Rebel Organizations, Force Structure, and the Dynamics of Violence in Armed Intrastate Conflicts

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Summary of the thesis

A burgeoning literature examines how armed groups' force structure, i.e. who fights for them, and their external support contributes to conflict dynamics. Building on this, this thesis seeks to further our understanding of rebel organizations' use of violence in civil war. Across four substantive chapters, it studies how rebel organizations' force structure and their external support affect their use of violence against civilians, combat violence, and sexual violence.

Chapter one focuses on child soldiering, suggesting that the practice does not have a uniformly positive effect on violence against civilians, as indicated by earlier work, but that the effect is conditioned by whether rebels receive civilian support. Chapters two and three use a quantitative case-study of the Nepalese civil war and a replication of a prominent earlier study to analyse how women's participation in rebel organisations affect group behaviour. They find that female fighters decrease rebels' civilian victimization and use of sexual violence, but also their combat performance. Finally, chapter four differentiates two modes of external support to rebel groups, hard and soft delegation, which vary in the control they afford to sponsors. While hard delegation increases combat deaths but not rebel violence against civilians, the opposite is the case for soft delegation. This thesis thus offers new theoretical and empirical insights into the drivers of civil war violence. It shows that the attributes of individual rebels crucially affect how rebel groups fight, challenging recent studies that emphasize the role of top-down socialization, such as ideological training, over that of combatant attributes while also suggesting a way forward by theoretically and empirically documenting the interaction of these two factors. In addition, it refines existing accounts of external state sponsorship of rebel groups, arguing that its effects on conflict dynamics depend on the control opportunities it affords to sponsors.

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1. Introduction

"War", in the words of Carl von Clausewitz, "is the continuation of political activity by other means" (as cit. in Mahnken 2016: 54). In armed intrastate conflicts, political actors thus continue ongoing bargaining processes over goods such as political power, economic resources, or minority rights by taking up arms (see e.g. Walter 2009). One prominent source, the Uppsala Conflict Data Program (UCDP), defines armed intrastate conflicts accordingly as "a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which […] one is the government of a state [and the other an internal opposition group], results in at least 25 battle-related deaths in a calendar year" and finds that there were 52 armed intrastate conflicts active in the year 2019 (Pettersson 2020a: 1; Pettersson and Öberg 2020). This represents the highest number of such conflicts over political power and rights in the period after World War Two, matching the previous peak in 2016 (Pettersson and Öberg 2020).

However, the conflicts included in these figures often differ substantially in how they are fought and who is most affected by the fighting. For instance, the long-running dispute in Afghanistan has resulted in close to 260,000 fatalities of which almost 95% occurred during fighting between government and opposition forces[1]. In contrast, fighting in Syria has been much more intense, producing almost 360,000 fatalities, but this casualty figure is also the result of combat between rebel groups which accounts for ~13% of all casualties. Similarly, the conflicts in Sri Lanka and Nigeria have both resulted in close to 60,000 fatalities but while fighting between government and rebels accounts for over 90% of casualties in the former dispute, it is only responsible for 31% of deaths in the latter as fighting between opposition groups and violence against non-combatants account for 41% and 28%, respectively. And finally, Rwanda remains the country with the highest total number of human loss due to armed conflict in the post-Cold War period with approximately 516,000 deaths, the majority of which can be attributed to violence against non-combatants during the Genocide in 1994. In summary, these figures suggest that armed conflicts vary substantially not only in their overall lethality but also in what specific types of fighting and violence produce their fatalities. Additionally,

[1] All these figures are based on table 1 in Pettersson and Öberg (2020). As discussed in more detail in the definitions below, they only pertain to total fatalities resulting from the direct use of armed force, thus omitting indirectly induced casualties from causes such as starvation and public health crises (Ghobarah et al. 2003).

armed conflicts further differ in whether and to what extent the conflict parties engage in not necessarily lethal but potentially highly traumatic acts of sexual violence such as rape. For instance, Cohen and Nordås (2014) report that sexual violence, defined as including "(1) rape, (2) sexual slavery, (3) forced prostitution, (4) forced pregnancy, and (5) forced sterilization/abortion […as well as…] (6) sexual mutilation, and (7) sexual torture" (2014: 419), was used on a massive scale in the Afghan conflict while in neighbouring Pakistan, there were only isolated reports of such transgressions while fighting was ongoing.

Formally and again following the definitions by the UCDP, one can distinguish fatalities in armed intrastate conflicts into resulting from three mutually exclusive categories of lethal violence, namely state-based, where "battle-related deaths refer to those deaths caused by the warring parties that can be directly related to combat" (Pettersson 2020b: 3), one-sided, "the use of armed force by the government of a state or by a formally organized group against civilians which results in at least 25 deaths per year" (Eck and Hultman 2007: 235), and non-state-based, "the use of armed force between two organized armed groups, neither of which is the government of a state, which results in at least 25 battle-related deaths in a year" (Sundberg et al. 2012: 352–3). In other words, one can distinguish between 1) violence against non-combatants, 2) violence between government and non-government combatants, and 3) violence between (at least) two groups of non-government combatants. This dissertation is concerned with rebel groups' use of lethal and sexual violence against non-combatants as well as their violent interactions with government forces.

2. Literature Review

Given the massive scale of human loss associated with contemporary armed conflict, it is unsurprising that a large literature on the causes and determinants of these different types of violence has emerged. And in line with the idea that armed conflict represents the continuation of a political bargaining process, many studies find that the extent of violence against non-combatants and of violence between government and opposition combatants is driven by structural and processual features of the polity they fight in and over[2]. For instance, existing studies argue that both types of violence are affected by the country's regime type and ethnic groups' in- or exclusion from political power (Eck 2009; Fjelde and Hultman 2014; Hultman 2012; Lacina 2006; Ottmann 2017; Wimmer and Miner 2019). And of course, a host of research underlines the conflict-fuelling effects of poverty, economic inequality, negative income

[2] For more extensive reviews of this literature than is possible here, see (Blattman and Miguel 2010; Cederman and Vogt 2017; Koos 2017; Valentino 2014). For the sake of this literature review, I discuss the determinants of sexual violence alongside those of lethal violence against civilians. However, note that doing so is not uncontested as some emphasize the need to discuss the phenomenon on its own (see e.g. Hoover Green 2016).

shocks, and atypical income opportunities (e.g. Chaudoin et al. 2017; Dube and Vargas 2013; Gawande et al. 2017; Nepal et al. 2011).

At the same time, a growing literature has begun to pay attention to the non-state groups fighting in armed conflict, noting that a "failure to specify *who* fights in civil wars ultimately makes it difficult to come up with good answers as to *why* we see civil wars in some countries and not others" as well as why some exhibit more and different kinds of violence than others (Cunningham et al. 2009: 571, emphasis in the original). Thus, existing studies show that the intensity of both combat and violence against non-combatants is driven by the belligerents' balance of military power as well as by each other as militarily weaker rebels substitute combat for violence against civilians (e.g. Balcells and Kalyvas 2014; Hultman 2007; Kalyvas 2006; Mehrl and Thurner 2020; Raleigh and Choi 2017; Wood 2010, 2014a; Wood and Kathman 2015). Armed groups thus use violence against civilians strategically but also differ in their propensity to victimize civilians based on two attributes that lie at the core of this thesis: their force structure and their source(s) and structure of support.

Force structure can generally be understood to denote "the specific mixture of materiel and personnel that compromises a military's war-making capabilities" (Lyall and Wilson 2009: 72) while for the purpose of this thesis, I use the term more narrowly to refer to military actors' *membership structure and their mode of recruitment*, that is, their personnel and how it entered the organization. As influential early studies understand violence against civilians as the product of principal-agent problems between group leaders and rank-and-file fighters (see e.g. Gates 2002; Humphreys and Weinstein 2006; Mitchell 2004; Weinstein 2005), force structure is often examined regarding the probability for such agency slack[3] to arise and the opportunities to reign it in. In this vein, Humphreys and Weinstein (2006) distinguish between fighters who joined for political reasons and those that entered a rebel group based on material incentives and argue that the latter are more likely to victimize civilians as a means of self-enrichment. They also argue that fighting units with dense social ties, as indicated by their ethnic homogeneity, are less likely to commit such nonstrategic acts of violence as these ties allow them to better sanction, and thus also deter, agency slack (Humphreys and Weinstein 2006; see also Habyarimana et al. 2007). This importance of joining motives and social ties between recruits to minimize principal-agent problems has been echoed in other studies on military organizations' ability to retain recruits (Costa and Kahn 2003; McLauchlin 2015; Oppenheim

[3] Within the principal-agent framework, agency slack can be understood to take place when "the agent takes actions that are not consistent with the preferences of the principal once delegation has been established" (Salehyan 2010: 495; see also Hawkins et al. 2006), i.e. when the agent uses the power and/or resources it has received from the principal to engage in activities other than those mandated by the principal.

et al. 2015). However, McLauchlin (2015) notes that the effect of social ties is restricted to fighting units which are largely made up of voluntary recruits, suggesting that fighting forces may markedly differ in their behaviour depending on whether their members were recruited voluntarily or through coercion. Whereas groups consisting of voluntary recruits usually already have a clear goal or ideology to rally around, groups employing forced recruitment must find ways to increase their initially low social cohesion; Cohen (2013a, 2017) suggests that one way to do so is the collective use of sexual violence against civilians. Alternatively, military organizations can seek to increase cohesion, instil loyalty and thus minimize slacking and the nonstrategic use of violence by employing other socialization practices such as political training (Hoover Green 2016; Oppenheim and Weintraub 2017). Or they can rely on sanctions and the enforcement of strict discipline to deter such actions (Humphreys and Weinstein 2006; Lyall 2017; Manekin 2013). In line with this idea of military organizations using top-down socialization practices, Loken also argues that combatants' gender has no effect on the organizational use of sexual violence as "women are subject to the same organizational pressures as male cadre" and it is these "organizational factors, not individual characteristics, [that] drive violence in armed groups" (2017: 62).

Departing from these studies focus on the nonstrategic use of violence, i.e. actions resulting from principal-agent problems between commanders and rank-and-file, a second group of studies examines how force structure affects military organizations' strategic use of violence. For instance, Moore (2019) argues that the presence of foreign fighters increases rebels' use of violence against civilians as it limits their links with and ability to rely upon civilians in their area of operation (see also Doctor and Willingham 2020). But she also points out that this effect is limited to non-coethnic foreign fighters, a finding that is in line with Lyall's (2010) argument that social ties between an armed group and civilians increase the former's access to civilian networks, giving it access to more information and a better ability to identify, sanction, and deter noncooperative individuals. This in turn allows it to effectively snuff out and deter enemy attacks. Fighting forces' co-ethnicity with the civilians they operate among, but also other factors which increase their access to local information networks (Pilster et al. 2016), are thus associated with a decrease in civilian victimization as well as gains in military effectiveness. Several existing studies of violence in intrastate armed conflict have hence considered force structure as an explanatory factor, establishing that particularly organizations' mode of attracting and/or recruiting members, their socialization practices, as well as social ties between recruits as well as with civilians affect group behaviour.

In contrast, existing scholarship on intrastate conflict has paid little attention to how individual combatant attributes, such as their gender, education or their youth, affect rebel organizations' use of violence (but see Loken 2017). This is problematic as research on interstate conflict suggests that such attributes can affect military organizations' fighting ability (Biddle and Long 2004) while recent work also indicates that rebel groups' inclusion of children and women among their fighting forces affects their combat effectiveness, staying power, and ability to garner support (Braithwaite and Ruiz 2018; Haer and Böhmelt 2016a, 2017; Manekin and Wood 2020; Wood 2019). In addition, existing studies emphasize organizational factors and practices such as the mode of recruitment, ideology, or political training as key drivers of the cohesion and behaviour of armed groups but largely ignore that the results of these top-down practices may interact with individual combatants' attributes and their according bottom-up practices (but see Braithwaite and Ruiz 2018). In other words, the results of top-down socialization in the form of e.g. ideological training may depend on its targets' susceptibility to such actions as well as their pre-existing ideology (see e.g. Cohen 2017; Gates 2017). As set out in more detail below, three of the chapters in this thesis seek to address these gaps by theoretically and empirically showing how individual combatant attributes, both on their own and together with practices of top-down socialization, alter rebel groups' treatment of civilians as well as their ability to fight.

The fourth chapter instead seeks to contribute to the literature on how rebel groups' *source(s) and structure of support* affect their combat violence and victimization of civilians. All rebel groups need resources such as weapons, recruits, and food to carry out and continue fighting their target government (see e.g. Cunningham et al. 2009; Fearon 2004). However, existing research has shown that how and where they obtain these resources from influences their fighting activity as well as their behaviour towards civilians. Groups that rely on civilian constituencies for supplies are incentivized to treat them well while, in contrast, groups that can rely on natural resources-based income or enjoy support from an external sponsor face less such restraints in their behaviour towards civilians (Wood 2014b). Additionally, existing work suggests that groups with foreign sponsors, even if willing to link up with civilian constituencies, may face difficulties doing so as they are often seen as foreign proxies (Roessler 2016: 141; Salehyan 2010: 507). As a result, these studies find that groups who enjoy an income from natural resources or external support are more violent towards civilians (Salehyan et al. 2014; Stewart and Liou 2017; Whitaker et al. 2019; Wood 2014b) but also, due to having more resources to invest in military power, fight more intense wars against their target (Lacina 2006; Lujala 2009; Moore 2012; Rasler 1983). Notably, these studies theoretically and empirically

often conflate different kinds of reliance on external support and natural resources. For instance, recent studies show that rebels who benefit from smuggling natural resources actually cooperate with civilian constituencies instead of targeting them, that only smuggling but not taxation increases their staying power, and that even when their income is generated from taxing producers, this has a heterogeneous effect on violence which depends on a location's distance from the taxed natural resource (Conrad et al. 2019; Krauser 2020; Whitaker et al. 2019). And similarly, different kinds of external support have been suggested to vary in how they affect rebels' staying power and prospects of success. Troops from the sponsor and offensive support more generally reduce the time to conflict termination while arms, money, and defensive support increase it (Roberts 2019; Sawyer et al. 2017). And combat training from external supporters only increases the probability of a favourable outcome if these supporters have previously successfully rebelled themselves (Keels et al. 2020).

However, concerning the dynamics of violence, the only published finding is that support-receiving rebels victimize less civilians if their external sponsors are democracies but more if they have multiple sponsors (Salehyan et al. 2014). Belgioioso (2018) again distinguishes between support in the form of a military intervention and funds, finding that the former leads rebels to kill more civilians than enemy combatants while the opposite is the case when they receive the latter. In other words, most existing work on the nexus between external support and rebel violence in armed conflict treats the effect of external support as homogenously violence-increasing, even though related work on rebels' staying power suggests that support types may differ in the effects they have. But more generally, studies that go beyond this broad treatment of the effects of foreign sponsorship then mostly focus either on only one type of support (Keels et al. 2020; Moore 2012; Stewart and Liou 2017) or contrast military intervention with the provision of funds or weapons (Belgioiso 2018; Sawyer et al. 2017), thus ignoring a multitude of other goods provided by external sponsors. As discussed in more detail below, chapter four of this thesis aims to address these gaps by refining the prominent principal-agent framework to theoretically distinguish between hard and soft delegation and showing that these support types differ in their effects on rebel violence against civilians and combat intensity.

3. Summary of the four chapters

Having discussed the existing literature on the role of force structure and external support in driving rebel groups' extent of violence in armed intrastate conflict as well as gaps in this body of research, I now summarize the four substantive chapters of this dissertation and how they contribute to the current state of research.

The first chapter focuses on the effect of child soldiering on rebels' extent of civilian victimization. Based on descriptions of minors with machetes and machine guns, existing work describes child soldiers as very violent towards civilians. This implies that employing children should increase rebels' victimization of civilians. Challenging this, I posit that children's effect on group behaviour is conditioned by whether rebels receive civilian support. Because they have weak pre-existing norms, children are prone to normalize violence but also likely to experience norm change due to rebel training. They should thus closely follow group rules in their behaviour towards civilians, implying a moderating effect of these rules. I expect that child soldiering increases civilian victimization only for groups who have little incentives to show restraint towards civilians because they receive no support from them. In contrast, child soldiering has no such effect for groups with a strong local support base. Tests using global data on intentional killings of civilians from the period 1989-2009 support these expectations. This chapter complements existing studies of how child soldiering affects the dynamics of armed conflict by uncovering the conditional effect this practice has on civilian victimization while contributing to the literature on force structure more generally by showing that individual- and group level attributes can interact in driving rebel group behaviour.

The second chapter moves the focus to a different individual combatant attribute, gender, and how it affects rebel interactions with civilians as well as their combat ability. Recent research has begun to examine when and why women join rebel groups as combatants. However, we are only beginning to understand how their presence affects rebel group behaviour and conflict dynamics more generally. I contribute to addressing this gap by analysing how the participation of female combatants influences two dimensions of rebel behaviour: their relationship to civilians and their fighting performance. I argue that more female rebels decrease civilian victimization, but also that rebel combat performance is likely to be lower. I test these propositions using detailed, time-varying district-level data from the Nepalese civil war. Results support both of my expectations. This chapter adds to the emerging literature on female combatants by theorizing and using quantitative microlevel data to test how they affect rebels' violence against civilians and ability to fight. By using an innovative microlevel research design based on a census of conflict casualties, it further contributes to the general civil war literature beyond the strands focusing on female participation and force structure.

Chapter three also evaluates the effects of combatant gender on rebel behaviour towards civilians but focuses on sexual instead of lethal violence. Whereas existing qualitative accounts posit that the presence of female fighters in armed groups decreases their propensity for wartime rape, one recent study (Loken, 2017) tests this claim quantitatively and is unable to detect a

statistically significant effect. This leads the author to conclude that female combatants do not decrease rape. Using Loken's original data, this chapter re-examines the evidence for the relationship between female combatants and wartime sexual violence. Replications of the original models suggest that they make strong functional form assumptions regarding numerous independent variables and time dependence and that relaxing them results in substantively different findings. Namely, women's participation in armed groups does decrease their use of wartime rape. In support of Loken's organizational theory of rape, results also suggest that this effect is moderated by group norms. This chapter thus adds additional evidence for the expectation that individual combatant attributes affect organizational violence against civilians while also providing further evidence that, in doing so, these attributes interact with organizational attributes.

The fourth and final chapter, co-authored with Tim-Heinkelmann-Wild, shifts the focus from rebel groups' force structure to their external support structure. As discussed above, existing studies argue that external support to rebels increases their extent of violence against civilians while also intensifying fighting. While these studies assume a homogenous effect of external support on conflict dynamics, we argue that the effect of external support depends on the structure of the support relationship between a state sponsors and a rebel group. We suggest differentiating between two modes of external support: Whereas hard delegation provides sponsors tight control mechanisms that deter rebels' non-compliance, soft delegation comes with little control opportunities and thus allows for rebels pursuing their diverging goals (See Abbott et al. 2015, 2016). We therefore hypothesize that hard delegation increases combat deaths, while soft delegation increases rebels' violence against civilians. Results from an analysis using global data on rebel sponsorship and armed intrastate conflict for the period 1989-2009 as well as a time-series study of the insurgency of the Allied Democratic Forces (ADF) in Uganda support our theoretical expectations. This final chapter thus contributes to the literature on external support in armed conflict by developing a theoretical framework that extends and refines the widely used principal-agent structure and applying it to rebel violence, empirically showing that sponsor control determines whether externally obtained resources increase rebels' violence against civilians or their combat activity against the target government.

Taken together, the four substantive chapters of this dissertation provide new theoretical and empirical insights on the drivers of rebel behaviour in armed conflict. They show that the attributes of individual rebels, them being children or adults, women or men, crucially affect how rebel groups fight. As such, these chapters challenge studies that emphasize the role of

socialization institutions, such as political education and combat training, but risk ignoring individual combatants. At the same time, particularly chapters one and three of this thesis also show that rebel group institutions and membership attributes interact in producing the group's ultimate behaviour. Additionally, chapter four provides a refinement over existing accounts of external state sponsorship of rebel groups by showing that different types of support have heterogeneous effects on the dynamics of violence due to the variation in control opportunities they afford to sponsors. In other words, external support may always increase rebel's capacities to kill but to what extent and against who they use these capacities depends on supporters' ability to monitor and sanction them. In a concluding chapter, I further summarize the theoretical and empirical contributions of these four chapters to the academic literature on rebel organizations and the dynamics of violence in armed intrastate conflict in order to delineate the future research directions and policy implications suggested by this work.

Chapter I - The Effect of Child Soldiers on Rebel Violence against Civilians

1. Introduction

Child soldiering continues to be a widespread feature of armed conflicts and though international actors have recently increased efforts to stop the practice, current numbers indicate that the global number of underage recruits is hardly decreasing (Bahgat et al. 2017). While some children join voluntarily, others are abducted and coerced into joining and the recruitment of minors in general has been identified as a glaring violation of children's rights (Cohn and Goodwin-Gill 1994). Former child soldiers have also been found to suffer from negative long-term consequences as regards their psychological well-being and economic prospects (Betancourt et al. 2013; Blattman and Annan 2010; Kohrt et al. 2008). In addition, recent studies argue that child soldiering also contributes to armed conflicts becoming more enduring and more likely to reignite (Haer and Böhmelt 2016b, 2017), thus shining a light on the negative outcomes the practice can have for entire societies.

I build on these studies by exploring how rebel groups' use of child soldiers affects their victimization of civilians. This topic has been examined by a rich qualitative literature on child soldiering and civil war which proposes that the participation of children is closely connected to subsequent atrocities against civilians (e.g. Münkler 2005; Peters 2011; Singer 2006). Accordingly, some authors even propose child soldiering as an early warning sign of future atrocities (Johnson et al. 2018). However, it is difficult to generalize from these studies' findings as they only cover a limited set of well-studied cases with many atrocities such as the civil wars in Uganda, Sierra Leone or Syria where large numbers of children were recruited. Building on this literature, I seek to provide a corrective to this by quantitatively comparing a global set of armed conflicts which vary in both the use of child combatants and the extent of violence against civilians.

In addition, I provide a theoretical development over existing studies. Based on a recent literature on rebel group socialization (e.g. Checkel 2017; Cohen 2017), I argue that the effect of child soldiers crucially depends on what type of group they fight for. On the one hand, I posit that exposure to violence during recruitment and induction makes underage recruits become disposed towards the use of violence. While this also affects older recruits, children are especially prone to normalize violence due to not yet having developed strong norms of their own. This implies that rebel groups with children among their ranks exhibit more violence towards civilians than groups without. On the other hand, rebel groups also use training and education to shape recruits' norms. As children are especially susceptible to such attempts at

norm change, they should more closely follow group rules in their behaviour towards civilians than adults that have already developed stronger norms. Child soldiering should hence only increase violence against civilians if rebels have no incentive to show restraint towards civilians and to train recruits accordingly. I expect that child soldiering increases civilian victimization only for groups who are unable to mobilize local support and thus have no such incentive for treating civilians well but not otherwise.

I test this proposition by analysing global data on intentional killings of civilians from the period 1990-2010. Results support my claim. For groups who have no local support base, child soldiering results in almost 91 additional civilian casualties. In contrast, the effect is statistically indistinguishable from zero for groups able to mobilize local support. This result is robust to a battery of robustness checks including matching, thus strengthening the notion that the effect of child soldiers on violence against civilians is positive but conditioned by rebels' extent of local support. The next section reviews the literature on civilian victimization. Section three develops my theoretical argument and section four discusses my research design. Section five presents my empirical analysis while section six concludes.

2. Literature Review

One-sided Violence against civilians, "the intentional and direct use of violence" against civilians by "the government of a state or by a formally organized group" (Eck and Hultman 2007: 235), is a regular feature of intrastate armed conflict. While its global levels have decreased since the 1990s, casualty numbers are still considerable and non-state actors have become the main culprits for them in the last twenty years (Eck and Hultman 2007; Pettersson and Öberg 2020). Thus, a recent but substantial literature examines what determines non-state actors' extent of targeted violence against civilians.

Following Kalyvas (2006), most studies focus on the strategic use of civilian victimization in order to bring or keep local populations on their side while deterring enemy informants. Accordingly, the extent of rebel's territorial control has been found to be negatively related to their use of violence against civilians (e.g. De la Calle 2017; Kalyvas and Kocher 2009; Raleigh and Choi 2017). Similarly, these studies posit that rebels victimize civilians as a reaction to shifting military power or new contestants entering the conflict as they seek to (re-)instill loyalty or cannot attack harder military targets (Clayton and Thomson 2016; Hultman 2007; Raleigh and Choi 2017; Wood 2010; Wood and Kathman 2015).

At the same time, many rebel groups also have to use strategic *restraint* towards communities they rely upon for recruits and support in order to wage an effective war (see Hoover Green 2016). As a result, groups who have clear civilian constituencies mostly spare

those (Balcells 2010; Fjelde and Hultman 2014; Ottmann 2017), especially as their power increases (Wood 2014b), as do ones with territorial control inside the conflict zone (Stewart and Liou 2017). These groups have little incentive to engage in violence as this would only decrease their support base. However, this is not true for all groups as those who have external sponsors and members or operate from outside the conflict zone are less dependent on and have weaker links with civilian communities, meaning that they have less incentives for restraint and hence attack civilians more often (Moore 2019; Salehyan et al. 2014; Stewart and Liou 2017; Wood 2014b).

The literature also suggests that though groups use violence and restraint strategically, this strategic use can be threatened by principal agent problems between group leaders and subordinates. Violence against civilians can also result from individual fighters or units seeking to achieve personal, non-military goals (Gates 2002; Mitchell 2004). In this line, it is argued that individuals who joined a group to gain material benefits are especially predisposed to deviate from group directives and violently pursue their own goals (Humphreys and Weinstein 2006; Weinstein 2005, 2007). At the same time, Manekin (2013) argues that even if combatants initially have individual norms against the use of violence, these norms can erode as they spend prolonged time in a clear power position among out-group civilians, implying that they become more likely to victimize civilians with time. As a result, armed groups that value strategic restraint at least towards some categories of civilians employ a variety of instruments to minimize such deviatory violence. These include selective recruitment, strict discipline and military and ideological training and are generally found to be effective in curtailing civilian victimization (see Hoover Green 2016; Humphreys and Weinstein 2006; Manekin 2013; Oppenheim and Weintraub 2017).

In sum, rebels' use of and restraint from violence against civilians can thus be seen as a strategic choice whose viability can be affected by individual combatants deviating from group orders and attacking civilians to pursue personal goals. However, the existing literature gives little consideration to how individual combatants' characteristics may affect their propensity to engage in strategic violence and restraint. And in consequence, it also hardly examines how these characteristics interact with group-level attributes such as rebels' political education or their general incentives for restraint to affect civilian victimization[4]. In the following, I begin

[4] One exception are studies that differentiate between recruits motivated by material and non-material incentives and examine how these individuals' decision to desert are affected by political training (Oppenheim et al. 2015; Weinstein 2005, 2007).

to tackle these issues by discussing how some combatants' status as children may be expected to affect their behaviour towards civilians conditional on the group norms they get exposed to.

3. Theory: Linking Child Soldiers and Civilian Victimization

Joining a rebel group can generally be expected to go hand in hand with a change in norms on the use of violence. On the one hand, recruits are very likely to experience combat, see people they know die, and even commit violence themselves. On the other hand, joining a rebel group often means undergoing a series of traumatic events that include coerced recruitment, seeing relatives be killed, being severely beaten and being forced to commit violence against others (Annan et al. 2011; Blattman and Annan 2008; Cohen 2017; Wessells 2006: 59). Entry into a rebel group has thus been described as causing a normalization of violence as individuals develop no other means of solving conflict than violence or even begin to enjoy it and the power it gives them over others (Hoover Green 2016; Maclure and Denov 2006; Mitton 2015: 136–9; Peters and Richards 1998). While joining a rebel group should result in such norm change for any individual, it should be especially likely and consequential for children as it has been found that they are more susceptible to be socialized to take up certain norms than adults (Checkel 2017; Draper 1974; Thompson 1999; Wessells 2006: 35–6). Accordingly, there is empirical evidence that both exposure to violence during childhood and its degree increase an individual's propensity for violence (Cecchi et al. 2016; Couttenier et al. 2019; Miguel et al. 2011). There are also results indicating that former child soldiers are more likely to self-report aggressive behaviour (Blattman and Annan 2010). This implies that child soldiers may be more prone to use violence in their contact with outgroup members, both enemy combatants and civilians, than adult combatants because of internalizing it as normal behaviour to a larger degree. Child soldiering may thus be expected to have a positive effect on the extent of rebels' violence against civilians. However, there is good reason to think that this effect is not unconditional but instead depends on the goals and incentives of the rebel group employing children as combatants.

Many rebel groups seek to socialize recruits into adhering to their norms and to elicit a genuine sense of belonging in order to make them stay and fight with them (Checkel 2017; Gates 2017). They use a mixture of combat and political training, rituals, religion, but also common experiences of both performing and suffering violence to elicit such a socialization of their recruits[5] (Becker 2010; Cohen 2017; Eck 2010; Gates 2017; Haer et al. 2011). Such

[5] While these studies of rebels all rely on evidence that is anecdotal or based on small convenience samples, common experiences of violence have generally been found to instil in-group cohesion and out-group antagonism

socialization efforts should again be more consequential for children than older recruits due to their weaker pre-existing norms (Checkel 2017; Draper 1974; Wessells 2006: 35–6). It should thus be especially likely for children to become committed members of rebel organizations and adhere to organizational norms as a result of socialization attempts. Indeed, the qualitative and quantitative case study literature on child soldiers describes how rebel groups in a variety of countries deliberately employ a mixture of training, ritual, and violence to turn scared, abducted children into reliable and committed combatants (Beber and Blattman 2013; Cohen 2017; Gates 2017; Haer et al. 2011; Haer and Banholzer 2015; Maclure and Denov 2006; Mitton 2015: 134–45; Peters and Richards 1998). It is this malleability that Beber and Blattman (2013; see also Andvig and Gates 2010) argue to be the key driver behind rebel groups' demand for child soldiers. In contrast, older recruits should generally be more resistant towards such attempts at behavioural and norm change and should more often follow personal goals by maximizing material rewards while incurring the minimum possible amount of risk. As a result, children that join a rebel group and participate in its activities should not only be more likely to be socialized into the use of violence than adults but should also exhibit higher degrees of socialization into the group's norms.

This idea means that how child soldiering ultimately affects rebel group's use of civilian victimization should crucially depend on what norms and behaviours recruits are trained to adhere to. Most critically, it appears relevant whether training only aims to make recruits stay with the organization or whether it is also seeks to instil additional behavioural constraints. That is, the effect of child soldiering should be moderated by whether the group children fight for has incentives for strategic restraint.

Ethno-nationalist[6] groups act as representing clear constituencies on which they rely for material support, information, and recruits. In addition, these groups are usually active among or at least close to their constituency (Beardsley et al. 2015). They thus have both ideological reasons and material incentives to keep good relations with that constituency and not to antagonize it (Olson 1993: 568; see also Polo 2019; Wood 2009). More generally, armed groups attempt to use restraint towards civilians if they need their support or collaboration but can and do behave more violently towards them when this is not the case (Salehyan et al. 2014; Whitaker et al. 2019; Wood 2014b). Accordingly, groups that enjoy local support should explicitly train

that may be detrimental in post-conflict contexts but highly suited to create an effective fighting force (see e.g. Cecchi et al. 2016; Miguel et al. 2011; Voors et al. 2012).

[6] (Ethno-)nationalist groups may attack civilians belonging to an out-group (see e.g. the LTTE in Sri Lanka) but tend to be mostly active among their constituents. They thus have less opportunity for such violence and need to be more selective in it.

combatants in behaving well towards civilians and aim to elicit norms that prohibit opportunistic violence against civilians. Given that they are quick to adapt organizational norms, underage recruits should develop exactly such norms and thus not normalize violent behaviour towards civilians.

In contrast, groups that have little or no ability to mobilize locally have no such incentive to spare civilians from violence. Instead, they may even be incentivized to use violence against civilians as attacking and pillaging local communities may be their main way of obtaining material supplies (Koren and Bagozzi 2017; Moore 2019; Stewart and Liou 2017). They are thus rovers in the sense that they move around and employ violence to extract as many resources as possible when they attack a community but do not seek to establish more durable links with it (Beardsley et al. 2015; Olson 1993). This means that they also have no incentives to emphasize peaceful behaviour toward civilians in their training, instead focusing on creating loyalty towards the organization by casting the civilian communities recruits hail from as enemy out-group which can legitimately be victimized. Attacks on civilians thus serve the procurement of supplies but also socialize recruits into loyalty (Cohen 2017; Mitton 2015: 134–45). At the same time, they normalize and even incentivize violence against civilians, meaning that children fighting for such groups will have very little restraint in victimizing civilians due to their weak prior norms.

The idea is thus that children are especially susceptible to experience norm change when recruited into rebel groups. This makes them bound to normalize the use of violence but also likely to adhere to any rules rebel groups emphasize in their socialization and training. Their behaviour towards civilians should thus depend upon group norms. Rebel groups that mobilize locally should train recruits to behave well towards the civilian population. But groups that have no local support have no incentives for such training and instead rely on victimizing civilians to gain supplies and socialize recruits.

Take RUF and the LRA as an illustration for the latter. Both groups have had little support from local communities and fit the mould of roving bandits who cast civilians as an enemy to be attacked (Beardsley et al. 2015; Blattman and Annan 2008; Peters 2011). Both groups made extensive use of child soldiering and employed training practices that would turn these children into reliable group members while severing their ties to the civilian communities they came from, e.g. by having them commit atrocities against neighbours and relatives (Blattman and Annan 2008; Denov 2010; Gates 2017). And in turn, child soldiers fighting for these groups normalized violence and obtained a reputation for extreme violence against civilians (Maclure and Denov 2006; Mergelsberg 2010). In contrast, the Nepalese CPN-M also extensively

recruited children during its ten-year war against the government but had a substantial local support base among the indigenous and Dalit population, especially in the west of the country (Sharma 2006). It thus did not use the violent socialization practises of RUF and LRA but instead invested in the relationship with these communities (Lecomte-Tilouine 2010) and emphasized the political training of recruits. It made extensive ideological schooling the key prerequisite of joining their armed forces and fighters' political education was constantly refreshed (Eck 2010). Accordingly, there is to the best of my knowledge no source reporting violence against civilians by child soldiers in the CPN-M. I thus hypothesize:

Hypothesis: Rebels' use of child soldiers increases civilian victimization if the rebel group does not mobilize locally; otherwise it does not.

4. Data and Methodology

In order to test this hypothesis, I employ a dependent variable that indicates the yearly number of civilians killed as a result of being "deliberately and directly targeted" (Eck and Hultman 2007: 235) by a rebel group engaged in intrastate conflict. This variable does not include civilians that were killed as bystanders in combat or died from causes indirectly connected to conflict (e.g. starvation). It is thus well-suited to measure rebels' treatment of civilians. It is coded from the UCDP Georeferenced Event Dataset (Croicu and Sundberg 2017; Sundberg and Melander 2013) and *does not* use the 25 yearly casualties threshold employed in the UCDP one-sided violence dataset[7] (Eck and Hultman 2007), thus also observing observations with less casualties. It is coded for rebel groups involved in an intrastate conflict producing at least 25 yearly battle-deaths as given in the UCDP Armed Conflict Data (Gleditsch et al. 2002; Pettersson and Öberg 2020). It covers the period 1989-2016 and 347 rebel groups, amounting to 1407 dyad-year observations[8], but my sample only includes pre-2011 observations due to data limitations on the main independent variables. While this is only a relatively short period of time, the data is preferable to other datasets on civilian victimization (e.g. Harff 2003; Melander et al. 2009) as it attributes violence to specific actors, includes only deliberate acts of violence, includes low- and high-intensity violence, and gives the number of deaths instead of an ordinal indicator.

[7] This allows me to count smaller-scale violence against civilians and to differentiate between acts of one-sided violence committed inside and outside the conflict country. My main analysis employs a variable counting all violence against civilians. Results are robust to employing dependent variables counting violence in the conflict country only or using the UCDP 25 death threshold.

[8] While the One-sided Violence data is organized in actor-years, many of my control variables have a dyadic format and the sample is defined as groups that achieve 25 battle-related deaths while fighting *one* specific government. Groups active in multiple states can thus fight in multiple dyads in one year.

This dependent variable is a count variable – it can take only positive integer values – that is overdispersed with its variance being larger than its mean, making a negative binomial model a good choice (Greene 2012: 846–9). As in previous studies of civilian victimization, I have a large number of dyad-year observations with zero observed killings of civilians. This is possibly the result of two different processes as rebel groups may abstain from targeting civilians or target but not necessarily be reported as killing them. I thus employ zero-inflated negative binomial (ZINB) models in the main analysis[9]. As the data includes 1036 observations from 268 groups over 21 years, I account for autocorrelation by including a lagged dependent variable in the negative binomial stage and cubic polynomials of time in the inflation stage (Carter and Signorino 2010). I also cluster standard errors on the conflict dyad.

To measure child soldiering, my main explanatory variable, I use an indicator constructed by Haer and Böhmelt (Haer and Böhmelt 2016a) which codes whether rebels employ soldiers aged under 18 as a binary variable[10]. The data covers the same universe of cases as the Non-State Actor (NSA) data, version 3.3, (Cunningham et al. 2009, 2013) and spans the years 1989-2010. I theorize that the effect of child soldiering is conditioned by whether a rebel group is able to mobilize support locally. To measure this, I use information from the NSA dataset to construct the binary item *mobilization* which takes the value 1 if a group has at least moderate mobilization ability and zero otherwise. In order to test my hypothesis, I thus interact the child soldier variable with the mobilization dummy. Table one presents a cross-tabulation of these two variables on the group level. It indicates that slightly less than half of the groups in my sample are able to mobilize locally and that a majority of them uses child soldiers. However, it also shows that both groups with a low and high ability to mobilize recruit children[11].

