Military Empowerment and Civilian Targeting in Civil War*

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Abstract

Civilians constitute a large share of casualties in civil wars across the world. They are targeted to create fear and punish allegiance with the enemy. This maximizes collaboration with the perpetrator and strengthens the support network necessary to consolidate control over contested regions. I develop a model of the magnitude and structure of civilian killings in civil wars involving two armed groups who fight over territorial control. Armies secure compliance through a combination of carrots and sticks. In turn, civilians differ from each other in their intrinsic preference towards one group. I explore the effect of the empowerment of one of the groups in the civilian death toll. There are two effects that go in opposite directions. While a direct effect makes the powerful group more lethal, there is an indirect effect by which the number of civilians who align with that group increases, leaving less enemy supporters to kill. I study the conditions under which there is one dominant effect and illustrate the predictions using sub-national longitudinal data for Colombia's civil war.

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1 Introduction

Over 3100 civilians died in 92 massacres in Algeria between August 1996 and December 1998.[1] The war between the government and various Islamist insurgencies (notably the Armed Islamic Group) spanned between 1991 and 2002 and left a remarkably high civilian death toll. The legacy of massacres in Colombia is equally distressing: Between 1988 and 2005 Colombian guerrillas killed 1200 civilians in about 200 massacres while over 6100 died in just under 1000 massacres perpetrated by right-wing militias.[2] This pattern of terror is by no means inherent to these two countries. Targeting civilians was the main strategy of the Peruvian militias (Rondas Campesinas) to recover the rural strongholds under the control of the Shining Path. Before the cease fire declared in October 2002, the Sudan People's Liberation Army targeted civilians all across southern Sudan to punish alleged supporters of Karthoum-backed militias (Johnson, 1995). During Museveni's rule in the 1990s, the Lord Resistance Army (LRA) alienated the local population in northern Uganda by massacring civilians. Later, to recover the lost territories, Museveni's National Revolutionary Army used the same strategy, killing alleged LRA supporters (Berkeley, 2001).

Most civilian killings are deliberately planned by both state and non-state actors (Eck and Hultman, 2007). The number civilians killed *intentionally and directly* in internal armed conflicts is about half the number of total deaths in combat.[3] War-induced famine and disease are likely to hit civilians further both during the conflict and in the post-conflict. The death of non-combatants represents an enormous long-term cost of civil war as it erodes the labor force of a country. In addition the deliberate killing of civilians nurses hatreds and revenge desires, triggering cycles of violence in what the World Bank calls a "conflict trap" (World Bank, 2003).

Civilians are targeted to create fear, spawn collaboration and consolidate control of contested territories. Neither the insurgency nor the incumbent can be successful without the support of civilians. The allegiance of the population is a primary objective of the armed groups in civil war. Contesting parties seek to form a "support network" of locals to secure the provision of food, shelter, supplies, information and recruits. The effectiveness of such network determines the group's success in securing contested areas.[4]

[1] Kalyvas (1999) reports all the massacre events that occurred in Algeria in that 29-month period. Each event is described in terms of its date and location, and includes the number of people killed.

[2] CERAC, a Colombian think tank, maintains an event-based dataset on the Colombian conflict (see www.cerac.org.co).

[3] Lacina and Gledistch (2005) introduce a longitudinal dataset on battle deaths. The Uppsala Conflict Data Program has a dataset on civilian casualties in civil war for the period 1989-2005 (see http://www.pcr.uu.se/research/UCDP/).

[4] As pointed out by an IRA combatant: "Without the community we were irrelevant. We carried the guns and planted the bombs, but the community fed us, hid us, opened their homes to us, turned a blind dye to our operations" (Collins 1999 cited in Kalyvas, 2006: p.91)

The same point is also emphasized by Carlos Castaño, head of the Colombian militias: "Since we could not combat [the rebels] where they were, we chose to neutralize the people

Hence the strategic rationale of targeting the civilian network of the enemy to weaken its power by damaging its local base. Petersen and Liaras (2006) argue that fear and terror are effective weapons often used to bend the enemy's objectives. Azam and Hoeffler (2002) show that in Subsaharan Africa terrorizing civilians is often used to substitute for actual combat. Because they generate widespread fear, civilian killings not only reduce the support of the enemy but also increase compliance with the perpetrator. So the degree of which different armed groups receive support from the population is endogenous to the dynamics of conflict (Kalyvas, 2006): On the one hand, armed groups constantly attempt to secure popular collaboration and deter support to rival groups. On the other, irrespective of their true preferences, most people tend to collaborate with the group that maximizes their survival opportunities. Indeed, when caught in a juncture of violence people naturally tend to put survival considerations and the protection of their family and property before their political preferences. Thus, the control of a specific territory by one group often leads to compliance from local communities.[5] Civilians are then compelled to participate in combat for strategic considerations rather than ideology. Greater compliance from the civilian population in turn helps consolidating control, making collaboration and control mutually reinforcing.

Collaboration is a zero-sum game. It must be exclusive and such condition is enforced with violence. Defection is severely punished. Information leaks, for example, are often punished with execution. Killing defectors creates widespread fear, which deters others from doing so. In addition, non-compliance with one group is equated with treason and also punished: Neutrality is not an option for the civilian population who often, and not without risk, prefer to flee the contested region. Households who choose to stay must show some allegiance to one group or the other. Civil war is a polarizing process.

There are many factors that can alter the balance of power between the armed groups of a civil war. A foreign power may intervene by providing financial aid or military support to one group. During the Cold War a number of civil strifes an Africa and Latin America were effectively proxy wars featuring the support of either the US or the USSR to incumbent regimes or insurgent movements. Several African governments supported the National Union for the Total Independence of Angola and the governments of Rwanda, Uganda and Zimbabwe have allegedly financed armed movements in Congo at least since the fall of Mobutu in 1996. More recently, the Colombian conflict has increasingly been shaped by the participation of international actors and both the government and the rebels have benefited from external support: While the Colombian government is the largest recipient of military aid from the US in the western

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who brought to their camps food, medicine, messages, liquor, prostitutes, and these types of things. And we realized that we could isolate them and that this strategy would give us very good results" (Quoted in Kirk, 2003).

[5] According to Cenarro (2002), during the Spanish Civil War many leftists living in regions dominated by the right-wing militias ended up supporting them.

In Colombia, collaboration with the FARC and ELN guerrillas is almost completely a rural phenomenon.

hemisphere, the Chavez regime from neighbor Venezuela has been accused of protecting and financing the Revolutionary Armed Forces of Colombia (FARC). Intervention from abroad can also take the form of donations from diasporas. Examples abound and range from the support of the Tamil diaspora in North America to Sri Lanka's Tamil Tigers –to the support Albanian diaspora in Europe to the Kosovo Liberation Army. The balance of power in civil war can also be altered by fluctuations in the value of natural resources that are used to finance armed groups.[6] Additionally, Ross (2005) reports that rebel groups have been able to raise substantial finance by selling the future rights to war booty. Insurgencies in Angola, Congo, Liberia and Sierra Leone have used this practice. Finally, armed groups can boost their power by merging into unified armies thereby sharing intelligence and taking advantage of military economies of scale. One example is the collusion in 1997 of several local right-wing militias in Colombia.

How is the security of the civilian population affected by shifts in the relative balance of power of armed groups? Because civilians are strategically targeted by local rebels and militias, the consequences of the empowerment of one of them may be catastrophic. A stronger military capacity boosts the ability of generating widespread fear by killing the civilian infrastructure of the enemy. This direct effect of military empowerment maps into higher tolls of civilian casualties. However, an empowered army that has built a reputation of executing enemy supporters is more frightful, and so induces some civilians to shift their support towards it. Thus there is an indirect *fear* effect of empowerment that works in the opposite direction and saves lives. The ultimate effect on civilians casualties depends on the relative size of the direct effect vis-a-vis de fear effect.

