and provincial fixed effects

Table 6: Interaction of education and unemployment within individual

VARIABLES	(1) part rate	(2) part rate	(3) part rate	(4) part rate	(5) part rate
Mean Education (Tutsi)	-0.0597	-0.0820	-0.0639	0.0817	0.0601
	(0.0967)	(0.0998)	(0.109)	(0.124)	(0.131)
Mean Ed of Unemployed Hutu	1.220**	1.088*	1.309**	1.165*	1.149
	(0.598)	(0.610)	(0.656)	(0.654)	(0.725)
Mean Ed of Employed Hutu	0.0980	0.0856	0.122	0.0787	0.0856
	(0.188)	(0.192)	(0.192)	(0.197)	(0.205)
Percent formally employed (Tutsi)	-0.0987	0.241	0.0403	-0.240	0.0629
	(2.494)	(2.706)	(2.943)	(2.200)	(2.671)
Percent formally employed (Hutu)	-28.92***	-35.77***	-28.95***	-30.59***	-34.66**
	(9.750)	(12.19)	(10.46)	(11.35)	(13.39)
Percent 18-30		37.67			33.58
		(37.22)			(41.81)
Percent male		16.29			8.553
		(64.57)			(71.11)
Percent born away			-1.715		1.357
			(7.155)		(8.494)
Percent left			11.98		12.09
			(12.49)		(12.90)
Radio ownership (Tutsi)				-3.834*	-4.081*
				(2.175)	(2.295)
Radio ownership (Hutu)				2.313	3.483
				(10.71)	(11.36)
Observations	137	137	137	135	135
R^2	0.689	0.692	0.691	0.684	0.689
F-stat	2.663	2.040	2.598	2.188	1.783
p-value	0.105	0.156	0.110	0.142	0.185

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All specifications include controls for density, population, proportion Hutu, and provincial FEs.