[9] There is empirical support for using ZINBs instead of standard Negative Binomials (Greene 2012: 861–3; Hilbe 2011: 371–9). In both main models, Vuong tests result in large and positive z-values, favouring the ZINB (Greene 2012: 863; Vuong 1989). As the Vuong test has been argued to be inappropriate for comparing overlapping models (Santos Silva et al. 2015; Wilson 2015), I also use alternative HPC tests (Santos Silva et al. 2015), which favour the ZINB.

[10] Haer and Böhmelt also provide an ordinal indicator which codes child soldiering as non-existent (0), intermediate with children comprising less than 50% of a group's forces (1), or high with children outnumbering adults (2). However, this more differentiated variable appears to suffer from substantial coding issues (Haer and Böhmelt 2017). Models using this alternative variable are presented in the appendix and mirror my main models in terms of their substantive results. This dataset has consequently also been expanded (Haer et al. 2019). However, this was done by differentiating whether groups used forced or voluntary recruitment to enlist child soldiers, not by extending the period of observation. I hence use the original child soldiering dataset provided by Haer and Böhmelt.

[11] This observation is relevant as separatist groups are, all else equal, less likely to recruit children in the first place (Lasley and Thyne 2015).

Table 1: Cross-tabulation of groups' use of child soldiers and ability to mobilize support

	Child Soldiers: No	*Child Soldiers: Yes*	Total
Mobilization: Low	37 (16.02%) (88 obs.)	104 (45.02%) (498 obs.)	141 (586 obs.)
Mobilization: Medium or High	28 (12.12%) (69 obs.)	71 (30.74%) (362 obs.)	99 (431 obs.)
Total	30 (111 obs.)	142 (796 obs.)	240 (1017 obs.)

Note: Cell Percentages do not add up to 100 because nine groups appear in two cells as either their use of children or mobilization ability changes over time.

In addition, I control for a number of attributes of the rebel group, conflict, and conflict country that the literature surveyed above has argued to influence civilian victimization and which may be correlated with child recruitment[12]. Regarding rebel attributes, I control for external support, access to safe havens and the presence of natural resources, employing two variables from the NSA data to account for the former and an additive index of the existence of drugs, petroleum, diamonds and gemstones in a country for the latter (Haer and Böhmelt 2016a). In terms of conflict characteristics, I control for fighting intensity and governmental violence against civilians using UCDP data (Croicu and Sundberg 2017; Pettersson and Öberg 2020; Sundberg and Melander 2013), both are lagged by one year to ensure temporal order, and use a binary measure of rebel strength from the NSA data to capture belligerents' relative capability. Additionally, civilian victimization may grow worse over the duration over conflict, I thus code how long a conflict-dyad has been active for in a given dyad-year from the UCDP armed conflict data. Finally, I account for a country's economic development, population, type of government, and ethnic composition by including, respectively, its logged real per capita GDP and population figures (Gleditsch 2002, 2013), polity score (Marshall et al. 2016), and the size of politically excluded ethnic groups (Vogt et al. 2015) as controls[13].

5. Empirical Analysis

I test my hypothesis on how rebels' use of child soldiers affects the scale of their violence against civilian by running ZINB models. I focus on the negative binomial part of these models here and discuss their logit inflation component in the appendix. While model 2a tests the hypothesized conditional effect of child soldiers by interacting my measure of child soldier usage with *Mobilization*, model 1a examines whether there is any unconditional relationship

[12] See e.g. Faulkner, Powell, and Thyne (2019), Haer, Faulkner, and Whitaker (2019), Lasley and Thyne (2015), Tynes and Early (2015), and Vargas and Restrepo-Jaramillo (2016).

[13] Summary statistics are reported in the appendix where the controls are also discussed in more detail.

between child soldiering and violence against civilians.

Column 1a provides no evidence that rebel groups who recruit children exhibit higher levels of violence against civilians than groups that do not. While the effect of *Child Soldiers* is positive, it is not distinguishable from zero on conventional levels of statistical significance, implying that child soldiering has no unconditional effect on rebel groups' propensity to victimize civilians.

Table 2: Child Soldiers and One-sided Violence

Dependent Variable: Rebel One-sided Violence	(1a) Negative Binomial	(2a) Negative Binomial
Rebel OSV (Lag)	0.000	0.000
	(0.001)	(0.001)
Child Soldiers	0.179	1.338***
	(0.431)	(0.403)
Mobilization	-0.079	1.464***
	(0.337)	(0.505)
*Child Soldiers*Mobilization*		-1.722***
		(0.653)
Rebel Strength	0.340	0.455
	(0.418)	(0.391)
Natural Resources	0.200	0.135
	(0.188)	(0.190)
Rebel External Support	0.359	0.222
	(0.291)	(0.306)
Conflict Intensity (Lag)	0.000*	0.000**
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	0.000
	(0.000)	(0.000)
Population (LN)	-0.122	-0.080
	(0.103)	(0.104)
Conflict Duration	-0.032	-0.026
	(0.022)	(0.020)
GDP p.c. (LN)	-0.238*	-0.210*
	(0.139)	(0.124)
Polity2 Score	-0.089**	-0.099***
	(0.035)	(0.029)
Ethnically Excluded Pop. (%)	-1.436***	-1.482***
	(0.440)	(0.414)
Constant	7.518***	6.026***
	(1.754)	(1.432)
Observations	642	642
Alpha (ln)	0.481***	0.455***
	(0.090)	(0.090)

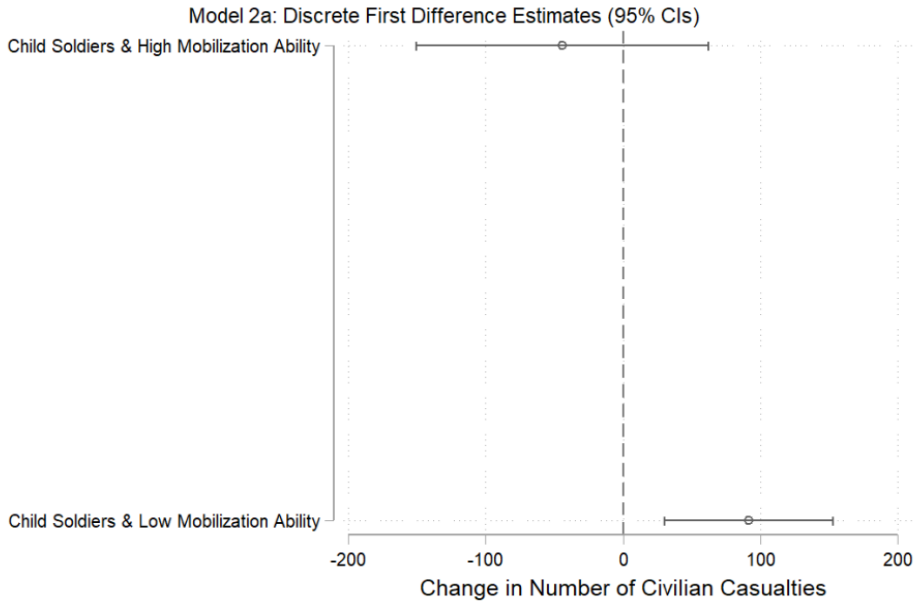
Note: Negative Binomial Parts of Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Column 2a indicates that the unconditional specification of the relationship between child soldier usage and civilian victimization hides considerable differences between rebel groups. Here, *Child Soldiers* exhibits a positive effect on rebel violence against civilians which is statistically significant on the 1%-level whereas the effect of the interactive term *Child Soldiers*Mobilization* is also statistically significant on the 1%-level but negative. For rebel groups with low mobilization capabilities, child soldier usage is thus associated with increased civilian victimization whereas this relationship is dampened for groups that can mobilize locally. In contrast, results for the zero inflation part of the model indicate that child soldiering has no statistically significant effect on whether rebel groups engage in civilian victimization at all.

To examine these effects substantively, I present discrete first differences in figure one. These give the change in the predicted number of civilian casualties for each combination of rebel child soldiering and mobilization ability as compared to having no child soldiers and no local support base. In figure one, it is visible that groups who have children among their ranks but no local support are predicted to kill 91 civilians more than groups that are also unable to mobilize such support but do not employ children. In contrast, a group having a local support base makes this violence-increasing effect of child soldiering disappear. Here, the first difference is negative and the confidence intervals include zero. This means that rebel child soldiering only has a substantial positive effect on violence against civilians if the group employing children is unable to mobilize local support[14].

[14] In addition, figure one also indicates that the number of civilians killed by groups that use child soldiers and can mobilize local support is lower and statistically distinguishable so from the number of civilians killed by groups who employ children but have no such support (Loftus and Masson 1994).

Figure 1: Discrete first difference estimates for Child Soldier * Mobilization Interaction



Notes: Base category is rebel groups without child soldiers and low mobilization ability. Whiskers represent 95% confidence intervals; dashed line represents zero difference; effects calculated while all other variables held at their mean.

These results thus indicate that child soldiering may indeed affect rebel violence against civilians but that this effect may be moderated by rebels' local support. Child soldiering has no statistically significant effect on the number of civilians killed by rebel groups that have a moderate or high ability to mobilize local support. In contrast, rebel groups that lack this ability kill significantly more civilians if they employ children than if they do not. Before testing the robustness of these results, I summarize the results for the controls in table two. Most of them fail to reach conventional levels of statistical significance. However, a country's Polity2 score, wealth, and size of its ethnically excluded population all decrease the extent of rebel violence against civilians. Particularly the first result is interesting as it runs counter to existing findings on the relationship between regime type and civilian victimization (see Hultman 2012).

One possible issue with the results presented above is that they may be model-dependent and thus subject to change if variables' functional form is adjusted or controls are added or deleted. In addition, groups that employ children may systematically differ from ones that only employ adult combatants. Matching offers one way to alleviate these concerns (Ho et al. 2007) and I use coarsened exact matching (Iacus et al. 2012) to decrease imbalance between treated and control groups. Results are in line with models one and two[15]. I further probe the robustness of my results by re-running models 1 and 2 using two alternative dependent variables. First, the

[15] See the appendix.

number of civilians a group has killed *in the conflict country* and second, a censored version of my original variable as provided by the UCDP One-sided Violence dataset where all casualty counts below 25 are set to zero. Next, I employ Haer and Böhmelt's (2016a) ordinal indicator of child soldiering, consider alternative measures of rebel group's incentive for restraint, and drop possible outliers from the analysis. I then re-run my main models while dropping all or only some, potentially problematic controls, while including the number of rebel groups in a conflict as an additional control, restricting the dataset to a cross-section of conflict-dyad periods, and using Poisson and standard negative binomial estimators. Due to limited space, I report justifications and results tables for these checks in the appendix. Results mirror those obtained in the main analysis.

In summary, my statistical results indicate that there is a consistent link between rebel child soldiering and civilian victimization if rebel groups have no local support base. Accordingly, the use of children is found to have no effect on violence against civilians for rebel groups able to mobilize considerable local support. In contrast, the civilian death count for groups without such support is estimated to increase by almost 100 additional casualties when they employ children.

6. Conclusion

The recruitment of children as combatants and the victimization of civilians represent two of the grimmest features of contemporary armed conflict. In this study, I have argued that the two phenomena are intimately related but that this not as straightforward as suggested by case studies that propose a direct link from children being enlisted as soldiers to civilians being killed. Instead, I have proposed that this relationship is not unconditional but depends on what type of group children were recruited by.

This is because children have weak pre-existing norms and should thus be likely to normalize the use of violence when exposed to it. However, they should also be susceptible to rebels' efforts at shaping their norms via training for the same reason. As a result, they should closely follow group rules in their behaviour towards civilians, meaning that their effect on the group's violence against civilians should be conditioned by these rules. I thus expect that child soldiering increases civilian victimization only for groups who have little incentives for restraint towards civilians because they lack local support. In contrast, this should not be the case for groups who benefit from the support of a constituency which they should seek not to alienate through the use of violence. Results from statistical tests using conflict-level data from a global sample of conflicts, 1990-2010, and a battery of robustness checks provide support for my theoretical claims.

This finding is important for our theoretical understanding of child soldiering and armed conflict but also has policy implications. Child soldiering has recently come into focus as a determinant of conflict dynamics. This is an important development because it further allows us to understand what factors make armed conflict more likely, lethal and durable, but also because it shines a light on why children are recruited in the first place. Here, I have developed an empirical implication of the notion that recruitment happens because minors are more likely to stay with and adhere to group norms than older recruits, namely that their effect on violence against civilians should depend on the characteristics of the recruiting group, and have found evidence supporting this expectation. This study thus complements and extends research that explains rebels' demand for child soldiers by claiming that they are comparatively cheap but effective combatants. Future studies may take up this proposition and develop it further in regards to the effect of child soldiering on other conflict dynamics but also to examine whether group type moderates its effect on affected individuals' post-conflict well-being and prospects of re-integration. This is relevant in terms of policy as the effective re-integration of former child soldiers may depend on what norms they acquired during their time as combatants. My results suggest that especially for children recruited by groups with a weak support base, re-integration programs may need to focus on instilling norms against violence.

However, the results of this study can only serve as a first indication on the link between child soldiering and violence against civilians. More research using higher quality data is necessary to trace e.g. whether it is actually children that commit violence in groups with little local support. Especially structured comparisons of different rebel groups inside the same conflict may present a promising way forward here.

The Effect of Child Soldiers on Rebel Violence against Civilians - Appendix

In this appendix, I provide descriptive statistics and a series of additional analyses that complement and further support the main article's findings. These include the following sections:

A.1. **Summary Statistics** of variables used in all models and discussion of controls.

A.2. **Zero-Inflation parts** of ZINB models in the main empirical analysis

A.3. **Matching**

A.4. Altered dependent variable: **25 civilian casualties threshold**

A.5. Altered dependent variable: **Civilian casualties in conflict country**

A.6. Main independent variables: **Ordinal child soldier variable**

A.7. Main independent variables: **Ethnonationalism** instead of mobilization ability

A.8. Main independent variables: **Dropping mobilization outliers**

A.9. Control variables: **Number of rebel groups**

A.10. Control variables: **Categorical regime type**

A.11. Control variables: None, estimating **naïve models**

A.12. **Cross-sectional** models

A.13. **Standard negative binomial**

A.1. Summary Statistics of Variables used in all models and discussion of controls

Variable	*Observations*	*Mean*	*SD*	*Min.*	*Max.*
Rebel OSV	1407	167.611	1009.694	0	30110
Child Soldiers	1036	.839	.368	0	1
Mobilization	1018	.423	.494	0	1
Rebel strength	1037	.087	.282	0	1
Nat. Resources	1037	2.300	1.157	0	4
Rebels External Support	984	.998	.924	0	2
Conflict Intensity (Lag)	910	1032.157	3882.607	25	68503
Gov. One-sided Violence (Lag)	910	86.371	311.653	0	5801
Population (LN)	1146	10.420	1.625	6.058	14.082
Conflict Duration	1407	5.530	6.582	1	42
GDP (LN)	1146	7.754	1.043	5.315	10.681
polity2 score	1005	1.226	6.040	-9	10
Excluded ethnic population	1235	.239	.232	0	.865
Rebel OSV (UCDP)	1407	166.042	1009.943	0	30110
Rebel OSV (Conflict only)	1407	85.630	848.168	0	30110
Child Soldiers: Index	1036	1.070	.622	0	2
Ethnonationalism (Polo & Gleditsch 2016)	1037	.500	.500	0	1
Ethnonationalism (Wood & Thomas 2017)	919	.519	.500	0	1
Mobilization: medium only	984	.404	.491	0	1
Conflict Rebel Groups (#)	1407	1.610	.921	1	6
Regime Type	1407	1.382	.679	0	2

Table A1: Summary Statistics for all variables. OSV=One-sided Violence..

While the data and methodology section summarizes the controls included in my models, lack of space did not allow a closer discussion of how I picked them. I thus provide this discussion here, covering why they may be related to both the dependent variable violence against civilians and the use of child soldiers.

Beginning with further rebel attributes, it has been argued that armed groups that receive external support, have safe havens in another country or can access natural resources to finance themselves are more violent against civilians (Salehyan et al. 2014; Stewart and Liou 2017; Weinstein 2007) and these same variables may also affect rebel groups' willingness to coerce children to fight for them (Faulkner et al. 2019; Haer et al. 2019). I employ two variables from the NSA data to account for the former and an additive index of the presence of drugs, petroleum, diamonds and gemstones in a country for the latter which was constructed by Haer and Böhmelt (2016a) based on PRIO data (Gilmore et al. 2005; Lujala 2009; Lujala et al. 2007). Turning to characteristics of the conflict dyad, rebel violence against civilians has been found

to be affected by how intense fighting with the government is and to what extent opposing forces victimize civilians. These variables could similarly affect child soldiering by e.g. producing easy to mobilize orphaned and displaced children (Achvarina and Reich 2006). I, respectively, employ the number of battle-related deaths in the dyad (Pettersson and Öberg 2020) and the number of targeted civilian casualties caused by opposing governmental forces (Croicu and Sundberg 2017; Sundberg and Melander 2013) to account for these factors, both are lagged by one year to ensure temporal order. In addition, a rebel group's ability to fight negatively affects its propensity of victimizing civilians but is also positively affected by its use of child soldiers (Haer and Böhmelt 2016a), causing me to include a binary measure of relative rebel strength from the NSA data. Additionally, civilian victimization may grow worse over the duration over conflict and should be higher in more populated countries (Wood 2010, 2014b). These variables can equally be expected to affect rebel groups' ability to find vulnerable children that can be mobilized (Tynes and Early 2015). I thus code how long a conflict-dyad has been active for in a given dyad-year from the UCDP Armed Conflict Data and include the log of Gleditsch's population measure (2013).

Finally, structural characteristics of the country a conflict is fought in and the government it is fought against may also affect both civilian victimization and the usage of child soldiers. First, an area's economic development and productiveness may be connected to the level of civilian victimization there while also influencing the recruitment of children (Vargas and Restrepo-Jaramillo 2016), I thus include a conflict-country's logged real per capita GDP (Gleditsch 2002, 2013) to account for this. Second, rebel groups use more targeted violence against civilians when fighting democratic governments and regime type may similarly affect to what extent rebel groups use children as combatants (Lasley and Thyne 2015; Tynes and Early 2015), leading me to include a conflict-country's polity score as a control (Marshall et al. 2016). Finally, rebel violence against civilians is more extreme when these civilians belong to ethnic groups associated with both the government and rebels or when rebels are internally ethnically polarized and politically salient ethnicity also influences child soldier usage (Lasley and Thyne 2015). I hence include the share of the population which belongs to politically excluded ethnic groups, taken from the Ethnic Power Relations Data (Vogt et al. 2015), as a final control.

A.2. Zero-Inflation parts of ZINB models in the main empirical analysis

A lack of space did not allow me to report and interpret the logit Inflation parts of the ZINB models used in my analyses in the main text where I focused on the Negative Binomial parts of these models. I thus discuss them here as Table A2 presents the logit inflation parts of models

1a-2a presented in table two in the main empirical analysis. Column 1b examines a linear effect of child soldiering while column 2b presents the full model with an interaction between child soldier usage and the ideology dummy to test my hypothesis.

Dependent Variable: No Rebel One-sided Violence	(1b) Logit Inflate	(2b) Logit Inflate
Rebel OSV (Lag)	-0.009*	-0.010**
	(0.005)	(0.005)
Child Soldiers	-0.323	0.035
	(0.612)	(0.820)
Mobilization	-0.322	0.382
	(0.347)	(0.913)
*Child Soldiers*Mobilization*		-0.822
		(0.997)
Rebel Strength	-0.383	-0.364
	(0.626)	(0.633)
Natural Resources	0.233	0.221
	(0.231)	(0.230)
Rebel External Support	0.230	0.191
	(0.407)	(0.392)
Conflict Intensity (Lag)	0.000	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	-0.000	-0.000
	(0.000)	(0.000)
Population (LN)	-0.187	-0.183
	(0.177)	(0.177)
Conflict Duration	-0.005	-0.003
	(0.027)	(0.026)
GDP p.c. (LN)	0.113	0.099
	(0.181)	(0.181)
Polity2 Score	-0.141***	-0.143***
	(0.040)	(0.038)
Ethnically Excluded Pop. (%)	-0.186	-0.129
	(0.805)	(0.797)
Years since no civilian casualties	-3.038***	-2.960***
	(0.677)	(0.622)
Years since no civilian casualties^2	0.421***	0.410***
	(0.101)	(0.093)
Years since no civilian casualties^3	-0.016***	-0.015***
	(0.004)	(0.004)
Constant	2.740	2.533
	(2.185)	(2.171)
Observations	642	642

*Table A2: Logit Inflation Parts of Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Before interpreting the results, it should be noted that here, the dependent variable is a dummy that takes the value 1 if the count of civilians killed by rebels is zero and the value 0 if that count is non-zero. Thus, coefficients in the logit inflation part have contrary interpretations to those in the negative binomial: Positive (negative) effects indicate a lower (higher)

probability of a group having used fatal violence against civilians in a given year (Long and Freese 2014: 536).

In model 1b testing an unconditional effect of child soldier usage on civilian victimization, results match those obtained in the negative binomial component. *Child Soldiers* has a negative effect on the likelihood of a group having killed zero civilians which is, however, statistically insignificant. But in contrast to the negative binomial component, this result stays substantively identical in model 2b which introduces the interaction between *Child Soldiers* and *Mobilization*. The constituent and the interaction term are oppositely signed but neither is even close to being statistically significant. This result indicates that child soldiering does not affect whether rebel groups use lethal violence against civilians but only to what extent.

A.3. Matching

One possible issue with the results presented in the main analysis is that they may be model-dependent and thus subject to change if variables' functional form is adjusted or controls are added or deleted. If treatment and control units significantly differ in their values in control variables, this imbalance can cause results to change substantially when e.g. the functional form of a variable is altered. Matching avoids this by excluding cases that lack a reasonably similar case in the other group, thus making the distributions of the controls more alike (Ho et al. 2007). I use Coarsened exact matching which groups substantially similar values of variables into coarser categories (e.g. polity2 values from 7 to 10 as "democracy") and creates strata $s \in S$ in which units belong to the same coarsened categories of the covariates (Iacus et al. 2012). Matching weights are then assigned based on whether a unit has no match, i.e. its stratum includes only control or only treatment units (weight 0), is a control (weight $\frac{m_C m_T^s}{m_T m_C^s}$ where m_C and m_T are the total number of control and treatment units, respectively, and m_C^s and m_T^s their number in stratum *s*), or is a treated case (weight 1). The actual analysis is then run by estimating the same model as employed otherwise, a ZINB regression in this case, while using the matching weights.

Matching comes with a possibly substantial reduction of sample size, the extent of which is positively related to the number of variables one matches on. Here, matching on all controls would result in very few observations. I thus examine which controls do not contribute to model quality using the Akaike (AIC) and Bayesian Information Criteria (BIC) to select a more parsimonious versions of model 2 which I can then re-evaluate using CEM. I stepwise delete one control variable at a time, compare the AIC and BIC values for the resulting model with the baseline values from model 2 as well as previous steps, and choose the specification that

maximizes model quality (Greene 2012: 179–80). Where dropping a variable results in both a lowered AIC and BIC, I exclude that variable from following steps. This process results in *Rebel Strength*, *Resources*, *Gov. Violence against Civilians*, *Population*, and *Conflict Duration* being dropped. Whereas model 2 from the main text has AIC and BIC values of 4516.475 and 4668.271, respectively, these values decrease to 4510.651 and 4617.801 for a model without these controls. However, the substantive results for child soldiering stay the same in this model (see model A1).

Coarsened exact matching allows the analyst to specify coarsening categories for individual variables based on the substantive meaning of values, otherwise coarsening is done automatically by an algorithm. Here, I specify that binary variables should be left unchanged, group alleged and explicit support to rebels together, and coarsen the polity2 scale into the three regime types autocracy, anocracy, and democracy. I use the automatic coarsening algorithm for all other controls. I carry out CEM using the *cem* Stata package (Blackwell et al. 2009), obtain the matching weights, and run regressions for the treatment *Child Soldiers*. Cases where no recruitment of children was coded form the control group. As a result of this matching process, samples should become less imbalanced. If this is not the case, matching was unsuccessful and results based on it may be discarded (Ho et al. 2007: 216)(Ho et al. 2007: 216). To assess this, I use the L_1 statistic which indicates the global imbalance over all variables used in the matching procedure. It measures by how much the multidimensional histograms of the data for treatment and control group overlap; lower values indicate more common support (Iacus et al. 2012: 6–7). Matching on *Mobilization*, *Rebels external support*, *Conflict Intensity*, *GDP p.c.*, *Polity2 Score*, and *Ethnically Excluded Population* decreased the L_1 statistic from 0.92646199 to 0.26202186, indicating that imbalance is substantially reduced.

The results from a ZINB regressions run on the resulting matched sample examining the effect of child soldier usage on violence against civilians are reported in model A2. They mirror those obtained in model 2. Child soldiering has a positive effect on violence against civilians committed by groups without a local support base. However, this is not the case for groups that do have such mobilization ability. The analysis of data pre-processed using coarsened exact matching thus corroborates the results of the main analysis.

Dependent Variable: Rebel One-sided Violence	(A1a) Negative Binomial	(A1b) Logit Inflate	(A2a) Negative Binomial	(A2b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.010**	0.008*	0.006
	(0.001)	(0.005)	(0.004)	(0.019)
Child Soldiers	1.437***	0.015	2.685**	-0.682
	(0.415)	(0.782)	(1.155)	(2.776)
Mobilization	1.694***	0.366	2.168	-12.462**
	(0.474)	(0.916)	(1.540)	(5.859)
*Child Soldiers*Mobilization*	-1.884***	-0.770	-2.193*	4.482
	(0.642)	(0.981)	(1.175)	(2.770)
Rebel External Support	0.133	0.040	-0.500	-0.979
	(0.275)	(0.374)	(0.934)	(2.347)
Conflict Intensity (Lag)	0.000*	0.000	-0.000	0.007**
	(0.000)	(0.000)	(0.001)	(0.003)
GDP p.c. (LN)	-0.267**	0.128	1.294	-0.647
	(0.129)	(0.173)	(1.188)	(1.236)
Polity2 Score	-0.113***	-0.146***	-0.197	0.181**
	(0.032)	(0.035)	(0.134)	(0.089)
Ethnically Excluded Pop. (%)	-1.552***	-0.275	-9.378	37.216**
	(0.465)	(0.654)	(8.127)	(14.647)
Years since no civilian casualties		-2.967***		-10.139***
		(0.578)		(3.642)
Years since no civilian casualties^2		0.420***		1.085**
		(0.091)		(0.464)
Years since no civilian casualties^3		-0.016***		-0.030*
		(0.004)		(0.016)
Constant	5.771***	0.977	-6.847	3.897
	(1.080)	(1.488)	(7.646)	(8.018)
Matched Sample	No	No	Yes	Yes
Observations	642	642	101	101
Alpha (ln)	0.480***		-0.102	
	(0.095)		(0.204)	

*Table A3: Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.4. Altered dependent variable: 25 civilian casualties threshold

To further probe robustness, I re-run my main model 2 while dropping, replacing or including additional control variables, employing a standard Negative Binomial instead of ZINB as well as using different versions of both the dependent and main independent variables. First, my original dependent variable does not censor observations with less than 25 casualties as done by the UCDP one-side violence dataset used in many studies of violence against civilians (Eck and Hultman 2007), implying that my results may not be entirely comparable to those of earlier studies. I thus re-run my analysis with an alternative dependent variable where all values below 25 are set to zero. However, my substantive results are unchanged.

Dependent Variable: Rebel One-sided Violence (min. 25 deaths)	(A3a) Negative Binomial	(A3b) Logit Inflate
Rebel OSV (Lag)	0.000***	-0.015***
	(0.000)	(0.005)
Child Soldiers	1.348***	-0.252
	(0.380)	(0.460)
Mobilization	1.335***	-0.470
	(0.512)	(0.621)
*Child Soldiers*Mobilization*	-1.615***	0.439
	(0.617)	(0.670)
Rebel Strength	0.559*	-0.405
	(0.321)	(0.568)
Natural Resources	0.064	0.016
	(0.116)	(0.159)
Rebel External Support	-0.017	-0.644**
	(0.233)	(0.295)
Conflict Intensity (Lag)	0.000	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000***	-0.000
	(0.000)	(0.000)
Population (LN)	-0.032	0.134
	(0.071)	(0.128)
Conflict Duration	-0.032***	-0.003
	(0.010)	(0.021)
GDP p.c. (LN)	-0.043	0.513***
	(0.105)	(0.163)
Polity2 Score	-0.066***	-0.056*
	(0.020)	(0.031)
Ethnically Excluded Pop. (%)	-1.001***	0.080
	(0.333)	(0.715)
Years since no civilian casualties		-1.049***
		(0.219)
Years since no civilian casualties^2		0.131***
		(0.037)
Years since no civilian casualties^3		-0.005***
		(0.002)
Constant	4.939***	-2.196
	(1.204)	(1.777)
Observations	642	642
Alpha (ln)	-0.263**	
	(0.104)	

*Table A4: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.5. Altered dependent variable: Civilian casualties in conflict country

Second, I employ the number of civilians killed by a rebel group in a given year as the dependent variable in my main analyses. This includes victims in the conflict country but also in other, contiguous and possibly even non-contiguous countries. This may be problematic as many of the indepent variables are focused on the conflict country and it has been found that rebels behave differently in the area of conflict and in safe havens (Stewart and Liou 2017). I thus re-

run my main model using a dependent variable identically constructed to the original one but counting only those civilian killings comitted in the country where a rebel group was also coded as engaging in armed conflict. Again, the substantive results remain unchanged.

Dependent Variable: Rebel One-sided Violence (in conflict country)	(A4a) Negative Binomial	(A4b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.016*
	(0.000)	(0.009)
Child Soldiers	1.161***	0.022
	(0.347)	(0.851)
Mobilization	1.272***	0.321
	(0.473)	(1.069)
*Child Soldiers*Mobilization*	-1.398**	-0.692
	(0.596)	(1.140)
Rebel Strength	0.471	-0.492
	(0.379)	(0.647)
Natural Resources	0.165	0.207
	(0.187)	(0.228)
Rebel External Support	0.357	0.345
	(0.288)	(0.431)
Conflict Intensity (Lag)	0.000***	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	-0.000
	(0.000)	(0.000)
Population (LN)	-0.093	-0.185
	(0.101)	(0.174)
Conflict Duration	-0.027	-0.002
	(0.019)	(0.029)
GDP p.c. (LN)	-0.219*	-0.004
	(0.127)	(0.201)
Polity2 Score	-0.094***	-0.145***
	(0.025)	(0.039)
Ethnically Excluded Pop. (%)	-1.395***	0.164
	(0.432)	(0.845)
Years since no civilian casualties		-2.208***
		(0.601)
Years since no civilian casualties^2		0.116
		(0.077)
Years since no civilian casualties^3		-0.000
		(0.004)
Constant	6.120***	3.221
	(1.399)	(2.277)
Observations	642	642
Alpha (ln)	0.516***	
	(0.087)	

*Table A5: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.6. Main independent variables: Ordinal child soldier variable

Dependent Variable: Rebel One-sided Violence	(A5a) Negative Binomial	(A5b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.007
	(0.001)	(0.005)
Child Soldiers: Some	0.976**	0.318
	(0.429)	(0.836)
Child Soldiers: Many	1.697***	-2.141**
	(0.415)	(1.065)
Mobilization	1.224**	0.430
	(0.531)	(0.948)
Child Soldiers: Some Mobilization*	-1.562**	-0.802
	(0.714)	(1.073)
*Child Soldiers: Many*Mobilization*	-1.691**	0.048
	(0.777)	(1.283)
Rebel Strength	0.736*	-0.399
	(0.421)	(0.570)
Natural Resources	0.046	0.267
	(0.173)	(0.245)
Rebel External Support	0.466	0.225
	(0.340)	(0.414)
Conflict Intensity (Lag)	0.000**	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000**	-0.000
	(0.000)	(0.000)
Population (LN)	0.007	-0.272
	(0.099)	(0.188)
Conflict Duration	-0.018	-0.017
	(0.022)	(0.028)
GDP p.c. (LN)	-0.115	0.013
	(0.133)	(0.170)
Polity2 Score	-0.087***	-0.143***
	(0.029)	(0.040)
Ethnically Excluded Pop. (%)	-1.045**	0.120
	(0.461)	(0.820)
Years since no civilian casualties		-2.954***
		(0.611)
Years since no civilian casualties^2		0.407***
		(0.091)
Years since no civilian casualties^3		-0.015***
		(0.004)
Constant	4.299***	4.015*
	(1.534)	(2.135)
Observations	642	642
Alpha (ln)	0.431***	
	(0.085)	

*Table A6: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

The main analysis uses a binary measure of child soldiering even though the authors of this variable, Haer and Böhmelt (2016a) also provide an ordinal version which differentiates between groups that use some and many child soldiers. This is done due to coding issues with the ordinal version (Haer and Böhmelt 2017). I replicate model 2 using the ordinal measure of child soldiering instead of the binary one. Results stay consistent and imply that both using some and many child soldiers affects violence against civilians.

A.7. Main independent variables: Ethnonationalism instead of mobilization ability

I next re-run my main model while replacing the dummy measuring a group's ability to localize mobilize with a binary item that indicate whether groups are ethnonationalist or not. Such groups claim to represent a specific part of a country's population and usually operate close to this constituency (Beardsley et al. 2015). They should thus be able to mobilize local support and more generally have clear incentives to install rules against mistreating civilians.

However, it may also be easier to code whether rebel groups have an ethnonationalist agenda than to ascertain their ability to mobilize support. Replacing *Mobilization* with *Ethnonationalist* may thus decrease measurement error in the item used to measure groups' incentive to show restraint towards civilians. In the models 6 and 7, I use *Ethnonationalist* dummys based on two coding efforts of group ideologies (Polo and Gleditsch 2016; Wood and Thomas 2017). My substantive results are unchanged.

A.8. Main independent variables: Dropping mobilization outliers

The item measuring local mobilization ability in the main analysis collapses an ordinal, three-category variable from the Non-State Actor Dataset (Cunningham et al. 2009, 2013) into a binary indicator where groups receive a zero if they have no or low mobilization ability (n=587) and a 1 if they have medium (n=397) or high mobilization ability (n=34). I chose to collapse the latter two categories into one as there are only few observations of groups with a high ability to mobilize. However, this may create some heterogeneity between groups receiving a one on the mobilization dummy. To check whether this heterogeneity drives results, I re-estimate model 2 while dropping groups with high mobilization ability from the analysis. However, the results, presented in table A8, stay substantively the same.

Dependent Variable: Rebel One-sided Violence	(A6a) Negative Binomial	(A6b) Logit Inflate	(A7a) Negative Binomial	(A7b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.010*	0.000	-0.011*
	(0.001)	(0.005)	(0.001)	(0.006)
Child Soldiers	0.763*	0.185	1.073**	-0.491
	(0.445)	(0.719)	(0.422)	(0.799)
Ethnonationalist	1.014	1.684**	1.390***	0.273
	(0.734)	(0.854)	(0.538)	(1.044)
Child Soldiers Ethnonationalist*	-1.125	-1.119	-1.201**	0.732
	(0.794)	(0.954)	(0.604)	(1.092)
Rebel Strength	0.368	-0.570	0.170	-0.470
	(0.404)	(0.681)	(0.467)	(0.656)
Natural Resources	0.167	0.229	0.253	0.304
	(0.184)	(0.228)	(0.212)	(0.227)
Rebel External Support	0.389	0.195	0.256	0.493
	(0.280)	(0.387)	(0.306)	(0.423)
Conflict Intensity (Lag)	0.000*	0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Population (LN)	-0.132	-0.243	-0.130	-0.307
	(0.095)	(0.189)	(0.121)	(0.196)
Conflict Duration	-0.032	-0.008	-0.026	-0.008
	(0.022)	(0.028)	(0.022)	(0.029)
GDP p.c. (LN)	-0.199	0.177	-0.262*	0.008
	(0.164)	(0.176)	(0.139)	(0.188)
Polity2 Score	-0.085**	-0.144***	-0.101***	-0.135***
	(0.033)	(0.038)	(0.038)	(0.039)
Ethnically Excluded Pop. (%)	-1.287***	-0.432	-1.418***	-0.542
	(0.402)	(0.908)	(0.443)	(0.829)
Years since no civilian casualties		-3.073***		-2.794***
		(0.750)		(0.741)
Years since no civilian casualties^2		0.424***		0.387***
		(0.109)		(0.110)
Years since no civilian casualties^3		-0.016***		-0.014***
		(0.004)		(0.004)
Constant	6.778***	2.034	6.711***	3.974
	(1.788)	(2.267)	(1.766)	(2.417)
Observations	648	648	614	614
Alpha (ln)	0.484***		0.481***	
	(0.099)		(0.099)	
Ethnonationalist Source	Polo and Gleditsch 2016		Wood and Thomas 2017	

*Table A7: Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Dependent Variable: Rebel One-sided Violence	(A8a) Negative Binomial	(A8b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.009**
	(0.001)	(0.004)
Child Soldiers	1.330***	-0.033
	(0.403)	(0.849)
Mobilization: medium only	1.449***	0.405
	(0.512)	(0.941)
Child Soldiers Mobilization: medium only*	-1.694**	-0.940
	(0.671)	(1.022)
Rebel Strength	0.444	-0.261
	(0.390)	(0.685)
Natural Resources	0.143	0.334
	(0.192)	(0.245)
Rebel External Support	0.232	0.240
	(0.312)	(0.398)
Conflict Intensity (Lag)	0.000**	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000*	-0.000
	(0.000)	(0.000)
Population (LN)	-0.082	-0.177
	(0.104)	(0.175)
Conflict Duration	-0.027	-0.011
	(0.021)	(0.026)
GDP p.c. (LN)	-0.210*	0.140
	(0.124)	(0.200)
Polity2 Score	-0.099***	-0.155***
	(0.029)	(0.043)
Ethnically Excluded Pop. (%)	-1.484***	0.228
	(0.416)	(0.812)
Years since no civilian casualties		-2.923***
		(0.580)
Years since no civilian casualties^2		0.404***
		(0.088)
Years since no civilian casualties^3		-0.015***
		(0.004)
Constant	6.037***	1.870
	(1.423)	(2.329)
Observations	621	621
Alpha (ln)	0.445***	
	(0.088)	

*Table A8: Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.9. Control variables: Number of rebel groups

Next, I include the number of rebel groups active in a conflict as an additional control variable because this was found to positively affect rebels' violence against civilians (Raleigh and Choi 2017; Wood and Kathman 2015). In addition, a higher number of groups may positively affect demand for recruits, thus also increasing child soldiering. The variable is coded from the dyadic version of the UCDP Armed Conflict dataset (Harbom et al. 2008; Pettersson and Öberg 2020).