This paper develops a simple rational choice model in which two armed groups fight for the control of a strategic territory. Local civilians are compelled to decide which groups to support. This decision depends on the combination of material payoffs and coercion offered by each group to the civilians as well as on an idiosyncratic political preference that every individual has towards one armed group. One obvious result of this simplified framework is that when the majority of the population has strong *a priori* preferences towards one group, compliance is so massive that such group is likely to consolidate territorial control easily.[7] I derive an expression for the equilibrium number of civilians killed by either armed group. The size of civilian casualties depends on the equilibrium size of the "support networks" of the armed groups and the military capacity of each of them. A testable comparative static is the effect on the number of killings of a change in the balance of power of the two armies. I rationalize

[6] Mahmud and Vargas (2008) provide an analytical framework to study the effect of resource booms in civil war. They distinguish booms in cash crops like coffee from booms in resource intensive commodities like oil. The effect of resource booms also depends on the regime type which proxies for whether the benefits of the boom are concentrated in the hands of the mass of citizens or the elite.

[7] This 'corner solution' can be illustrated by the fact that most foreign powers find it extremely difficult to subjugate colonized territories for too long. Polk (2007) argues that because most human beings are territorial, they are seldom willing to accept foreign rulers.

the conditions under which the direct effect of empowerment dominates the fear effect and thus the casualty toll increases. Because the model describes a subnational phenomenon that cannot be contrasted with cross-national variation, I am able to test the predictions using micro-level conflict data across circa 1000 Colombian municipalities for the period 1988-2005. Consistent with the model, I show that *everything else equal* a shift in the military capacity of one group leads to an increase in the number of civilian killings only in territories in which *the enemy* is more powerful.

The rest of the paper is organized as follows. Sections 2 and 3 present the analytical framework and the main testable predictions. Section 4 discuses the case study of Colombia, a country that has experienced civil war for over 40 years and where about a third of all the casualties are civilians killed directly and intentionally. I exploit longitudinal variation across Colombian municipalities to test the model. Section 5 concludes.

2 The Model

I develop a simple model to study the pattern of civilian killings given their strategic role regarding the formation of networks for the provision of supplies, shelter and information to armed groups. In the model armed groups fight for the control of a strategic territory and it is the allegiance of the civilian population what determines the relative success in achieving territorial control. Indeed, as recognized by Russell (1974), no insurgency can be successful without the support of civilians and no incumbent can retain power without it.

2.1 Set up

Consider a territory of some strategic value, V, with no state presence, which is disputed by two armed groups: the rebels and the militia (henceforth R and M respectively).[8,9] The probability that group j secures control over the contested territory is determined by the size of its civilian *support network*: N_j, $j \in \{R, M\}$.

[8] The choice of these two actors over the more obvious pair *Rebels* and *Government* responds to the fact that in most civil wars civilians are not targeted by the givernment directly but by illegal militias instead (although often with the acquiescence and support of the government). However this is just a choice of notation. The two armed groups described in this model could as well be two rebel groups. This has indeed been the case in specific areas of countries like Congo, Angola and Colombia.

[9] The model abstracts from the reason why achieving control over the territory (and therefore appropriating the prize V) is important. Some such reasons may include the existence of a valuable natural resource, the control of which would help financing the armed struggle; the necessity of consolidating a safe haven for the cultivation of hard drugs or for the illegal transportation of arms and supplies; or the strategic proximity of an important city or enemy's camp.

Compliance by the civilian population is enforced through the use of violence: each armed group targets the supporters of its enemy. The probability (p_j) that a given civilian, i, gets killed by group j given its support to j's enemy ($-j$) is determined by the relative bellicose effort of j and $-j$. Let r be the fighting effort of R and m that of M. The probability that i is killed by the rebels given her support to the militia is then determined by a standard contest success function of the form:[10]

$$p_R = \begin{cases} \frac{\lambda r}{\lambda r + \gamma m} \text{ for } r, m > 0 \\ \frac{1}{2} \text{ otherwise} \end{cases} \tag{1}$$

where $\lambda > 0$ is the effectiveness of the fighting effort of the rebels and $\gamma > 0$ is that of the fighting effort of the militia. The effectiveness parameters λ and γ can be interpreted as the "power" of R and M respectively. In this model I assume λ and γ exogenous. Note that p_R is an increasing and concave function of the ratio: $\frac{\lambda r}{\gamma m}$. In turn, the probability that civilian i gets killed by the militia given her support to the rebels, p_M, is equal to $1 - p_R$.

Armed groups simultaneously choose their fighting effort to maximize the size of their support network and thus the probability of controlling the contested territory and appropriating the prize V. Hence the objective function of group j is:

$$\max_{e_j} N_j(r, m)V - c_j(e_j) \tag{2}$$

where

$$e_j = \begin{cases} r \text{ if } j = R \\ m \text{ if } j = M \end{cases} \tag{3}$$

and $c_j(\cdot)$ is the cost for group j of its fighting effort, with $c'_j(\cdot) > 0$.

There is a continuum of mass 1 of civilians each of whom must decide what group to support. Civilian i's payoff from supporting the rebels is linear and additive in her expected material compensation and in an idiosyncratic component representing the individual's bias towards supporting the rebels. It can be represented with the utility function:

$$U_R^i = (1 - p_M)y + \sigma_R^i \tag{4}$$

where p_M is the probability of being killed by the militia –who target i because of her support to the rebels–, y is i's income –which is assumed exogenous and the same for every civilian, and can be thought of as the average compensation to peasants in the contested (rural) territory– and σ_R^i is a non-negative payoff derived privately by civilian i and measured in the same units as y. As in

[10] A contest success function (CSF) is a technology that translates the resources invested by two or more contenders into the probability of winning a contest (or alternatively the share of the prize that each contender will appropriate). See Tullok (1967) for the seminal application of CSF to rent seeking models. Hirshleifer (1991) was among the firsts to use CSF in conflict models. See Skaperdas (1996) and Hirshleifer (2001) for detailed explanations of the different functional forms CSF can take.

a standard probabilistic-voting model (Lindbeck and Weibull, 1987 and Persson and Tabellini, 2000) this component of the utility can be interpreted as parametrizing the ideological bias of individual i towards group R.[11]

Similarly, individual i's utility from supporting the militia is:

$$U_M^i = (1 - p_R)y + \sigma_M^i \tag{5}$$

where p_R is the probability of being killed by the rebels –who target i because of her support to the militia– and σ_M^i is the non-negative idiosyncratic reward derived from supporting the militia.

For completeness, consider a third option whereby i does not support either armed group. In such case the utility of not taking part of the conflict is given by:

$$U^i_{\overline{R},\overline{M}} = (1 - p_R)(1 - p_M)y + \sigma^i_{\overline{R},\overline{M}}$$

This formulation captures the idea that neutrality is a very risky strategy in civil war. Collaborators to one armed group are automatically seen as non-collaborators of the rival group and hence targeted by the latter (Kalyvas, 2006). In this sense, the choice of neutrality implies becoming a target of both armed groups. For simplicity I assume that the neutrality alternative is strictly dominated by supporting either armed group for every civilian i. This is equivalent of assuming that $\sigma^i_{\overline{R},\overline{M}}$, cannot take extraordinarily high values. In other words, the private utility of not taking part in the conflict is limited by survival considerations.

Opposition to all armed actors is of course observed in reality. Amidst other reasons, in order to avoid the risk inherent to not aligning with any armed group, a great number of civilians usually flee from territories under dispute. According to the UN High Commissioner for Refugees (UNHCR, 2006), the country with the largest number of internally displaced people is Colombia. Iraq and Sudan rank second and third respectively. Colombian NGO CODHES estimates that between 1988 and 2004 over 3 million people have internally migrated. The model I present here abstracts from this phenomenon and in some sense deals with the situation of civilians *who choose not to flee, and stay after displacement has taken place*. The fact that in the model those who stay are forced to take side in the conflict is consistent with the empirical observation that collaboration must be exclusive.[12]

[11] For an application of this approach to the context of the trade-off between democracy and fighting, see Chacón, Robinson and Torvik (2007). This parametrization of individual allegiance is also consitent with Petersen (2001)'s account of how ordinary people became involved in resistance movements in Eastern Europe. According to Petersen, there is wide variation in patterns of civilian support toward armed groups. The level of support varies from neutrality to sympathetic fellings to the provision of information to full involvement with the group.