The substantive results of Child soldiering on violence against civilians are unchanged. Interestingly, model 9 also suggests that the number of rebel groups in a conflict actually decreases civilian victimization.

Dependent Variable: Rebel One-sided Violence	(A9a) Negative Binomial	(A9b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.010*
	(0.000)	(0.005)
Child Soldiers	1.548***	0.037
	(0.378)	(0.833)
Mobilization	1.877***	0.387
	(0.532)	(0.920)
Child Soldiers Mobilization*	-2.261***	-0.824
	(0.667)	(1.015)
Rebel Strength	0.695	-0.365
	(0.431)	(0.634)
Natural Resources	0.095	0.221
	(0.186)	(0.230)
Rebel External Support	0.241	0.197
	(0.283)	(0.388)
Conflict Intensity (Lag)	0.000*	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	-0.000
	(0.000)	(0.000)
Population (LN)	-0.112	-0.185
	(0.102)	(0.181)
Conflict Duration	-0.023	-0.002
	(0.020)	(0.026)
GDP p.c. (LN)	-0.153	0.107
	(0.120)	(0.179)
Polity2 Score	-0.097***	-0.142***
	(0.027)	(0.038)
Ethnically Excluded Pop. (%)	-1.440***	-0.148
	(0.380)	(0.797)
Rebel Group Number	-0.287**	-0.007
	(0.145)	(0.176)
Years since no civilian casualties		-2.954***
		(0.611)
Years since no civilian casualties^2		0.409***
		(0.092)
Years since no civilian casualties^3		-0.015***
		(0.004)
Constant	6.253***	2.503
	(1.335)	(2.308)
Observations	642	642
Alpha (ln)	0.438***	
	(0.090)	

*Table A9: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.10. Control variables: Categorical regime type

I also use a three-category regime type variable which based on the polity2 score codes whether a government is an autocracy ($polity2 \leq -6$), anocracy ($-6 < polity2 < 6$) or democracy ($polity2 \geq 6$).

Dependent Variable: Rebel One-sided Violence	(A10a) Negative Binomial	(A10b) Logit Inflate
Rebel OSV (Lag)	0.000	-0.009*
	(0.001)	(0.005)
Child Soldiers	1.670***	-0.048
	(0.435)	(0.800)
Mobilization	1.868***	0.324
	(0.532)	(0.900)
Child Soldiers Mobilization*	-2.188***	-0.851
	(0.691)	(0.991)
Rebel Strength	0.430	-0.445
	(0.386)	(0.619)
Natural Resources	0.165	0.171
	(0.193)	(0.235)
Rebel External Support	0.281	0.239
	(0.295)	(0.404)
Conflict Intensity (Lag)	0.000*	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	-0.000
	(0.000)	(0.000)
Population (LN)	-0.080	-0.230
	(0.111)	(0.175)
Conflict Duration	-0.028	-0.006
	(0.021)	(0.028)
GDP p.c. (LN)	-0.218*	0.037
	(0.131)	(0.191)
Anocracy	-0.175	-0.939**
	(0.422)	(0.464)
Democracy	-1.191**	-1.831***
	(0.497)	(0.601)
Ethnically Excluded Pop. (%)	-0.911**	-0.031
	(0.403)	(0.863)
Years since no civilian casualties		-3.094***
		(0.727)
Years since no civilian casualties^2		0.422***
		(0.106)
Years since no civilian casualties^3		-0.015***
		(0.004)
Constant	5.936***	4.571**
	(1.701)	(2.089)
Observations	642	642
Alpha (ln)	0.473***	
	(0.089)	

*Table A10: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

This is done as the link between regime type and rebel violence against civilians may not be linear as e.g. anocracies may be more or less sensitive to civilian casualties than democracies and autocracies, respectively. I use autocracy as baseline category. Substantive results remain unchanged. Both a country being anocratic and democratic make it more likely that rebels use violence against civilians but democracy also *decreases* the extent of such violence.

A.11. Control variables: None, estimating naïve models

Next, I drop all control variables and present naïve ZINB models where I regress violence against civilians only on child soldiering and mobilization as the inclusion of controls may bias estimates (Clarke 2005). The results mirror those obtained in the main analysis as the signs on both *Child Soldiers* and *Child Soldiers* Mobilization* are identical; the first term is also statistically significant. In contrast, the interaction term does not reach conventional levels of statistical significance.

Dependent Variable: Rebel One-sided Violence	(A11a) Negative Binomial	(A11b) Logit Inflate
Child Soldiers	1.775***	-1.558*
	(5.123)	(-1.710)
Mobilization	1.144*	-0.872
	(1.936)	(-0.803)
Child Soldiers Mobilization*	-0.419	0.886
	(-0.458)	(0.728)
Constant	2.955***	0.743
	(9.463)	(0.897)
Observations	1,017	1,017
Alpha (ln)	1.611***	
	(4.174)	

*Table A11: Zero-inflated Negative Binomial Regression. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.12. Cross-sectional models

The main analysis uses the dyad-year as unit of observation and thus treats the data as being time-series cross-sectional. While this is appropriate for the dependent variable as violence against civilians is recorded yearly, the variable used to measure child soldiering originally takes the dyad-period from the Non-State Actor Dataset as unit of observation (Haer and Böhmelt 2016a). In practical terms, this means that it is largely time-invariant and that. To test whether expanding it to the time-series cross-section format has affected the substantive results, I re-estimate my main models using the dyad-period as the unit of observation. For this purpose, I take the average of time-variant, continuous variables, the median values of time-variant, categorical variables, and drop the dynamic control variables on violence in the dyad. The results are presented in table A12 and mirror those obtained in the main analysis. *Child Soldiers*

is found to have a positive and statistically significant effect on rebel violence against civilians whereas the interaction term *Child Soldiers* Mobilization* is statistically significant but has a negative effect.

Dependent Variable: Rebel One-sided Violence	(A12a) Negative Binomial	(A12b) Logit Inflate
Child Soldiers	1.513***	-1.069
	(0.477)	(0.842)
Mobilization	1.372**	-0.634
	(0.594)	(1.058)
*Child Soldiers*Mobilization*	-1.366*	1.146
	(0.769)	(1.102)
Rebel Strength	2.151***	-0.629
	(0.796)	(0.819)
Natural Resources	-0.010	0.094
	(0.267)	(0.338)
Rebel External Support	0.026	-0.418
	(0.391)	(0.502)
Population (LN)	-0.056	-0.090
	(0.172)	(0.233)
Conflict Duration	-0.037	-1.039**
	(0.029)	(0.413)
GDP p.c. (LN)	-0.438**	0.469*
	(0.194)	(0.252)
Polity2 Score	0.052	-0.120**
	(0.044)	(0.052)
Ethnically Excluded Pop. (%)	0.671	-0.142
	(0.870)	(1.115)
Constant	6.679***	0.816
	(2.330)	(2.455)
Observations	220	220
Alpha (ln)	1.148***	
	(0.306)	

*Table A12: Zero-inflated Negative Binomial Regressions. Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

A.13. Standard negative binomial

Finally, I also re-estimate my main model using count estimators that have no zero-inflation. This is done even though both Vuong and HPC tests indicate that my dependent variable, rebel violence against civilians, has an excess number of zeroes and that modelling with zero-inflated count model is thus the best choice. To do so, I use Poisson and standard negative binomial regression. However, the results of interest remain unchanged, implying that they do not depend on model choice.

Dependent Variable: Rebel One-sided Violence	(A13) Poisson	(A14) Negative Binomial
Rebel OSV (Lag)	0.000***	0.003
	(0.000)	(0.002)
Child Soldiers	2.412***	1.668**
	(0.761)	(0.828)
Mobilization	2.126**	1.666*
	(0.894)	(0.901)
Child Soldiers Mobilization*	-2.568***	-1.652
	(0.952)	(1.059)
Rebel Strength	0.547	0.610
	(0.514)	(0.523)
Natural Resources	-0.108	-0.055
	(0.157)	(0.226)
Rebel External Support	-0.132	-0.133
	(0.369)	(0.313)
Conflict Intensity (Lag)	0.000	0.000
	(0.000)	(0.000)
Gov. one-sided Violence (Lag)	0.000	0.000
	(0.000)	(0.000)
Population (LN)	-0.066	-0.031
	(0.147)	(0.138)
Conflict Duration	-0.004	0.011
	(0.018)	(0.021)
GDP p.c. (LN)	-0.314**	-0.216
	(0.147)	(0.158)
Polity2 Score	-0.009	0.001
	(0.029)	(0.043)
Ethnically Excluded Pop. (%)	-1.414	-1.378*
	(0.879)	(0.743)
Constant	5.778***	4.428**
	(1.634)	(2.198)
Observations	642	642
Alpha (ln)		1.771***
		(0.153)

*Table A13: Poisson (model 12) and Negative Binomial Regression(model 13). Standard Errors clustered on the Rebel Group in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

Chapter II - Female Combatants and Rebel Group Behaviour: Evidence from Nepal

1. Introduction

In contrast to many popular depictions, civil wars are not only fought by men. While most combatants are male, women participate in armed conflict not only as victims but also as perpetrators of violence. For example, women play a prominent role in Kurdish forces' military activities in northern Syria, e.g. the recapture of Kobanê in 2015 or the resistance against Turkey's ongoing military intervention. They also fight or fought in the armed conflicts in Colombia, Sri Lanka, and eastern Ukraine (Alison 2003; Trisko Darden et al. 2019). As a result, numerous qualitative studies provide in-depth examinations of female recruitment and roles in specific civil wars[16] and quantitative work is also increasingly asking more broadly why women fight in some but not all civil wars (e.g. Henshaw 2016; Thomas and Bond 2015; Thomas and Wood 2018; Wood and Thomas 2017). A nascent literature is also beginning to consider how the presence of female combatants in a rebel group affects the behaviour of that group and conflict dynamics more generally. Loken (2017) argues that the participation of female combatants does not constrain wartime rape as organizational factors, not individual ones, drive violence. Braithwaite and Ruiz (2018) find that groups where women voluntarily participate in combat are less likely to be defeated in civil war. And in line with these findings, a group of recent studies claims that women's presence increases group legitimacy, allowing rebels to mobilize larger fighting forces and, crucially, third-party support (Loken 2020; Manekin and Wood 2020; Wood 2019).

I seek to contribute to shedding more light on this debate by analysing how the participation of female combatants influences two crucial dimensions of rebel behaviour, namely their relationship to civilians and their fighting performance. These dimensions are of utmost importance because, in order to win any war, an armed group has to defeat the enemy on the battlefield but also has to win and keep the support of the civilian population (see e.g. Galula 2006; Kalyvas 2006). Taking up the suggestion that female recruits are "specialized labour" for rebel organizations (Thomas and Bond 2015: 490), I argue that their presence has diverging effects on the two dimensions of group behaviour. On one hand, I propose that civilians view female rebels as less dangerous than male ones, providing them better access to and rapport with especially female civilians. This increased contact to civilians should make the relationship between rebels and civilians more amicable. In addition, it should result in

[16] See Trisko Darden (2015) for a review of this literature.

civilians sharing more information with rebels, allowing to better target politically suspect civilians such as informers while refraining from indiscriminate violence. This induces a negative effect of female combatants on lethal rebel violence against civilians. However, I also expect that the presence of female combatants lowers rebels' fighting performance. Gender inequality is a persistent feature of most countries experiencing civil wars while inequality within military organizations is a major detriment to their fighting performance (Lyall 2020). The introduction of women into fighting units may thus result in male backlash and an erosion of trust and social networks within the unit. At the same time, female recruits may seek to introduce gender issues as a new, additional organizational goal at the risk of creating internal conflict and disagreement. Against the backdrop of pre-existing gender inequalities, mixed-gender fighting units will thus exhibit lower trust, coordination ability, and willingness to fight for shared goals. As a result, I expect that female combatants decrease rebels' combat effectiveness.

I test these two arguments using quantitative microlevel data from the Nepalese civil war. I accordingly examine variation in the share of female combatants over fighting units of one rebel group, the Communist Party of Nepal – Maoist (CPN-M), and how it affected these units' victimization of civilians and fighting performance. This subnational research design is warranted as it cancels out a number of group and country-level determinants of both dependent variables such as ideology and target government while allowing me to go beyond rough categorical indicators for measuring female's participation in rebellion. Nepal is a very interesting case for this purpose. On one hand, Nepalese society is ridden with various forms of gender discrimination such as forced marriage and the use of menstruation huts (Goswami 2015; Jolly and Venema 2017). On the other hand, the CPN-M put the fight against these practices on its agenda early on, resulting in substantial female recruitment and up to 40% of its active members being women (K.C. and Van Der Haar 2019; Sharma and Prasain 2004). This is counterintuitive because women are more likely to join armed groups in more gender equal societies (Thomas and Wood 2018). My results provide support to both of my expectations. These findings should generalize well to other cases of substantial female participation in ideologically rooted insurgencies such as those in El Salvador, Colombia or Sri Lanka.

2. Theoretical Framework

While Thomas and Wood (2018) argue that the supply of female recruits for insurgencies is more likely in societies that are gender-equal in terms of social and economic activities, there are also various demand-side factors that structure women's recruitment. Rebel groups'

willingness to recruit females plays a role as women particularly join leftist groups or those with a gender ideology (Henshaw 2016; Thomas and Bond 2015; Wood and Thomas 2017) but are hardly recruited into Islamist groups (Haer and Böhmelt 2018; Wood and Thomas 2017). Rebel demand for female recruits is also determined by strategic factors. Larger rebel movements that need to mobilize more fighters are more likely to consider recruiting women (Haer and Böhmelt 2018; Thomas and Bond 2015). And females may serve as "an important type of specialized labour" due to the stereotypes generally associated with femininity (Thomas and Bond 2015: 490). I use this idea of women as "specialized" rebel recruits as a starting point to develop my argument on how females should affect two key dimensions of rebels' strategic behaviour in armed conflict: Relations with civilians and fighting performance.

Thomas and Bond focus on female membership in terrorist organizations when testing their specialized labour argument as women may be more effective suicide bombers (see also Alakoc 2020). However, they do acknowledge that being perceived as "more pacific, more caring, and less physically dangerous than men" (2015: 490) should also provide women with better access to and rapport with civilians in their area of operation. This should hold for all civilians but especially be the case for interactions with female civilians. Female civilians should perceive a bigger difference in the physical danger posed by male and female rebels due to bigger differences in physical strength as well as the added possibility of falling prey to sexual violence[17]. In addition, societal gender roles may make it generally frowned upon for women to interact with male strangers, thus further limiting male rebels' possible rapport with female civilians and providing female rebels with a comparative advantage. Relatedly, Karim (2017, 2019) examines how contact with female peacekeepers and police officers affects Liberian civilians' trust in and demand for these security forces. She finds that such exposure positively affects both outcomes and that it also leads civilians to regard female peacekeepers as "better" than male ones. However, her results also indicate that women generally prefer female peacekeepers and that the effect on demand for security services is mostly driven by women (see also Córdova and Kras 2020). This substantiates the idea that female members of military organizations are seen as more approachable and trustworthy by civilians generally but by women especially. At the same time, it is argued that their inclusion boosts rebels' legitimacy and support among civilians as women are generally perceived to fight only when facing legitimate grievances (Braithwaite and Ruiz 2018; Loken 2020; Manekin and Wood 2020).

This seems not to be lost on rebel organizations: the FARC and the El Salvadorian FMLN, but also Mao's Chinese Red Army, relied on women to engage with civilians because

[17] Male-on-male and female-on-female sexual violence exist in civil war but are relatively rare (see Cohen 2013b).

of them seeming less threatening and being better communicators than men (DeGroot 2001; Herrera and Porch 2008; Viterna 2013). And the FMLN, CPN-M, and LTTE even had specific women's organisations working to mobilize support among female civilians (Alison 2003; Sharma and Prasain 2004; Viterna 2013). These higher levels of interaction, legitimacy, and trust achieved by rebel forces which include females should result in more amicable relationships and cooperation with local civilians, thus decreasing the potential for conflict between them.

In addition, there is another reason to think that females' presence in rebel organizations should decrease the extent to which they are in conflict with and victimize civilians. If female rebels do indeed have better access to civilians than male ones due to being seen as more trustworthy and less dangerous, they should also be able to obtain more and better information from them (see also Wood 2019: 88). Rebel organizations with female members should thus suffer less from "information starvation" (Lyall and Wilson 2009). And indeed, studies on the CPN-M, FARC, and FMLN all indicate that female rebels successfully worked to obtain intelligence from civilians (Herrera and Porch 2008; K.C. and Van Der Haar 2019; Viterna 2013). This should have allowed them to better identify and target individuals that collaborate with the enemy, in turn making indiscriminate violence against groups suspected of this less necessary (see also Kalyvas 2006). Females' participation in rebellion should thus decrease rebels' potential for conflict with civilian populations as well as decrease their need for indiscriminate targeting of civilians as a tool of deterrence. As a result, I expect:

Hypothesis 1: Rebel units with a higher share of females exhibit lower violence against civilians.

But how does female participation affect rebels' fighting performance? If civilians are more willing to provide information to fighting units featuring females, then this may also increase these units' ability to fight. Better access to local information may allow fighting units e.g. to detect enemy informants before they can pass on information, to better avoid enemy traps, or carry out their own ambushes if told about expected enemy troop movements. Existing work further suggests that women may struggle with some types of combat roles due to being, on average, physically weaker than men but also notes that it is unclear whether this affects combat effectiveness (Epstein et al. 2013). However, there are also good reasons to expect that female participation *decreases* rebels' fighting performance.

Specifically, the inclusion of female combatants may decrease fighting units' military effectiveness by reducing their internal ability to cooperate and coordinate. Lyall (2020) shows

that pre-war inequality between the social groups making up military organizations results in poor fighting performance, tracing this outcome to the absence of trust between marginalized and privileged individuals. Soldiers who have experienced discrimination at the hands of the privileged group will find it hard to trust other soldiers from that group while members of the high-status group will also be hesitant to cooperate with low-status individuals as not to jeopardize their position (Lyall 2020). By inducing mistrust and an unwillingness to cooperate, inequality also severely reduces information flows and the establishment of social networks across group boundaries within affected military organizations, further reducing their ability to cooperate, coordinate, and fight effectively. In the absence of trust and social ties, combatants are more likely to abandon organizational goals and instead pursue their own aims but less likely to put up a coordinated fighting effort (see Costa and Kahn 2003; Humphreys and Weinstein 2006; Lyall 2020; McLauchlin 2015; Pilster and Böhmelt 2011; Shils and Janowitz 1948).

Crucially, while Lyall (2020) mainly refers to ethnicity as the cleavage separating low- and high-status groups, he also emphasizes that other identities may have similar effects as "gender differences […] might in turn affect battlefield performance in much the same way as ethnicity and race" (2020: 419). Indeed, gender represents a salient cleavage of inequality in many societies as women continue to face disparities in their economic, societal, political, and educational opportunities, especially in economically less-developed societies (Jayachandran 2015; World Economic Forum 2019). Pre-war inequalities between men and women may thus not only contribute to the outbreak of civil wars (Caprioli 2005; Melander 2005; but see Bjarnegård and Melander 2013) and decrease women's mobilisation into rebel groups (Thomas and Wood 2018), but also result in mixed-gender units exhibiting mistrust, low cohesion[18], and ultimately low fighting effectiveness. In this vein, studies focusing on state militaries document that units including both male and female soldiers can exhibit lower cohesion than homogenous ones and, in line with the idea that members of the privileged group seek to defend their position in the hierarchy, significant pushback from male soldiers against serving with women (Heinecken 2017; MacKenzie 2015; Rosen et al. 1999, 2003). Notably, male pushback against the inclusion of women has even been reported for prominent examples of non-state armed groups that incorporated women, e.g. CPN-M, FARC, LTTE, and PKK (Alison 2004; Haner et al. 2019; Herrera and Porch 2008; Onesto 2005: 181).

[18] I do not distinguish between social and task cohesion as the concepts are closely related and have been shown to both affect group outcomes such as military effectiveness (Beal et al. 2003; MacCoun 1993).

The inclusion of women in military organizations should only have a more prominent effect on fighting performance if these recruits also seek to shift organizational goals. Thomas and Bond (2015) suggest that the recruitment of female combatants may cause internal rifts in a rebel group as these recruits may call for gender issues to be an additional group goal (see also Wood 2019: 32–3). This would in turn anger elements inside the group that are opposed to female empowerment or see it as a subordinate issue, inducing internal conflict over group objectives and thus decreasing members' shared commitment to what have suddenly become ambiguous goals. Olsson (2005) points to SWAPO avoiding the question of gender equality to preserve internal unity. And the main Kurdish groups in Iraq, KDP and PUK, have been much more hesitant to integrate women into their combat forces than their Turkey- and Syria-based equivalents as doing so would upset their conservative, mainly rural support base (Trisko Darden et al. 2019: 46–8). Accordingly, the few women who have joined the Peshmerga forces see this as an opportunity to increase societal gender equality but regularly meet pushback from patriarchally-minded male soldiers as further recruitment of women was even stopped in 2015 due to a lack of funding (Nilsson 2018; Trisko Darden et al. 2019: 45). Finally, Thomas and Bond demonstrate how such conflict over gender equality and the integration of women lead to the splintering of the Eritrean Liberation Front and its year-long conflict with the off-shoot Eritrean People's Liberation Front (Thomas and Bond 2015: 500–2). Introducing women into military units and organizations may thus not only decrease these groups' internal trust and ability to coordinate but also to what extent their members agree on and are willing to fight for common goals.

Given that unit cohesion and recruits' ability to cooperate and coordinate is generally regarded as a key prerequisite of fighting effectively (see e.g. Lyall 2020; McLauchlin 2015; Pilster and Böhmelt 2011; Shils and Janowitz 1948), this discussion links women's participation in rebel groups to decreased fighting performance. As a result, I expect:

Hypothesis 2: Rebel units with a higher share of females exhibit lower fighting performance.

3. Research Design

I test these two propositions regarding the effect of female combatants on rebel behaviour using district-level panel data from the Nepalese Civil War, which is constructed from a dataset that provides individual level casualty data for that conflict[19] (Joshi and Pyakurel 2015). As I discuss

[19] While the dataset also includes 780 observations of non-lethal casualties, I use only those casualties that were coded as being killed or disappeared. "Casualty" throughout this paper refers to these cases.

below, the Nepalese case is an interesting case for this purpose because it combines very patriarchal and gender discriminatory societal norms with a rebel group that was hugely successful in mobilizing women to join their ranks. Focusing on this single civil war to test my hypotheses also allows me to hold a number of macro-level determinants of rebel behaviour such as target government, economic development, organizational culture, and ideology constant. Due to the fine-grained data quality, I can do the same for factors such as terrain while going beyond rough categorical indicators for measuring female's participation in rebellion. Before describing my empirical strategy and variable construction, I provide a short overview of the role of women in the Nepalese Civil War and discuss why it is a good case to test their effect on rebel behaviour.

3.1 The Case: Civil War in Nepal

The Nepalese Civil War began as an armed insurrection when members of the Communist Party of Nepal-Maoist (CPN-M) attacked police stations in February 1996[20]. These assaults had been preceded by government repression against the party as well as a catalogue of demands by the Maoists that the government had ignored (Hutt 2004). In its first years, the conflict was largely concentrated in rural areas in the country's Midwest and fought with low intensity between CPN-M members operating as guerrillas and Nepalese police forces (Mehta and Lawoti 2010). The Nepalese army only got involved after the Maoists had proclaimed the second phase of their insurrection in November 2001, switching from pure guerrilla tactics to more open warfare and also attacking military barracks (Eck 2014; Mehta and Lawoti 2010). This shift in military tactics caused a significant increase in casualties as more were recorded in 2002 alone than in the preceding six years of conflict. This state of intense warfare continued until 2006 when the conflict ended with a peace deal between CPN-M and the government, having killed almost 15,000 people (Joshi and Pyakurel 2015). Linking Maoist tenets to existing grievances of the indigenous and low-caste segments of Nepal's rural population, the CPN-M mainly mobilized support among rural individuals with a variety of ethnic and caste backgrounds, casting their experience of inequality and underdevelopment vis-à-vis ruling upper-caste elites as a class struggle (Joshi and Mason 2010; Sharma 2006). This political ideology was emphasized both in recruitment and afterwards as new recruits had to prove their political values before being allowed into the group's military wing (Eck 2014).

The CPN-M based its military structure to a large degree on geography, eventually dividing Nepal into three divisional commands which included brigades, battalions, companies,

[20] The Nepalese Civil War has been the subject of numerous quantitative single-country studies which are discussed in the appendix.

platoons, and squads as one moved down the line of command as well as locally organized militias (ICG 2005; Mehta and Lawoti 2010). Accordingly, most operational units were based in one district which was the centre of their activities and rarely, if ever crossed district-borders (Holtermann 2016; Onesto 2005: 134–5, 154, 204). The individual members of these units also tended not to move around a lot, as exemplified by both rank-and-file and commanders staying in a district for multiple years (see Jackson 2019: 1004–5; Onesto 2005: 45, 140, 208).

Women were recruited into the CPN-M's fighting forces from the onset of the insurgency, often joining because of family ties or witnessing propaganda displays (K.C. and Van Der Haar 2019; Onesto 2005; Shrestha-Schipper 2008). This successful mobilization was the result of gender discrimination being highly prevalent in Nepalese society, e.g. in the form of forced marriages, menstruation huts, and laws prohibiting most women including widows from inheriting property, which the Maoists promised to change (Goswami 2015; Pettigrew and Shneidermann 2004; Sharma and Prasain 2004). Within the CPN-M, all positions were open to women with many serving as combatants and rising into commanding positions (K.C. and Van Der Haar 2019; Onesto 2005). Female combatants fought both in mixed and all-female units, in the main forces and auxiliary militias, as well as in rank-and-file and commanding positions, accounting for up to 30-40% of recruits according to some sources while ~20% of the former Maoist combatants registered in UN cantonment sites were women (Goswami 2015; Onesto 2005; Sharma and Prasain 2004; Shrestha-Schipper 2008). Duties such as cooking and washing clothes were carried out by both men and women and the Maoists helped civilian women by e.g. punishing and trying to prevent sexual violence (K.C. and Van Der Haar 2019; Sharma and Prasain 2004). While the ultimate level of gender equality inside the CPN-M remains contested (Pettigrew and Shneidermann 2004; Shrestha-Schipper 2008), it is also clear that female combatants there experienced more social freedom and equality than they did before or, indeed, after demobilizing (K.C. et al. 2017; K.C. and Van Der Haar 2019).

This combination of substantial mobilization of women into the CPN-M and Nepalese society being very patriarchal makes Nepal a relevant case to test female combatants' effect on rebel behaviour as on average, female recruitment into armed groups is more likely in more gender equal societies (Thomas and Wood 2018). At the same time, results of this test should be generalizable to other cases of highly ideological rebel groups with substantive female participation active in patriarchal societies such as Colombia, El Salvador, and Sri Lanka. In contrast, women's effect on group behaviour may well be different for groups that base recruitment not on ideology but mainly on coercion such as the Ugandan LRA or Sierra Leone's RUF.

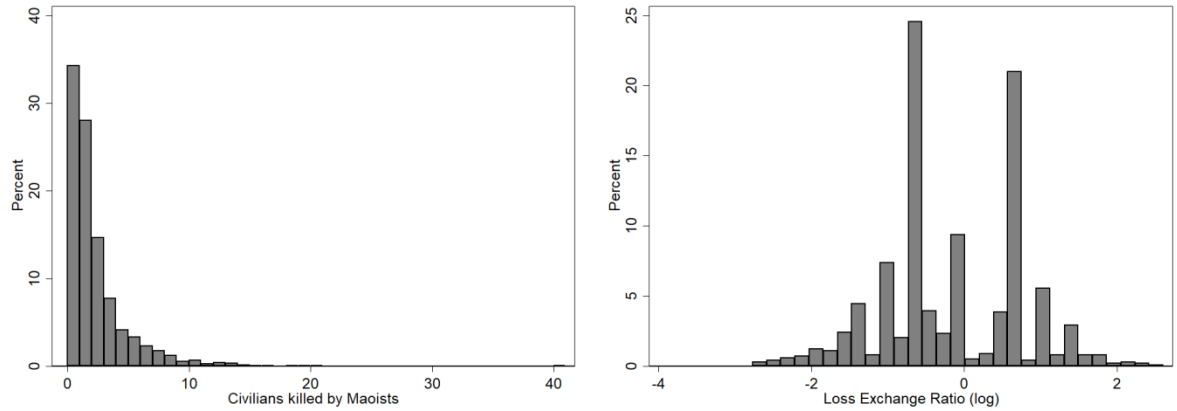
3.2 Data and Empirical Strategy

I construct district-level panel data from a dataset that provides the date, location, demographic background, political alignment, and way of being killed for 13,230 casualties of the Nepalese civil war, 1996-2006 (Joshi and Pyakurel 2015). These data were collected by a Nepalese human rights organization, INSEC, which collected reports of killings from local newspapers, their district-level offices, and a wide network of contacts in civil society and in both fighting parties. INSEC staff visited the site of all reported killings to verify the incident, documenting information about the event and its victims in the process. This dataset is suitable for my purposes due to its detailed information on casualties' individual attributes and since it arguably suffers from less of the issues associated with standard conflict data, e.g. the politicized counting of casualties and reporting bias (Joshi and Pyakurel 2015: 605; see also Seybolt et al. 2013). In addition, it does not exhibit the problems associated with the combatant surveys generally used to study the effects of individual fighters' and units' attributes on conflict (e.g. Humphreys and Weinstein 2006; Oppenheim and Weintraub 2017), i.e. non-random sampling of respondents, recall bias and interviewees' hesitancy to answer sensitive questions on wartime behaviour. I aggregate individual observations to the district-quarter year which I use as unit of observation to test my hypotheses. I conceive of these district-quarter year observations as "quasi-units" representing the military activity of rebels and security forces in a small geographic zone during a relatively short period of time. This equation of fighting unit and geographical and temporal closeness is appropriate given that the CPN-M based its military structure on geography and that fighting units (and their members) exhibited little spatial movement over time. In addition, this geo-temporal approach to identifying quasi-units is well-established in the literature on rebel organizations (Humphreys and Weinstein 2006; Oppenheim and Weintraub 2017).

To test hypothesis 1, I measure the Maoists' violence against civilians by counting the number of civilians killed by the Maoists in a given district-quarter year. I record 1,764 district-quarter year observations of this variable instead of a possible 3300 as many district-quarter years did not experience any conflict incidents and are thus not part of my data. Its values range from 0 to 41 but more than 75% of observations take values from 0 to 2. To test hypothesis 2, I require a measure of the Maoists' combat performance. For this, I use a measure that explicitly relates Maoist combat casualties to battle deaths incurred by the security forces, namely the Loss Exchange Ratio (LER). It measures their ability to destroy enemy forces while preserving their own and is calculated as $LER_{dt} = \frac{battle\ deaths_{mdt}+1}{battle\ deaths_{sfdt}+1}$ for each district d in quarter year t

(see Biddle and Long 2004)[21]; *m* and *sf* respectively indicate Maoist and security forces casualties. Lower LER values thus indicate higher Maoist Military Effectiveness. I record 999 district-quarter year observations of this variable with values ranging from 0.0625 to 13.6. Out of the 3300 district-quarter years my data could cover, less than a third actually experienced combat[22] because the civil war was limited to remote districts in the country's mid-west for a long time and spread to more than half of all districts only in 2001. As the LER is strictly positive and right-skewed[23], I use its natural logarithm when testing female combatants' effect on Maoist combat performance. Figure two presents histograms of my two dependent variables.

Figure 2: Histograms of the dependent variables



Note: Histogram of Maoist Violence against civilians (left) and of logged Loss Exchange Ratio (right).

I also construct the variables used to test my hypotheses from this dataset, meaning that I use data on *killed* combatants to approximate the attributes of the general rebel and security forces population. I thus assume that a unit's *casualties* are broadly representative of its *members* more generally. This assumption should be relatively unproblematic as members of the same fighting units should not substantively vary in their exposure to combat and risk of being killed in it[24]. This assumption allows me to create unit-level, time-variant measures of women's participation in the Nepali civil war.

[21] I add one in the numerator and denominator as many observations would otherwise have missing values due to no recorded security forces casualties. I omit cases where neither side experienced losses.
[22] Nepal is divided into 75 districts and the conflict lasted 11 years, i.e. 44 quarter years. 44 times 75 is 3300.
[23] See figure 1 in the appendix.
[24] One may argue that if female combatants' decrease fighting performance, they should be more likely to be killed in combat. However, first, I argue that the fighting effectiveness of their entire unit decreases as a result of female participation, not only their own. Inside those units, it should thus be random which specific combatant gets killed in combat and which survives. Second, 17% of Maoist casualties in my data are women which is slightly below their share among cantoned fighters and well below the official Maoist estimate of 30-40%. This implies that female combatants, if anything, are underrepresented among combat casualties, meaning that my measure of female participation may undersell the true number of women in the CPN-M, thus biasing against my hypotheses. In addition, even if women were overrepresented among battle deaths, this bias should not meaningfully vary across districts and especially not across time within a district. Hence, it would be controlled for by the subnational research design using district-fixed effects.

For this, I cannot use observations that are concurrent with the dependent variable as the possible values the independent variables could take would depend on how many combatants were killed at that point in time[25]. Instead, I use the variables' averages over the three district-quarter years preceding an observation $t-1, t-2, t-3 = z$ to measure their effect on rebel behaviour in t[26]. I thus measure the participation of female combatants in a Maoist unit as the average share of women among its casualties during the period z. I use this variable to examine the effect of women's participation on violence against civilians but for combat performance, an additional step is required. As that dependent variable, LER, is a dyadic measure of Maoist combat performance against the security forces, I also construct the independent variables possibly affecting it in a dyadic fashion. I thus take the *ratio* of the Maoists' and security forces' values for a variable, that is $X_{d,z} = \frac{X_{mdz}}{X_{sfdz}}$. However, the main variation here comes from Maoist units as security force casualties included only very few women[27]. More specifically, 1,026 out of the 1,667 female casualties recorded by my data are coded as Maoist combatants and the remainder are largely non-combatants. I use only the Maoists' values on group-level variables when examining violence against civilians but employ the ratio between the Maoists' and Security Forces' Values when examining combat performance. Summary statistics for the dependent variables and the two versions of female participation are presented in table three[28]. These show that average Maoist fighting units were 15% female, contradicting claims that the CPN-M had 30-40% female leadership (see e.g. Sharma and Prasain 2004). This divergence may indicate that women were actually underrepresented in the Maoists' fighting forces and mostly occupied support roles or that the CPN-M inflated its reported number of female members for propaganda purposes.

Table 3: Summary statistics of key variables

Variable	Obs.	Mean	Standard Deviation	Min.	Max.
Civilians killed by Maoists	1,764	1.82	2.618	0	41
LER (logged)	990	-0.166	0.942	-2.773	2.61
Female Combatants	1,450	0.149	0.197	0	1
Ratio: Female Combatants	1,043	1.156	0.186	0.75	2

[25] Observations with one casualty would result in perfect ethnic homogeneity while ones with two would result in either perfect homo- or heterogeneity. The same is the case with the share of females among unit casualties.
[26] In case of missing values, these averages are calculated over the available observations.
[27] Women have been allowed to fight in the Nepalese army since 2003 (Shrestha-Schipper 2008).
[28] See the appendix for summary statistics of the controls.

Since lethal violence against civilians is a count variable, I use poisson regression models. In contrast, I use OLS to examine combat performance since the logged Loss Exchange Ratio is a continuous outcome variable. Both analyses include district-fixed effects, which control for time-invariant features of a district that may affect both rebel behaviour and female participation, e.g. its political history, terrain, ethnic makeup, and wealth (Angrist and Pischke 2009: 221–4). In the case of violence against civilians, it should be noted that I use fixed-effects Poisson models because fixed-effects Negative Binomial models either do not purge the effect of time-invariant predictors or lead to inconsistent and biased coefficient estimates due to the incidental parameter problem (Allison and Waterman 2002; Lancaster 2000). In contrast, fixed effects Poisson models are consistent and robust even when the conditional mean and variance are not equal (Cameron and Trivedi 2010: 633; Lancaster 2000; Wooldridge 1999). While conventional standard errors would be too small for these models, I correct this by clustering them on the district (Allison 2009; Wooldridge 1999). To account for within-unit dependences, I also cluster standard errors on the district in the OLS models and further include the average value of the respective dependent variable in the previous three periods *z* as a control variable.

In addition, I control for a number of time-varying unit and district characteristics that may be correlated to female participation as well as one or both outcome variables. Unless noted otherwise, these variables are constructed from the district-quarter year panel data based on Joshi and Pyakurel (2015). First, as discussed above, the Nepalese Civil War had two distinct phases which differed in their intensity and military tactics. I thus construct a dummy that takes the value 1 if a district-quart year observation happened after October 2001[29]. After this date, the Maoists increasingly asked households to contribute one member as a recruit and reports indicate that this was often a female rather than a male (Becker 2010; Goswami 2015). At the same time, both outcome variables should be affected because of the conflict spreading beyond key areas of Maoist support and due to the Nepalese army getting involved in the conflict.

Second, more socially heterogeneous fighting units have been found to be less cohesive and responsible for more violence against civilians (Costa and Kahn 2003; Humphreys and Weinstein 2006; McLauchlin 2015). At the same time, Sharma and Prasain (2004) suggest that female recruits mostly belonged to indigenous groups, implying that their units were rarely all-upper caste Hindu but instead more socially heterogeneous units. I thus code casualties'

[29] The fourth quarter of 2001 is coded as belonging to the second phase.

membership in one of the five broader groups usually identified as politically relevant in Nepal and compute unit fractionalization scores as well as their ratio[30].

Third, a unit's fighting experience should affect its behaviour as veterans should be better at fighting but may also increasingly victimize civilians (Manekin 2013). And while women participated in the CPN-M from the start of the insurgency, it does appear as if their recruitment may have increased after November 2001, implying that on average, women may have had a shorter participation period. Unfortunately, I cannot directly measure how long individuals fought with the Maoists. Instead, I proxy unit fighting experience via mean age – and its square – as older fighters, on average, should have joined the insurgency earlier.

Fourth, the CPN-M recruited substantial numbers of child soldiers and it has been suggested that they increase both combat effectiveness (Haer and Böhmelt 2016a) and violence against civilians (Peters 2011; Singer 2006). In addition, one may expect that rebel groups attempt to have a minimum number of male adult fighters in a unit and that children and women thus substitute for each other. I hence control for the share of members under 18 in a unit.

Fifth, the intensity of fighting should drive down the combat performance of an organization often using guerrilla tactics such as the CPN-M who may then react with increased violence against civilians (Hultman 2007). In addition, higher battle loses should lead to more aggressive recruitment and, if households mainly contributed females when asked to send one member to the rebels, increased female participation. I thus take the total number of combat casualties in a district to control for the intensity of fighting.

Sixth, I include a dummy indicating when and where there were Maoist district people's governments[31]. This indicates that they had substantial support in these districts but also that they moved from pure guerrilla tactics to providing governance and services to communities. Hence, this factor may be related to their recruitment but also their behaviour towards civilians and military effectiveness.

Finally, I include a district's logged population size as a control as it may correspond to an increased presence of the security forces but also a larger pool of male, adult recruits. It is taken from the Nepali censuses of 1991 and 2001 (Central Bureau of Statistics 1991, 2001); I use the 1991 values for the years 1996-2000 and the 2001 ones for 2001-2006. I include these

[30] $Fractionalization_d = 1 - \sum_i^n {p_{id}}^2$, where p_i is the share of individuals belonging to group i among the total population of casualties in district d. The groups are Hill Brahmans / Chetris, indigenous communities, Dalits, Madheshi, and Muslims. See e.g. Gellner (2007), and Lawoti and Hangen (2013) on ethnic politics in Nepal.

[31] I collected data on this from Hachhethu (2004: 77), Ogura (2008a, 2008b), Sharma (2004: 42–3), and Shneiderman and Turin (2004). It should be noted that while none of these sources report any district people's governments being set up after November 2001, this may either reflect reality or result from limited access to information from rebel-held areas during the second, more intense phase of the war.

seven controls when modelling both Maoist violence against civilians and combat performance. In addition, models of the former include governmental violence against civilians as belligerents often respond to the other side's violence with more violence (Wood 2010) but it also motivated women to join the Maoists (Sharma and Prasain 2004). Models of combat performance further comprise a unit's share of high school graduates and recruits hailing from the district they are active in. Human capital in the form of education is a key driver of military effectiveness (Biddle and Long 2004) and should also correlate with combatants' gender because some families may prefer or be unable to send girls to school. And the access to local information and knowledge of the terrain available to natives are key factors in (counter-)insurgency (Fearon and Laitin 2003; Lyall 2010) but individuals who have such knowledge may be more likely to be women as these may exhibit less geographic mobility to e.g. find work. I thus estimate the following two linear models:

$$MOSV_{d,t} = \alpha_d + \beta_1 \overline{Female\ Combatants}_{d,z} + \beta_2 MOSV_{d,z} + \boldsymbol{\beta}(\boldsymbol{X}) + \varepsilon_{d,t}$$
$$\ln LER_{d,t} = \alpha_d + \beta_1 Ratio{:}\ \overline{Female\ Combatants}_{d,z} + \beta_2 \ln LER_{d,z} + \boldsymbol{\beta}(\boldsymbol{X}) + \varepsilon_{d,t}$$

where d is the district, t is the quarter-year of the observation, z is the three quarter-years preceding t, and $\boldsymbol{X}$ is a vector of control variables. While the second model can be estimated right away using OLS, the first is estimated using a Poisson model; it thus enters model $f\left(MOSV_{d,t}\middle|\lambda_{dt}\right) = \frac{{\lambda_{d,t}}^{MOSV_{d,t}}}{MOSV_{d,t}!} e^{-\lambda_{dt}}$ as $\lambda_{d,t} = e^{\alpha_d + \beta_1 Ratio{:}\ \overline{Female\ Combatants}_{d,z} + \beta_2 \ln LER_{d,z} + \boldsymbol{\beta}(\boldsymbol{X})}$.

4. Empirical Results

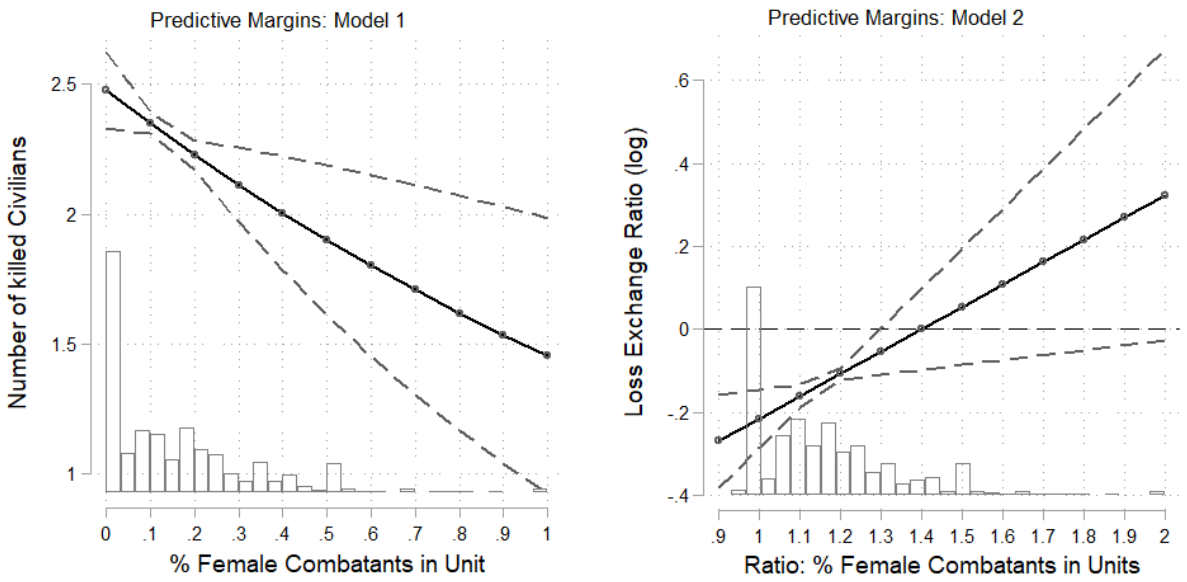
Models 1 and 2 in table four present the results of these two models. The results in column one support the proposition that female combatants decrease a rebel unit's use of violence against civilians. *Female Combatants* exhibits a negative effect on Maoist violence against civilians which is statistically significant below 5%. To examine this effect substantively, figure three plots the predicted number of civilians killed by the Maoists over the range of females' share in a unit: perfectly balanced units kill ca. 0.6 civilians less per quarter-year than all-male units. While this effect seems small, note that 604 out of 1,764 observed district-quarter years (34.24%) experience no violence against civilians and that in another 494 (28%), only one civilian gets killed. The effect of female participation on rebel violence against civilians is thus not negligible but instead substantively quite significant. This result corroborates my claim that increasing female participation in rebel units decreases their level of civilian victimization.

Table 4: Female combatants and conflict dynamics

Dep. Var.:	(1) Maoist OSV	(2) LER (log)
Female Combatants (%)*	-0.531	0.539
	(0.038)	(0.038)
Phase of War	1.347	-0.069
	(0.000)	(0.692)
Ethnic Fractionalization*	0.361	-0.114
	(0.142)	(0.625)
Age (Unit Mean)*	-0.004	0.916
	(0.943)	(0.428)
Age Square (Unit Mean)*	-0.000	-0.390
	(0.896)	(0.491)
Child Soldiers (%)*	0.139	-0.465
	(0.631)	(0.147)
Conflict Intensity	-0.011	0.001
	(0.023)	(0.927)
Maoist District Government	-1.241	0.509
	(0.000)	(0.060)
Population (LN)	-1.348	2.106
	(0.183)	(0.104)
Government OSV	0.012	
	(0.058)	
High School Graduates*		-0.095
		(0.591)
Natives*		-0.147
		(0.333)
Dependent Variable in *z*	0.075	-26.984
	(0.000)	(0.095)
Constant		-26.984
		(0.095)
District-Fixed Effects	Yes	Yes
Observations	1,084	594

Note: Model 1 is a Poisson, model 2 OLS. District-clustered standard errors; p-values in parentheses. Variables marked with a * are included as the Maoists' values in Model 1 and as ratios between Maoists' and Security Forces' values in Model 2.

Figure 3: The substantive effects of female combatants on conflict dynamics



Note: Predicted number of civilians killed by Maoists in a district-quarter year over the observed range of Female Combatants (left panel); Predicted LER values over the observed range of Ratio: Female Combatants; the black dashed line indicates a logged LER of 0 (= a LER of 1) (right panel). Grey dashed lines represent 90% Confidence Intervals. Bins of the histogram represent the share of observations with the respective value.

Turning to hypothesis 2, it should be noted that a higher Loss Exchange Ratio indicates decreased military effectiveness on the part of the Maoists as the LER is calculated as the number of rebel casualties divided by the number of government casualties. The results in column two support the expectation that female combatants also decrease a rebel units fighting performance. *Female Combatants* exhibits a positive effect on Maoist unit's Loss Exchange Ratio which is statistically significant with a p-value of 0.038. This indicates that as the rebels have a comparatively higher share of females than the security forces, their ability to eliminate enemy forces while preserving their own decreases. To examine this effect substantively, I also plot the predicted Loss Exchange Ratio between Maoists and security forces over the observed range of ratios between females' share in Maoist and Security Forces units in figure three. This figure shows that rebel units that include less, as many, or slightly more females than the opposing security forces are predicted to achieve Loss Exchange Ratios significantly below 1, i.e. they incur less own casualties than they are able to inflict on the enemy. This picture changes once Maoist units include more than 1.25 as many women as the security forces they are fighting. These units' LERs cannot be statistically distinguished from a symmetrical LER of 1 even though their point estimates are bigger than 1 for rebel units with more than 1.4 times as many women as present in the enemy unit. This result thus indicates that rebel units with none or only few women fight more effectively than ones with more female participation, corroborating my claim that female combatants decrease unit combat performance.

Before further discussing these results, I shortly summarize the results of the control variables, concentrating on significant effects. For violence against civilians, these results corroborate previous studies findings' that previous civilian victimization by the government increases the targeting of civilians whereas rebels' territorial control decreases it. In contrast to expectations, higher previous conflict intensity is also associated with lower violence against civilians. For combat performance, only territorial control reaches conventional levels of statistical significance but is surprisingly associated with a decrease in combat effectiveness. However, this changes in the case of child soldiers once no age terms are in the model; these variables are obviously highly correlated. Then, results indicate that Maoist units with more underage combatants fight more effectively, corroborating earlier findings that child soldiers increase combat performance.

My results thus corroborate the idea that female combatants influence two important dimensions of rebel behaviour, violence against civilians and combat performance. They also provide substantial support to my expectation that these women may be seen as specialized rebel labour as they decrease civilian victimization, thus indicating that rebels' relations with civilians become more amicable in their presence, but also diminish rebels' combat performance. These findings should also credibly not result from omitted variable bias. My microlevel research design focusing on one rebel organization in one country purges the effects of numerous potential group- and country-level confounders such as societal gender equality or rebel ideology. Using district-fixed effects also purges the effect of any time-invariant district-level confounders such as local gender customs, thus further isolating the effect of female combatants on rebel behaviour. However, my findings may still result from excluding time-varying district-level confounders, outliers, multicollinearity, sample selection, and estimator choice. I thus run a number of additional specifications which address these concerns. There, I include neighbourhood-averages of the dependent variables to account for spill-over effects, include year-fixed effects, remove outliers, drop possibly multicollinearity-inducing variables, use negative binomial instead of Poisson models, employ genetic matching (Diamond and Sekhon 2013) to reduce sample imbalance, and condition female combatants' effect on combat effectiveness on the use of suicide attacks. I also drop the lagged values of the respective dependent variable due to the potential for Nickell bias (Nickell 1981) and allow for non-independent error terms as violence against civilians and fighting effectiveness may be related processes. Results mirror those in the main specifications and are presented in full in the appendix.

5. Conclusion

A substantial literature studying why women participate in organized intrastate violence and what roles they take up in armed non-state groups has recently emerged. However, very little is known about how they affect the behaviour of the rebel groups they participate in. This paper contributes to filling this gap by studying how female participation affects two dimensions of rebel behaviour, violence against civilians and combat performance. On the one hand, I argued that female rebels should decrease civilian victimization because they are better able to peacefully engage with and obtain information from civilians due to being perceived as less dangerous than male combatants. On the other hand, I posited that due to societal gender inequality, the presence of female combatants also results in lower trust and cohesion of fighting units, thus decreasing rebel combat effectiveness. I test these expectations using micro-level data from the Nepalese Civil War, 1996-2006, and find considerable support for them. All-male rebel units were responsible for 25% more killings of civilians than perfectly balanced ones. But all-male units were also able to eliminate 12.25 enemies for 10 own casualties whereas rebel units with more than 25% female participation incurred at least as many casualties as they caused. These findings thus corroborate the notion that female combatants appear more trustworthy and approachable for civilians but that their presence also decreases fighting unit cohesion. And more generally, they indicate that women's participation has a substantial effect on rebel behaviour.

This study thus contributes to the literature on women's participation in armed conflict by providing some first evidence on how female combatants affect fighting units' behaviour beyond the use of rape. The argument that female combatants decrease violence against civilians because they increase rebels' rapport with civilians also suggests that including women may have further positive consequences for insurgent organizations that outweigh their negative effect on fighting effectiveness. For example, including females may allow rebels to survive longer in conflict due to increased civilian support. And it may also increase their likelihood of being extended negotiations or mediation due to increasing their legitimacy among third-party countries that may then intervene (see Manekin and Wood 2020; Wood 2019).

These results similarly contribute to a small but growing literature on the effects of rebel force structure by introducing women's participation as a new factor and, perhaps more importantly, providing evidence that does not only rest on the Colombian (e.g. Oppenheim and Weintraub 2017) or Sierra Leonean cases (e.g. Humphreys and Weinstein 2006). And finally, I provide an innovative research design as I do not rely on costly combatant survey data but instead employ a socio-demographic census of conflict casualties to analyse the micro-level

dynamics of armed conflict. This approach comes without some of the issues combatant surveys have such as recall or social desirability bias and may also provide benefits in terms of the randomness of "sampling", i.e. entering the dataset.

In addition, this study also has practical relevance. The finding that female combatants decrease fighting units' extent of civilian victimization adds to findings that policewomen and female peacekeepers are seen as more trustable and approachable than their male counterparts (Karim 2017, 2019) and has significant implications both for future research and for policy. If further studies in settings such as Afghanistan and Iraq or during peacekeeping operations could replicate the finding that fighting units with female participation have less hostile relations with civilian communities, both counterinsurgency and peacekeeping practitioners should consider making all-male units a thing of the past. This is the case even if future research corroborates the result that such units are less effective in combat as the success of these operations should ultimately rest on winning "hearts and minds", not fighting engagements (Galula 2006; Gizelis and Kosek 2005; Kalyvas 2006).

Female Combatants and Rebel Group Behaviour: Evidence from Nepal - Appendix

1. Previous quantitative microlevel studies of Civil War in Nepal and elsewhere

The Nepalese Civil War has previously been the subject of numerous quantitative microlevel studies. I shortly discuss these here to point to linkages to the present study but also to show differences. On one hand, some studies are concerned with the long-run effects of the civil war violence has had on Nepalese citizens' education, social capital and political trust (De Juan and Pierskalla 2016; Gilligan et al. 2014; Valente 2014). On the other hand and more closely related to this study, numerous studies use district-level data on the civil war to examine organized violence in a subnational setting. For instance, they study the effects of relative deprivation and horizontal inequalities on conflict onset and rebel recruitment (Deraniyagala 2005; Do and Iyer 2010; Macours 2011; Murshed and Gates 2005; Nepal et al. 2011), examine the link between agricultural subsistence patterns and the conflict (Joshi 2013; Joshi and Mason 2008, 2010), and how local geography affects conflict (Bohara et al. 2006; Do and Iyer 2010). All these studies have in common that they are cross-sectional. They only observe each district (or village in the case of Nepal et al. (2011)) once and thus cannot capture time dynamics. They are thus microlevel studies in the geographical sense but still use highly time-aggregated data. This also means that their results may be subject to numerous unobservable confounders such as local history or customs. Three more recent papers are more similar in spirit to the present study. Holtermann (2016) is explicitly interested in the time dynamics of the conflict when studying how rebel capacity affects the local onset of insurgent violence in a district using district-year observations and event history models. However, comparisons here still rely on variation between districts. Joshi and Quinn (2017) use the casualty census also underlying the data used in this study (Joshi and Pyakurel 2015) to examine how victims of government- and rebel-perpetrated violence differ. Most closely related is a recent paper stdying the effects of government attacks on violence against civilians using a panel of district-weeks (Holtermann 2019). This short survey thus indicates that the present study differs from most previous studies of the Nepalese Civil War in employing data that is both spatially and temporally highly disaggregated and a research design that makes use of this disaggregation to purge relevant unobservable confounders such as local histories and customs from the estimation. This is a relevant step in terms of reducing omitted variable bias and also makes this study compare favourably to related microlevel studies on other civil wars that use more aggregated designs (e.g. Humphreys and Weinstein 2006; Oppenheim and Weintraub 2017).

2. Data and summary statistics

Table A1 presents summary statistics of all variables used in the analysis. The left-hand panel in figure A1 presents a histogram of LER and indicates that the variable is strictly positive and right-skewed. I thus use its natural logarithm, presented in the right-hand panel in figure 1, as dependent variable in all models on military effectiveness.

Variable	Obs.	Mean	Standard Deviation	Min.	Max.
Maoist OSV	1,764	1.820	2.618	0	41
LER	990	1.299	1.332	0.063	13.6
LER (logged)	990	-.166	.942	-2.77	2.610
Female Combatants	1,450	.149	.197	0	1
Ratio: Female Combatants	1,043	1.156	.186	.75	2
Phase of War	1,764	.723	. 448	0	1
Ethnic Fractionalization	1,448	.252	.205	0	.735
Ratio: Ethnic Fract.	1,037	1.105	.222	.615	1.694
Age (Unit Mean)	1,444	25.294	5.270	12	50.75
Ratio: Age (Unit Mean)	1,036	.929	.219	.387	2.044
Child Soldiers	1,450	.126	.195	0	1
Ratio: Child Soldiers	1,043	1.114	.173	.667	2
Conflict Intensity	1,119	2.845	5.760	0	59
Maoist District Gov.	1,764	.278	.448	0	1
Population (logged)	1,764	12.440	.671	9.615	13.894
Government OSV	1,119	2.306	4.126	0	51.667
Ratio: Natives	1,043	1.396	.373	.5	2
Ratio: High School Grads.	1,043	.937	.306	.5	2
Maoist OSV in *z*	1,119	2.275	2.029	0	11.667
Maoist OSV in zone in *z*	1,119	11.036	7.486	.333	34
LER in *z*	1,302	-.069	.798	-2.639	2.302
LER in zone in *z*	1,119	2.165	1.269	.111	6.8
Female Combatants Dummy	1,450	.587	.493	0	1
Maoist Suicide Attacks	1,162	.309	.462	0	1

Table A1: Summary Statistics.

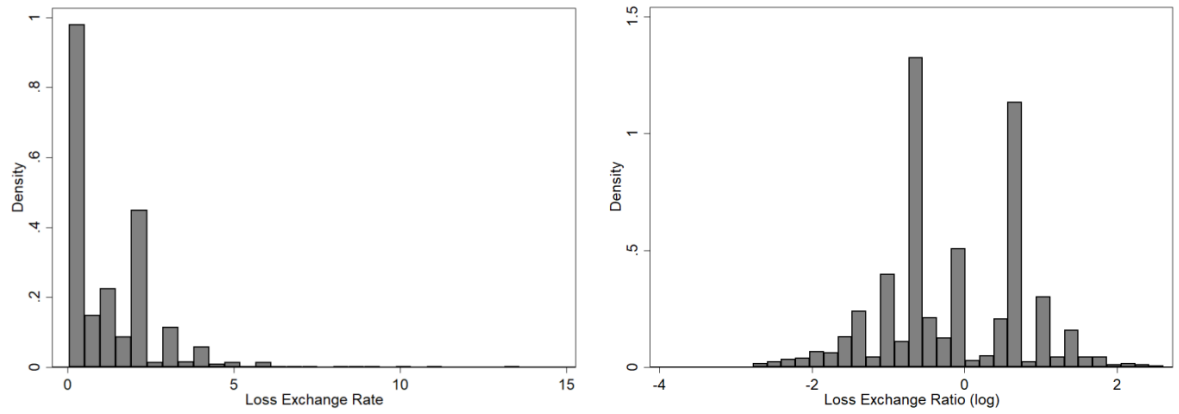


Figure A1: Histograms of Loss-Exchange Ratio before and after applying logarithmic transformation.

3. Robustness Checks

I ran a number of alternative specifications to examine the robustness of our findings. These address concerns that my findings are the result of bias due to omitted confounders, sample selection, multicollinearity, and estimator choice.

Results in tables A1 and A2 concern violence against civilians (OSV) while the dependent variable in tables A3 and A4 is military effectiveness as measured by the Loss Exchange Ratio. First, using lagged dependent variables with fixed effects can bias results (Nickell 1981), models A1 and A9 hence drop the average value of the dependent variable during the preceding period *z*. Second, my main specifications take into account temporal dependence but ignore correlations over space in the dependent variables. That is, I do not take into account that $y_{d,t}$ may be influenced by $y_{d-1,t}$. Models A2 and A9 include Maoist OSV and LER in a district's close neighbourhood, the administrative zone, averaged over the three quarter-years before the observation as controls.

Third, I account for change in military tactics from guerrilla to more conventional warfare in 2001 using a "Phase of War dummy" but idiosyncratic events that affect both female participation and the dependent variables may also have taken place in other years, e.g. temperature or precipitation deviations that affected agricultural employment. To account for this, models A3 and A11 also include year-fixed effects. Fourth, Allison (2009) suggests to use unconditional fixed effects-Negative Binomial models despite the incidental parameter problem, I hence re-estimate Model from the main analysis using such an estimator in model A4.

Dep. Var.: Maoist OSV	(1) No Maoist OSV in *z*	(2) Maoist OSV in zone in *z*	(3) Year-Fixed Effects	(4) Negative Binomial
Female Combatants (%)	-0.506	-0.565	-0.467	-0.468
	(0.060)	(0.029)	(0.053)	(0.024)
Phase of War	1.493	1.367		1.240
	(0.000)	(0.000)		(0.000)
Ethnic Fractionalization	0.599	0.297	0.337	0.338
	(0.027)	(0.253)	(0.195)	(0.107)
Age (Unit Mean)	0.010	-0.013	0.003	-0.008
	(0.864)	(0.814)	(0.958)	(0.873)
Age Square (Unit Mean)	-0.000	0.000	-0.000	-0.000
	(0.735)	(0.971)	(0.724)	(0.942)
Child Soldiers (%)	0.142	0.172	-0.032	0.099
	(0.640)	(0.565)	(0.905)	(0.692)
Conflict Intensity	-0.006	-0.011	-0.012	-0.014
	(0.290)	(0.028)	(0.005)	(0.019)
Maoist District Government	-1.425	-1.340	-0.886	-1.167
	(0.000)	(0.000)	(0.016)	(0.000)
Population (LN)	-1.433	-1.383		-0.999
	(0.194)	(0.169)		(0.319)
Government OSV	0.018	0.012	0.005	0.019
	(0.008)	(0.046)	(0.388)	(0.018)
Maoist OSV in *z*		0.048	0.070	0.085
		(0.075)	(0.000)	(0.000)
Maoist OSV in zone in *z*		0.013		
		(0.170)		
Constant			1.153	13.149
			(0.124)	(0.328)
District-Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,084	1,084	1,084	1,084

Table A2: Poisson Models. District-clustered standard errors, p-values in parentheses.

Fifth, Alakoc (2020) argues that women are effective suicide bombers. This suggests that the effect of female participation on a unit's military effectiveness may be moderated by its use of suicide attacks. In model A12, I thus interact female participation with a dummy that takes the value 1 if the Maoist unit has made use of suicide attacks in the three quarter-years preceding the observation. Sixth, a unit's mean age and its share of child soldiers should be strongly correlated, giving rise to concerns about multicollinearity. Models A5-6 and A13-14 thus replicate the main analysis while dropping one of them. Seventh, figure three suggests the existence of some outlier observations where the percentage of women among combatants was very high; these outliers may affect results. Models A7 and A15 thus drop observations in the top 5% of the main independent variable.

Dep. Var.: Maoist OSV	(5) No Child Soldiers	(6) No Mean Unit Age	(7) No Outliers	(8) Genetic Matching
Female Combatants (%)	-0.518	-0.497	-0.597	
	(0.043)	(0.054)	(0.051)	
Female Combatants (Dummy)				-0.257
				(0.010)
Phase of War	1.340	1.352	1.336	1.220
	(0.000)	(0.000)	(0.000)	(0.000)
Ethnic Fractionalization	0.363	0.364	0.352	0.532
	(0.140)	(0.128)	(0.160)	(0.142)
Age (Unit Mean)	-0.014		-0.008	-0.005
	(0.788)		(0.891)	(0.964)
Age Square (Unit Mean)	0.000		-0.000	0.000
	(0.971)		(0.941)	(0.978)
Child Soldiers (%)		0.232	0.134	-0.054
		(0.381)	(0.671)	(0.882)
Conflict Intensity	-0.012	-0.011	-0.011	-0.007
	(0.022)	(0.041)	(0.026)	(0.187)
Maoist District Government	-1.252	-1.242	-1.311	-1.153
	(0.000)	(0.000)	(0.000)	(0.000)
Population (LN)	-1.280	-1.284	-1.076	-2.980
	(0.189)	(0.208)	(0.266)	(0.037)
Government OSV	0.012	0.011	0.012	0.014
	(0.049)	(0.068)	(0.055)	(0.012)
Maoist OSV in *z*	0.075	0.074	0.074	0.065
	(0.000)	(0.000)	(0.000)	(0.004)
Constant				37.818
				(0.036)
District-Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,084	1,087	1,047	1,469

Table A3: Poisson Models. District-clustered standard errors, p-values in parentheses.

Eight, observations with more and less female combatants may differ from each other to the extent that there is a lack of common support between the groups. To tackle this sample imbalance, I create a dummy indicating whether a unit included *any* female combatants and then pre-process the data using genetic matching (Diamond and Sekhon 2013). Results using matched samples are presented in models A8 and A16.

And finally, fighting units' behaviour towards civilians and their military effectiveness may be non-independent processes, leading me to allow for correlated errors between the two models through seemingly unrelated estimation in A17.

Dep. Var.: LER (log)	(9) No LER in *z*	(10) LER in zone in *z*	(11) Year-Fixed Effects	(12) Suicide Attacks
Female Combatants (%)*	0.509	0.533	0.494	0.512
	(0.049)	(0.039)	(0.052)	(0.091)
Maoist Suicide Attacks				-0.157
				(0.825)
FC(%)* x Maoist Suicide Attacks				0.126
				(0.831)
Phase of War	-0.124	-0.109		-0.065
	(0.470)	(0.547)		(0.711)
Ethnic Fractionalization*	-0.187	-0.131	-0.109	-0.111
	(0.405)	(0.576)	(0.650)	(0.637)
Age (Unit Mean)*	0.822	0.829	0.874	0.914
	(0.469)	(0.469)	(0.480)	(0.429)
Age Square (Unit Mean)*	-0.336	-0.350	-0.383	-0.389
	(0.542)	(0.530)	(0.532)	(0.492)
Child Soldiers (%)*	-0.431	-0.443	-0.361	-0.469
	(0.172)	(0.160)	(0.234)	(0.150)
Conflict Intensity	-0.001	-0.001	0.003	0.001
	(0.916)	(0.905)	(0.691)	(0.931)
Maoist District Government	0.516	0.528	0.539	0.511
	(0.058)	(0.047)	(0.163)	(0.055)
Population (LN)	2.087	2.159	2.051	2.099
	(0.091)	(0.096)	(0.682)	(0.105)
High School Graduates*	-0.119	-0.072	-0.072	-0.094
	(0.490)	(0.683)	(0.678)	(0.596)
Natives*	-0.106	-0.132	-0.152	-0.150
	(0.472)	(0.386)	(0.299)	(0.319)
LER in *z*		-0.101	-0.145	-0.104
		(0.060)	(0.011)	(0.063)
LER in zone in *z*		0.042		
		(0.349)		
Constant	-26.597	-27.721	-26.429	-26.869
	(0.086)	(0.087)	(0.675)	(0.097)
District-Fixed Effects	Yes	Yes	Yes	Yes
Observations	594	594	591	594

Table A4: Ordinary Least Squares. District-clustered standard errors, p-values in parentheses. Variables marked with a * are included as ratios between Maoists' and Security Forces' values.

The results of these tests are in line with those presented in the main analysis. As an exception, it may be noted that the effect of female participation on fighting effectiveness does not reach conventional levels of statistical significance when possible outlier observations are excluded. However, the estimated effect of the variable is very much in line with the other models while it estimated less precisely.

Dep. Var.: LER (log)	(13) No Child Soldiers	(14) No Mean Unit Age	(15) No Outliers	(16) Genetic Matching
Female Combatants (%)*	0.490	0.498	0.461	
	(0.056)	(0.055)	(0.163)	
Female Combatants (Dummy)				0.376
				(0.097)
Phase of War	-0.070	-0.061	-0.058	-0.399
	(0.690)	(0.736)	(0.753)	(0.167)
Ethnic Fractionalization*	-0.089	-0.123	-0.062	0.297
	(0.705)	(0.594)	(0.796)	(0.427)
Age (Unit Mean)*	1.320		0.966	-1.043
	(0.243)		(0.418)	(0.665)
Age Square (Unit Mean)*	-0.537		-0.425	0.462
	(0.333)		(0.459)	(0.666)
Child Soldiers (%)*		-0.549	-0.386	-0.769
		(0.072)	(0.268)	(0.040)
Conflict Intensity	0.001	0.001	0.002	-0.009
	(0.864)	(0.899)	(0.711)	(0.245)
Maoist District Government	0.584	0.481	0.445	0.680
	(0.034)	(0.085)	(0.137)	(0.030)
Population (LN)	1.687	1.966	2.507	2.754
	(0.187)	(0.137)	(0.084)	(0.006)
High School Graduates*	-0.068	-0.092	-0.177	-0.492
	(0.691)	(0.590)	(0.328)	(0.049)
Natives*	-0.157	-0.129	-0.100	0.068
	(0.310)	(0.381)	(0.523)	(0.744)
LER in *z*	-0.096	-0.097	-0.102	-0.107
	(0.084)	(0.067)	(0.052)	(0.253)
Constant	-22.478	-24.595	-32.101	-33.271
	(0.160)	(0.134)	(0.077)	(0.010)
District-Fixed Effects	Yes	Yes	Yes	Yes
Observations	594	596	576	874

Table A5: Ordinary Least Squares. District-clustered standard errors, p-values in parentheses. Variables marked with a * are included as ratios between Maoists' and Security Forces' values.

Seemingly unrelated Estimation, Dep. Var.:	(17a) Maoist OSV	(17b) LER (log)
Female Combatants (%)*	-0.531	0.539
	(0.039)	(0.033)
Phase of War	1.347	-0.069
	(0.000)	(0.688)
Ethnic Fractionalization*	0.361	-0.114
	(0.145)	(0.620)
Age (Unit Mean)*	-0.004	0.916
	(0.943)	(0.421)
Age Square (Unit Mean)*	-0.000	-0.390
	(0.897)	(0.484)
Child Soldiers (%)*	0.139	-0.465
	(0.633)	(0.138)
Conflict Intensity	-0.011	0.001
	(0.024)	(0.926)
Maoist District Government	-1.241	0.509
	(0.000)	(0.053)
Population (LN)	-1.348	2.106
	(0.186)	(0.095)
Government OSV	0.012	
	(0.060)	
High School Graduates*		-0.095
		(0.585)
Natives*		-0.147
		(0.324)
Dependent Variable in *z*	0.075	-0.102
	(0.000)	(0.052)
Constant	17.736	-29.442
	(0.198)	(0.081)
District-Fixed Effects	Yes	
Observations	1,084	

Table A6: Model 1: Poisson, Model 2: OLS. District-clustered standard errors, p-values in parentheses. Variables marked with a * are included as the Maoists' values in Model 1 and as ratios between Maoists' and Security Forces' values in Model 2.

Chapter III - Female Combatants and Wartime Rape: Reconsidering the Role of Women in Armed Conflict

1. Introduction

Recent research has begun to consider the structural and strategic determinants of women participating as fighters in armed intrastate conflict (Henshaw 2016; Thomas and Bond 2015; Thomas and Wood 2018; Wood and Thomas 2017). At the same time, studies begin to examine the effects such participation has on the dynamics of armed conflict. Most prominently[32], Meredith Loken (2017) presents evidence that contrary to qualitative studies and common expectations (Wood 2006, 2009), female combatants do not decrease the prevalence of war-time rape. She argues instead that armed groups' violence is driven by organizational features such as military culture and that individuals conform to this culture irrespective of their personal identities.

This article presents a replication and extension of Loken's statistical analysis. It begins by conducting a close replication of her results and uncovers two statistical issues with the analysis. First, the main independent variable as well as three control variables are included as continuous items even though all of them are categorical and two, *ethnic war* and *conflict aim*, also exhibit no clear rank-ordering. Second, the analysis includes a continuous variable indicating the calendar-year of the observation. This imposes the strong assumption on the data that the baseline hazard of wartime rape monotonically increases, decreases or stays constant over time. However, neither theory nor the data support this assumption. Addressing these two issues, both separately and together, results in female rebel combatants having a negative and statistically significant effect on wartime rape.

In an extension, I link this result back to Loken's organizational theory of wartime rape by testing whether the effect of female combatants is conditional on the group environment they operate in. In line with expectations derived from Loken's arguments, the effect is not moderated by the strength of central command rebel groups have but instead by their norms pertaining to gender. Group norms thus determine to whether women participating in rebel movements can affect their behaviour and hence decrease the extent of rape or whether they even participate in gang rapes in order to fit in and not be victimised themselves. This conditional finding connects the results of this note to studies documenting female rebel's

[32] In addition to Loken, see (Braithwaite and Ruiz 2018; Wood 2019). Out of these studies, Loken has been cited most often and has received attention outside of political science (e.g. McDermott, 2020).

participation in rape and suggests that combatant and organizational characteristics interact in driving rebels' level of rape.

The next section presents a short discussion of Loken's argument, replicates the analysis and addresses the statistical issues therein, finding that female rebel combatants are associated with less wartime rape. Section three extends the analysis to taking organizational features into account and section four concludes by discussing the implications of these findings.

2. Replication: Female Rebels and Wartime Rape

Loken provides the first quantitative test of the conjecture that female combatants decrease armed groups' wartime rape. This theoretical conjecture rests on four mechanisms, namely that female combatants are more peaceful than their male counterparts because they are women; that they are (willing or unwilling) sexual partners for male combatants, thus substituting for civilian women; that the armed groups they participate in have more feminist, anti-rape goals; and that their presence changes group socialization practices to become less misogynistic and hence less supportive of sexual violence (Loken 2017; Wood 2009). Finding no statistically significant effect of female combatants on wartime rape, Loken then contends that this is the case because "organizational cultures of militaries are often replete with hypermasculine and misogynistic norms" and "women are subject to the same organizational dogmatism as the men" (2017: 83). In other words, she argues that organizational, not individual factors drive wartime rape as group members are socialized into a group top-down, leading to a null effect of combatant attributes such as gender. Notably, she suggests that this should be the case irrespective of rebels groups' strength of command because the pervasiveness of their misogynistic norms (2017: 83-84).