[12] Horton (1998) describes how the Contras repressed sympathizers of the Frente Sandinista during the Nicaraguan civil war. As a result some peasants abandoned their farms. Some others decided to stay and comply with the Contras, withdrawing support to the Sandinista project. Horton quotes a peasant from Quilali town: "If you behaved well you wouldn't have problems [with the contras]. If not, it was a mess."

The relative importance of p_j and σ_j^i, $j = \{R, M\}$, depends of the stage of the civil war at which fighting takes place. The average civil war lasts about 16 years (Fearon, 2004). Initial ideological convictions may be replaced by the accumulated hatreds created by a long-lasting conflict. As a result, the relative importance of σ_j^i may be offset overtime by an increase in coercion.

Given equations (4) and (5) civilian i will support the rebels if:

$$(1 - p_M)y > (1 - p_R)y + \sigma^i$$

which, using (1) and the fact that $p_M = 1 - p_R$, can be written:

$$\sigma^i < y\left(\frac{\lambda r - \gamma m}{\lambda r + \gamma m}\right) \tag{6}$$

where:

$$\sigma^i = \sigma_M^i - \sigma_R^i \begin{cases} > 0 & \text{if } \sigma_M^i > \sigma_R^i \\ = 0 & \text{if } \sigma_M^i = \sigma_R^i \\ < 0 & \text{if } \sigma_M^i < \sigma_R^i \end{cases}$$

This parameter is crucial in the analysis since it gives the private component to (6) and hence allows individuals to differ in their optimal decision. Notice that, in the absence of σ^i, for any given set of material compensations and coercion parameters, every civilian would support the same armed group. To focus on the more interesting case in which civilian support is divided between the two groups, let σ be distributed across civilians according to the probability density function $f(\sigma)$.

Define $\widehat{\sigma} = (p_R - p_M)y$. From inequality (6) it follows that any civilian i for which $\sigma^i < \widehat{\sigma}$ will support the rebels. Otherwise, she will support the militia. Hence, the fraction of civilians who align with the rebels (N_R) is:

$$N_R = \int_{-\infty}^{\widehat{\sigma}} f(\sigma)d\sigma \tag{7}$$

while a fraction $N_M = 1 - N_R$ aligns with the militia.

Note that $f(\sigma)$ depends on how attached the local population is to the cause of one group or the other. In an extreme case, for a particular civilian i, σ^i would be sufficiently negative (positive) that i would strongly support the rebels (the militia). In order to make i switch sides the enemy would have to supply extremely high threats $\{r, m\}$.

Polk (2007) argues that the very presence of foreigners who attempt to control a specific region stimulates a strong sense of group cohesion among natives that often materializes in strong insurgency movements. To Polk the Vietnam experience is the ultimate example of how, regardless of how many soldiers and civilians are killed, how much money is spent and how powerful and sophisticated are the weapons, foreigners cannot militarily defeat an insurgency that is supported by the majority of the people, except perhaps by genocide. Other examples range from the Spanish Guerrilla against the French in the early 19th century to the Mau Mau rebellion in Kenya in the 1950s to, arguably, today's armed resistance in Iraq against the Americans.

In sharp contrast with the corner solution in which a foreign power is ultimately defeated by a cohesive resistance, in most instances σ^i is likely to be sufficiently small for the majority of the population. Only a small share of civilians will be tightly attached to one party or the other. In fact, the majority of people tend to be only weakly committed to any specific group. That is, the average non-combatant does not support any cause with sufficient conviction so as to be willing to make big sacrifices (including death) for the cause. In this case of "weak" inherent preferences, military considerations can be more important than actual political preferences at driving actions (what group to show allegiance to). In fact, irrespective of preferences, equilibrium behavior in terms of support to a given group can change. Switching sides is common in civil war: entire Algerian communities in the early 1990s defected the GIA to join the militias (Kalyvas, 1999). Widespread fear created by the Rondas Campesinas led to massive desertions of insurgents from the Shining Path in Peru during the 1980s. The Zapatista Revolution in early 20th century Mexico was only able to overthrow Porfirio Diaz when twenty six thousand men deserted from the constitutional army and joined the rebels (Wolf, 1973). In Colombia, 46% of the 316 FARC members demobilized by 2002 stated that they joined the guerrilla by force because a salary was promised, or simply because of fear. Only 12% of the subjects claim to have joined the insurgency for ideological reasons (Pinto et al., 2002).[13]

2.2 Civilian casualties

In this reduced-form framework with an inherent risk of death since given coercion efforts, $\{r, m\}$, civilians who decide to support one group are targeted by the other, both the rebels and the militia end up killing civilians. This is consistent with the observation that in civil wars featuring local contests for territorial control, civilian communities are strategically targeted by all armed actors. In the model, the total number of civilian killings is then the sum of killings by the rebels and by the militia: $K_T = K_R + K_M$. This can be written:

$$K_T = p_R N_M(\widehat{\sigma}) + p_M N_R(\widehat{\sigma}) \tag{8}$$

Equation (8) summarizes the magnitude and structure of civilian casualties in an environment of armed struggle for the control of a valuable stateless territory. I will explore how changes in the relative power of the armed groups involved change K_T. To do that I first characterize the equilibrium values of

[13] However it is very likely that this number is a lower bound because of selection issues. Arguably the most ideological of the combatants of a rebel group are underrepresented among those who demobilize.

K_R and K_M as functions of the exogenous parameters of the model, notably the fighting effectiveness of the armed groups: λ and γ.

2.3 Timing of the game

Let G be the game described above. The timing of actions is as follows:

1. Every civilian stationed in the contested territory decides whether to align with R or M.

2. R and M *simultaneously* choose their fighting effort level, respectively r and m, to maximize compliance of civilians to their own group, and hence the probability achieving territorial control.

3. All the killing of civilians by armed groups takes place given compliance levels (N_R and N_M) as well as killing probabilities (p_R and p_M).

2.4 Equilibrium

This is a one-shot sequential game with perfect information. I solve the game by backward induction starting with the optimal fighting effort chosen by R and M, given the compliance shares N_R and N_M. Before turning to the characterization of the equilibrium I provide formal definition of the equilibrium of the game G.

Definition (Subgame Perfect Equilibrium) *Consider the game G. Let s^i be the action taken by civilian i regarding what armed group to align to (R or M), given both i's net idiosyncratic parameter, $\sigma^i = \sigma^i_M - \sigma^i_R$, and the probabilities of being killed by either group, p_R and p_M, so that $s^i : \sigma^i \times \{p_R, p_M\} \rightarrow \{R, M\}$. Similarly, let s^j be the action taken by armed group j regarding its bellicose effort given the compliance shares from the civilian population so that $s^j : \{N_R, N_M\} \rightarrow \{e_j\}$, where $e_j = r$ (m) if $j = R$ (M). Further, let $S_C = \{..., s^i, ...\}$ be the set of strategies taken by all civilians and $S_G = \{s^R, s^M\}$ the set of strategies taken by the two armed groups. An SPE is a strategy combination $\left\{\widetilde{S_1}, \widetilde{S_2}\right\}$ such that $\widetilde{S_1}$ and $\widetilde{S_2}$ are best responses to each other given $f(\sigma)$.*

In the second stage armed group j maximizes the payoff function given by equation (2) where N_j depends on the critical value $\widehat{\sigma}$ and $f(\sigma)$,the distribution across the civilian population of the net component of political preferences on civilians' payoff. Recall that σ can take positive as well as negative values: a civilian i who is ideologically biased towards the rebels has σ^i less than 0, while $\sigma^i > 0$ reflects bias toward the militia. I make the following simplifying assumption:

Assumption *Let $f(\sigma)$ be uniformly distributed in the support $\left[-\frac{1}{2\phi}, \frac{1}{2\phi}\right]$, with density ϕ*

Notice that the density, ϕ, is inversely related to the strength of ideology in the population. Larger values of ϕ shorten the support of the distribution which becomes more concentrated around the mean ($\sigma = 0$) and so individuals are less "ideological" and more responsive to incentives (which in this case are give by coercion). With this functional form for $f(\sigma)$ equation (7) becomes:

$$N_R = 1 - N_M = \frac{1}{2} + \phi y \left(\frac{\lambda r - \gamma m}{\lambda r + \gamma m}\right) \tag{9}$$

Substituting (9) into (2) and assuming for simplicity a linear cost of effort such that $c_j(e_j) = e_j$, the F.O.C. are (for the rebels and the militia respectively):

$$\frac{V y \phi \lambda}{(\lambda r + \gamma m)} \left[1 - \left(\frac{\lambda r - \gamma m}{\lambda r + \gamma m}\right)\right] = 1$$

and

$$\frac{V y \phi \gamma}{(\lambda r + \gamma m)} \left[1 + \left(\frac{\lambda r - \gamma m}{\lambda r + \gamma m}\right)\right] = 1$$

The F.O.C can be expressed as reaction functions of each group's fighting effort with respect to the enemy's effort. In the case of the rebels' effort:

$$r = \frac{1}{\lambda}\left[\left(\left(2V y \phi \lambda \gamma m\right)^{\frac{1}{2}} - \gamma m\right)\right]$$

By symmetry, the reaction function of the militia effort is:

$$m = \frac{1}{\gamma}\left[\left(\left(2V y \phi \gamma \lambda r\right)^{\frac{1}{2}} - \lambda r\right)\right]$$

It follows that the equilibrium fighting efforts r^* and m^* are given by:

$$r^* = m^* = \frac{2V y \phi \gamma \lambda}{(\gamma + \lambda)^2}$$

Note that equilibrium efforts are strictly positive; $\widehat{r} = \widehat{m} = 0$ is not an equilibrium. To see this notice from (1) that $\widehat{r} = \widehat{m} = 0$ yields $p_R = p_M = \frac{1}{2}$. For any ε arbitrarily small but positive, with e_j defined by (3), setting $e_j = \varepsilon$ makes p_j discontinuously jump from $p_j = \frac{1}{2}$ to $p_j = 1$. Thus $e_j = 0$ is strictly dominated and $\widehat{r} = \widehat{m} = 0$ cannot be an equilibrium.

Proposition 1 *There is a unique SPE given by: $r^* = m^* = \frac{2Vy\phi\gamma\lambda}{(\gamma+\lambda)^2}$*

Collolary *Equilibrium efforts are the same for the two groups in spite of the fact that their effectiveness per unit of effort is not necessarily the same ($\gamma \neq \lambda$)*

This result is equivalent to the strong form of Hirshleifer (1991)'s *paradox of power*, whereby weaker contestants perform a higher bellicose effort relative to stronger ones in order to offset the advantage of their enemy.

Turning to the first stage of the game, $r^* = m^*$ determine the equilibrium killing probabilities of both armed groups. These are:

$$p_R^* = \frac{\lambda}{\lambda + \gamma}$$

and

$$p_M^* = \frac{\gamma}{\lambda + \gamma}$$

Each civilian takes these as given and, for every value of her idiosyncratic-preference parameter she decides what group to support. In equilibrium, inequality (6), which defines whether civilian i supports R or M, can be written: $\sigma^i < y\left(\frac{\lambda-\gamma}{\lambda+\gamma}\right)$. Hence the equilibrium compliance shares are:

$$N_R^* = 1 - N_M^* = \frac{1}{2} + \phi y \left(\frac{\lambda - \gamma}{\lambda + \gamma}\right) \tag{10}$$

The compliance share of group j is increasing in its power and decreasing in the power of the enemy. This happens because, for a given net idiosyncratic component of the utility (σ^i), the probability of being killed by a a group given compliance to its enemy is increasing in the power of the group. Thus, there is a *fear effect* driven by survival considerations whereby more powerful groups are able to increase the size of their support network.

From equation (8), it follows that the number of civilians killed in equilibrium is:

$$K_T^* = \left(\frac{\lambda}{\lambda + \gamma}\right) N_M^* + \left(\frac{\gamma}{\gamma + \lambda}\right) N_R^*$$

with N_R^* and N_M^* given by (10). Note that the magnitude and structure of civilian casualties is determined in equilibrium by the parameters of the model, namely the power of both armed groups, γ and λ, the average compensation of peasants, y, and the relative importance of incentives *vis-a-vis* ideology among the civilian population, ϕ.

3 Empowerment

There are many different potential reasons why the balance of power between two armed groups can change in civil war. Foreign intervention is perhaps the most notorious. The involvement of the Soviet Union and the US in Africa and Latin America during the Cold War is an illustrative example. While the USSR gave military and financial support to "communist" insurgencies fighting in most cases against authoritarian regimes, the US backed incumbents in their struggle to content such insurgencies. Congo's president Joseph Mobutu is a telling example of a ruthless dictator backed by successive American administrations because of its strategic value in the anti-communist campaign in Central Africa. Donations by diasporas living in rich countries are another potential source of empowerment. For many years the main source of finance of the Eritrean People's Liberation Front was its huge diaspora (World Bank, 2003). Irish Americans were suspected of contributing to the campaign of IRA in Great Britain. Secondly, insurgent organizations in Angola, Congo, Liberia and Sierra Leone have acquired non-negligible resources by selling the future rights on the war booty (Ross, 2005). Third, fluctuations in the value of natural resources used to finance armed struggles, like oil or diamonds are also a potential source for the relative empowerment of one groups. Finally, there are also cases of alliances and mergers of armed groups after which the resulting force is able to benefit from increasing returns in the use of mass violence. The spectacular upsurge of the late 1990s in militia activity in Colombia documented by Restrepo et al. (2004) originated in the collusion of a large number of militias from different parts of the country under an umbrella organization.

In the context of their strategic role in civil war as the source of the support networks necessary for victory, would more civilians get killed if one group becomes stronger? I use the simple framework developed above to study how changes in the fighting effectiveness of one group change the magnitude and structure of civilian victimization. That this empowerment translates into a greater number of killings is not obvious and I explore the conditions under which this is the most likely outcome. Since more power maps into more killing capacity there is a clear direct effect whereby the number of deaths will increase. However, everything else equal, a more lethal group attracts more supporters who shift sides to reduce the chance of being killed. This fear effect can offset the aforementioned direct effect and the net impact on the number of casualties is ambiguous.

I illustrate these opposite effects by means of equation (8). I examine an increase of, say γ, on K_T. The total change in civilian casualties due to an increase in the power of the militia, $\partial K_T/\partial\gamma$ can be decomposed in the change in rebel victims, $\partial K_R/\partial\gamma$, and the change in civilians killed by the militia, $\partial K_M/\partial\gamma$. The first component can be written:

$$\frac{\partial K_R}{\partial \gamma} = p_R \frac{\partial N_M}{\partial \gamma} + N_M \frac{\partial p_R}{\partial \gamma} \tag{11}$$

Using the equilibrium values for p_R^* and N_M^* it can be seen that the first component of the right hand side of equation (11) is positive since p_R^* is positive and $\partial N_M^*/\partial\gamma = \frac{2\phi y\lambda}{(\lambda+\gamma)^2} > 0$. This is because a more powerful militia attracts more compliers out of fear. Indeed, dying becomes more likely for rebel supporters. The second component is however negative since $N_M^* > 0$ but $\partial p_R^*/\partial\gamma = -\frac{\lambda}{(\lambda+\gamma)^2} < 0$, which happens because a greater fighting effectiveness of the militia makes it less likely to be killed by the rebels (see the contest success function defined in [1]). Then the net effect of militia empowerment on the victimization of civilians *by the rebels* depends on whether the fear-driven increase in N_M offsets the drop in p_R. Hence we have:

Lemma 1 *The effect of an increase in the power of the militia on the number of civilians killed by the rebels is:*

- $\frac{\partial K_R}{\partial \gamma} > 0$ if $p_R \frac{\partial N_M}{\partial \gamma} > N_M \frac{\partial p_R}{\partial \gamma}$, *or* $\gamma < \lambda$. *So* K_R *increases as long as the power of the militia is less than the power of the rebels.*
- $\frac{\partial K_R}{\partial \gamma} < 0$ *if* $p_R \frac{\partial N_M}{\partial \gamma} < N_M \frac{\partial p_R}{\partial \gamma}$, *or* $\gamma > \lambda$. *So* K_R *decreases as long as the power of the militia is greater than the power of the rebels.*
- $\frac{\partial K_R}{\partial \gamma} = 0$ *if* $p_R \frac{\partial N_M}{\partial \gamma} = N_M \frac{\partial p_R}{\partial \gamma}$, *or* $\gamma = \lambda$. *So* K_R *remains unchanged as long as the power of the militia is equal to the power of the rebels.*