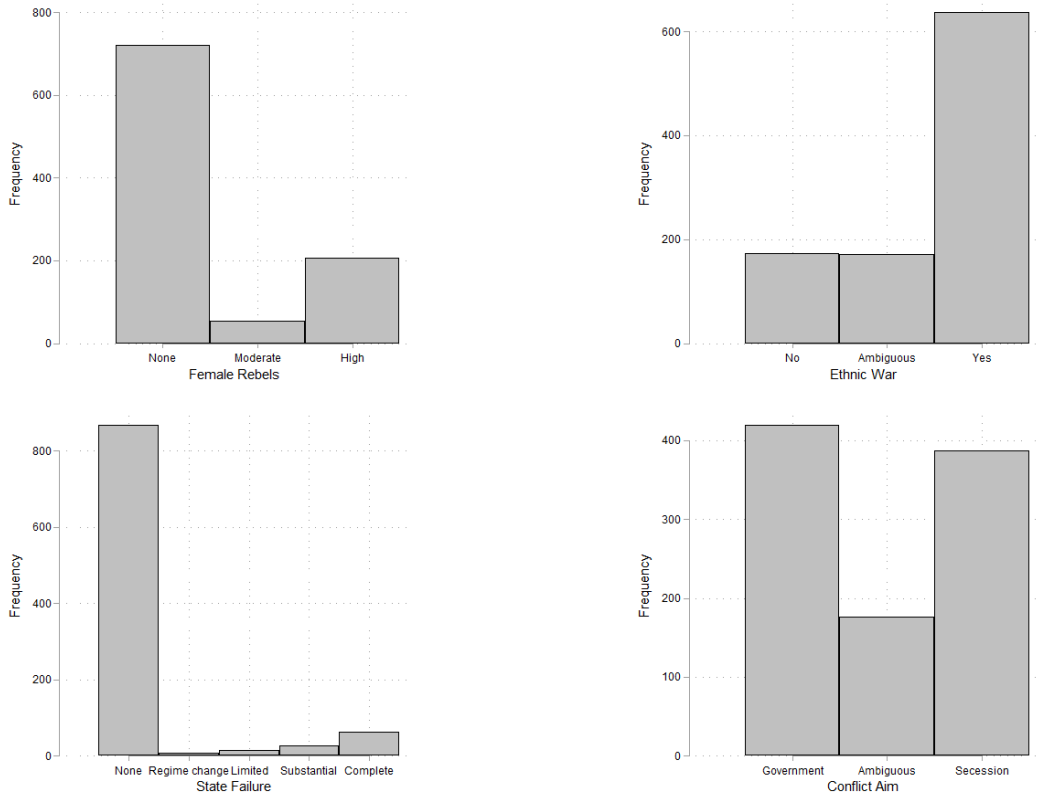
To re-examine this expectation, this note revisits Loken's article, uses its replication dataset, and starts by reconstructing its reported findings[33]. This dataset includes 983 conflict-year observations from 86 individual intrastate conflicts over the period 1980-2009 and is described in more detail in Loken. In line with Loken, the dependent variable, rebel *wartime rape*, is measured using an ordered categorical item that indicates how intensely rebels used rape in a given year; ordered probit models are accordingly used to analyse it and standard errors are clustered on the conflict to account for within-conflict interdepencies. The main independent variable is an item measuring whether the rebel combatants in a conflict included women; it is time-invariant and collected by Loken. Finally, the replication begins with

[33] The replication dataset is available from Loken's website. This is a corrected dataset as some errors were found in the one used in the original article. The results reported here should hence also be compared to those reported in the corresponding correction (Loken n.d.).

including all controls as done in Loken, these are *Ethnic war*, S*tate failure*, *Conflict aim*, *Genocide*, *Abduction*, *Forced recruitment*, *Drugs*, *Female labour force participation*, *Polity*, *Fertility rate*, *Duration*, *Population (log)*, and *Year*.

Model 1 in table five presents the resulting close replication of Loken's model on rebel female combatants and wartime rape. The results are in line, if not identical, with the original analysis in that the presence of female combatants has a negative effect on wartime rape which, however, is not statistically significant. Instead, a number of control variables are identified as significant predictors of rape including S*tate failure* and *Conflict aim*. These results mirror those in Loken as well as in (Cohen 2013a), upon which Loken's analysis is based to a large degree. However, a closer inspection reveals that both variables, as well as *Female rebels* and *Ethnic war*, are categorical; their categories and distribution are presented in figure four[34].

Figure 4: Categorical independent variables



Note: Histograms of *Female rebels*, *Ethnic war*, S*tate failure*, and *Conflict aim*.

Both Loken and Cohen include these variables as continuous items in their analysis. By including *Female rebels*, S*tate failure*, *Ethnic War* and *Conflict aim* in a continuous manner, both studies assume that changes in these variables are monotonic and proportional. In other

[34] See also the appendix of Cohen (2013a) for a detailed description of these variables. However, note that Cohen's main results, pertaining to abduction and forced recruitment, are reproduced here.

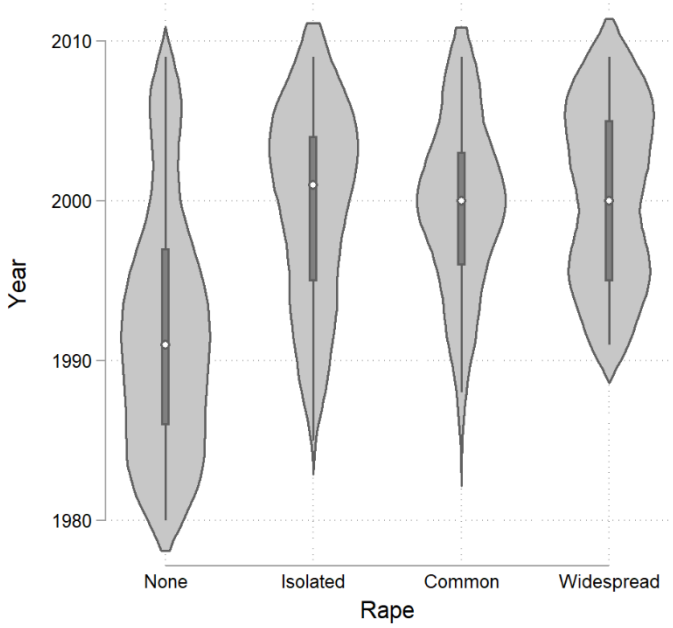
words, they assume that e.g. a one-unit change from a Conflict over government to a Conflict where rebels have ambiguous goals has the same effect on rape as a one-unit change from such an ambiguous conflict to one where rebels are fighting for secession. This monotonicity and proportionality of effects is similarly assumed for the difference between non-ethnic and ambiguous conflicts and ambiguous and ethnic conflicts as well as the categories of *Female rebels* and S*tate failure*. While there may be theoretical reasons to make these assumptions, these are spelled out in neither Cohen nor Loken. Including the four variables as continuous items may thus give rise to bias through functional form misspecification, assuming a linear relationship between categories where there is none (Wooldridge, 2013: 294).

Models 2-5 in table five thus one-by-one separate these items into factor variables instead, i.e. include a dummy for each but their respective lowest category which is accordingly taken as baseline (Wooldridge, 2013: 228). The results support scepticism over the variables' linear inclusion as none appears to have a linear effect on wartime rape; instead, category one of the S*tate failure, regime change,* is found to decrease the probability of rebels engaging in rape as compared to no state failure while complete collapse has a positive effect. Similarly, rebels fighting over government appear somewhat less likely to rape than rebels with ambiguous aims but more likely than secessionist rebels. Notably, model 5 also indicates that the presence of female rebels decreases wartime rape. Both groups with moderate and high numbers of women are found to be less likely to engage in higher levels of rape once the assumption that *conflict aim* has a monotonic and proportional effect on rape is relaxed. In line with the original study, this effect is thus found to be negative but here it is also statistically distinguishable from zero.

Models 2-5 follows the original analysis in Loken and Cohen by including a variable *Year* to "capture whether time is a significant factor, either because measurement is improving over time or wartime rape is getting worse" (Cohen 2013: 469). More specifically, this variable indicates in which year a given observation took place and it enters the model as an continuous item in both (Cohen 2013a) and Loken. As with the previously discussed continuous treatment of categorical variables, this implies a strong assumption in terms of functional form. Including *Year* in a linear fashion only allows for a baseline hazard of rape that is either constant or monotonically increases or decreases. In this case, Cohen argues that this may be the case "either because measurement is improving over time or wartime rape is getting worse" (2013: 469). However, while the measurement of rape may improve over time, the same should be the case for the main independent variable of interest, *Female combatants*. And the available data also does not suggest that rape has gotten monotonically worse or more prevalent over time. Figure five graphs *Year* against *Wartime Rape*, showing that while earlier observations are more

likely to have no reported acts of rape, there is little difference in the temporal distribution of categories 1-3 of *Wartime Rape*. There is thus little clear evidence to support the strong assumption made by including *Year* as a linear time trend.

Figure 5: *Wartime Rape* and *Year*



Note: Grey areas represent probability density, spikes denote adjacent values, boxes indicate interquartile ranges, and white dots give the medians.

This is especially the case as there are other available methods of taking time trends into account which allow a more flexible baseline hazard. Accordingly, model 6 uses year splines[35] instead of the linear year variable, allowing the baseline hazard of rape to non-linearly vary with time. In line with model 5, the effect of female combatants on rebel groups' level of rape is again negative and statistically significant in model 6[36].

[35] These are restricted cubic splines with five knots, placed at the 5th, 27.5th, 50th, 72.5th, and 95th percentiles (Harrell 2015). Results remain substantively identical if alternative knot numbers are used.

[36] In the appendix, model 6 is also replicated using year-fixed effects and results are substantively identical. *Female rebels* also achieves statistical significance when using year-fixed effects while including all categorical variables in a linear fashion.

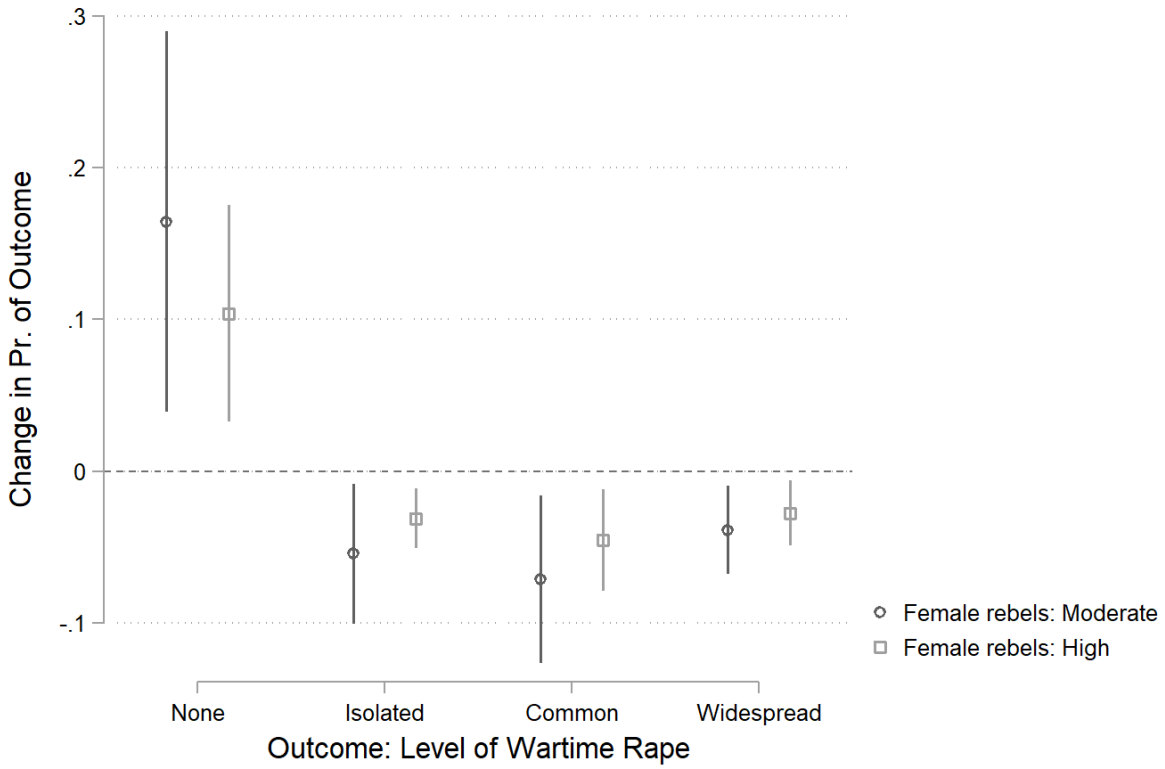
Table 5: Female Rebels and Rape

Dependent Variable: Rape	(1) Replication	(2) Categorical Vars.	(3) Categorical Vars.	(4) Categorical Vars.	(5) Categorical Vars.	(6) Year Splines
Female rebels	-0.204					
	(-1.599)					
Female rebels: moderate		-0.288	-0.422	-0.461	-1.115*	-0.992*
		(-0.672)	(-0.922)	(-0.986)	(-1.933)	(-1.671)
Female rebels: high		-0.403	-0.436	-0.434	-0.578**	-0.562**
		(-1.579)	(-1.637)	(-1.639)	(-2.329)	(-2.230)
Ethnic war	0.182	0.182				
	(1.049)	(1.047)				
Ethnic war: Ambiguous			0.365	0.324	0.504	0.488
			(1.066)	(0.932)	(1.523)	(1.398)
Ethnic war: Yes			0.406	0.356	0.421	0.452
			(1.115)	(0.953)	(1.286)	(1.361)
State failure	0.235***	0.235***	0.226***			
	(2.927)	(2.923)	(2.738)			
Regime change				-4.954***	-4.993***	-4.916***
				(-14.719)	(-14.591)	(-17.763)
Limited failure				-0.336	-0.384	-0.405
				(-1.100)	(-1.267)	(-1.347)
Substantial failure				0.362	0.258	0.299
				(1.044)	(0.830)	(0.968)
Complete Collapse				1.110***	1.000**	1.007**
				(3.092)	(2.455)	(2.369)
Conflict aim	-0.281**	-0.281**	-0.284**	-0.276**		
	(-2.090)	(-2.086)	(-2.087)	(-1.982)		
Aim: Ambiguous					0.434	0.384
					(1.564)	(1.350)
Aim: Secession					-0.776***	-0.792***
					(-2.680)	(-2.770)
Genocide	-0.763**	-0.779**	-0.752**	-0.704*	-0.629*	-0.625*
	(-2.406)	(-2.220)	(-2.138)	(-1.958)	(-1.768)	(-1.742)
Abduction	0.676***	0.674***	0.663***	0.654***	0.663***	0.649***
	(3.044)	(3.031)	(2.938)	(3.109)	(3.035)	(2.992)
Forced recruitment	0.255	0.254	0.286	0.289	0.258	0.267
	(0.948)	(0.949)	(1.053)	(1.060)	(0.980)	(1.001)
Drugs	0.816***	0.825***	0.814***	0.822***	0.974***	0.940***
	(3.675)	(3.544)	(3.537)	(3.482)	(3.910)	(3.746)
Fem. labour force part.	0.003	0.003	0.003	0.004	0.009	0.008
	(0.482)	(0.506)	(0.512)	(0.607)	(1.510)	(1.309)
Polity	-0.016	-0.018	-0.016	-0.021	-0.017	-0.016
	(-1.113)	(-1.077)	(-0.908)	(-1.220)	(-0.962)	(-0.909)
Fertility rate	0.031	0.028	0.017	0.025	-0.026	-0.025
	(0.356)	(0.318)	(0.184)	(0.276)	(-0.274)	(-0.257)
Duration	-0.009	-0.008	-0.008	-0.009	-0.018	-0.017
	(-0.919)	(-0.730)	(-0.718)	(-0.752)	(-1.373)	(-1.290)
Population (log)	0.061	0.061	0.061	0.082	0.130	0.129
	(0.797)	(0.792)	(0.794)	(1.040)	(1.640)	(1.621)
Observations	867	867	867	867	867	867
Time Trend	Year Variable	Year Variable	Year Variable	Year Variable	Year Variable	Year Splines

Note: Constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

To get a more substantive understanding of this negative effect, figure six presents how the probability of each of the outcome values of *Wartime Rape* changes with the presence of female rebel combatants in model 6, the model including all corrections. Here, two effects of female rebels, for *moderate* and for *high* numbers, are shown. However, the confidence intervals of these variables almost completely overlap for all outcome categories, suggesting that while organizations that include no women behave differently from both, there is little difference between them[37]. In terms of their substantive effects, figure six indicates that groups including women as combatants are 10.4-16.4 percentage points more likely to engage in no rape at all. In contrast, the presence of female combatants decreases the probability that rebels engage in sporadic, widespread or systematic rape by 2.8-7.1 percentage points. All these effects are also statistically distinguishable from zero, suggesting that female combatants have a statistically and substantively significant effect on the use of rape by rebel organizations.

Figure 6: *Female Rebels* and *Wartime Rape*



Note: Figure presents the marginal effect of switching Female Combatants from zero to either moderate or high levels on each of the outcome values of *Wartime Rape* based on model 6. Dots give point estimates while whiskers represent 90%-CIs.

[37] As presented in figure four, there are few observations in the moderate category, all of which come from Myanmar (30), Guatemala (17), and Nicaragua (8). This lack of a difference is reassuring as it implies that the decision to include a middle category for three conflicts does not drive results.

In the appendix, I show that this result also holds up when accounting for time dependence *within* and possible heterogeneity *across units*, including year-fixed effects, using matching or a multinomial logit model, and when restricting the sample to a pure cross-section of conflicts.

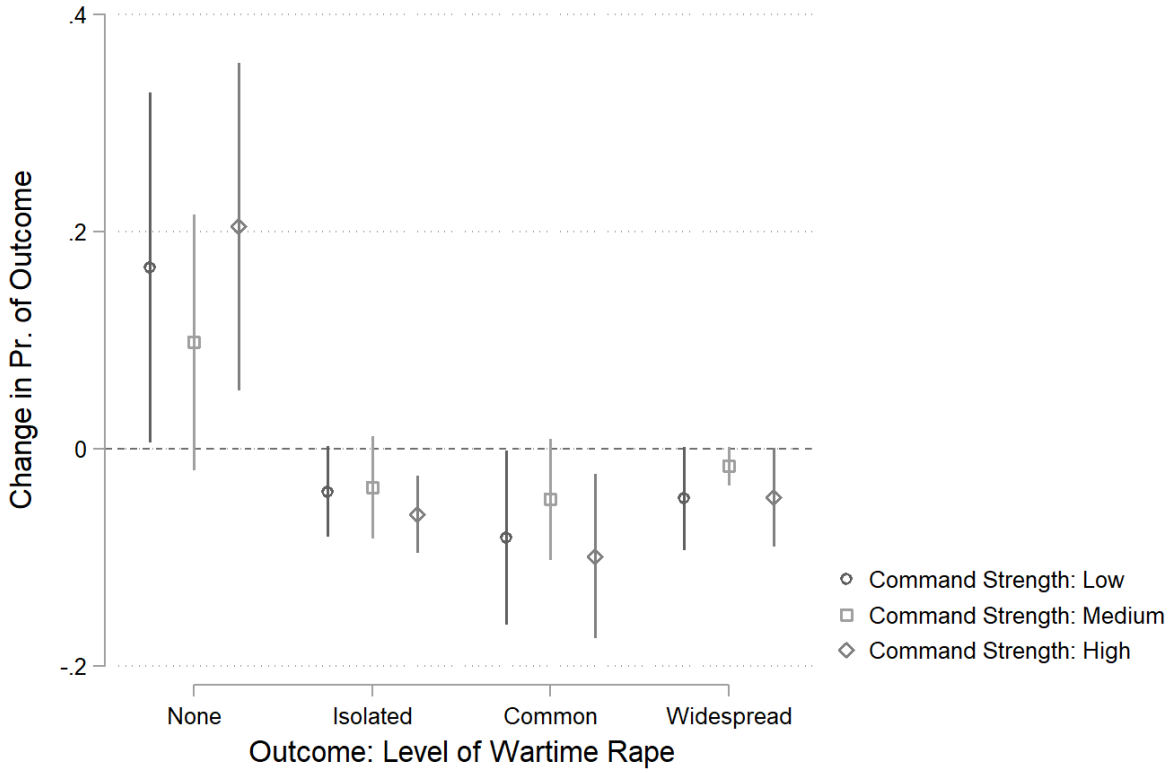
3. Extension: Female Rebels, Organizational Features, and Wartime Rape

In summary, these results do not support the argument that female combatants do not decrease rape. In other words, individual combatants being women affects group behaviour which in turn is not completely determined by organizational features. However, the effect of individual combatant attributes such as gender may still depend on the organizational context in which these individuals operate. This section thus links the effect of female combatants on rape back to two factors that play a prominent role in Loken's organizational role of wartime rape, rebel groups' strength of command and their misogynistic norms. Loken argues that misogynistic norms in rebel groups are so strong that their effect is pervasive and that central command's level of authority hardly matters. As a result, the latter should have little effect on whether female combatants can deviate from group orders regarding rape. In contrast, it should be the nature of group *norms* that determines to what extent women participating in rebel movements can affect their behaviour and hence the extent of rape. Where these norms are especially misogynistic, female rebels may participate in gang rapes in order to fit in and not become victims themselves (Cohen 2013b). Whereas if norms are less misogynistic, they may use this as an opportunity to challenge group behaviour and strive for more gender equality; both within and outside the group. Given Loken's organizational theory of wartime rape, it should thus be expected that the effect of female combatants on rape is not moderated by rebels' strength of command but instead by their gender norms.

This section extends Loken's analysis by testing the effect of female rebels on rape conditional on rebel group command strength and norms. To measure the former, I employ an ordinal variable *Command Strength* which is taken from the Non-State Actor Data, version 3.4 (Cunningham et al. 2013). Measuring group norms is less straight-forward as they are unobservable, I use a dummy indicating whether rebels include *female commanders* in their leadership as a proxy (Henshaw et al. 2019). Group commanders should have a clear influence on group norms as they are in a position to directly institute them through training and threats as well as sanction their breaches as they seek to direct the use of violence (Hoover Green, 2016; Wood, 2018). If commanders are women, norms should be somewhat less misogynistic as a result. At the same time, women being in commanding positions can already be viewed as a signal that group norms are not very misogynistic given that their presence implies male rank-and-file being subordinate to and having to follow the orders of women. For instance, the

Kurdish forces in Syria include numerous women among their commanders and have been documented to exhibit gender-equal group norms as well as policies that explicitly guarantee women's rights (Szekely 2019). I thus replicate model 6 while respectively adding the *command strength* and *female commanders* items and interacting them with *female rebels*.

Figure 7: *Female Rebels*, *Command Strength*, and *Wartime Rape*



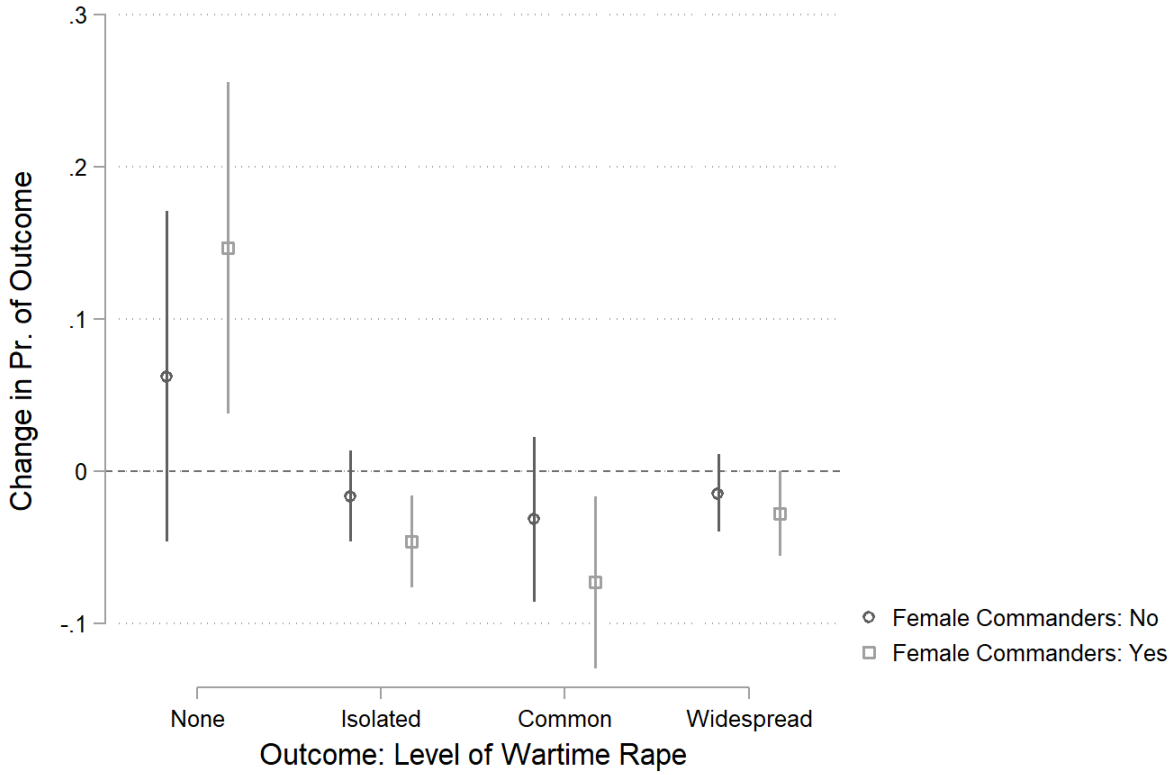
Note: Figure presents the marginal effect of switching Female Combatants from zero to one on each of the outcome values of *Wartime Rape* based on appendix model A12. Dots give point estimates while whiskers represent 90%-CIs.

Given that the middle category of *female rebels* consists of observations from only three conflicts, I binarize this measure; substantive results however remain unchanged when using the original, ordinal version. The substantive results of these extended models are presented in figures seven and eight[38]. In line with Loken's claims, figure seven presents no clear evidence that group command strength moderates the effect of female combatants on rape. Their presence is found to make the non-occurrence of rape 20 percentage points more likely in groups with a strong central command, but also 16 percentage points more likely in groups where central command is weak. Similarly, the probability of rape being common is decreased by 8.2 percentage points when women fight for a group and its central command is weak whereas that decrease is 9.9 percentage points if the group has a strong central command instead. All these

[38] A full results table is presented in the appendix.

effects are also statistically distinguishable from zero, suggesting that female combatants decrease wartime rape both in groups with low and high levels of central command strength.

Figure 8: *Female Rebels, Female Commanders,* and *Wartime Rape*



Note: Figure presents the marginal effect of switching Female Combatants from zero to one on each of the outcome values of *Wartime Rape* based on appendix model A13. Dots give point estimates while whiskers represent 90%-CIs.

In contrast, figure eight suggests that group's gender norms, as proxied by having women in leadership positions, moderate the effect of female combatants on wartime rape. Where women have access to commanding positions, female combatants are found to decrease the probability of rape by 14.7 percentage points, where they are not this effect decreases to 6.2 percentage points and is statistically insignificant. Similarly, female combatants decrease the probability of groups with women in leadership positions engaging in isolated or common levels of wartime rape by 4.6 and 7.3 percentage points; they again are found to have no statistically significant effect when there are no women in the group leadership and hence more misogynistic group norms. These results thus provide suggestive evidence in support of Loken's argument that group culture matters as misogynistic norms prove so pervasive as to erase any rape-decreasing effect female combatants might otherwise have. In contrast, less misogynistic norms provide space to women to affect group behaviour and hence decrease ape levels. This suggests that the overall finding that female combatants are associated with a

decrease in rape is mainly driven by groups which are not extremely misogynistic. At the same time, this conditional effect also provides an important linkage from this overall finding to qualitative studies documenting women's participation in gang rapes as members of highly misogynistic groups (Cohen 2013b).

Taken together, these results suggest that the null effect of female rebel combatants on the wartime use of rape, as found by Loken, can be attributed to the strong functional form assumptions imposed on some of the control variables by having them enter the model in a linear fashion. Once one relaxes these assumptions by including categorical items such as *conflict aim* as factor variables and allowing a non-monotonic baseline hazard of rape, the evidence presented here supports the idea that female rebel combatants decrease conflict-related sexual violence. However, further analyses also provide support for Loken's organizational theory of wartime rape as the effect of female combatants is moderated by group norms relating to gender. Female rebels are only associated with a lower probability of rape in organizations where norms afford them the space to affect group behaviour; whereas there is no such effect on rape when group norms are misogynistic and female combatants participate in rape to fit in.

4. Conclusion

This article reconsidered the effect of female rebel combatants on wartime rape, finding support for the notion that rebel groups which include women as fighters are less prone to commit acts of conflict-related sexual violence than strictly male groups. This conclusion differs from Loken's and this article shows that this is due to strong and problematic assumptions in the specification of her analysis. In short, all independent variables enter the model in a continuous fashion there, including categorical ones with more than two outcome categories and a variable indicating the year of the observation, thus restricting their effect on wartime rape to be linear. However, there is little theoretical and empirical support for the assumptions that rape increases linearly from rebel groups who fight over government to groups that have ambiguous goals to groups who aim to achieve secession or that the baseline hazard of rape is either flat or monotonically changing with time; the analysis in this article thus replicates Loken's models while allowing the effects of multi-categorical variables and of time to be nonlinear. Results provide support for the idea that female rebel combatants decrease wartime rape. However, the results of an extension of Loken's analysis provide support for her organizational theory of rape as the effect of female combatants on rape is driven by groups without misogynistic gender norms. In sum, my findings suggest that individual combatant and group attributes interact in shaping rebel organizations' level of rape.

First and foremost, this research thus adds to the literature on the drivers and effects of female participation in rebel groups. Future studies should seek to examine this phenomenon further by e.g. seeking micro-level data on the participation of women in rebel fighting units and how it affects these units' behaviour as compared to homogeneously male units. More generally, this research should also serve as a reminder that assumptions over the functional form of an effect matter. It illustrates that including multi-categorical variables in a linear fashion can severely change the results one obtains, especially if these variables are not rank-ordered. At the same time, it serves as another reminder that it not only matters *whether* potential effects of time are accounted for but also *how* this is done. As shown prominently in the context of binary dependent variables, it can only be the first step to realize that one needs to account for time dependence, the second step should be to do so in a flexible manner that imposes no strong, unintended functional form assumptions (Carter and Signorino 2010). The results on the relationship between female combatants and wartime rape presented here serve as an example for the effect that such assumptions can have on substantive conclusions.

Female Combatants and Wartime Rape: Reconsidering the Role of Women in Armed Conflict - Appendix

In this appendix, I provide a series of additional analyses that complement and further support the main article's findings. These include the following models based on the replication analysis.

A.1. Ordered probit model with **year-fixed effects.**
A.2. Ordered probit model with **time-since-event controls.**
A.3. Ordered probit model with **binary measure of female rebels.**
A.4. Ordered probit model with **binary measure of female rebels and a matched sample**.
A.5. **Random Effects** ordered probit model.
A.6. **Random Effects** ordered probit model with **year splines**.
A.7. Ordered probit model with year splines, **three knots**.
A.8. Ordered probit model with year splines, **four knots**.
A.9. Ordered probit model with year splines, **six knots**.
A.10. Ordered probit model with year splines, **seven knots**.
A.11. Multinomial logit model.
A.24. **Cross-sectional** ordered probit model.

I show that the results from the main model also holds up in a variety of further specifications. Most relevantly, the rape-decreasing effect of female rebel combatants still holds once time dependence *within units* and possible heterogeneity *across units* are taken into account, respectively via including cubic polynomials of time (Carter and Signorino 2010) and employing random-effects ordered probit models. It also holds when using year-fixed effects instead of splines, when binarizing the main independent variable to *female rebels* by merging the *moderate* and *high* categories or when using a multinomial logit model instead of the ordered probits, thus allowing the effects of the independent variables to vary across outcome categories. Given that the *Female rebels* item is time-invariant, I also show that its statistically significant negative effect persists in a cross-section of conflicts. Finally, I use Coarsened Exact Matching (Iacus et al. 2012) to reduce sample imbalance; imbalance tests suggest that matching resulted in a moderate improvement of balance between observations with and without *female rebels* and results remain substantively unchanged.
Following these models, the appendix also includes the following models for the extensions.

A.12. Command Strength**: Main model,** ordered probit models with year splines.
A.13. Group Norms**: Main model,** ordered probit models with year splines.
A.14. Command Strength: Ordered probit model with **year-fixed effects.**
A.15. Command Strength: Ordered probit model with **time-since-event controls.**
A.16. Command Strength: **Random Effects** ordered probit model.
A.17. Command Strength: **Random Effects** ordered probit model with **year splines**.
A.18. Command Strength: **Multinomial logit model**.
A.19. Group Norms: Ordered probit model with **year-fixed effects.**
A.20. Group Norms: Ordered probit model with **time-since-event controls.**
A.21. Group Norms: **Random Effects** ordered probit model.
A.22. Group Norms: **Random Effects** ordered probit model with **year splines**.
A.23. Group Norms: **Multinomial logit model**.
A.25. Command Strength: **Cross-sectional** ordered probit model.
A.26. Command Strength: **Cross-sectional** ordered probit model.