Proof. Equation (11) is positive as long as $p_R \left(\partial N_M / \partial \gamma\right) > N_M \left(\partial p_R / \partial \gamma\right)$. Substituting in the equilibrium values for p_R^* and N_M^* and their derivatives with respect to γ we have the following condition:

$$\frac{\partial K_R}{\partial \gamma} > 0 \Leftrightarrow \gamma < \frac{\lambda(6\phi y - 1)}{1 + 2\phi y} \tag{12}$$

Further, note that $K_R(\gamma = 0)$ has to be equal to 0: If the militia has no power at all, they will get no supporters; everybody will support the rebels who then end up killing no one. Since $K_R(\gamma = 0) = \frac{1}{2} - \phi y$, the condition $K_R(\gamma = 0) = 0$ imposes the following restriction on the parameters: $2\phi y = 1$. Substituting into (12) we have

$$\frac{\partial K_R}{\partial \gamma} > 0 \Leftrightarrow \gamma < \lambda$$

■

In turn, the effect of an increase in the power of the militia on the number of their own killings of civilians $\partial K_M / \partial \gamma$ can be written:

$$\frac{\partial K_M}{\partial \gamma} = p_M \frac{\partial N_R}{\partial \gamma} + N_R \frac{\partial p_M}{\partial \gamma} \tag{13}$$

Using the equilibrium values for p_M^* and N_R^* it can be seen that the first component of the right hand side of equation (13) is negative since p_M^* is positive but $\partial N_R^* / \partial \gamma = -\frac{2\phi y \gamma}{(\lambda + \gamma)^2} < 0$. This is because some rebel compliers shift sides and support the empowered militia. The second component is however positive since $N_R^* > 0$ and $\partial p_M^* / \partial \gamma = \frac{\lambda}{(\lambda + \gamma)^2} > 0$, which happens because the militia becomes more lethal. Then the net effect of militia empowerment on their own victimization of civilians depends on whether the fear-driven decrease in their target pool, N_R, offsets their higher killing probability, p_M. Hence we have:

Lemma 2 *The effect of an increase in the power of the militia on their civilian killings is:*

- $\frac{\partial K_M}{\partial \gamma} > 0$ if $-p_M \frac{\partial N_R}{\partial \gamma} < N_R \frac{\partial p_M}{\partial \gamma}$, *or* $\gamma < \lambda$. *So the direct effect of militia empowerment dominates and* K_M *increases*
- $\frac{\partial K_M}{\partial \gamma} < 0$ *if* $-p_M \frac{\partial N_R}{\partial \gamma} > N_R \frac{\partial p_M}{\partial \gamma}$, *or* $\gamma > \lambda$. *So the fear effect of militia empowerment dominates and* K_M *decreases*
- $\frac{\partial K_M}{\partial \gamma} = 0$ *if* $-p_M \frac{\partial N_R}{\partial \gamma} = N_R \frac{\partial p_M}{\partial \gamma}$, *or* $\gamma = \lambda$. *So the two effects cancel-out and* K_M *remains unchanged*

Proof. Equation (13) is positive as long as $-p_M (\partial N_R/\partial \gamma) > N_R (\partial p_M/\partial \gamma)$. Substituting in the equilibrium values for p_M^* and N_R^* and their derivatives with respect to γ we have the following condition:

$$\frac{\partial K_M}{\partial \gamma} > 0 \Leftrightarrow \gamma < \frac{\lambda(1+2\phi y)}{6\phi y - 1} = \lambda$$

where the right hand side equality comes from the restriction $K_R(\gamma = 0) = 0 \Leftrightarrow 2\phi y = 1$ discussed in the proof of lemma 1. ■

Combining lemmas 1 and 2 we have:

Proposition 2 *The effect of an increase in the power of the militia on the total number of civilians killed is:*

- *If* $\gamma < \lambda$ *then* K_T *increases because both* K_R *and* K_M *increase*
- *If* $\gamma > \lambda$ *then* K_T *decreases because both* K_R *and* K_M *decrease*
- *If* $\gamma = \lambda$ *then* K_T *remain unchanged because both* K_R *and* K_M *do so*

3.1 Comparative statics

Recall that both $\partial K_R/\partial \gamma$ and $\partial K_M/\partial \gamma$ are positive if and only if $\gamma < \lambda$. It follows that greater power of the *rebel group* is associated with a larger parameter space for which an empowerment of the *militia* will result in a higher death toll of civilians. This result is not obvious *a priori.* Intuitively this happens because a bigger λ implies that civilians who support the militia are more likely to be killed and hence the indirect effect of an increase in γ–whereby the support to the empowered militia increases- will be weakened by the fact that the rebels themselves are also more effective so militia collaborators will be targeted by a more powerful enemy. Thus, the fact that the indirect effect gets weakened is due to the fear that the rebels generate among the civilians. In the next section I test this prediction using longitudinal data of conflict-related violence in Colombia.

4 Testing the Model: Empowerment of Colombian Militias

4.1 Background

4.1.1 Colombia's armed conflict

Colombia's civil war involves rebel insurgencies, government forces and illegal militias. By most accounts the civil war has lasted over four decades and scholars identify its origin in *La Violencia,* a period of intense violence between the two traditional political parties from 1946 to 1966. Insurgent groups were formed in the early 1960s as peasant self-defense organizations originally aligned with the Liberal party. Two of them survive today as the main guerrilla organizations: the FARC and the National Liberation Army (ELN) with about 20,000 and 4,000 combatants respectively. While allegedly the main objective of these groups is taking over political power, their actions have increasingly relied on terrorism. For instance the two most important sources of finance for rebel groups from the early 1990s are the drug business and the kidnapping of civilians. Drugs are a major source of finance especially for the FARC, which is known to tax coca crops, and to control the production, processing and export of cocaine and heroine. In terms of bellicose activity the most common guerrilla actions are the disruption of the economic infrastructure (e.g, attacks to oil pipelines), attacks to government military positions, and bombings and road blocks.

The other major active armed actors of the conflict are the illegal militias, called paramilitary forces. They are said to have had over 12,000 members at the peak of their strength. The first militias were organized by the military during the late 1970s thanks to a law that permitted the formation of armed self-defense organizations of civilians encouraged to fight against the insurgents. Subsequently, rural elites formed private armies which emerged on a widespread scale during the eighties when drug lords started becoming landowners and facing extortion from the guerillas. These militias were banned in 1989 but kept operating in the shadow after which the Colombian conflict technically became three-sided. However, in recent years the vast majority of the fighting involves the guerilla against the military. Paramilitaries are not primarily a clash force and try to avoid direct combat with either the guerrilla or the government forces. Rather, the militia specializes in selective killings of civilians whom they presume support the rebels. Seven out of ten civilians killed in Colombia from 1988 to 2005 have been victimized by armed militias, often with the alleged acquiescence of the military. Over 70% of all the uncontested attacks carried out by militias have been massacres, with incursions, check points and kidnapping taking up the slack (Restrepo and Spagat, 2004).

4.1.2 The United Self-Defense of Colombia–AUC

In 1997, several disparate local militias came together under an umbrella alliance called the United Self-Defense of Colombia (AUC), which contributed substantially to the dramatic expansion of conflict-activity during the late 1990s. The AUC intensified its strategy of targeting civilians. Two thirds of the 7,000 civilians killed by paramilitary groups from 1988 to 2005 died in one third of the time, from 1997 to 2002 during the life span of the AUC. At the same time Colombia witnessed a rapid geographical expansion of militia presence. Year 2000 was the peak of paramilitary activity with attacks in 120 municipalities, four times the average geographical incidence of the pre-AUC period –1988 to 1997. This is consistent with the idea that civilians are killed as means of consolidating control over new strongholds. In the words of the AUC leader Carlos Castaño:

> " I made of this conflict a high intensity war that now involves the people it must involve: the hidden allies of the guerrilla" (quoted in Aranguren, 2001, p. 116).