Dependent Variable: Rape	(1) Year-fixed effects	(2) Time since event	(3) Binary	(4) Binary, Matched	(5) Random Effects	(6) Random Effects
Female rebels: moderate	-1.060*	-1.272**			-4.482**	-0.995
	(-1.694)	(-2.265)			(-2.477)	(-1.117)
Female rebels: high	-0.599**	-0.534**			-1.208*	-0.941**
	(-2.304)	(-2.328)			(-1.816)	(-1.979)
Female rebels: Yes			-0.585**	-4.994***		
			(-2.287)	(-3.688)		
Ethnic war: Ambiguous	0.510	0.837**	0.407		2.146**	0.735
	(1.422)	(2.520)	(1.246)		(2.331)	(1.314)
Ethnic war: Yes	0.460	0.620**	0.433		0.637	0.402
	(1.366)	(2.076)	(1.324)		(0.671)	(0.770)
Regime change	-5.408***	-4.063***	-4.867***		-5.558***	-5.919***
	(-19.009)	(-15.643)	(-17.814)		(-21.690)	(-28.916)
Limited failure	-0.209	-0.289	-0.387		-0.758	-0.663
	(-0.694)	(-0.829)	(-1.308)		(-1.293)	(-1.332)
Substantial failure	0.342	0.631**	0.307		0.370	0.256
	(1.081)	(2.477)	(0.966)		(0.778)	(0.591)
Complete Collapse	1.005**	0.839**	1.017**		0.739	0.751
	(2.305)	(2.335)	(2.374)		(1.278)	(1.310)
Aim: Ambiguous	0.384	0.088	0.337		-0.038	0.706
	(1.339)	(0.380)	(1.158)		(-0.042)	(1.335)
Aim: Secession	-0.818***	-0.757***	-0.782***	-0.523*	-1.601*	-0.935*
	(-2.849)	(-2.620)	(-2.778)	(-1.927)	(-1.778)	(-1.787)
Genocide	-0.709*	-1.131***	-0.586*		-1.212**	-0.904**
	(-1.929)	(-3.638)	(-1.718)		(-2.395)	(-2.213)
Abduction	0.708***	0.989***	0.666***	0.883	0.622***	0.549***
	(3.074)	(3.970)	(3.175)	(1.335)	(2.928)	(2.580)
Forced recruitment	0.280	0.437*	0.264	13.469***	0.650	0.761
	(1.045)	(1.820)	(0.983)	(4.622)	(0.880)	(1.441)
Drugs	0.967***	0.721***	0.905***	5.202***	1.771***	1.340***
	(3.736)	(3.422)	(3.858)	(3.717)	(2.937)	(3.006)
Female labour force part.	0.008	0.015***	0.007	0.016	0.019	0.019
	(1.255)	(2.820)	(1.151)	(0.605)	(1.085)	(1.578)
Polity	-0.019	0.023	-0.011	-0.011	0.047	0.049*
	(-1.022)	(1.433)	(-0.662)	(-0.142)	(1.550)	(1.751)
Fertility rate	-0.031	-0.071	-0.007		-0.474**	-0.069
	(-0.325)	(-0.916)	(-0.074)		(-2.422)	(-0.466)
Duration	-0.017	-0.018	-0.019	-0.524***	0.092***	-0.028
	(-1.246)	(-1.472)	(-1.485)	(-3.582)	(3.823)	(-1.288)
Population (log)	0.134	0.149**	0.125	0.474	-0.263	-0.051
	(1.643)	(2.224)	(1.595)	(1.239)	(-1.322)	(-0.359)
Observations	867	867	867	74	867	867
Time Control	Year FE	Cubic Polynomials	Year Splines	Year variable	None	Year Splines

Table A1: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(7) Knots: 3	(8) Knots: 4	(9) Knots: 6	(10) Knots: 7
Female rebels: moderate	-0.969	-0.966	-0.986	-0.976
	(-1.630)	(-1.623)	(-1.635)	(-1.626)
Female rebels: high	-0.545**	-0.546**	-0.575**	-0.571**
	(-2.182)	(-2.188)	(-2.274)	(-2.251)
Ethnic war: Ambiguous	0.484	0.486	0.498	0.493
	(1.390)	(1.378)	(1.415)	(1.403)
Ethnic war: Yes	0.451	0.453	0.446	0.448
	(1.370)	(1.372)	(1.349)	(1.355)
Regime change	-4.889***	-4.755***	-4.879***	-4.914***
	(-17.882)	(-17.290)	(-18.463)	(-18.176)
Limited failure	-0.472	-0.470	-0.346	-0.382
	(-1.534)	(-1.536)	(-1.142)	(-1.272)
Substantial failure	0.282	0.282	0.293	0.293
	(0.912)	(0.920)	(0.940)	(0.945)
Complete Collapse	0.976**	0.978**	0.990**	0.999**
	(2.300)	(2.313)	(2.340)	(2.370)
Aim: Ambiguous	0.385	0.384	0.381	0.381
	(1.350)	(1.344)	(1.347)	(1.344)
Aim: Secession	-0.783***	-0.784***	-0.801***	-0.799***
	(-2.721)	(-2.744)	(-2.814)	(-2.810)
Genocide	-0.591*	-0.587	-0.638*	-0.620*
	(-1.657)	(-1.634)	(-1.787)	(-1.733)
Abduction	0.677***	0.679***	0.682***	0.672***
	(3.082)	(3.110)	(3.136)	(3.085)
Forced recruitment	0.271	0.271	0.263	0.261
	(1.011)	(1.015)	(0.984)	(0.977)
Drugs	0.933***	0.932***	0.937***	0.935***
	(3.789)	(3.773)	(3.739)	(3.737)
Female labour force part.	0.008	0.008	0.008	0.008
	(1.315)	(1.309)	(1.287)	(1.298)
Polity	-0.016	-0.016	-0.016	-0.016
	(-0.884)	(-0.873)	(-0.895)	(-0.870)
Fertility rate	-0.016	-0.016	-0.022	-0.023
	(-0.173)	(-0.173)	(-0.228)	(-0.240)
Duration	-0.017	-0.017	-0.017	-0.017
	(-1.263)	(-1.263)	(-1.265)	(-1.274)
Observations	867	867	867	867
Time Control	Year Splines	Year Splines	Year Splines	Year Splines
Spline knots	three	four	six	seven

Table A2: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(11) Rape: Isolated	(11) Rape: Common	(11) Rape: Widespread
Female rebels: moderate	0.460	-4.146***	-21.781***
	(0.598)	(-2.594)	(-9.188)
Female rebels: high	-0.260	-1.977***	-1.829*
	(-0.512)	(-2.973)	(-1.693)
Ethnic war: Ambiguous	0.041	1.121	17.674***
	(0.064)	(1.296)	(13.098)
Ethnic war: Yes	0.913	0.438	16.983***
	(1.497)	(0.479)	(11.870)
Regime change	-17.918***	-18.617***	-17.270***
	(-27.053)	(-21.232)	(-8.198)
Limited failure	1.124	-18.499***	-15.244***
	(1.125)	(-21.073)	(-14.190)
Substantial failure	0.593	0.959	2.766*
	(0.622)	(0.977)	(1.935)
Complete Collapse	0.512	1.676**	3.875***
	(0.626)	(2.021)	(2.651)
Aim: Ambiguous	0.976*	1.163*	1.334
	(1.683)	(1.650)	(1.315)
Aim: Secession	-2.012***	-2.238**	-1.483
	(-2.682)	(-2.541)	(-0.872)
Genocide	-18.960***	-0.640	-18.535***
	(-14.570)	(-0.633)	(-11.308)
Abduction	-0.532	1.825***	2.668***
	(-0.875)	(3.834)	(2.811)
Forced recruitment	0.802	0.054	1.480
	(1.399)	(0.085)	(1.253)
Drugs	1.898***	2.090***	3.316***
	(3.624)	(2.696)	(3.418)
Female labour force part.	-0.001	0.017	0.056**
	(-0.066)	(1.063)	(2.353)
Polity	-0.028	-0.086*	-0.082
	(-0.759)	(-1.695)	(-0.948)
Fertility rate	0.137	0.109	-0.638
	(0.761)	(0.473)	(-1.564)
Duration	-0.061***	-0.008	-0.021
	(-3.110)	(-0.361)	(-0.463)
Population (log)	0.150	0.654***	0.229
	(0.829)	(3.089)	(0.797)
Constant	-522.281***	-445.128***	-619.248***
	(-6.255)	(-5.864)	(-3.375)
Observations		867	
Time Control		Year variable	

Table A3: Multinomial logit model, Reference Category: No Rape (Level 0). Conflict-clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(12) Main Model: Command Strength	(13) Main Model: Group Norms
Female rebels: Yes	-0.771	-0.300
	(-1.574)	(-0.900)
Command Strength (CS): Medium	-0.682*	
	(-1.712)	
Command Strength (CS): High	-0.154	
	(-0.342)	
Female Commanders		-0.017
		(-0.058)
Female rebels: Yes x CS: Medium	0.208	
	(0.366)	
Female rebels: Yes x CS: High	-0.270	
	(-0.483)	
Female rebels: Yes x Female Commanders		-0.488
		(-1.120)
Ethnic war: Ambiguous	0.379	0.499
	(1.320)	(1.536)
Ethnic war: Yes	-0.903***	-0.695**
	(-2.783)	(-2.219)
Regime change	0.408	0.208
	(1.213)	(0.541)
Limited failure	0.442	0.362
	(1.316)	(1.006)
Substantial failure	-5.188***	-5.052***
	(-11.519)	(-13.149)
Complete Collapse	-0.405	-0.320
	(-1.196)	(-1.120)
Aim: Ambiguous	0.243	0.251
	(0.624)	(0.733)
Aim: Secession	1.035**	1.208***
	(2.069)	(2.793)
Genocide	-0.772*	-0.442
	(-1.909)	(-1.269)
Abduction	0.595***	0.642***
	(2.644)	(3.154)
Forced recruitment	0.407	0.253
	(1.397)	(0.894)
Drugs	0.639**	0.752***
	(2.483)	(2.874)
Female labour force part.	0.004	0.008
	(0.759)	(1.242)
Polity	-0.022	-0.027
	(-1.029)	(-1.524)
Fertility rate	-0.009	-0.016
	(-0.093)	(-0.166)
Duration	-0.017	-0.018
	(-1.392)	(-1.398)
Population (log)	0.154*	0.203**
	(1.833)	(2.293)
Observations	734	747
Time Control	Year Splines	Year Splines

Table A4: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(14) Year-fixed effects	(15) Time since event	(16) Random Effects	(17) Random Effects
Female rebels: Yes	-0.846*	-0.661	-0.178	-0.363
	(-1.720)	(-1.487)	(-0.216)	(-0.494)
Command Strength (CS): Medium	-0.725*	-0.428	0.453	0.144
	(-1.740)	(-1.227)	(0.752)	(0.240)
Command Strength (CS): High	-0.189	-0.327	0.405	0.591
	(-0.419)	(-0.930)	(0.775)	(0.988)
Female rebels: Yes x CS: Medium	0.241	0.097	-1.304**	-0.622
	(0.414)	(0.195)	(-2.247)	(-0.878)
Female rebels: Yes x CS: High	-0.278	-0.225	-2.478**	-1.072
	(-0.497)	(-0.470)	(-2.486)	(-1.243)
Ethnic war: Ambiguous	0.381	-0.075	-0.739	0.695
	(1.286)	(-0.265)	(-0.712)	(1.389)
Ethnic war: Yes	-0.951***	-1.036***	-2.513**	-1.115**
	(-2.899)	(-3.164)	(-2.554)	(-1.989)
Regime change	0.434	0.587**	2.172**	0.676
	(1.249)	(2.009)	(2.256)	(1.225)
Limited failure	0.460	0.786**	1.738	0.638
	(1.349)	(2.560)	(1.596)	(1.055)
Substantial failure	-5.930***	-4.518***	-9.200***	-5.621***
	(-9.699)	(-14.346)	(-4.376)	(-10.405)
Complete Collapse	-0.150	-0.308	-0.465	-0.521
	(-0.446)	(-0.860)	(-0.692)	(-0.902)
Aim: Ambiguous	0.252	0.582*	0.547	0.324
	(0.660)	(1.839)	(0.977)	(0.674)
Aim: Secession	1.079**	0.847*	1.018*	0.940
	(2.127)	(1.908)	(1.670)	(1.530)
Genocide	-0.824**	-1.198***	-1.015*	-0.937*
	(-2.005)	(-3.300)	(-1.718)	(-1.918)
Abduction	0.631***	0.992***	0.634***	0.494**
	(2.866)	(4.012)	(2.740)	(2.174)
Forced recruitment	0.456	0.523*	0.803	0.799
	(1.519)	(1.912)	(0.998)	(1.393)
Drugs	0.654**	0.656***	1.881***	1.267**
	(2.505)	(2.845)	(2.661)	(2.574)
Female labour force part.	0.004	0.013**	0.012	0.011
	(0.753)	(2.496)	(0.644)	(0.894)
Polity	-0.025	0.015	0.039	0.039
	(-1.103)	(0.755)	(1.250)	(1.240)
Fertility rate	-0.029	-0.096	-0.533**	-0.030
	(-0.317)	(-1.201)	(-2.551)	(-0.188)
Duration	-0.018	-0.020	0.081***	-0.028
	(-1.431)	(-1.491)	(3.140)	(-1.305)
Population (log)	0.164*	0.175**	-0.087	0.023
	(1.894)	(2.395)	(-0.404)	(0.155)
Observations	734	734	734	734
Time Control	Year FE	Cubic Polynomials	None	Year Splines

Table A5: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(18) Rape: Isolated	(18) Rape: Common	(18) Rape: Widespread
Female rebels: Yes	-0.790	-0.761	-15.029***
	(-0.887)	(-0.777)	(-8.274)
Command Strength (CS): Medium	-1.153	-1.339	-1.865
	(-1.317)	(-1.560)	(-1.062)
Command Strength (CS): High	0.466	-0.411	0.539
	(0.477)	(-0.376)	(0.284)
Female rebels: Yes x CS: Medium	0.945	-2.768**	13.411***
	(0.889)	(-2.064)	(5.403)
Female rebels: Yes x CS: High	-1.277	-1.499	11.995***
	(-0.994)	(-0.865)	(4.394)
Ethnic war: Ambiguous	0.523	1.426	13.453***
	(0.903)	(1.374)	(9.778)
Ethnic war: Yes	0.399	1.164	14.086***
	(0.685)	(1.363)	(15.493)
Regime change	-17.149***	-16.335***	-15.775***
	(-20.359)	(-16.895)	(-7.791)
Limited failure	0.778	-17.072***	-15.193***
	(0.602)	(-15.846)	(-8.377)
Substantial failure	0.586	0.990	2.835
	(0.571)	(0.843)	(1.338)
Complete Collapse	-0.635	1.180	3.889**
	(-0.648)	(1.048)	(2.139)
Aim: Ambiguous	1.415**	0.440	-0.102
	(2.433)	(0.601)	(-0.105)
Aim: Secession	-1.865**	-3.605***	-0.301
	(-2.286)	(-4.445)	(-0.243)
Genocide	-18.127***	-0.984	-18.237***
	(-12.900)	(-0.814)	(-8.286)
Abduction	-0.711	2.007***	2.786**
	(-1.075)	(4.203)	(2.004)
Forced recruitment	0.817	0.333	2.037*
	(1.388)	(0.477)	(1.929)
Drugs	1.300**	1.408**	1.609
	(2.471)	(2.099)	(1.500)
Female labour force part.	-0.007	-0.001	0.028
	(-0.685)	(-0.038)	(1.124)
Polity	-0.046	-0.075	0.008
	(-0.924)	(-1.324)	(0.069)
Fertility rate	0.243	0.227	-0.026
	(1.333)	(1.035)	(-0.105)
Duration	-0.048**	-0.029	-0.004
	(-2.557)	(-1.211)	(-0.108)
Population (log)	0.217	0.819***	0.176
	(1.104)	(2.824)	(0.565)
Constant	-551.047***	-515.493***	-674.481***
	(-5.978)	(-5.422)	(-4.235)
Observations	734	734	734
Time Control		Year Variable	

Table A6: Multinomial logit model, Reference Category: No Rape (Level 0). Conflict-clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(19) Year-fixed effects	(20) Time since event	(21) Random Effects	(22) Random Effects
Female rebels: Yes	-0.430	-0.281	-1.029	-0.587
	(-1.186)	(-0.882)	(-1.500)	(-1.255)
Female Commanders	-0.073	-0.553**	-0.338	0.411
	(-0.241)	(-2.370)	(-0.986)	(1.054)
Female rebels: Yes x Female Commanders	-0.361	-0.081	-0.520	-0.849*
	(-0.803)	(-0.217)	(-1.185)	(-1.665)
Ethnic war: Ambiguous	0.490	-0.005	-0.606	0.818
	(1.449)	(-0.018)	(-0.587)	(1.561)
Ethnic war: Yes	-0.764**	-0.735**	-1.746**	-0.780
	(-2.405)	(-2.480)	(-1.989)	(-1.462)
Regime change	0.231	0.471*	1.822*	0.724
	(0.573)	(1.653)	(1.916)	(1.216)
Limited failure	0.385	0.517*	0.839	0.408
	(1.045)	(1.826)	(0.869)	(0.709)
Substantial failure	-5.660***	-4.977***	-9.495***	-5.882***
	(-10.593)	(-16.202)	(-4.641)	(-10.080)
Complete Collapse	-0.084	-0.210	-0.724	-0.617
	(-0.292)	(-0.554)	(-1.237)	(-1.281)
Aim: Ambiguous	0.277	0.437	0.360	0.187
	(0.825)	(1.390)	(0.690)	(0.425)
Aim: Secession	1.258***	0.961**	1.074*	0.842
	(2.864)	(2.433)	(1.743)	(1.438)
Genocide	-0.482	-0.576	-1.123**	-0.916**
	(-1.325)	(-1.634)	(-2.243)	(-2.253)
Abduction	0.686***	0.928***	0.561**	0.480**
	(3.359)	(3.972)	(2.516)	(2.169)
Forced recruitment	0.295	0.397	0.526	0.704
	(1.027)	(1.601)	(0.683)	(1.263)
Drugs	0.778***	0.490**	1.261**	1.101**
	(2.887)	(2.156)	(2.053)	(2.471)
Female labour force part.	0.008	0.015***	0.018	0.014
	(1.238)	(3.027)	(0.983)	(1.176)
Polity	-0.029	0.020	0.045	0.039
	(-1.538)	(1.211)	(1.351)	(1.175)
Fertility rate	-0.031	-0.067	-0.421**	-0.031
	(-0.326)	(-0.839)	(-2.115)	(-0.210)
Duration	-0.019	-0.019	0.095***	-0.029
	(-1.396)	(-1.570)	(3.688)	(-1.312)
Population (log)	0.218**	0.185***	-0.118	0.018
	(2.420)	(2.681)	(-0.538)	(0.113)
Observations	734	734	734	734
Time Control	Year FE	Cubic Polynomials	None	Year Splines

Table A7: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(23) Rape: Isolated	(23) Rape: Common	(23) Rape: Widespread
Female rebels: Yes	-3.059*	-1.316	14.272***
	(-1.943)	(-1.345)	(6.698)
Female Commanders	-0.504	-0.429	-0.010
	(-0.967)	(-0.583)	(-0.006)
Female rebels: Yes x Female Commanders	3.275**	-1.100	-33.270***
	(2.035)	(-0.955)	(-7.575)
Ethnic war: Ambiguous	0.956	0.916	1.947
	(1.610)	(0.846)	(0.801)
Ethnic war: Yes	0.997	0.197	18.280***
	(1.614)	(0.197)	(17.000)
Regime change	-20.590***	-19.947***	-18.527***
	(-25.256)	(-25.608)	(-12.754)
Limited failure	0.760	-20.931***	-15.902***
	(0.730)	(-21.465)	(-9.634)
Substantial failure	0.553	0.657	2.446
	(0.598)	(0.666)	(1.079)
Complete Collapse	0.157	1.700*	4.334***
	(0.172)	(1.898)	(3.595)
Aim: Ambiguous	0.976	1.186	0.215
	(1.501)	(1.411)	(0.159)
Aim: Secession	-2.198***	-2.459***	-0.206
	(-3.107)	(-2.737)	(-0.111)
Genocide	-20.987***	0.256	-20.461***
	(-14.333)	(0.251)	(-8.065)
Abduction	-0.605	2.023***	3.480*
	(-1.045)	(4.615)	(1.948)
Forced recruitment	0.810	-0.130	1.496
	(1.333)	(-0.175)	(1.186)
Drugs	1.974***	1.634**	2.201
	(3.632)	(2.330)	(1.503)
Female labour force part.	-0.003	0.010	0.015
	(-0.260)	(0.594)	(0.677)
Polity	-0.047	-0.080*	-0.034
	(-1.440)	(-1.907)	(-0.447)
Fertility rate	0.170	0.255	-0.177
	(0.841)	(1.043)	(-0.555)
Duration	-0.065***	-0.019	-0.021
	(-3.016)	(-0.804)	(-0.579)
Population (log)	0.226	0.822***	0.143
	(1.161)	(3.263)	(0.449)
Constant	-525.631***	-517.251***	-631.244***
	(-5.674)	(-5.706)	(-3.907)
Observations	747	747	747

Table A8: Multinomial logit model, Reference Category: No Rape (Level 0). Conflict-clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Dependent Variable: Rape	(24) Cross-section: Unconditional	(25) Cross-section: Command Strength	(26) Cross-section: Group Norms
Female rebels: Yes	-1.033**	-1.816	0.000
	(-2.151)	(-1.158)	(0.000)
Command Strength (CS): Median		-0.227	
		(-0.619)	
Female rebels: Yes x CS: Median		0.407	
		(0.601)	
Female Commanders			-0.237
			(-0.397)
Female rebels: Yes x Female Commanders			-1.357
			(-1.568)
Ethnic war: Ambiguous	1.844***	1.757***	1.692**
	(2.990)	(2.754)	(2.466)
Ethnic war: Yes	1.254**	1.308*	1.113*
	(2.099)	(1.917)	(1.722)
Regime change	-0.714	-0.870	-1.005
	(-0.845)	(-0.874)	(-1.069)
Limited failure	0.507	0.473	0.097
	(0.825)	(0.758)	(0.144)
Substantial failure	0.286	0.294	0.313
	(0.445)	(0.421)	(0.487)
Complete Collapse	0.277	0.460	0.094
	(0.533)	(0.733)	(0.158)
Aim: Ambiguous	0.476	0.466	0.566
	(0.987)	(0.893)	(1.198)
Aim: Secession	-0.728	-0.900	-0.703
	(-1.127)	(-1.497)	(-1.085)
Genocide	-4.861***	-4.511***	-5.188***
	(-5.274)	(-4.218)	(-5.148)
Abduction	0.202	0.235	0.345
	(0.459)	(0.502)	(0.774)
Forced recruitment	2.038***	1.949***	1.856***
	(3.770)	(3.543)	(3.389)
Drugs	0.783	0.742	0.390
	(1.573)	(1.382)	(0.670)
Female labour force part.	0.006	0.009	0.005
	(0.611)	(0.887)	(0.486)
Polity	0.024	0.002	0.021
	(0.698)	(0.050)	(0.572)
Fertility rate	-0.150	-0.229	-0.158
	(-1.026)	(-1.476)	(-1.096)
Duration	-0.069***	-0.073***	-0.065***
	(-3.624)	(-3.685)	(-3.288)
Population (log)	0.228*	0.265**	0.273**
	(1.701)	(2.040)	(1.973)
Observations	80	74	73
Time Control	None	None	None

Table A9: Ordered probit models, constants omitted from presentation. Conflict-clustered standard errors, z-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Chapter IV - External Support in Civil War: How State Sponsors' Control over Rebels Shapes Conflict Dynamics

1. Introduction

Most armed conflicts since the end of the Second World War are intra-state conflicts where rebel groups challenge a government (Pettersson and Öberg 2020). However, rather than being purely domestic, two-thirds of those conflicts see an external intervention in the form of third-party support to one or both conflict parties (Karlén 2016; San-Akca 2016). External support has severe impacts on conflict dynamics: Existing studies argue that such interventions markedly increase the intensity of fighting in armed conflicts (See e.g. Balcells and Kalyvas 2014; Lacina 2006; Mehrl and Thurner 2020; Moore 2012; Petersohn 2017; Rasler 1983). Research on external support to rebel groups finds a similar positive effect on rebels' use of one-sided violence against civilians (See e.g. Hovil and Werker 2005; Salehyan et al. 2014; Stewart and Liou 2017; Weinstein 2007). When rebels receive external state support, they are thus expected to step up their violence both against civilians as well as government combatants.

However, we observe that different support relationships between external state sponsors and rebel groups can exhibit substantial variation in how they ultimately affect violence on the ground. Some rebels who receive external state sponsorship show little activity in terms of fighting their target government but are very violent towards civilians. For instance, the Lord's Resistance Army (LRA) received support from Zaire and Sudan to fight the Ugandan government. But instead of engaging in combat with government forces, they have mainly targeted civilians, resulting in many deaths and large-scale displacement (Wood 2014a). Other rebel groups receive substantial state support but engage in comparatively low levels of atrocities against civilians, instead concentrating on fighting their target government. In El Salvador, the Frente Farabundo Marti para la Liberacion Nacional (FMLN) was supported by Cuba in fighting a bloody, decade-long war against the central government which according to the UCDP resulted in almost 5,000 battle deaths in 1989 alone (Oñate 2011). However, the group was responsible for only a small fraction of the total violence against civilians as approximately 95% of about 71,000 civilian casualties were the result of government actions (Hoover Green 2016: 628; Hoover Green and Ball 2019). External state support to rebels therefore does not seem to uniformly increase both conflict intensity and rebel violence against civilians at the same time but may instead have more heterogeneous effects. This paper explores the empirically heterogeneous effects of support relationships by re-examining the question *how external state support affects conflict intensity and atrocities.*

We argue that the effect of external state support is shaped by state sponsors' control over 'their' rebel groups. We adopt an understanding of the interaction between state sponsors and rebels as a principal-agent relationship (see Byman and Kreps 2010; Hovil and Werker 2005; Popovic 2017; Rauta 2016; Salehyan 2010; Salehyan et al. 2011, 2014; Szekely 2016) and suggest differentiating between two modes: (1) *hard delegation*, where a support state shapes a rebel group and exerts hierarchical control over it; and (2) *soft delegation*, characterized by a sponsor relying only on soft inducements (see Abbott et al. 2016, 2019). We expect the two modes of external support to have a different effect on violence in armed conflict: hard delegation increases conflict intensity while soft delegation increases rebels' violence against civilians.

Our argument about support relationships and their impact on conflict dynamics ties in with recent studies that begin to disentangle the effects of different kinds of support based on their fungibility and usability for defensive or offensive purposes (Belgioiso 2018; Roberts 2019; Sawyer et al. 2017). We add to this literature by highlighting the importance of sponsors' control opportunities provided by different support types. Understanding the different effects of external sponsorship on violence against combatants and civilians is pressing since it is not only a literal matter of life and death, but also because conflict intensity and atrocities can have potentially severe implications for post-conflict societies as they may significantly affect economic outcomes, human capital, as well as whether conflict reoccurs (e.g. Abadie and Gardeazabal 2003; Hartzell and Hoddie 2003; León 2012).

The remainder of this paper is structured as follows: After providing an overview of the existing research on external support and rebels' violence, Section 2 develops our argument about how state sponsors' control over rebels leads to either increased conflict intensity, in the case of hard delegation, or atrocities against civilians, in the case of soft delegation. In Section 3, we present our research design and then put our model to a twofold test. We first employ in Section 4 panel and time-series count models to test our theory on global data on rebel support, combat violence, and violence against civilians for the period 1989-2009. We then also conduct a within-case study of the effects of shifting external support to the Allied Democratic Forces (ADF) in its rebellion against the Ugandan government. Our findings support our theoretical expectation that hard delegation increases combat violence but has no statistically significant effect on rebels' propensity to victimize civilians while soft delegation increases violence against civilians but does not affect the intensity of fighting. Section 5 concludes by summarizing our contributions to the literature on conflict dynamics.

2. Modes of rebel support and conflict dynamics

This section starts out with discussing existing literature on how external state support shapes rebel violence. It then introduces our conceptual distinction between hard and soft delegation, from which we derive two hypotheses on rebels' violence.

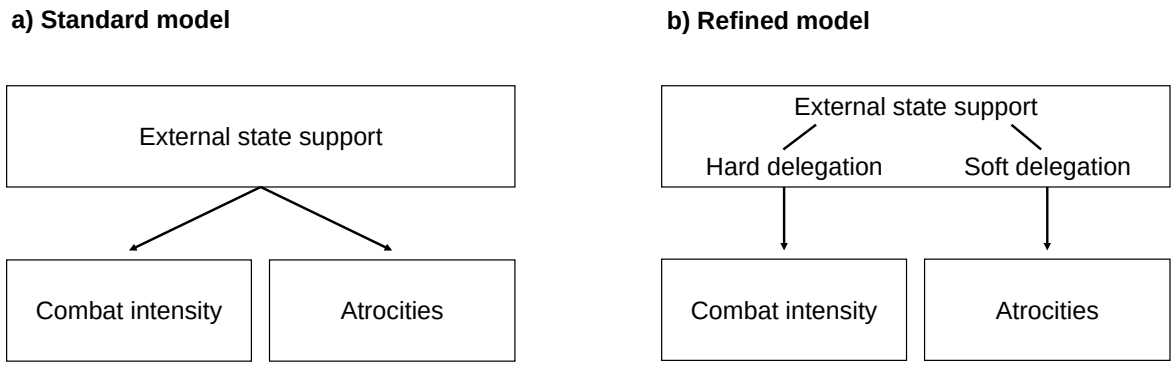
A substantial literature has emerged which studies the determinants of combat violence and civilian victimization. Key findings include the effects of regime type (Hultman 2012; Lacina 2006; Valentino et al. 2004), natural resources (Lujala 2009; Rigterink 2020; Whitaker et al. 2019), strategic interactions between the opponents (Balcells and Kalyvas 2014; Kalyvas 2006; Wood 2014a), and the presence of peacekeeping forces (Hegre et al. 2019; Hultman et al. 2013, 2014).

Perhaps most prominent is the idea that third-party interventions and external support to the warring parties increase the level of violence in civil wars. Research found that intrastate conflicts where either belligerent receives external support cause more combat deaths (Balcells and Kalyvas 2014; Lacina 2006). Other studies report similar positive effects of external support on violence against civilians by both governments (Zhukov 2017) and rebels (Hovil and Werker 2005; Salehyan et al. 2014; Weinstein 2007; but see Wood et al. 2012). This claim is further corroborated by studies focussing on the effects of particular support types such as arms transfers (Mehrl and Thurner 2020; Moore 2012), troop support (Petersohn 2017), and the provision of safe havens to rebels (Stewart and Liou 2017).

With regards to external state support to rebels, this literature generally suggests that the increased capacities due to this sponsorship not only foster rebels' ability to inflict violence on the enemy but also renders them more independent from the local population. While attacking government forces is usually in line with state sponsors' goals, research indicates that this might be different with regards to violence against civilians. With some infamous exceptions such as Charles Taylor, state sponsors are unwilling to bear the costs of atrocities. Specifically, human rights violations risk domestic or international backlash (Byman and Kreps 2010: 7; Mumford 2013; Salehyan et al. 2014). Domestically, atrocities might lead to protests and the punishment of the government in the voting booth. Internationally, this might harm the sponsor's reputation and even trigger sanctions. And even if sponsors are willing to bear the reputational costs of rebel atrocities against civilians, they will oppose such actions because they allow rebels to obtain resources and recruits independently from the sponsor. Because it provides the opportunity to loot and forcibly recruit new group members, violence against civilians thus increases rebels' independence from the sponsor and hence their ability to pursue goals that are not in line or even opposed to that of the supporter (See Abbott et al. 2019; Bapat 2012).

We take these insights as a starting point and suggest distinguishing between two modes of support relationships between external state supporters and rebels which differ in their effect on violence. We thereby adopt a principal-agent perspective on the relationship between external state sponsors and rebels (see Byman and Kreps 2010; Hovil and Werker 2005; Popovic 2017; Rauta 2016; Salehyan 2010; Salehyan et al. 2011, 2014; Szekely 2016). Specifically, we argue that whether external support increases rebels' violence against government combatants or civilians is shaped by state sponsors' control over them. Our differentiation between hard delegation and soft delegation in rebel support leads us to adapt the literature's standard expectation of how external state support for rebels impacts wartime violence (see figure nine). While external support generally increases rebels' capacity to fight, whether they direct their violence at government combatants (i.e. conflict intensity) or target civilians (i.e. atrocities) depends, all else equal, on the mode of support.

Figure 9: **The standard model and the refined model**



2.1 Hard delegation

We speak of *hard delegation* when the sponsor exerts hierarchical control over a rebel group (see Abbott et al. 2016, 2019, 2020; Tamm 2020). When an external support relationship takes the mode of hard delegation, the sponsor can shape a rebel group in line with its goals or even create it in the first place. And the sponsor can use coercive means to ensure the rebels' compliance (Byman and Kreps 2010: 2–3; Popovic 2017: 3–4; Rauta 2016: 93; Salehyan 2010: 495; Salehyan et al. 2011: 713; Szekely 2016: 452). A sponsor can exercise hard control ex ante and/or ex post. On the one hand, state sponsors can exercise ex ante hard control by manipulating rebels' preference structure via socialization. It can influence the rebels' identities by subjecting rebel leaders to long training and indoctrination. On the other hand, sponsors can rely on ex post hard control by supervising rebels' execution of delegated tasks and sanctioning potential slack. A sponsor can send counsellors to the rebels that closely monitor their behavior (and possibly also entail socializing effects). If rebels slack, the sponsor can use coercive force

to compel them into compliance. It might (threaten to) remove its forces on the ground or expel rebels from safe havens on the sponsor's territory. Its threats of punishment are also more credible as the sponsor is aware of the rebels' location. Overall, the sponsor is in a strong position as it can take away the provided support. While the sponsor might provide additional material or immaterial support, it is thus always able to use both carrots and sticks (Byman and Kreps 2010: 10–1; Salehyan 2010: 501, 505–6). Hence, external support relationships where a sponsor assists rebels via training, sanctuaries, and/or employing own personnel on the ground provide it with hard control.

In hard delegation relationships, rebels are thus more likely to comply with the sponsor's goals. Their goals are either aligned due to ex ante socialization or rebels' slacking is prevented by monitoring and threats of sanctions ex post. Take as an example the hard delegation relationship between the Reagan administration and the Nicaraguan Contras which included clear mechanisms to deter the rebels from attacking civilians. For instance, three million US dollars of the US' support were reserved for the training of human rights officers and setting up a rebel office to investigate atrocities and bring suspects before a special rebel court (Hoekstra 2019: 11). Moreover, the support relationship between the Rwandan government and the Rassemblement Congolais pour la Démocratie (RCD) entailed troops that fought together with the rebels on the ground. This hard delegation relationship allowed the sponsor to supervise its proxy in both of its interventions in the DRC since, as Rwandan president Paul Kagame's himself stated, the rebels were not "fully prepared to carry it [toppling Mobutu] out alone" (cit. in Reyntjens 2011: 135; see also Tull 2003).

We therefore expect hard delegation to primarily increase conflict intensity as opposed to atrocities because state sponsors will use their hard control to direct rebels' violence against government forces. By contrast, external state supporters will usually favor violence against civilians less (Byman and Kreps 2010: 7; Mumford 2013; Salehyan et al. 2014).

Hypothesis 1: If a support relationship takes the mode of hard delegation, this increases conflict intensity rather than atrocities.

2.2 Soft delegation

We speak of *soft delegation* when the sponsor lacks hard controls over rebels but solely relies on positive inducements (see Abbott et al. 2016, 2019, 2020; Tamm 2020). When an external support relationship takes the mode of soft delegation, a sponsor does not shape rebels ex ante but enlists an independent rebel group that agrees on cooperating in return for support. The sponsor also does not possess hierarchical control instruments but tries nudging rebels in the preferred direction. In the absence of coercive means to compel rebels into compliance, a

sponsor can only influence rebels ex post by means of conditionality. It can make demands in exchange for further strengthening rebels' operational abilities through material, financial, or informational support. Compared to hard delegation relationships, the sponsor is in a weaker position as it cannot take away the support once handed over even when rebels slack. In other words, the sponsor can only use carrots but lacks a stick. Moreover, the sponsor might not even be aware of rebels' slacking in the first place, as it cannot monitor their activities. In the absence of hard control via ex ante socialization or ex post monitoring, a sponsor can never be sure that rebels are committed to the delegated tasks. Hence, in external support relationships where a sponsor provides rebels only with material and/or immaterial support, it just has soft control.

In a soft delegation relationship, a rebel group is thus able to pursue its own goals, even when these deviate from their sponsor as it was unable to shape rebels by means of socialization ex ante or warrant information by monitoring its actions ex post. Rebels therefore have less reason to fear that slacking behavior is uncovered – and even if it is the sponsor is not in a position to sanction them (beyond terminating its support). Take as an example the support of the United States (US) for the Afghan Mujahedeen's fight against the Soviet Union. The lack of control opportunities allowed the Mujahedeen to focus on soft, non-military targets and even use their newly acquired US military technology to shoot down civilian airplanes (Hartman 2002).

We therefore expect soft delegation to mainly affect atrocities instead of conflict intensity. As state sponsors do not possess hard control over 'their' rebels, these are free to choose the target against which they employ their increased capabilities. Rebels then are likely to aim at softer, less risky targets than the government's military forces (Byman and Kreps 2010; Salehyan 2010). For instance, a sponsor might want rebels to attack well-guarded critical infrastructure while rebels may fear losing too many fighters in such an attack. Hence, rebel groups might slack from the activity their sponsor provided them with resources for and abstain from fighting the target state (Weinstein 2007: 129–30).

Hypothesis 2: If a support relationship takes the mode of soft delegation, this increases atrocities rather than conflict intensity.

3. Research Design

To test our theoretical propositions, we combine data on violence between combatants and violence against non-combatant civilians from the UCDP Armed Conflict dataset (Pettersson and Öberg 2020) with data on rebel support based on the UCDP External Support Dataset (Högbladh et al. 2011). This makes 1989-2009 our period of observation and we use the conflict dyad-year as our unit of observation. We observe 265 distinct dyads, resulting in a total 1057

possible observations. We take both *dependent variables* – conflict intensity and atrocities – from the UCDP Armed Conflict data:

- **Conflict intensity:** To measure conflict intensity, we use a variable counting the number of battle-related deaths, that is "those deaths caused by the warring parties that can be directly related to combat" (Pettersson 2020b).
- **Atrocities:** To measure atrocities, we employ a variable counting the number of deaths due to rebel violence against civilians, i.e. civilians that were killed as a result of being "deliberately and directly targeted by […] non-state groups" (Eck and Hultman 2007: 235).

Crucially, these two variables are mutually exclusive and coded by the same team at UCDP (Pettersson and Öberg 2020). As the UCDP defines armed conflict as a "contested incompatibility that concerns government or territory or both where the use of armed force between two parties results in at least 25 battle-related deaths in a year" (Pettersson 2020b: 3), conflict intensity is truncated at 25. In contrast, the Atrocity measure we use is not truncated at 25 but instead starts from zero as we code it from the UCDP Georeferenced Event Dataset for all ongoing conflicts in the period 1989-2009 (Croicu and Sundberg 2017; Sundberg and Melander 2013). We thus also observe cases where rebel groups involved in an intrastate conflict producing at least 25 yearly battle-deaths were responsible for less than 25 civilian deaths. We use count models to analyze both dependent variables as they only take on positive integer values.

To check whether our expectations hold against the baseline model, we first use a dummy variable measuring *external state support* in general. We coded external state support as existent in a dyad-year when at least one state provided at least one of form of support to the rebel group. We take the information for these variables from the UCDP External Support Dataset (Högbladh et al. 2011) which includes information on the external sponsorship of warring parties for the period 1975-2009 and indicates what specific (material or non-material) goods these parties received.

To test our hypotheses, we use the same information to distinguish these external state support relationships into *hard delegation* and *soft delegation*. To do so, we replace the external state support dummy with a categorical variable which measures whether a dyad-year features no support, soft delegation, or hard delegation to rebels. In practice, this variable enters our models as two dummies that indicate the occurrence of the respective support modes with no external state support as the reference category. The two dummy variables hard delegation and

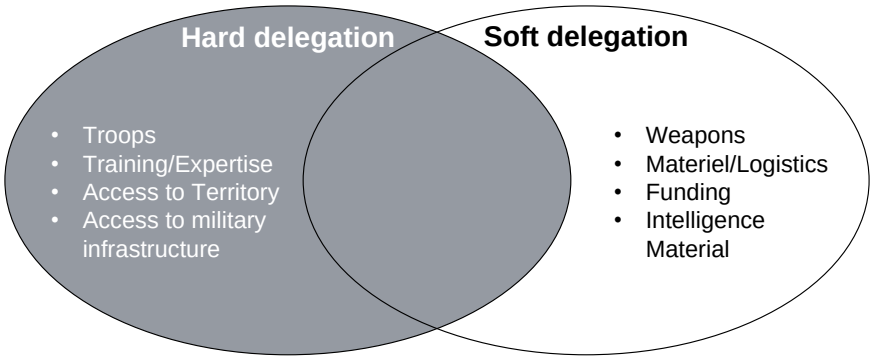
soft delegation take the value 1 if a rebel group receives the respective type of support in the dyad-year and zero otherwise and are coded as follows:

- **Hard delegation:** A dyad-year was coded as hard delegation when at least one of the forms of support provided by one or more external states allows for the sponsor's hierarchical control. Support types featuring hierarchical control options are the provision of troops, training as well as access to the sponsor's territory (i.e. safe havens) or its military infrastructure. We hold each of these support forms sufficient to code the whole dyad-year as hard-controlled delegation. Thus, instances of hard delegation always comprise at least one of the support types listed above.
- **Soft delegation:** A dyad-year was coded as soft delegation when one or more state sponsors only provided weapons, funding, intelligence, or 'logistic goods'[39] since hierarchical control over these goods is relinquished when handed over. Note that only in the absence of the support types sufficient for hard-controlled delegation (see above), a dyad-year was coded as soft delegation.