Indeed, the AUC publicly claimed that at least two thirds of the guerrilla members were civilian supporters rather than proper combatants (Aranguren, 2001). The organization also argued that while the human rights constraints prevent the Colombian military from involving civilians in the conflict, the survival success of the rebels is determined by the capacity of coercing rural communities into supporting them. According to the AUC rhetoric, an effective counterinsurgency strategy must give priority to block these "guerrillas without uniform".

Taking advantage of a presidential transition, in 2002 the AUC leadership estimated the organization had enough leverage to cut a good deal on an eventual peace process (see Romero, 2003). In December the AUC command unilaterally declared a cease fire as a gesture to foster negotiations with the administration of President Alvaro Uribe. Negotiations started in January 2003 and lasted about three years, ending with a controversial peace process and a massive demobilization of militia combatants in 2006 and 2007.[14]

4.2 Data

The conflict dataset used in this paper was first introduced by Restrepo, Spagat and Vargas (2004). Since 2005 it is maintained by CERAC, a Colombia-based think-tank. It is an event-based conflict dataset on Colombia covering the period 1988-2005. For every event the dataset records its type, the date, location,

[14] Although the number of massacres dropped significantly,militia killings of civilians did not stop. From 2003 several massacres have taken place. However, the government argues that most of these violations are carried out by splinter militia groups and AUC dissidents.

perpetrator, and victims involved in the incident. The dataset is described thoroughly by Restrepo et al. (2004) and Dube and Vargas (2008). Here I provide a succinct account of the data collection process.

The dataset is constructed on the basis of events listed in the annexes of periodicals published by two Colombian human rights NGO's: *CINEP* and *Justicia y Paz*. Most of the event information in these annexes comes from two primary sources, a network of priests from the Catholic Church–with representation in almost every municipality in Colombia-and over 25 newspapers with national and local coverage. The inclusion of reports from the Catholic priests, who are often located in rural areas that are unlikely to receive press coverage, broadens the municipality-level representation. Based on these sources, the resulting data includes every municipality that has ever experienced a conflict related action (either a unilateral attack or a clash between two groups). There is a stringent regime to guarantee the quality and representativeness of the data. As a first step a large number of events and is randomly sampled and compared against the original source, to check for correct coding from the annexes into the dataset. Second, a different random sample is looked up in press archives to confirm whether incidents should have been included in the annexes. This step checks the quality of the raw information provided by the NGO's, which turns out to be quite high. Third, the largest events associated with the highest number of casualties are carefully investigated in press records. Finally, without double-coding, the dataset is complemented with additional events provided in reports by human rights NGOs and by Colombian Government agencies.

I use several variables from the CERAC dataset throughout the empirical analysis that follows. These include the number of civilian casualties (the dependent variable); the number of *combatants* killed; the number of massacres of civilians[15]; and the number of attacks by the rebels, which I treat as the baseline proxy of rebel power, λ (see Table 1). Other proxies of rebel power are a dummy for the presence of rebel fronts (from the Colombia Ministry of Defense); a dummy for the presence of coca crops in 1994 (from the Colombia National Police Department); and a dummy for whether a municipality is a strategic stronghold of FARC, the country's largest rebel group (from Giraldo et al., 2001)–see Table 1.

I control for a number of observable time-invariant and time-varying municipality specific characteristics including (the log of) population–which is used as scale control-, poverty, health and education rates (all from DANE, the national statistics office of Colombia); an index of institutional quality (from Fundacion Social, a local NGO); and several geographic characteristics like altitude and average levels of temperature and rainfall (from IGAC, the country's geography bureau)–Table 1.

<Table 1 about here>

[15] Massacres are defined as single killing events resulting in the death of at least four people.

4.3 Empirical analysis

4.3.1 Benchmark results

Recall that an empowerment episode triggers two opposite forces: an indirect effect and a direct effect. From subsection 3.1 we know that everything else equal, when the militia gets more powerful: the greater the power of the rebels the weaker the indirect effect, which operates by preventing rebel supporters to switch sides. Hence civilian casualties will be higher in places where rebels are stronger. Table 2 shows evidence in this respect. I regress the number of civilians killed on the interaction between λ (proxied by the number of rebel attacks in a given municipality-year) and a dummy that takes the value of 1 from 1997 to 2002, representing the period where militias colluded into the AUC[16]. The model predicts that the lethality of the rebels should be positively associated with civilian killings, *especially* after the formation of the AUC (which shifted the relative balance of power in favor of the militia). In other words, an increase in the power of the militia worsens human security especially in places where the rebels are more powerful. I then expect the coefficient on the interaction between the proxy of λ and a dummy for the militia collusion period to be positive and significant.[17]

<Table 2 about here>

Column 1 of Table 2 reports estimates from pooling the data across municipalities, and years and running an OLS of the number of civilian casualties on the interaction of the number of rebel attacks and the six-year period of militia empowerment (1997-2002) across the pooled data. This specification controls for the non-interacted version of the two variables. Column 2 explores how robust the baseline result is to controlling for a battery of municipality-specific observable characteristics, both time-invariant and time-varying. In particular, socioeconomic controls like the poverty rate, school enrollment and an indicator of average health conditions are included. Other controls are municipality-specific institutional quality, a dummy for whether the municipality is urban or rural, geographical characteristics like average temperature, altitude and rainfall, and (the log of) the municipality's registered population as a time-varying scale control. Column 3 adds state-specific time-trends. This is a very stringent test because there are about 1000 municipalities but just 32 states. The trend controls for serial correlation over time and across municipalities in the same state.

[16] Clearly, this proxy of λ may be problematic. In particular, rebel attacks may be *negatively* related to their power if such attacks occur in places where they seek to gain control through violence. Table 2 delas with these concerns and show the robustness of the baseline results to a number of potential proxies for the unobservable power measure.

[17] For conciseness, in the reported tables I only include the coefficients of interest. Estimated coefficients on control variables have the expected sign and vary in significance. These are available from the author by request.

A potential problem with the approach taken in columns 1 to 3 is that it does not account for potential unobserved municipality-specific heterogeneity. If present, such heterogeneity can take different forms: It may be independent from the covariates or it may be correlated with them. If the unobserved characteristics are independent from the regressors a *random-effects* estimation is consistent. However, if the unobserved heterogeneity is systematically correlated with the covariates, failing to remove the time-invariant unmeasured municipality-level characteristics may confound the analysis since it leads to omitted variable bias. Results from a Hausman test (not reported) suggest one cannot accept the null hypothesis that the unobserved heterogeneity is uncorrelated with the covariates. That is, it seems that the data generating process is best described by a *fixed-effects* model. Moreover, in addition to municipality-specific fixed-effects, in column 4 I include year fixed-effects, which control for any arbitrary annual changes in the militia killing of civilians.[18]

Columns 5 and 6 break down the number of civilian casualties between civilians killed by the rebels (column 5) and civilians killed by the militia (column 6). The coefficients on the interaction of interest are positive and significant in both columns. This is consistent with proposition 2 which says that the increase in civilian casualties (K_T) is due both to an increase in rebel killings (K_R) and an increase in militia killings (K_M).

All specifications account for the fact that stochastic disturbances are likely to be correlated over time within a given municipality, or may have covariances that differ across regions. Such potential problems of serial correlation and heteroskedasticity respectively are taken care of by clustering the errors at the municipal level. Hence reported standard errors in all tables are panel-robust.

Results show that the power of rebels (as measured by the number of guerrilla unilateral attacks) is positively associated with the number of civilian casualties during the militia empowerment period.[19] The coefficient of interest is significant at 99 percent of confidence and its magnitude implies that a municipality going from the mean number of rebel attacks in the pre-AUC period to one *additional* rebel attack during the empowerment of the militia will have 1.1 additional civilians killed. This figure is remarkably stable across specifications and the effect is significantly different from zero in all cases.