Soft delegation and hard delegation are thus coded as being mutually exclusive. We opt for this instead of using alternative, continuous measures of control (e.g. the share of support forms that allow control among the total number of different support forms a sponsor provides) because if a sponsor supports a rebel group by, for instance, providing troops, weapons, and funding, the rebels will unable to use the received money and arms freely. Instead, the sponsor's troops will not only control that the group attacks the appropriate targets but also that it uses the additional resources it was provided with for this goal. In other words, the control offered by support types we code as hard delegation constrains the rebels' use of other types of support received from a sponsor at the same point in time. Figure ten summarizes the support types necessary for soft delegation and those sufficient for hard delegation. Based on this coding, our dataset includes 373 dyad-years in which rebels received external support from a country. Of these, we coded 299 dyad-years as hard delegation (80.2%), whereas 74 dyad-years were coded as soft delegation (19.8%).

[39] This support type mainly comprises the transfer of "non-weaponry and non-munition supplies that […] serve direct military purposes" (Croicu et al. 2011: 16).

Figure 10: Types of external state support coded as hard or soft delegation



Note: We coded two dummy variables based on UCDP External Support Dataset; 'unknown types' (O) and 'other types' (U) were coded as missing.

In testing for the effects of hard and soft delegation on conflict violence, we account for the effects of potential time-invariant confounders by using dyad-fixed effects (Angrist and Pischke 2009: 221–4). This should for instance purge the influence a conflict regions' geography or history may have on our results. In the context of count models, we can thus choose between fixed effects negative binomial and fixed effects Poisson models. Generally, it is advised to use negative binomial models to model count outcomes as they can handle overdispersion, i.e. the conditional variance being larger than the conditional mean, whereas this results in artificially small standard errors for Poisson Models (see Cameron and Trivedi 2010: 570; Hilbe 2011). However, this is not the case when using fixed effects. Here, a conditional maximum likelihood fixed effects negative binomial has been proposed (Hausman et al. 1984) but this does not actually purge the effect of time-invariant predictor variables (Allison 2009; Allison and Waterman 2002). The alternative, unconditional maximal likelihood estimator would purge these effects but suffers from the incidental parameter problem, resulting in coefficient estimates being inconsistent and potentially severely biased, especially in short panels such as ours (see Cameron and Trivedi 2015: 242; Greene 2012: 453, 659). We thus instead opt to use fixed effects Poisson models to test our hypotheses as these have been shown to be consistent and robust to a number of its assumption being violated, including that of the conditional mean and variance being equal (Cameron and Trivedi 2010: 633, 2015: 242; Lancaster 2000; Wooldridge 1999). One exception here is that conventional standard errors would be too small and we hence correct them by clustering them on the conflict dyad (Allison 2009; Wooldridge 1999).

In addition, we include a number of variables relating to characteristics to control for the effect of potential time-varying confounders that may affect the violence between combatants and/or against civilians while also being correlated with our main independent variables. Beginning with the rebel group, we include *rebel strength* as stronger rebels may be less prone to victimize civilians but more prone to participate in intense conflict (Balcells and Kalyvas 2014; Wood 2010; Wood et al. 2012). At the same time, external support should increase rebel strength. The variable should thus capture shifts in rebel capabilities that are the result of different support types, allowing us to better isolate the effect of the different levels of control hard and soft delegation afford to sponsors, irrespective of the added capabilities they provide. This variable is a dummy coded from the Non-State Actor data (Cunningham et al. 2009, 2013) which takes the value 1 if rebels are militarily at least as strong as the target government and zero otherwise.

Finally, we also control for several country characteristics, namely *population size*, *economic development*, *regime type*, and the size of *politically excluded ethnic groups*. All of these factors may reasonably affect both combat violence and violence against civilians (see e.g. Chaudoin et al. 2017; Hultman 2012; Lacina 2006; Valentino et al. 2004). At the same time, they may also affect whether and what external support rebels receive. There is some evidence that rebels fighting democratic governments are less likely to receive external support (Salehyan et al. 2011) and economic development and population size may similarly deter external support to rebels. Previous research has also linked the size of ethnic groups which are politically excluded to armed conflict (Cederman et al. 2013a, 2013b) while ethnic ties also drive the occurrence and type of external support (Saideman 1997, 2002; Salehyan et al. 2011). Data for these variables comes from Gleditsch (2002, 2013), the Polity IV Project (Marshall et al. 2016), and Vogt et al. (2015).

Given the observational nature of this research design, endogeneity in the form of selection bias and reverse causality clearly challenges identification. We face potential selection bias as external state support to rebel groups is hardly randomly assigned (see e.g. Salehyan et al. 2011). To tackle endogeneity arising from selection, we re-estimate our models using both selection models and matching. Moreover, we might face reverse causality as combat violence and civilian victimization may drive whether and particularly what type of support third parties provide to rebel groups. Below, we make a theoretical case against reverse causality driving our results. Additionally, we present a within-case study 'zooming' into the case of the intrastate conflict pitting the Allied Democratic Forces (ADF) against the Ugandan government. As the ADF experienced a shift in its external support from hard to soft delegation due to the Zairean

government supporting it being removed as a result of the first Congo war, the case study allows us to examine the effects of hard and soft delegation in a setting where the shift from the former to the latter was not due to the actions of the rebel group.

4. Empirical Analysis

To test our hypotheses, we thus conduct two types of analyses, one large-n analysis across all dyad-years in our dataset, and one within-case study analyzing a single "crucial case". We first test our hypotheses on global data on rebel support, combat violence, and violence against civilians for the period 1989-2009 using the research design discussed above. Next, we summarize additional specifications. Finally, we present additional case evidence from the Allied Democratic Forces rebellion in Uganda which further support our findings.

4.1 Main results

We test our hypotheses by running four main models (see Table 1). Model 1 replicates the general positive effect on wartime violence that existing studies find for external state support to rebels whereas Model 3 interestingly finds no statistically significant relationship between external support and violence against civilians. Models 2 and 4 then replace the external state support item with two dummies indicating whether the relationship between an external support state and a rebel group took the mode of hard or soft delegation. Results are in line with our theoretical expectations.[40]

Hard delegation has a positive and statistically significant effect on the number of casualties resulting from combat violence but an effect on violence against civilians that is statistically indistinguishable from zero. In contrast, soft delegation has a positive and statistically significant effect on the number of casualties resulting from violence against civilians whereas its coefficient for combat violence is statistically insignificant and close to zero. In both Model 2 and Model 4, Wald tests also clearly reject the Null Hypothesis that the coefficients of hard and soft delegation are the same. These results thus imply that hard and soft delegation do indeed differ in their effects on violence in intrastate conflict: We find evidence that, as compared to no external state support, hard delegation increases combat violence but does not affect civilian victimization whereas soft delegation increases rebel violence against civilians but does not significantly change conflict intensity.

[40] Fixed-effects Poisson models require within variation on the dependent variable. That is, dyads where the dependent variable does not change across observations are dropped. This results in models 3 and 4 having 312 fewer observations as these dyads are reported to never exhibit violence against civilians.

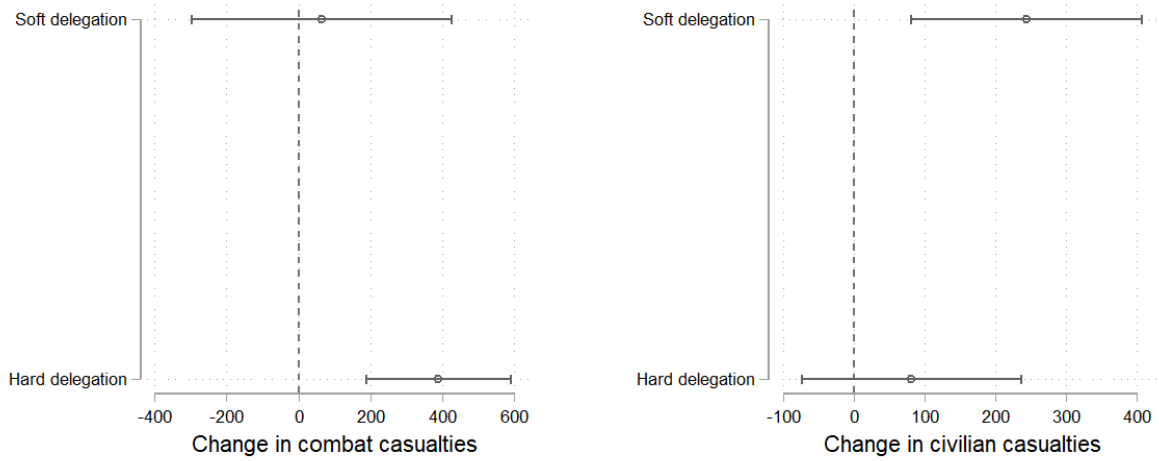
Table 6: Poisson models

Dependent Variable	(1) Battle-related Casualties	(2) Battle-related Casualties	(3) Civilian Casualties	(4) Civilian Casualties
External State Support	0.421**		0.583	
	(0.205)		(0.532)	
Hard Delegation		0.568***		0.474
		(0.208)		(0.559)
Soft Delegation		0.094		1.421***
		(0.212)		(0.489)
Rebel Strength	0.296	0.274	-1.054***	-0.808
	(0.664)	(0.637)	(0.348)	(0.510)
ln Population	-0.199	0.129	0.667	0.352
	(0.717)	(0.712)	(2.176)	(2.090)
ln GDP p.c.	-0.264	-0.311	0.198	0.301
	(0.456)	(0.455)	(0.823)	(0.744)
Anocracy	-0.443	-0.481*	-0.050	-0.009
	(0.281)	(0.273)	(0.475)	(0.490)
Democracy	-0.580	-0.631*	-0.356	-0.312
	(0.367)	(0.362)	(0.453)	(0.463)
Excl. Ethnic Population	0.610	0.597	-1.860***	-1.928***
	(0.862)	(0.847)	(0.666)	(0.636)
Observations	912	912	560	560
Dyad-fixed Effects	Yes	Yes	Yes	Yes
Log Likelihood	-193889.301	-190882.379	-43716.460	-43111.415
P > chi2	0.073	0.013	0.000	0.000
Wald test *Hard Delegation = Soft Delegation*: p > chi2		0.002		0.03

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses. Base category for external state support items: No support. *** p<0.01, ** p<0.05, * p<0.1

Figure eleven presents a substantive examination of these results by reporting the first difference effects of hard and soft delegation. Moving from no external support to hard delegation increases a dyad-year's predicted number of combat casualties by ~400 additional deaths but does not significantly affect the number of civilian casualties; the point estimate of the effect is ~80 but the 95%-confidence intervals clearly include zero. Moving from no external state support to soft delegation instead increases the number of casualties from violence against civilians by ~250 victims but does not significantly affect the number of combat casualties.

Figure 11: First difference estimates for Model 2 and 4.



Note: Discrete first difference estimates for hard and soft delegation, Models 2 (left panel) and 4 (right panel). Base category: No support. Whiskers represent 95% confidence intervals; dashed line represents zero difference; effects calculated while all other variables held at observed values.

To summarize, our results lend support to our theoretical expectations. While external support is generally found to increase both combat violence and violence against civilians in civil wars, this effect is driven by different types of third-party support. Hard delegation has a substantive positive effect on violence between combatants, but its effect on violence against civilians is small and statistically indistinguishable from zero. Soft delegation is associated with substantial increases in the number of civilians killed by rebels, but its effect on combat violence is neither statistically nor substantively significant.

4.2 Robustness checks

To examine the robustness of these results, we also run a number of additional specifications which we summarize here and report in more detail in the Appendix. Most importantly, we take into account that the occurrence of external support to rebels as well as its specific type will hardly be randomly assigned (see e.g. Salehyan et al. 2011; San-Akca 2016). This implies that observations of hard delegation, soft delegation, or no support relationship at all may substantially differ from each other. In addition, factors contributing to violence in civil war may also affect the chance of external support being granted in the first place, giving rise to potential selection bias.

We tackle these potential challenges to our results in two ways. First, we employ matching to reduce sample imbalance, hence making treated and untreated observations (i.e. observations that receive a certain type of support and observations that do not) more comparable to each other (see Ho et al. 2007). More specifically, we use coarsened exact matching (Iacus et al. 2012) to arrive at a more balanced sample and then re-estimate models two and four. The results suggest a substantial reduction of sample imbalance and are

substantively in line with our main models. Second, we re-estimate models two and four using Heckman selection models.[41] This allows us to explicitly model the first stage of rebel groups receiving external support and thus becoming 'eligible' for the distinction between hard and soft delegation. The results from these selection models substantively mirror those presented in Table 1. This provides further evidence that the possibly non-random assignment of support types is not driving our results.

A further challenge to our results may be that they depend on the truncation points of our samples. On the one hand, the existing literature on violence against civilians has mostly set all observations below 25 to zero (e.g. Wood 2010) whereas we code these observations from the georeferenced UCDP data. On the other hand, our measure of conflict intensity is truncated due to being observed if at least 25 battle deaths were reported in a dyad-year, resulting in biased estimation of the expected value of the dependent variable (Greene 2012: 873–9). To address this, we re-estimate Models 1-2 employing fixed effects Poisson models for truncated samples (Grogger and Carson 1991). And we re-estimate Models 3-4, while setting all observations below 25 to zero, and while setting them to missing and using fixed effects Poisson models for truncated samples. Our substantive results remain unchanged.

In a next step, we further disaggregate our categorical external state support variable. Until now, we have only distinguished hard from soft delegation. However, we theoretically discussed two means of hard control: ex ante socialization and ex post coercion. To ensure that aggregating support types that allow for these two means of hard control did not affect our results, we re-estimate Models 2 and 4 while distinguishing between soft delegation and ex ante hard delegation (i.e. training) as well as ex post hard delegation (i.e. access to territory or military infrastructure or troops). Reassuringly, we find that while ex post hard delegation has a somewhat stronger effect on combat deaths than ex ante hard delegation, both effects are positive, statistically significant, and can be statistically distinguished from the effect of soft delegation but not from each other. For violence against civilians, we find that the effect of ex post hard delegation is small and statistically insignificant while that of ex ante hard delegation is marginally significant at the 10%-level but much smaller than that of soft delegation and statistically indistinguishable from that of ex post hard delegation. While further corroborating our theoretical expectations, this analysis also increases our confidence in the distinction between soft and hard delegation. In an additional analysis, we also distinguish cases of armed intervention in the form of troop support from other types of hard delegation; the positive effect

[41] As Heckman selection models perform OLS regression in the second stage, the dependent variables in these models are log-transformed to account for skewness.

of hard delegation on combat violence may only arise from the additional fighting carried out by the support state's troops. However, our results suggest that this is not the case as both hard delegation with and without external troop support increase combat violence and cannot statistically be distinguished.

Next, we include additional control variables. First, previous violence may have feedback effects. We thus re-estimate Models 1-4 while including one-year lags of combat violence, rebel violence against civilians as well as government violence against civilians. These variables have been found to be relevant predictors of civilian victimization (Hultman 2007; Wood 2014a) but may also inform (potential) external supporters about rebels' behavior and current military prospects, thus affecting whether and how they (continue to) support them. As including a lagged dependent variable and fixed effects at the same time can induce bias, especially in short panels (Nickell 1981), we also re-estimate Models 1-4 while including the three measures of previous violence but without dyad-fixed effects. This provides a lower bound to the effect of external support on civil war violence (Angrist and Pischke 2009: 246). Alternatively, we include year-fixed effects to address overall time trends. Related to these concerns, we also allow errors to be non-independent between our two models as violence against civilians and combat violence are clearly interrelated processes. Next, we include a number of additional rebel group attributes such as their number, territorial control, command structure, and mobilization capacity instead of – and alongside with – rebel strength as controls as previous studies show that these may affect both conflict dynamics and rebels' relationship with their sponsors (Cunningham et al. 2009; Popovic 2017; Wood and Kathman 2015). We then control for and conditioned hard and soft delegation on groups' ideological type as this may affect their baseline incentives for fighting and attacking civilians (e.g. Polo and Gleditsch 2016). And because particularly the effect of hard delegation may depend on how many sponsors a group has (Salehyan et al. 2014), we also present analyses where we allow the effects of the support types to vary over the number of supporter states. Finally, we drop all control variables to run naïve models estimating the effect of external support type on civil war violence. None of these changes affect our substantive results which are consistently in line with the claim that external support to rebel groups increases both combat violence and rebels' victimization of civilians but that these two effects are driven by different types of support.

A final challenge to our results may be reverse causality, i.e. that it is combat violence and civilian victimization that drive the type of support, not the other way around. If this was the case, however, it should only make our results less likely: Rebels fighting government forces, a sign of compliance with sponsors' wishes, suggests that rebels comply with sponsors'

wishes and should hence lead to supporters choosing soft delegation. In contrast, rebels deviating from the sponsor's preferences by attacking civilians should result in stronger control through hard delegation. The effect of rebel behavior on the delegation mode would thus be opposite to that of delegation modes on rebel behavior, thus biasing against our results. To further examine whether our results are due to endogeneity in the form selection bias or reverse causality, we use a case of an arguably exogenous change in support types to further test the effects of hard and soft delegation on rebel violence in the next section.

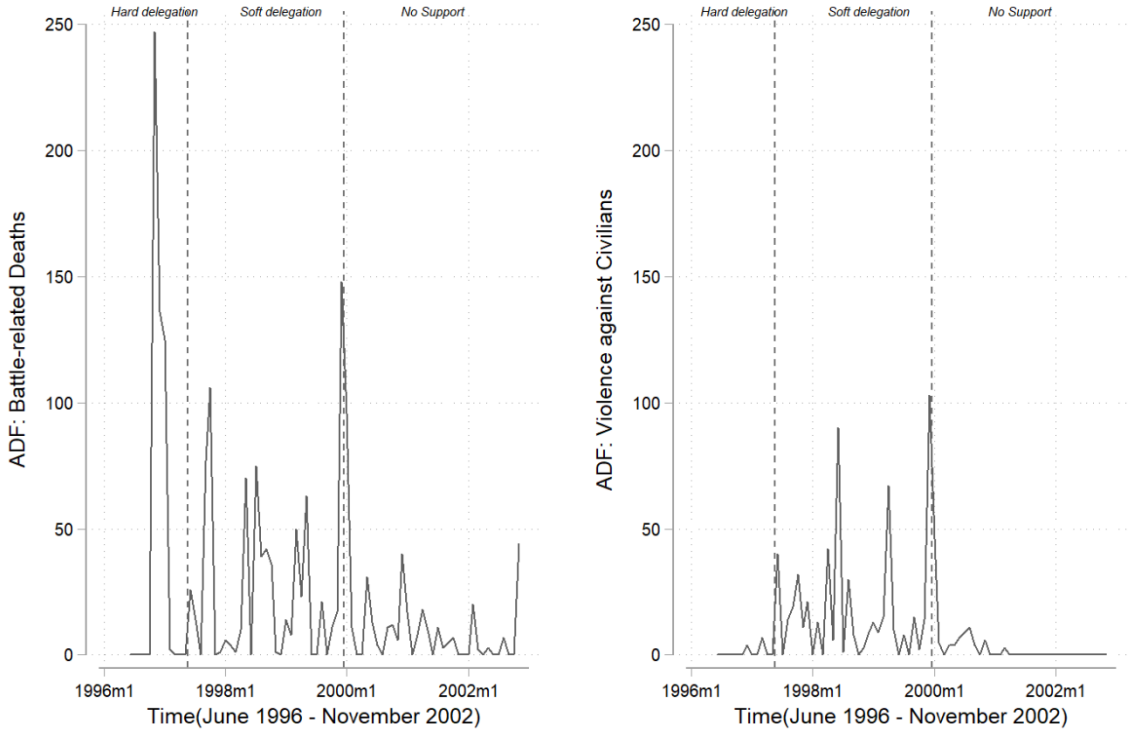
4.3 Case analysis: Evidence from the Allied Democratic Forces, 1996-2002

A case study of the Allied Democratic Forces' (ADF) rebellion in western Uganda over time further supports our hypotheses. We additionally analyze this case for four reasons. First, it is a "crucial case" (Gerring 2007) as a key study in the literature that suggests a general effect of external state support on violence is based on the same conflict (see Hovil and Werker 2005). Second, focusing on the case of the ADF allows us to isolate the effect of different types of external state support on combat and anti-civilian violence as the group was first in a hard delegation relationship with the government of the Democratic Republic of Congo (DRC) (1996-1997), then in a soft delegation relationship with Sudan (1997-2000), and then continued fighting without any external state support (2001-2002). Third, focusing on this case over time allows us to hold constant a number of potential confounders, such as group ideology, target state, and a variety of demographical and geographical factors. Fourth and most importantly, the shift from hard to soft delegation in this case can be traced back to the ADF's key supporter, the DRC's president Mobutu, losing his office as a result of the first Congo war, an outcome that should arguably be unrelated to the ADF fight against the Ugandan government. As such, this section provides further reassurance that reverse causality is not driving our results.

The ADF was founded in 1995 as an amalgam of various existing groups opposing the Ugandan government. Its foundational meeting was held in the eastern DRC. Kinshasa's influence was essential in forming the group. The Mobutu-led government of the DRC allowed the ADF to establish training camps as well as its headquarters on its territory, coordinated their operations, provided training, and contributed material resources in the form of arms, materiel, and money (Scorgie-Porter 2015). Mobutu even personally met with ADF leaders in Kinshasa and his army commanders regularly visited ADF headquarters (Titeca and Vlassenroot 2012). At the same time, the ADF was also receiving support from Sudan who air-dropped military supplies and provided some training (Scorgie-Porter 2015). All of this changed with Mobutu's ouster from government in May 1997, Kinshasa terminated its support to the ADF while the Sudanese government continued providing weapons via air-drops (Titeca and Vlassenroot

2012). In summary, ADF was thus created under the strong control of the government of the DRC and remained in a hard delegation relationship with Kinshasa until that government was toppled in 1997. At the same time, the ADF continued receiving support from Khartoum who air-dropped weapons and military supplies, indicating soft delegation.

Figure 12: Monthly ADF Violence, 1996-2002



Note: Figures depict monthly battle-related deaths (left panel) and violence against civilians (right panel) in the ADF rebellion in western Uganda. Dotted, vertical lines indicate switch of support mode.

Accordingly, we should expect ADF combat violence to be most pronounced in the period running up to Mobutu's ouster while its violence against civilians should increase after this event. To examine this expectation, we draw on monthly data from the UCDP Georeferenced Event Dataset (Croicu and Sundberg, 2017; Sundberg and Melander, 2013) to examine ADF activity both in terms of fighting Ugandan government forces and violence against civilians. Figure twelve presents monthly death counts resulting from ADF violence in combat and against civilians; vertical lines represent changes of support mode after Mobutu's government fell in May 1997 and in 2000 as the ADF lost all external state support according to the UCDP External Support data. As expected, battle-related deaths are highest during the period of hard delegation and fall after regime change in Kinshasa. In contrast, civilian casualties are relatively limited in the first months of ADF activity but climb substantially after May 1997. This suggests that hard delegation is associated with higher combat violence whereas soft delegation

contributes to civilian victimization.

To test this argument more formally, we also examine the monthly data on ADF activities underlying figure twelve using time-series models. Given that the two dependent variables are stationary event counts[42], we use auto-regressive Poisson models for this purpose (Brandt and Williams 2001). In addition to binary items indicating whether hard delegation, soft delegation, or no support occurred in the observed month, we also include lagged terms of the respective other dependent variables as predictor variables. After experimenting with various specifications, we present models with first- and second-order auto-regressive terms in table 2; models with alternative lag structures are presented in the appendix but have substantively similar results.

Table 7: Autoregressive Poisson models: ADF Activities, 1996-2002

Dependent Variable	(5) Battle Casualties	(6) Battle Casualties	(7) Civilian Casualties	(8) Civilian Casualties
Hard Delegation	1.774***	2.033***	-0.699	-2.335
	(0.463)	(0.491)	(1.634)	(1.946)
Soft Delegation	0.963**	0.944**	1.961***	1.877***
	(0.422)	(0.423)	(0.561)	(0.572)
Other DV_{t-1}		0.018***		0.015***
		(0.006)		(0.005)
Other DV_{t-2}		-0.009		-0.010
		(0.013)		(0.008)
AR(1)-term	0.284**	0.192*	0.074	0.011
	(0.128)	(0.109)	(0.132)	(0.088)
AR(2)-term	-0.164	-0.144	0.060	0.009
	(0.128)	(0.132)	(0.132)	(0.090)
Constant	2.381***	2.124***	1.018*	0.828
	(0.351)	(0.370)	(0.517)	(0.564)
Observations	74	74	74	74
R-squared	0.226	0.309	0.175	0.226
P > chi2	0.001	0.000	0.009	0.007
Wald test *Hard Delegation* = *Soft Delegation*: p > chi2	0.04	0.02	0.09	0.03

Note: Autoregressive Poisson models. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The results in Table 2 are in line with our theoretical expectations and the findings from the cross-country analysis. Hard-controlled delegation is associated with higher battle casualties whereas ADF killed more civilians when it was only softly controlled by the DRC; both effects

[42] Dickey-Fuller and Phillips-Perron tests reject the Null hypothesis of non-stationarity at the 1%-level.

are statistically significant. In contrast to the previous analysis, Models 5 and 6 suggest that soft-controlled delegation also increases combat violence as compared to rebels receiving no external support. However, Wald tests indicate that this effect is still smaller than that of hard delegation at a statistically significant level. In other words, these results suggest that hard and soft delegation affect rebel behavior in the hypothesized manner even when holding a number of potential confounders such as group ideology, target state, and demographical and geographical factors constant. More importantly, the shift in support modes in this case was not driven by ADF violence as it resulted from the group's main supporter losing power, not any conscious sponsor decisions based on previous group behavior.

Overall, the analysis of the ADF's activities in western Uganda thus provides further evidence supporting our claim that external support in the form of hard delegation increases fighting intensity but not rebel violence against civilians.

5. Conclusion

The combination of a global analysis of conflict-dyads in the period 1989-2009 and the within-case analysis of the ADF's rebellion in Uganda provide considerable support to our hypotheses about how state sponsors' control over 'their' rebels shapes wartime violence. Hard delegation increases combat violence but has no statistically significant effect on rebels' propensity to victimize civilians while soft delegation increases violence against civilians but does not affect the intensity of fighting.

By introducing the mode of a support relationship – hard or soft delegation – as an important, previously omitted factor, our paper contributes to scholarship on conflict dynamics. Differentiating between modes of delegation that provide state sponsors different degrees of control over 'their' rebels provides a tool to refine existing 'monistic' accounts of external support's effects on conflict dynamics. This paper constitutes only a first step towards understanding the impact of hard and soft delegation on conflict dynamics. Future research may not only probe whether our theory also applies, for instance, to conflicts during the Cold War but also examine the effects of hard and soft delegation on other conflict dynamics, such as conflict duration, rebel movement fragmentation, and side-switching (see Popovic 2017; Tamm 2016, 2020).

Finally, our findings also yield clear policy implications. External support to non-state groups is not only provided by supposedly 'villainous' regimes, such as those headed by Charles Taylor or Omar Al-Bashir, but also by Western governments who supported challengers against the Taliban or the Islamic State. Democracies should therefore care more about whether the support they provide is used to combat terrorist groups as intended or to

victimize the civilian population. Our research clearly points to the necessity of supervising non-state actors' use of the resources they were supplied with.

External Support in Civil War: How State Sponsors' Control over Rebels Shapes Conflict Dynamics - Appendix

In this Appendix, we provide descriptive statistics and a series of additional analyses that complement and further support the main article's findings. These include the following sections:

A.1. **Descriptive statistics** of all variables used in the analysis
A.2. Fixed-Effects Poisson models using **matched samples**
A.3. Fixed-Effects Heckman **Selection models**
A.4. Fixed-Effects Poisson models adjusting for **truncated samples**
A.5. Fixed-Effects Poisson models with **disaggregated hard delegation variables**
A.6. Fixed-Effects and pooled Poisson models with **one-year lags of combat violence, rebel violence against civilians and government violence against civilians**
A.7. Fixed-Effects Poisson models with **year-fixed effects**
A.8. Fixed-Effects Poisson models with **non-independent error structures**
A.9. Fixed-Effects Poisson models controlling for **additional group characteristics**
A.10. Fixed-Effects Poisson models accounting for **group ideology**
A.11. Fixed-Effects Poisson models **without control variables**
A.12. Autoregressive Poisson models of **with alternative lag structures**

A.1. Descriptive statistics of all variables used in the analysis

Table A1: Descriptive statistics

Variable	*Observations*	*Mean*	*Std. Dev.*	*Min*	*Max*
Battle-related Casualties	1,533	831.788	3293.052	25	68614
Civilian Casualties	1,404	167.952	1010.746	0	30110
Hard Delegation	1,751	.345	.476	0	1
Soft Delegation	1,751	.073	.259	0	1
Rebel Strength	2,421	.081	.272	0	1
ln Population	2,417	10.123	1.439	5.958	14.082
ln GDP p.c.	2,417	7.662	1.048	5.315	10.797
Anocracy	2,698	.355	.479	0	1
Democracy	2,698	.333	.472	0	1
Excl. Ethnic Population	2,809	.247	.236	0	.98
Number Land Borders	2,751	4.452	2.338	0	20
Gov. Civilian Casualties	948	85.690	306.213	0	5801
Rebel Territorial Control	2,409	.435	.496	0	1
Rebel Mobil. Capability	2,386	.478	.500	0	1
Rebel Arms Procurement	2,359	.236	.425	0	1
Rebel Fighting Capability	2,388	.220	.415	0	1
Rebel Groups in Conflict	2,871	1.636	1.151	1	8
Nationalist	1,034	.500	.500	0	1
Ethnoreligious	1,034	.151	.358	0	1
Marxist	1,034	.152	.359	0	1
Religious	1,034	.122	.327	0	1
Battle-related Casualties*	78	22.462	41.849	0	247
Civilian Casualties*	78	9.039	18.797	0	103
Hard Delegation*	78	.154	.363	0	1
Soft Delegation*	78	.397	.493	0	1

Note: Variables marked with * are from ADF time-series analysis

A.2. Fixed-Effects Poisson models using matched samples

First, we employ matching to reduce sample imbalance, hence making treated and untreated observations (i.e. observations that receive a certain type of support and observations that do not) more comparable to each other (Ho et al. 2007). Specifically, we employ coarsened exact matching (Iacus et al. 2012) which groups similar values of variables into coarser categories and creates strata $s \in S$ in which units belong to the same coarsened categories of the covariates. Matching weights are then assigned based on whether a unit has no match, i.e. its stratum does not include both treatment and control units (weight 0), is a control (weight $\frac{m_C m_T^s}{m_T m_C^s}$ where m_C and m_T are the total number of control and treatment units, respectively, and m_C^s and m_T^s their number in stratum *s*), or is treated (weight 1). The analysis is then run by estimating the same model as employed otherwise while using the matching weights.

Table A2: Fixed-Effects Poisson models using matched samples

Dependent Variable	(1) Battle-related Casualties	(2) Battle-related Casualties	(3) Civilian Casualties	(4) Civilian Casualties
Hard Delegation	0.723***		-0.455	
	(0.207)		(0.325)	
Soft Delegation		-0.404*		0.529*
		(0.225)		(0.315)
Rebel Strength	-0.977	-3.295***	-6.234***	-5.895***
	(0.784)	(0.899)	(1.903)	(1.131)
ln Population	2.784	-3.646	-0.023	3.618
	(2.036)	(3.242)	(3.105)	(3.082)
ln GDP p.c.	-1.807	-3.972**	0.214	-2.072
	(1.243)	(1.957)	(1.338)	(2.079)
Anocracy	0.231	0.216	1.201	-0.588
	(0.323)	(0.373)	(1.152)	(1.537)
Democracy	0.372	9.626*	-4.784	-7.271*
	(3.104)	(4.975)	(3.919)	(3.877)
Excl. Ethnic Population	3.930	5.279	33.561**	16.043
	(8.308)	(10.222)	(16.774)	(19.605)
Constant	-10.399	68.937**	2.091	-15.455
	(21.240)	(34.346)	(26.990)	(27.226)
Observations	167	167	88	88
Dyad-fixed Effects	Yes	Yes	Yes	Yes
L_1-Initial	0.934	0.888	0.942	0.908
L_1-Matched	0.205	0.230	0.246	0.204
Log Likelihood	-16631.527	-39337.245	-2442.080	-1978.458

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

To assess whether matching was successful in reducing sample imbalance, Iacus, King, and Porro (2012) propose an L_1 statistic measuring global imbalance over all variables used in the procedure; lower values imply less imbalance and matching should hence result in a lowered L_1 statistic. In table A2, we re-estimate models two and four from the main analysis using matched samples. For this, we use either the hard delegation or the soft delegation dummy as treatment and match on all control variables. As is shown in the table, this resulted in a reduction of sample size but also clearly lowered sample imbalance. At the same time, results from this analysis using matched samples are substantively in line with our main models as hard delegation is found to increase combat violence but not violence against civilians while soft delegation has a positive effect only on violence against civilians.

A.3. Fixed-Effects Heckman Selection models

Next, we explicitly account for external support to rebels being nonrandomly assigned by modelling the first stage of rebel groups receiving external support and thus becoming "eligible" for the distinction between hard and soft delegation. For this, we log-transform our two dependent variables and use hackman selection models. In the first stage, we thus model whether rebel groups receive external support as a result of a number of controls from the outcome stage as well as two identifying variables. As identifying variables, we employ the time since a group last received external support as well as the number of direct neighbors a conflict country has; both should affect the probability of receiving support while otherwise not influencing the level of violence. In the second stage of these selection models, we then test the effect of hard and soft delegation on rebel groups' combat violence and civilian victimization, conditional upon the group enjoying external support. The results from these selection models substantively mirror those of the main analysis as hard delegation increases only combat violence whereas soft delegation only has a positive effect on civilian victimization.

Table A3: Fixed-Effects Heckman Selection models

Dependent Variable	(5) ln Battle-related Casualties	(6) ln Battle-related Casualties	(7) ln Civilian Casualties	(8) ln Civilian Casualties
Outcome Equation				
Hard Delegation	0.491**		-0.350	
	(0.247)		(0.350)	
Soft Delegation		-0.195		0.526*
		(0.252)		(0.306)
Rebel Strength	-0.119	-0.071	-1.123*	-1.141**
	(0.770)	(0.779)	(0.595)	(0.574)
ln Population	1.472	1.109	-0.144	-0.152
	(1.223)	(1.267)	(1.474)	(1.407)
ln GDP p.c.	-0.817*	-0.788*	-0.041	0.002
	(0.438)	(0.447)	(0.625)	(0.617)
Anocracy	-0.144	-0.170	0.205	0.221
	(0.458)	(0.464)	(0.493)	(0.483)
Democracy	-2.802***	-2.821***	0.101	0.122
	(0.471)	(0.477)	(0.490)	(0.488)
Excl. Ethnic Population	0.961	0.956	-3.039*	-3.066*
	(0.921)	(0.935)	(1.752)	(1.750)
Selection Equation				
Rebel Strength	0.215	0.215	0.258	0.256
	(0.197)	(0.197)	(0.206)	(0.208)
ln Population	-0.039	-0.039	-0.038	-0.038
	(0.061)	(0.061)	(0.061)	(0.061)
ln GDP p.c.	-0.098	-0.098	-0.104	-0.103
	(0.074)	(0.074)	(0.077)	(0.077)
Anocracy	0.250*	0.250*	0.257*	0.254*
	(0.139)	(0.139)	(0.141)	(0.141)
Democracy	0.408*	0.409*	0.404*	0.404*
	(0.222)	(0.222)	(0.222)	(0.222)
Excl. Ethnic Population	0.582**	0.583**	0.639**	0.636**
	(0.289)	(0.289)	(0.320)	(0.322)
Number of Land Borders	0.068***	0.068***	0.072***	0.072***
	(0.026)	(0.026)	(0.027)	(0.027)
Support Years	-0.727***	-0.724***	-0.673***	-0.680***
	(0.076)	(0.076)	(0.135)	(0.130)
Support Years^2	0.072***	0.072***	0.066***	0.066***
	(0.012)	(0.012)	(0.018)	(0.018)
Support Years^3	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
Constant	0.095	4.298	6.571	5.750
	(13.873)	(14.177)	(17.320)	(16.500)
Observations	1,333	1,333	1,333	1,333
Dyad-fixed Effects	Yes	Yes	Yes	Yes
Log Likelihood	-1037.598	-1040.612	-1163.231	-1161.979

Note: Heckman selection models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

A.4. Fixed-Effects Poisson models adjusting for truncated samples

Next, we explore whether our results are driven by cut-off points in our dependent variables. Our measure of conflict intensity is truncated due to being observed only if at least 25 battle deaths were reported in a dyad-year; this can result in biased estimation of the expected value of the dependent variable (Greene 2012: 873–9). To address this, we re-estimate model two using fixed effects Poisson models for truncated samples (Grogger and Carson 1991). We do not have this problem with the indicator of violence against civilians as it is based on the UCDP GED data and hence starts from zero; however, this means that it is different from most of the existing literature on violence against civilians which has mostly set all observations below 25 to zero. We thus re-estimate model four while setting all observations below 25 to zero as well as while setting them to missing and using fixed effects Poisson models for truncated samples. Our substantive results remain in line with those of the main analysis.