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[18] This specification absorves the time-invariant municipality-specific controls. In this sense, while fixed effects estimates are consistent even if the 'true' data generating process has random effects, one disadvantage of fixed over random effects is that the marginal effect of time-invariant regressors cannot be estimated. But this is not true for time-varying controls, which can also be estimated using fixed effects. In any case, in the present analysis I do not conduct substantive interpretation of the impact of any of the controls and focus on the interaction which is relevant according to the theoretical model.

[19] Note that I do not make any claim of *causality* since the power of rebels is likely to be endogenous. Despite the fact that the fixed-effects approach of columns 4 to 6 deals in part with such endogeneity by controlling for unobserved characteristics that may be affecting both civilian casualties and the power of the rebels, I interpret the econometric results as associations. Nevertheless these associations are informative, especially since they are consisting with the predictions of the theoretical framework.

4.3.2 Accounting for the count nature of the data

Count-data are highly non-normal and hence not well estimated by linear regression. The Poisson model is usually incorporated to account for the data generating process that produces counts.

Columns 1 and 2 of Table 3 fit Poisson models with and without fixed effects. As in Table 2 the latter includes year-fixed effects to account for any arbitrary annual changes in the dependent variable in addition to the municipality-specific unobserved heterogeneity.[20] The coefficient on the interaction between the proxy for the power of the rebels and the empowerment period of the militia is once again positive and significantly different from zero at 99 percent confidence in both cases. Despite the difference in the magnitude of the coefficients reported in columns 1 and 2, the substantive economic quantity of interest is very similar: A municipality going from the mean number of rebel attacks in the pre-AUC period to one *additional* rebel attack during the empowerment of the militia, will have 0.4 additional civilians killed. Despite the fact that this figure is quite smaller than the one predicted by the linear regression approach (Table 2) its magnitude is far from negligible if one takes into account that the average number of civilians killed by the militia per municipality-year is 0.6, hence one additional rebel attack during the AUC period will almost double the average number of killings

<Table 3 about here>

Columns 3 and 4 of Table 3 account for the fact that the simple Poisson approach has two potential problems. First, the Poisson distribution sets the population mean equal to the variance. However, it is often the case for count variables to be *overdispersed*, that is to have the variance greater than the mean. Here, the variance of the dependent variable (the municipality-year count of civilians killed) is 3.1, about six times larger than the mean(0.6).[21]

The second problem of the Poisson approach is that count data may be highly left-skewed, having "excess zeros": Consider the process that could led to a count being zero. An armed group may be stationed in a municipality but abstain from targeting the civilian population. Another municipality may lack armed presence altogether and hence present zero killings. In the latter case zero killings are a certain outcome and thus the number of zeros may be inflated and killings in municipalities free of armed groups cannot be explained in the same way as killings in regions with armed presence. Here, 90% of the 14,370 observations the dependent variable is zero, so the data is indeed highly left-skewed.

[20] The fixed-effects Poisson model is estimated by conditional maximum likelihood. Because the likelihood function is contional to the aggregate sum of counts the actual number of observations used to estimate the parameters is smaller than the whole sample.

[21] These are however the unconditional mean and variance and their comparison only suggests whether overdispersion is likely to be present. More formally, in the regression setting one can test whether the conditional mean and variance are significantly different from each other or not.

This discussion suggests that the Poisson assumptions are most probably not met and different models for count-data analysis should be considered. Column 3 of Table 3 fits a (fixed effects) Negative Binomial distribution which can be regarded as a generalization of the Poisson with one additional ancillary parameter that allows the variance to be greater than the mean. The model estimated in column 3 of Table 3 produces an estimate of such parameter that confirms the existence of overdispersion an validates the Negative Binomial over the Poisson. The coefficient on the interaction of interest is positive and significant and does not differ substantively from the marginal effect implied by the Poisson and reported above.

The standard Negative Binomial model does not distinguish between the two possibly different processes causing a high number of zero counts. Column 4 of Table 3 fits a *zero-inflated* Negative Binomial model. The complication of excess zeros is corrected by combining two otherwise separate models: A Logit model is used to predict the cases in which zero is a certain outcome and a Negative Binomial distribution fits the counts having non-certain zeros. For the former I use as predictors the whole set of time-varying and time-invariant municipality-specific characteristics that otherwise serve as controls across specifications. Once again the estimated value of the ancillary parameter of the Negative Binomial suggests that this model is more appropriate than the Poisson. In addition, the Vuong test (not reported) suggests that the zero-inflated model is significantly better than the standard Negative Binomial. Finally, the coefficient of interest turns out to be robust to this general model that accounts for both overdispersion and excess zeros and it is indeed positive and significant, this time at 95 percent confidence. Its marginal effect is also virtually unchanged and so a municipality going from the mean number of rebel attacks (0.6) in the pre-AUC period to one *additional* rebel attack during the empowerment of the militia, will have on average *double* number of civilians killed.

4.3.3 Other proxies of rebel power

Proxying the power of an armed group that fights for territorial control with the number of attacks it carries out on such territory may be problematic. It could be argued that the opposite is in fact true: while the more contested a territory is, the more bellicose activity there will be from contesting groups, the consolidation of territorial control is associated with a rather peaceful period ex post. Table 4 acknowledges such concern and looks at the robustness of the benchmark fixed-effects model presented in Table 2 (column 4) to the use of different proxies of λ. Columns 1 and 2 use a dummy for whether a given municipality is reported–by the military intelligence-to have respectively a FARC or ELN front operating in a municipality, independently of whether there has been any recent active bellicose activity by it or not. The idea is that, everything else equal, rebels hold relatively more power in places where they are reported to have a permanent basis. The results suggest that, with 99 percent confidence, districts where there is a FARC (ELN) front had an average of 0.6

(0.7) additional civilian killing in the period 1997-2002.

<Table 4 about here>

Columns 3 and 4 of Table 4 look at other two proxies for λ. The coefficient of interest in column 3 is the interaction between the dummy for the militia empowerment period and a dummy for whether a municipality grew any coca plants in 1994 according to a survey conducted that year by the National Police Department. This is arguably highly correlated with the places where the rebels have been traditionally powerful. Indeed, after the Medellin and Cali drug cartels were dismantled in the early-to-mid 1990s the rebels took over the control of the production-trafficking chain. The militia was not involved in the coca business until well after the formation of the AUC in 1997 (Aranguren, 2001). The interaction term is positive and significant so the baseline results are also robust to the third alternative measure of rebel power and suggest that, everything else equal, had an additional municipality been controlled by the rebels in the period 1997-2002; in expectation such municipality would have had 0.7 additional civilians killed. In turn, column 4 focus on the effect of rebel power proxied by an indicator of municipalities that, according to the thorough study of rebel territorial control in Colombia by Giraldo et al. (2001), are strongholds of the FARC, the largest rebel group in Colombia. These are municipalities that: i) belong to the strategic backward of the rebel group–mainly located in the states of Caqueta and Meta– where the rebel command is thought to be located; ii) secure access to strategic roads and rivers (in Caqueta, Cundinamarca, Huila and Guaviare) and iii) ensure a steady finance source for the rebel group. Column 4 suggests that these municipalities have had on average 1.3 additional civilians killed in the period of the empowerment of the militia relative to the previous period.

The baseline results are then robust to using a heterogenous set of proxies for rebel power, in addition to time-varying scale controls, state-specific time trends, and year and municipality-specific fixed effects, which account respectively for time and municipality unobserved heterogeneity not captured by the controls.

4.3.4 Additional robustness checks

Table 5 reports additional robustness checks. Columns 1 and 2 check whether the results are robust to changing the dependent variable. Instead of looking at the number of civilians killed, these columns report the effect of the interaction between λ and the militia empowerment period on *the number of civilian massacres*. The effect is positive and significant suggesting that, even after controlling for municipality-specific economic, social, political, geographical and demographic characteristics, civilians were massacred more in places where the rebels were more powerful.

Columns 3 and 4 perform falsification tests. A 'placebo' empowerment period, one that also last six years (as the true AUC life-span, 1997-2002), is used instead to interact the proxy for λ. The coefficient associating this interaction with the number of civilians killed is insignificant. Further, the model predicts an association between the power of one of the contesting groups and the number of *civilians* killed by the other. While combatants die as result of clashes with contesting illegal armed groups or government forces, civilians are target with the specific objective of consolidate territorial control. Indeed, a different dependent variable (namely the number of *combatants* killed) is not significantly associated with the interaction of interest, after controlling for municipality-specific and year fixed effects, state time trends and time-varying characteristics of the municipality.

<Table 5 about here>

5 Conclusion

Most civil wars witness the killing of non-combatants by both state and non-state parties. The objective behind this practice seems to be weakening the enemy by eliminating its civilian support network, and take military advantage over it. I capture this idea in a simple model were civilians stationed in a contested territory are killed by the party they do not comply with. In this context I examine under what circumstances the empowerment of one of the groups will result in more or less civilian casualties.

There are two opposite forces captured by the model. On the one hand, assuming that more power translates into a greater killing capacity there is a direct effect whereby more civilians will die as a result of the greater killing capability. On the other hand this same mechanism dissuades some civilians from supporting the enemy, so it is not clear whether the total number of civilians killed increases or decreases. The model predicts that greater power will result in more civilian killings only if the enemy is itself powerful enough.

Using an event-based dataset that permits exploiting the sub-national variation of the Colombian armed conflict, I find empirical support for this prediction. The empowerment of illegal right-wing militias resulted in higher killing of civilians in places where the rebels are more powerful. This result is robust to various econometric specifications, set of controls, measures of power and dependent variables.

Future work is needed to enrich the model with a more complex economic environment that allows testing predictions on the pattern of killings in places that vary in terms of their socioeconomic characteristics.

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TABLE 1
Descriptive Statistics

	Type	Mean	Standard Deviation	Source
1. Conflict Variables				
1.1. Intensity Measures				
Civilian casualties	count	0.61	3.3	CERAC
Number of massacres	count	0.06	0.34	CERAC
Combatant casualties	count	0.01	0.31	CERAC
1.2. Proxies of Rebel Power				
Attacks by rebels	count	0.61	1.78	CERAC
Presence of FARC front[a]	dummy	0.48	0.5	Colombian Army
Presence of ELN front[a]	dummy	0.23	0.42	Colombian Army
Presence of coca crops in 1994	dummy	0.06	0.23	National Police Department
Municipality is FARC strategic stronghold[b]	dummy	0.07	0.25	Garcia et al. (2002)
2. Municipality Characteristics				
2.1. Time Invariant Controls				
2.1.1. Socioeconomic Characteristics				
Poverty rate (index of unmet basic needs)	0-100 index	54.53	19.81	DANE
Education (secondary enrolment)	percentage	0.57	0.26	DANE
Health conditions (< 1 year-old child mortality)	deaths per 1000 births	58.35	119.29	DANE
Institutional quality[c]	count per capita	1.14	0.84	Fundacion Social
Whether municipality is urban or rural	dummy	0.70	0.46	Based on 2004 population
2.1.2. Geographic Controls				
Altitude	meters	1,136.58	1,167.81	IGAC
Average temperature	ºC	21.96	4.77	IGAC
Average rainfall	mm^3	1,978.07	1,070.6	IGAC
2.2. Time Varying Controls				
Log of population	ln(count)	9.66	1.05	DANE

a) FARC and ELN are the two largest rebel groups
b) See text for discussion
c) the sum of the (per capita) number of financial, social, fiscal, security and law enforcement institutions

TABLE 2

Benchmark Results

Dependent variable: *Civilians casualties*

	Ordinary Least Squares					
	(1)	(2)	(3)	(4)	(5)	(6)
Rebel power x militia	0.596	0.599	0.574	0.620	0.136	0.484
empowerment period	(0.159)***	(0.162)***	(0.170)***	(0.139)***	(0.052)***	(0.108)***
Time-invariant controls	no	yes	yes	no	no	no
Time-varying controls	no	yes	yes	yes	yes	yes
Time trends	no	no	yes	yes	yes	yes
Municipality fixed effects	no	no	no	yes	yes	yes
Year fixed effects	no	no	no	yes	yes	yes
Observations	14,370	12,420	12,420	13,740	13,740	13,740

Note - Panel-robust standard errors are in parentheses. Regression disturbance terms are clustered at the municipality level. Time-invariant controls (coefficient estimates not reported) include poverty rate, average education, health conditions, institutional quality, whether the municipality is urban or rural and geographic characteristics like average rainfall, average temperature and altitude. The Log of population (coefficient estimates not reported) is used as a scale control and it is time-varying. Time trends are at the state level.

* Significantly different from zero at 90 percent confidence

** Significantly different from zero at 95 percent confidence

*** Significantly different from zero at 99 percent confidence

TABLE 3

Results from Distributions for Count Data

Dependent variable: *Civilian casualties*

	Poisson		Negative Binomial	
	(1)	(2)	(3)	(4)
Rebel power x militia	0.058	0.032	0.056	0.044
empowerment period	(0.016)***	(0.004)***	(0.009)***	(0.020)**
Time-invariant controls	yes	no	no	yes
Time-varying controls	yes	yes	yes	yes
Municipality fixed effects	no	yes	yes	no
Year fixed effects	no	yes	yes	no
Excess-zeros correction	no	no	no	yes
Observations	12,420	5,462	4,995	12,420

Note - Standard errors are in parentheses. Regression disturbance terms of columns (1) and (4) clustered at the municipality level. Time-invariant controls (coefficient estimates not reported) include poverty rate, average education, health conditions, institutional quality, whether the municipality is urban or rural and geographic characteristics like average rainfall, average temperature and altitude. The Log of population (coefficient estimates not reported) is used as a scale control and it is time-varying. Column (4) uses a Zero-inflated negative binomial distribution

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TABLE 4
Robustness to Measures of Rebel Power
Dependent variable: *Civilian casualties*

	Ordinary Least Squares			
	FARC front	ELN front	Coca in 1994	FARC strategic stronghold
Proxy for rebel power:	(1)	(2)	(3)	(4)
Rebel power x militia	0.587	0.702	0.739	1.335
empowerment period	(0.213)***	(0.230)***	(0.442)*	(0.791)*
Time-invariant controls	no	no	no	no
Time-varying controls	yes	yes	yes	yes
Time trends	yes	yes	yes	yes
Municipality fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
Observations	13,740	13,740	13,740	13,740

Note - Panel-robust standard errors are in parentheses. Regression disturbance terms are clustered at the municipality level. The Log of population (coefficient estimates not reported) is used as a scale control and it is time-varying. Rebel power measures are: the presence of a FARC company in column 1; the presence of an ELN company in column 2; whether there were illegal coca crops in a given municipality in 1994 in column 3; whether a given municipality is part of FARC strategic stronghold according to Giraldo et al. (2001) in column 4.

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*** Significantly different from zero at 99 percent confidence

TABLE 5
Additional Robustness Checks

	Ordinary Least Squares			
			Falsification tests	
	Dependent variable: number of massacres		Placebo empowerment period	Dependent variable: killing of combatants
	(1)	(2)	(3)	(4)
Rebel power x militia	0.061	0.061	-0.044	0.000
empowerment period	(0.013)***	(0.011)***	(0.106)	(0.004)
Time-invariant controls	yes	no	no	no
Time-varying controls	yes	yes	yes	yes
Time trends	no	yes	yes	yes
Municipality fixed effects	no	yes	yes	yes
Year fixed effects	no	yes	yes	yes
Observations	12,420	13,740	13,740	13,740

Note - Panel-robust standard errors are in parentheses. Regression disturbance terms are clustered at the municipality level. Time-invariant controls (coefficient estimates not reported) include poverty rate, average education, health conditions, institutional quality, whether the municipality is urban or rural and geographic characteristics like average rainfall, average temperature and altitude. The Log of population (coefficient estimates not reported) is used as a scale control and it is time-varying. Columns 1 and 2 report results from falsification tests. Column 1 uses a placebo empowerment period for the militias. Column 2 looks at militia killing of combatants as dependent variable. Columns 3 and 4 look at the robustness to using the number of militia massacres of civilians as the dependent variable.

* Significantly different from zero at 90 percent confidence

** Significantly different from zero at 95 percent confidence

*** Significantly different from zero at 99 percent confidence