Table A4: Fixed-Effects Poisson models adjusting for truncation

Dependent Variable	(9) Battle-related Casualties	(10) Civilian Casualties (<25: missing)	(11) Civilian Casualties (<25: zero)
Hard Delegation	0.572***	0.342	0.471
	(0.146)	(0.356)	(0.570)
Soft Delegation	0.104	1.349***	1.450***
	(0.269)	(0.406)	(0.508)
Rebel Strength	0.274	-0.381	-0.834
	(0.430)	(0.711)	(0.549)
ln Population	0.182	-0.180	0.318
	(0.626)	(1.617)	(2.164)
ln GDP p.c.	-0.325	0.984	0.320
	(0.315)	(0.735)	(0.761)
Anocracy	-0.478**	-0.115	0.002
	(0.217)	(0.392)	(0.500)
Democracy	-0.633*	-0.458	-0.303
	(0.375)	(0.322)	(0.475)
Excl. Ethnic Population	0.576	-1.055	-1.981***
	(0.647)	(0.672)	(0.653)
Observations	912	279	518
Dyad-fixed Effects	Yes	Yes	Yes
Truncation adjustment	Yes	Yes	No
Wald test	0.062	0.014	0.026
Log Likelihood	-191267.372	-27955.271	-45280.500

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

A.5. Fixed-Effects Poisson models with disaggregated hard delegation variables

In a next step, we further disaggregate our categorical external state support variable. Until now, we have only distinguished hard from soft delegation. However, there are two concerns in doing so. First, we theoretically discussed two types of hard delegation: ex ante socialization and ex post coercion. To ensure that aggregating these support types does not substantively affect our results, we re-estimate Models 2 and 4 while distinguishing between soft delegation, ex ante hard delegation (i.e. training) and ex post hard delegation (i.e. access to territory or military infrastructure or troops). While ex post hard delegation has a somewhat stronger effect on combat deaths than ex ante hard delegation, both effects are positive, statistically significant, and can be statistically distinguished from the effect of soft delegation but not from each other. For violence against civilians, we find that the effect of ex post hard delegation is small and statistically insignificant while that of ex ante hard delegation is marginally significant at the 10%-level but much smaller than that of soft delegation and statistically indistinguishable from that of ex post hard delegation.

In addition, one may be concerned that the positive effect of hard delegation on combat violence is mainly driven by the inclusion of direct troop support being included in this variable. We thus also re-estimate models 2 and 4 from the main analysis while separating such armed interventions from other types of hard delegation. However, our results indicate that both kinds of hard delegation, with and without direct troop support from external state sponsors, increase combat violence while having no statistically significant effect on violence against civilians.

Table A5: Fixed-Effects Poisson models with disaggregated hard delegation variables

Dependent Variable	(12) Battle-related Casualties	(13) Civilian Casualties	(14) Battle-related Casualties	(15) Civilian Casualties
Hard Delegation 1: ex ante	0.463***	0.558*		
	(0.176)	(0.317)		
Hard Delegation 2: ex post	0.604***	0.461		
	(0.232)	(0.610)		
Hard Delegation 1: troop support			0.636***	-0.028
			(0.189)	(0.252)
Hard Delegation 2: other support			0.533**	0.757
			(0.256)	(0.794)
Soft Delegation	0.064	1.434***	0.130	1.239***
	(0.195)	(0.469)	(0.200)	(0.391)
Rebel Strength	0.257	-0.787	0.265	-0.637
	(0.620)	(0.571)	(0.642)	(0.521)
ln Population	0.132	0.325	0.199	0.401
	(0.706)	(2.100)	(0.735)	(2.205)
ln GDP p.c.	-0.322	0.301	-0.321	0.179
	(0.446)	(0.745)	(0.458)	(0.688)
Anocracy	-0.483*	0.001	-0.482*	0.017
	(0.272)	(0.505)	(0.274)	(0.482)
Democracy	-0.633*	-0.303	-0.635*	-0.282
	(0.362)	(0.476)	(0.362)	(0.464)
Excl. Ethnic Population	0.583	-1.964***	0.624	-1.877***
	(0.845)	(0.726)	(0.869)	(0.628)
Observations	912	560	912	560
Dyad-fixed Effects	Yes	Yes	Yes	Yes
Wald test:				
HD1 = HD2	0.364	0.834	0.639	0.241
HD1 = SD	0.011	0.006	0.001	0.000
HD2 = SD	0.001	0.061	0.089	0.474
Log Likelihood	-190687.543	-43106.902	-190774.922	-42548.546

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

A.6. Fixed-Effects and pooled Poisson models with one-year lags of combat violence, rebel violence against civilians and government violence against civilians

Existing research on violence in armed conflict has shown that especially violence against civilians is driven by armed actors' previous battlefield losses (Hultman 2007; Raleigh and Choi 2017; Wood 2014a). Past violence may have feedback effects on present violence while also informing (potential) external supporters about rebels' behavior and current military prospects, thus affecting whether and how they (continue to) support them. At the same time controlling for lagged values of combat violence and civilian victimization may be problematic in the presence of fixed effects due to the Nickell bias (Nickell 1981). Below, we thus re-estimate models two and four while including one-year lags of combat violence, rebel violence against civilians as well as government violence against civilians and both with and without dyad-fixed effects. Results remain substantively unchanged from those of the main analysis.

Table A6: Fixed-Effects Poisson models with additional dynamic control variables

Dependent Variable	(16) Battle-related Casualties	(17) Battle-related Casualties	(18) Civilian Casualties	(19) Civilian Casualties
Hard Delegation	0.646***	0.408**	0.317	-0.218
	(0.238)	(0.163)	(0.272)	(0.184)
Soft Delegation	-0.080	0.141	1.300***	0.562*
	(0.293)	(0.298)	(0.327)	(0.325)
Rebel Strength	0.582	0.376	-0.513	0.234
	(0.563)	(0.312)	(0.586)	(0.312)
ln Population	-0.444	-0.000	0.882	-0.099*
	(0.860)	(0.053)	(1.086)	(0.057)
ln GDP p.c.	-0.057	0.076	0.218	-0.161**
	(0.485)	(0.079)	(0.541)	(0.079)
Anocracy	-0.510	-0.292	-0.365	-0.185
	(0.349)	(0.233)	(0.411)	(0.216)
Democracy	-0.653*	-0.768***	-0.540	-0.851***
	(0.394)	(0.247)	(0.390)	(0.222)
Excl. Ethnic Population	0.203	-0.416	-1.922***	-1.436***
	(0.781)	(0.307)	(0.454)	(0.382)
Battle-related Casualties$_{t-1}$	-0.000	0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Rebel Civilian Casualties $_{t-1}$	0.001***	0.000**	0.000*	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Gov. Civilian Casualties $_{t-1}$	0.000	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant		6.087***		7.466***
		(0.898)		(0.838)
Observations	624	624	441	441
Dyad-fixed Effects	Yes	No	Yes	No
Wald test	0.002	0.387	0.001	0.024
Log Likelihood	-117021.182	-388200.327	-19190.436	-35035.059

Note: Poisson models, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.7. Fixed-Effects Poisson models with year-fixed effects

The inclusion of lagged dependent variables presents one way to deal with time dynamics. Alternatively, we now address overall time trends in combat violence and violence against civilians by including year-fixed effects in addition to dyad-fixed effects. As before, soft delegation increases only violence against civilians but has no statistically significant effect on combat violence. In contrast, hard delegation here is found to have a positive and statistically significant effect not only on the number of battle casualties but also on civilian victimization. However, this effect is only statistically significant on the 90%-level and is markedly smaller than that of soft delegation as a Wald test rejects the null hypothesis that they do not differ with $p<0.008$.

Table A7: Fixed-Effects Poisson models with year-fixed effects

Dependent Variable	(20) Battle-related Casualties	(21) Civilian Casualties
Hard Delegation	0.500***	0.611*
	(0.153)	(0.358)
Soft Delegation	0.122	1.649***
	(0.234)	(0.348)
Rebel Strength	0.470	-1.073
	(0.403)	(0.805)
ln Population	-0.671	2.750
	(1.188)	(2.688)
ln GDP p.c.	-0.663**	0.097
	(0.298)	(0.629)
Anocracy	-0.408**	-0.147
	(0.195)	(0.322)
Democracy	-0.597*	-0.356
	(0.349)	(0.398)
Excl. Ethnic Population	0.356	-1.624**
	(0.542)	(0.736)
Constant	19.150	-21.470
	(12.519)	(29.778)
Observations	912	560
Dyad-fixed Effects	Yes	Yes
Year-fixed Effects	Yes	Yes
Wald test	0.083	0.008
Log Likelihood	-179876.526	-31477.477

Note: Poisson models with dyad- and year-fixed effects, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.8. Fixed-Effects Poisson models with non-independent error structures

Given that numerous existing studies show the interconnectedness of violence against civilians and combat violence, we next model these two processes as interrelated by allowing the errors to be non-independent between our two models. However, results stay substantively unaffected.

Table A8: Fixed-Effects Poisson models with non-independent errors

Dependent Variable	(22) Battle-related Casualties	(23) Civilian Casualties
Hard Delegation	0.568***	0.474
	(0.146)	(0.442)
Soft Delegation	0.094	1.421***
	(0.268)	(0.382)
Rebel Strength	0.274	-0.808
	(0.430)	(0.705)
ln Population	0.129	0.352
	(0.621)	(1.315)
ln GDP p.c.	-0.311	0.301
	(0.313)	(0.567)
Anocracy	-0.481**	-0.009
	(0.217)	(0.344)
Democracy	-0.631*	-0.312
	(0.374)	(0.375)
Excl. Ethnic Population	0.597	-1.928***
	(0.649)	(0.731)
Observations	912	
Dyad-fixed Effects	Yes	

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.9. Fixed-Effects Poisson models controlling for additional group characteristics

In our main models, we parsimoniously control for rebel group characteristics by including only an indicator of the strength relative to the government they are fighting. However, previous studies show that a number of other rebel group characteristics, e.g. their number, territorial control, and ability to fight, mobilize recruits, and procure arms, can drive conflict dynamics (Cunningham et al. 2009; Wood and Kathman 2015). Below, we thus control for these additional factors alongside and instead of rebel strength while re-estimating models two and four. As in the main analysis, results suggest that hard delegation increases only the number of battle-related deaths while soft delegation increases only rebels' violence against civilians.

Table A9: Fixed-Effects Poisson models controlling for additional rebel attributes

Dependent Variable	(24) Battle-related Casualties	(25) Battle-related Casualties	(26) Civilian Casualties	(27) Civilian Casualties
Hard Delegation	0.569***	0.597***	0.473	0.524
	(0.210)	(0.209)	(0.565)	(0.584)
Soft Delegation	0.078	0.252	1.422***	1.289***
	(0.207)	(0.192)	(0.488)	(0.385)
Rebel Strength	0.330		-0.809	
	(0.595)		(0.510)	
Rebel Territorial Control		-0.498		0.510**
		(0.641)		(0.219)
Rebel Mobilization Capability		-1.242		-3.135**
		(0.800)		(1.302)
Rebel Arms Procurement		2.631**		1.324**
		(1.037)		(0.574)
Rebel Fighting Capability		-2.109***		-2.734**
		(0.548)		(1.307)
Rebel Groups in Conflict	-0.097	0.048	0.006	-0.036
	(0.118)	(0.113)	(0.144)	(0.143)
ln Population	0.036	0.472	0.360	0.053
	(0.706)	(0.897)	(2.111)	(2.459)
ln GDP p.c.	-0.338	-0.767*	0.303	0.360
	(0.440)	(0.466)	(0.746)	(0.801)
Anocracy	-0.486*	-0.591**	-0.012	-0.058
	(0.264)	(0.273)	(0.471)	(0.486)
Democracy	-0.632*	-0.793**	-0.315	-0.388
	(0.358)	(0.372)	(0.448)	(0.463)
Excl. Ethnic Population	0.560	0.988	-1.926***	-2.038***
	(0.806)	(0.930)	(0.641)	(0.702)
Observations	912	886	560	557
Dyad-fixed Effects	Yes	Yes	Yes	Yes
Wald test	0.001	0.022	0.028	0.055
Log Likelihood	-190215.964	-182469.809	-43111.142	-42589.642

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Additionally, rebel groups might receive external support by multiple states. Our focus on conflict dyad years assumes that a hard delegation relationship with a single external state supporter is sufficient to observe the effect of hard control on rebel violence. However, it might be argued that a rebel group with more than one state sponsor is less dependent – particularly when one of its sponsors employs hard control – and thus more likely to slack (Popovic 2017; Salehyan et al. 2014). We therefore condition the effect of hard delegation on the number of support states; this variable is again coded from the UCDP external support data. Because the number of supporters is only theoretically meaningful for groups that actually receive external state support, we use the heckman selection specifications for these models.

Table A10: Fixed-Effects Heckman Selection models with the number of supporters

Dependent Variable	(28) ln Battle-related Casualties	(29) ln Battle-related Casualties
Outcome Equation		
Hard Delegation	0.503*	-0.625
	(0.270)	(0.422)
Number of Supporters – 1	0.054	-0.195
	(0.298)	(0.350)
Hard Delegation x Number of Supporters - 1	-0.051	0.465
	(0.321)	(0.402)
Rebel Strength	-0.144	-1.206
	(0.799)	(0.768)
ln Population	1.462	0.043
	(1.229)	(1.825)
ln GDP p.c.	-0.814*	0.080
	(0.438)	(0.909)
Anocracy	-0.130	-0.042
	(0.500)	(0.408)
Democracy	-2.787***	-0.171
	(0.512)	(0.393)
Excl. Ethnic Population	0.959	-3.632
	(0.950)	(2.577)
Selection Equation		
Rebel Strength	0.215	0.275
	(0.197)	(0.200)
ln Population	-0.039	-0.035
	(0.061)	(0.068)
ln GDP p.c.	-0.098	-0.102
	(0.074)	(0.077)
Anocracy	0.250*	0.270
	(0.139)	(0.175)
Democracy	0.408*	0.399*
	(0.222)	(0.232)
Excl. Ethnic Population	0.581**	0.664*
	(0.289)	(0.348)
Number of Land Borders	0.068***	0.072***
	(0.026)	(0.027)
Support Years	-0.727***	-0.621
	(0.076)	(0.429)
Support Years^2	0.072***	0.059
	(0.012)	(0.053)
Support Years^3	-0.002***	-0.001
	(0.000)	(0.002)
Constant	0.432	0.325
	(0.770)	(0.980)
Observations	1,333	1,333
Dyad-fixed Effects	Yes	Yes
Log Likelihood	-1037.559	-1156.958

Note: Heckman selection models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Moreover, we include the centralization of a rebel group's command structure as a further control variable. Less centralized and formalized rebel organizations might be more likely to slack as rebel group's weak central leadership diminishes a support state's control over the fighting on the ground (Popovic 2017). We take this variable from the Non-state Actor data (Cunningham et al. 2009, 2013).

Table A11: Fixed-Effects Poisson models controlling for additional rebel attributes

Dependent Variable	(30) Battle-related Casualties	(31) Civilian Casualties
Hard Delegation	0.561***	0.463
	(0.211)	(0.565)
Soft Delegation	0.076	1.333**
	(0.218)	(0.539)
Rebel Strength	0.276	-0.827
	(0.636)	(0.515)
Rebel Central Command	0.870**	
	(0.406)	
ln Population	0.154	0.422
	(0.719)	(2.106)
ln GDP p.c.	-0.315	0.272
	(0.458)	(0.753)
Anocracy	-0.484*	-0.014
	(0.273)	(0.489)
Democracy	-0.641*	-0.320
	(0.365)	(0.462)
Excl. Ethnic Population	0.603	-1.902***
	(0.848)	(0.638)
Observations	890	546
Dyad-fixed Effects	Yes	Yes
Wald test	0.002	0.063
Log Likelihood	-190404.929	-42775.305

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.10. Fixed-Effects Poisson models accounting for group ideology

We argue that rebel groups receiving external support should have a higher disposition to victimize civilians than wished for by their sponsors. This argument does not take into account the claim that armed nonstate actors show substantial variation in their willingness to attack civilians based on their ideology (Asal and Rethemeyer 2008; Polo and Gleditsch 2016). We thus now re-estimate models which control for or interact the types of external support with binary items indicating a rebel group's ideology (Polo and Gleditsch 2016). The results for combat violence are presented in table A8 while those for violence against civilians are in table A9, they are substantively in line with those of the main analysis.

Table A12: Fixed-Effects Poisson models accounting for group ideology: Combat Violence

	(22)	(23)	(24)	(25)	(26)
Dependent Variable: Battle-related Casualties					
Hard Delegation	0.603***	0.325**	0.655***	0.591**	0.613***
	(0.214)	(0.146)	(0.235)	(0.237)	(0.230)
Soft Delegation	0.118	0.062	-0.012	0.101	0.083
	(0.209)	(0.217)	(0.221)	(0.234)	(0.245)
Separatist	-1.228***	-1.018***			
	(0.352)	(0.176)			
Ethnoreligious	-0.363		0.535		
	(0.306)		(0.386)		
Marxist	0.219			0.312	
	(0.318)			(0.211)	
Religious	-0.433				-0.277
	(0.352)				(0.517)
Hard Delegation x Separatist		0.586			
		(0.363)			
Soft Delegation x Separatist		0.150			
		(0.426)			
Hard Delegation x Ethnoreligious			-0.525		
			(0.521)		
Soft Delegation x Ethnoreligious			0.049		
			(0.467)		
Hard Delegation x Marxist				-0.169	
				(0.442)	
Soft Delegation x Marxist				0.056	
				(0.493)	
Hard Delegation x Religious					-0.294
					(0.410)
Soft Delegation x Religious					0.159
					(0.412)
Rebel Strength	0.284	0.282	0.326	0.273	0.253
	(0.631)	(0.597)	(0.649)	(0.638)	(0.643)
ln Population	0.109	0.237	0.061	0.184	0.069
	(0.703)	(0.686)	(0.709)	(0.775)	(0.721)
ln GDP p.c.	-0.258	-0.260	-0.286	-0.317	-0.302
	(0.430)	(0.417)	(0.423)	(0.459)	(0.458)
Anocracy	-0.483*	-0.471*	-0.452	-0.485*	-0.488*
	(0.273)	(0.273)	(0.291)	(0.277)	(0.276)
Democracy	-0.592*	-0.584*	-0.577	-0.638*	-0.637*
	(0.342)	(0.344)	(0.357)	(0.368)	(0.367)
Excl. Ethnic Population	0.570	0.521	0.580	0.595	0.602
	(0.832)	(0.849)	(0.850)	(0.846)	(0.859)
Observations	906	906	906	906	906
Dyad-fixed Effects	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-188485.235	-187236.394	-189124.958	-190694.854	-190271.362

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A13: Fixed-Effects Poisson models controlling for and interacting support types with group ideology: Violence against Civilians

Dependent Variable: Civilian Casualties	(27)	(28)	(29)	(30)	(31)
Hard Delegation	0.482	0.382	0.504	0.426	0.337
	(0.563)	(0.743)	(0.575)	(0.597)	(0.252)
Soft Delegation	1.430***	1.089***	1.572***	1.455***	1.249**
	(0.493)	(0.380)	(0.473)	(0.553)	(0.549)
Separatist	-1.159**	-1.696***			
	(0.509)	(0.202)			
Ethnoreligious	0.374		0.879		
	(0.449)		(0.750)		
Marxist	-0.724			-1.300**	
	(0.702)			(0.586)	
Religious	0.424***				0.419***
	(0.144)				(0.144)
Hard Delegation x Separatist		0.699			
		(0.957)			
Soft Delegation x Separatist		1.164			
		(0.735)			
Hard Delegation x Ethnoreligious			-0.726		
			(0.560)		
Soft Delegation x Ethnoreligious			-1.615**		
			(0.735)		
Hard Delegation x Marxist				1.058*	
				(0.602)	
Soft Delegation x Marxist				-0.356	
				(0.625)	
Hard Delegation x Religious					0.338
					(1.475)
Soft Delegation x Religious					0.266
					(0.705)
Rebel Strength	-0.816	-0.742	-0.719	-0.797	-0.798
	(0.510)	(0.472)	(0.458)	(0.512)	(0.531)
ln Population	0.274	0.292	0.332	0.134	0.480
	(2.132)	(2.223)	(2.113)	(2.172)	(2.163)
ln GDP p.c.	0.343	0.353	0.350	0.357	0.215
	(0.750)	(0.808)	(0.751)	(0.745)	(0.793)
Anocracy	0.005	0.029	-0.022	0.036	-0.033
	(0.493)	(0.502)	(0.497)	(0.506)	(0.553)
Democracy	-0.285	-0.233	-0.313	-0.268	-0.343
	(0.468)	(0.479)	(0.468)	(0.481)	(0.529)
Excl. Ethnic Population	-1.952***	-2.062***	-1.969***	-1.935***	-1.861***
	(0.636)	(0.653)	(0.645)	(0.631)	(0.676)
Observations	559	559	559	559	559
Dyad-fixed Effects	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-42890.552	-42752.942	-42860.228	-42893.844	-42925.337

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Even when controlling for group ideology, hard delegation is found to increase battle-related deaths whereas soft delegation increases civilian victimization. The respective constituent terms of hard and soft delegation also remain positive and significant in all interaction models, suggesting that their overall effect is not driven by one ideology-based subsample of groups. However, the results from the interaction models also suggest that soft delegation has no effect on the amount of violence against civilians committed by ethnoreligious groups while hard delegation may actually increase Marxist group's level of civilian victimization.

A.11. Fixed-Effects Poisson models without control variables

Finally, we re-estimate models two and four while dropping all control variables. We do so because control variables may sometimes induce bias instead of ameliorating omitted variables bias (Clarke 2005). The results of this naïve analysis are in line with those of the main analysis as hard-controlled delegation has a positive and statistically significant effect on the number of combat casualties but not that of civilian casualties whereas the opposite is the case for soft delegation. In both models, Wald tests also reject the null hypothesis that the effects of hard and soft delegation are the same.

Table A14: Fixed-Effects Poisson models without control variables

Dependent Variable	(32) Battle-related Casualties	(33) Civilian Casualties
Hard Delegation	0.641***	0.346
	(0.192)	(0.564)
Soft Delegation	0.213	1.396***
	(0.195)	(0.457)
Observations	912	560
Dyad-fixed Effects	Yes	Yes
Wald test	0.015	0.016
Log Likelihood	-198268.751	-44043.647

Note: Poisson models with dyad-fixed effects, Standard errors clustered on the dyad in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.12. Autoregressive Poisson models of with alternative lag structures

In the main analysis, we present autoregressive Poisson models with first- and second-order auto-regressive terms. To ensure that our results are not just driven by a specific lag structure, we present models with alternative lag structures, only AR(1) and up to AR(3), here. As in the main analysis, these alternatively include and exclude lags of the other dependent variable mirroring the current lag structure.

Table A15: Autoregressive Poisson models with AR(1) and AR(3) lag structures: Combat Violence

Dependent Variable	(34) Battle-related Casualties	(35) Battle-related Casualties	(36) Battle-related Casualties	(37) Battle-related Casualties
Constant	2.052***	2.372***	2.092***	2.395***
	(0.371)	(0.363)	(0.353)	(0.338)
Hard Delegation	1.844***	1.559***	2.402***	1.893***
	(0.482)	(0.479)	(0.491)	(0.447)
Soft Delegation	0.999**	1.001**	0.807*	0.900**
	(0.433)	(0.436)	(0.407)	(0.408)
Civilian Casualties$_{t-1}$	0.016**		0.017***	
	(0.006)		(0.006)	
Civilian Casualties$_{t-2}$			-0.003	
			(0.012)	
Civilian Casualties$_{t-3}$			0.169	
			(2.152)	
AR(1)-term	0.219**	0.273**	0.123	0.228*
	(0.109)	(0.121)	(0.108)	(0.128)
AR(2)-term			-0.129	-0.114
			(0.129)	(0.132)
AR(3)-term			-0.368**	-0.237*
			(0.140)	(0.128)
Observations	76	76	73	73
Wald test	0.052	0.161	0.009	0.002
R-squared	0.263	0.178	0.396	0.289

Note: Autoregressive Poisson models. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The results are also in line with those of the main analysis as only soft delegation has a positive and statistically significant effect on violence against civilians while both hard and soft delegation are found to increase combat violence, with the former having a larger effect.

Table A16: Autoregressive Poisson models with AR(1) and AR(3) lag structures: Violence against Civilians

Dependent Variable	(38) Civilian Casualties	(39) Civilian Casualties	(40) Civilian Casualties	(41) Civilian Casualties
Constant	0.677	1.028**	0.888	1.024*
	(0.470)	(0.508)	(0.878)	(0.527)
Hard Delegation	-2.004	-0.932	-2.491	-0.444
	(1.555)	(1.607)	(3.196)	(1.667)
Soft Delegation	1.916***	1.941***	1.910**	1.953***
	(0.489)	(0.550)	(0.890)	(0.572)
Battle-related Casualties$_{t-1}$	0.013***		0.016*	
	(0.004)		(0.009)	
Battle-related Casualties$_{t-2}$			-0.009	
			(0.013)	
Battle-related Casualties$_{t-3}$			-0.009	
			(0.014)	
AR(1)-term	0.096	0.079	0.001	0.078
	(0.130)	(0.129)	(0.072)	(0.135)
AR(2)-term			-0.001	0.063
			(0.039)	(0.135)
AR(3)-term			0.003	-0.041
			(0.004)	(0.129)
Observations	76	76	72	72
Wald test	0.010	0.066	0.165	0.138
R-squared	0.282	0.176	0.120	0.172

Note: Autoregressive Poisson models. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Conclusion

Armed intrastate conflict remains a major source of suffering as it can lead to severe human loss and has adverse log-run effects on affected countries' economic development and public health (Collier et al. 2003; Ghobarah et al. 2003). However, not all armed intrastate conflicts are created equal as some, such as the civil wars in Syria (2011-ongoing), Southern Sudan (1983-2005) or the former Yugoslavia (1991-2001), result in casualty numbers in the ten- and hundred-thousands as well as major political upheaval whereas other conflicts, for instance rebellions in Cabinda, Western Sahara or Bodoland, remain unresolved but at low intensity for a long time while barely registering in the international news media. Across four chapters, this dissertation has sought to contribute to our knowledge on why some conflicts become extremely violent, both within combat as well as against non-combatants, whereas others remain at a much lower level of intensity. In doing so, it has focused on two aspects of rebel groups, namely their *force structure* and their *external support structure*.

1. Summary of the four substantive chapters

The first substantive chapter has argued that child soldiering and the victimization of civilians, arguably two of the grimmest features of contemporary armed conflict, are intimately related. However, this relationship is not as straightforward as suggested by case studies that propose a direct link from children being enlisted as soldiers to civilians being killed. Instead, I have proposed that this relationship is conditional on what type of group children were recruited by. This is because children have weak pre-existing norms and should thus be likely to normalize the use of violence when exposed to it. However, they should also be susceptible to rebels' efforts at shaping their norms via training for the same reason. As a result, they should closely follow group rules in their behaviour towards civilians, meaning that their effect on the group's violence against civilians should be conditioned by these rules. This led me to expect that child soldiering increases civilian victimization only for groups who have little incentives for restraint towards civilians because they lack local support. In contrast, this should not be the case for groups who benefit from the support of a constituency which they should seek not to alienate through the use of violence. Results from statistical tests using dyad-level data from a global sample of conflicts, 1990-2010, and a battery of robustness checks provide support for these claims.

In chapter two, I have studied how the presence of female combatants affects a rebel group's behaviour towards civilians as well as its combat performance. On the one hand, I argued that female rebels should decrease civilian victimization because they are better able to

peacefully engage with and obtain information from civilians due to being perceived as less dangerous than male combatants. On the other hand, I posited that female combatants decrease rebel combat effectiveness because, against the backdrop of gender inequalities, their presence decreases trust and coordination ability within otherwise all-male fighting units. I test these expectations using micro-level data from the Nepalese Civil War, 1996-2006, and find considerable support for them. All-male rebel units were responsible for 25% more killings of civilians than perfectly balanced ones. But all-male units were also able to eliminate 12.25 enemies for 10 own casualties whereas rebel units with more than 25% female participation incurred at least as many casualties as they caused. These findings thus corroborate the notion that female combatants appear more trustworthy and approachable for civilians but that their presence also decreases fighting unit cohesion. And more generally, they indicate that women's participation has a substantial effect on rebel behaviour.

The third substantive chapter subjected this notion to further scrutiny by reconsidering the effect of female rebel combatants on wartime rape. In contrast to the previous analysis by Loken (2017), it found clear support for the idea that rebel groups which include women as fighters are less prone to commit acts of conflict-related sexual violence than strictly male groups. While in line with the results of chapter two, this conclusion differs from Loken's and I show that this is due to strong modelling assumptions in the specification of her analysis. In her original analysis, all independent variables enter the model in a continuous fashion, including categorical ones with more than two outcome categories and a variable indicating the year of the observation, thus restricting their effect on wartime rape to be linear. I show that there is little theoretical and empirical support for assuming such linear effects and that, when allowing these variables to have nonlinear effects, results are in line with the claim that female rebel combatants decrease wartime rape. However, additional analyses extending Loken's models also indicate support for her organizational theory of rape as the effect of female combatants on rape is driven by groups without misogynistic gender norms.

Finally, chapter four develops an indirect governance model of external support in armed conflict and applies it to rebels' violent interactions with civilians and enemy combatants. Drawing on recent advances in the scholarship on indirect governance, it suggests differentiating two modes of support relationships in indirect wars: hard delegation and soft delegation. Hard delegation allows for the hierarchical control of rebels' compliance whereas soft delegation lacks the hard control instruments to enforce rebels' compliance. We therefore expected that the two modes of external support relationships should have very different effects on violence between combatants and violence against non-combatant civilians. We hypothesize

that it is only hard delegation that increases conflict intensity (whereas soft delegation does not); and soft delegation increases rebels' violence against civilians (whereas hard delegation does not). Our analysis of a global sample of armed conflicts, 1989-2009, and the Allied Democratic Forces' insurrection against the Ugandan government support these expectations.

2. Contributions to the existing literature

In sum, this thesis thus provides clear contributions to our understanding of the roles of force structure and external support in driving violence in armed intrastate conflict. As discussed at length in the introduction, most existing scholarship examining the effects of force structure has paid little attention to, or even actively rejected (Loken 2017), the role of individual combatant attributes, instead emphasizing the effects of organizational features such as ideological training or mode of recruitment. Chapters one, two, and three challenge this lack of attention to combatant attributes by showing that both the presence of child soldiers and of female combatants affects how rebels behave towards civilians and how they perform in battle (see also Haer and Böhmelt 2016a). In doing so, these chapters join an emerging body of literature elucidating how rebel groups' inclusion of children and women among their fighting forces alters their durability, mobilization ability, and conflict outcomes (Braithwaite and Ruiz 2018; Haer and Böhmelt 2016a, 2017; Loken 2020; Manekin and Wood 2020; Wood 2019). At the same time, chapters one and three suggest that these effects of individual-level attributes do not operate in isolation but instead interact with group level attributes. As such, the results of these chapters should not be taken to mean that combatant attributes supersede group-level ones but instead that they operate alongside and, depending on the setting, amplify or diminish each other. For instance, chapter one indicates that recruits differ in how susceptible they are to groups socialization practices, with child soldiers' norms and actions being easier to alter than that of adult recruits. In contrast, chapter three indicates that female combatants are generally associated with rebel groups engaging in lower levels of rape but also suggests that this effect may disappear in some, particularly misogynistic groups where women are then forced and/or socialized into participating in conflict-related sexual violence (see Cohen 2013b). And finally, these chapters also speak to the literature on why rebel organizations recruit women and children in the first place (see e.g. Beber and Blattman 2013; Lasley and Thyne 2015; Thomas and Bond 2015; Thomas and Wood 2018; Wood and Thomas 2017) by pointing to the strategic benefits these specific types of recruits have for rebel groups. Namely, they suggest that child soldiers are easier to turn into loyal and rule-adhering fighters than adult recruits whereas female combatants benefit rebels' relationship with civilians.

Finally, chapter four shifts the focus from rebels' force structure to the structure of their external support. It contributes to the literature on external support in armed intrastate conflict by introducing the mode of a support relationship, hard or soft delegation, as an important, previously omitted factor which goes beyond the simple distinction of a group either enjoying or not enjoying external support. This theoretical development provides an overarching framework to existing studies which contrast the effects of different support types by focusing on the provision of e.g. troops, training or weapons while ignoring other resources rebels receive from outside sponsors (Belgioiso 2018; Keels et al. 2020; Moore 2012; Sawyer et al. 2017; Stewart and Liou 2017). Importantly, it also allows us to show that, in contrast to earlier studies on this relationship, external support does not have a homogenously violence-increasing effect but that instead soft delegation only increases rebels' violence against civilians whereas hard delegation only increases their combat violence. Building on recent advances in scholarship on direct governance, the chapter thus refines existing accounts of the effect of external support on armed conflict by theorizing how the structure of the support relationship allows for or constrains sponsors' control opportunities and thus rebels' compliance.

3. Limitations and Directions for Future Research

However, these chapters can only provide initial progress in furthering our understanding of the roles of force structure and external support in driving rebel violence in intrastate conflict. First, due to limitations in space, time and resources, this thesis left a lot of ground unexplored. For instance, the argument that female combatants decrease violence against civilians because they increase rebels' rapport with civilians suggests that women may have further positive consequences for insurgent organizations that outweigh their negative effect on fighting effectiveness. By boosting their support and legitimacy among civilians as well as international observers, women's participation may allow rebels to survive longer in conflict but also increase their probability of being offered negotiations or mediation from third-party countries (see Manekin and Wood 2020; Wood 2019). At the same time, it is currently unclear whether women's inclusion as combatants in *governmental* armed forces has comparable effects; the literature on women's participation in peacekeeping forces (e.g. Karim 2017) may suggest yes whereas state forces' stronger organizational culture may suggest no (e.g. Brownson 2014). Similarly, an extensive literature is concerned with the post-conflict outcomes and reintegration of child soldiers (see e.g. Betancourt et al. 2013; Blattman and Annan 2010; Haer 2017) but the claim that child soldiers' behaviour during a conflict is conditional on the type of group they fight for suggests that their post-conflict outcomes and the policies necessary for their successful reintegration may also depend on who they fought for and what norms they were

trained to adhere to. And finally, the result that the effect of external support on violence in armed conflict depends on its mode, i.e. it being hard or soft delegation, opens up a variety of avenues for future research which should not only ask when sponsors choose one mode or the other (Heinkelmann-Wild and Mehrl 2020) but also extend this model to re-examine the effects of external support on e.g. conflict duration, rebel movement fragmentation, or sanctions against sponsors.

Second, the statistical analyses presented in the chapters of this dissertation, to a varying degree, ultimately only report robust correlations between their respective independent variable and rebel violence. This is the case particularly in chapters one and three which solely rely upon macro-level, country-year data to study processes which are theorized at the micro- and meso-level. This opens up the possibility of falling victim to ecological fallacies while also meaning that any statistical relationships presented there cannot represent an ultimate answer to whether child soldier increases civilian victimization or whether female combatants decrease war-time rape. In contrast, chapters two and four replace or at least complement such macrolevel analyses with more disaggregated analyses, meaning that their level of analysis more closely corresponds to their level of theorization but also that heterogeneity between units of observation presents less of a problem. That being said, future research should seek to collect and analyze more fine-grained quantitative data on the participation of women and children in rebel organizations, their external support structure, lethal and sexual violence against civilians as well as combat violence in order to trace whether e.g. it is actually children that commit violence in groups with little local support. At the same time, more research is clearly necessary on the precise mechanisms underlying the robust correlations established here, pointing to a need for additional fieldwork- or archive-based qualitative studies on these relationships.

Third and finally, chapters one-three, as well as the existing literature surveyed in the introduction and in these chapters, focus either on the personnel fighting for rebel organizations or on group-level practices such as political training. However, chapter four as well as an emerging literature on state security forces suggest that military organizations' materiel, i.e. the weapons and resources they can make use of, also significantly affect their combat effectiveness and outcomes (Caverley and Sechser 2017; Lyall and Wilson 2009; Mehltretter et al. 2019). In line with this, existing scholarship also provides some evidence that conflicts become more lethal when rebels receive major conventional weapons from abroad and can face government forces using conventional military tactics (Balcells and Kalyvas 2014; Moore 2012). Future work may thus consider to take the material aspects of rebel force structure seriously by collecting data on rebels' extent of mechanization or their use of major conventional weapons

such as aircraft, howitzers, or armored fighting vehicles (see Sechser and Saunders 2010).

4. Policy Implications

Finally, the results of this thesis also have practical implications for policy. First, the findings on the conditional effect of child soldiering on violence against civilians suggest that the effective re-integration of former child soldiers may depend on what norms they acquired during their time as combatants. That is, my results suggest that especially for children recruited by groups with a weak support base, re-integration programs may need to focus on instilling norms against violence, particularly as previous research has found the presence of former child soldiers to increase the probability of armed conflict to recur and existing programs for disarmament, demobilization and reintegration to exhibit little influence on this relationship (Haer and Böhmelt 2016b).

In contrast, the finding in chapters two and three that female combatants decrease rebel organizations' extent of lethal and sexual violence adds to findings that policewomen and female peacekeepers are seen as more trustable and approachable than their male counterparts (Córdova and Kras 2020; Karim 2017, 2019; Miller and Segal 2019) and has significant implications both for future research and for policy. If further studies in settings such as Afghanistan and Iraq or during peacekeeping operations could replicate the finding that fighting units with female participation have less hostile relations with civilian communities, both counterinsurgency and peacekeeping practitioners should consider making all-male units a thing of the past. This is the case even if future research corroborates the result that such units are less effective in combat as the success of these operations should ultimately rest on winning "hearts and minds", not fighting engagements (Galula 2006; Gizelis and Kosek 2005; Kalyvas 2006).

Finally, the theory and results in chapter four yield further clear policy implications. External support to non-state groups is not only provided by supposedly 'villainous' regimes, such as those headed by Charles Taylor or Omar Al-Bashir, but also by Western governments who support challengers against the Taliban or the Islamic State. Democracies should therefore care more about whether the support they provide is used to combat terrorist groups as intended or to victimize the civilian population. The research presented here clearly points to the necessity of supervising non-state actors' use of the resources they were supplied with.

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