

The Pro-Social Determinants of Violent Collective Action: Evidence from Participation in Militias in Eastern Congo

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October 2, 2022

Abstract

Why does violent collective action succeed? We conduct a series of surveys reconstructing the history of violent collective action covering twenty years (1994-2014) of the eastern Democratic Republic of the Congo's civil conflict. The surveys include one of the largest violent social movements of the region, which formed at the time of our survey. For a sample of 6,809 individuals, we construct a comprehensive history of participation in violent organizations and of their communities. We document several facts about participation in violent collective action: (i) *militias*—armed organizations that emerge from rural *communities* with community-oriented missions, predominate all other violent organizations; (ii) while militias offer little material rewards, militias' combatants joined them with the purported motivation to protect (or exact revenge for) their communities against threats of violence by actors perceived to be foreign; (iii) using quasi-experimental variation induced by a military policy which drastically reduced the state's ability to protect entire communities, we show that violent threats against the community lead to the formation of violent social movement chapters, fueled by spikes in participation from people who purportedly joined voluntarily, and by people who reported to be socially coerced, sparked by community leader efforts to mobilize participation; (iv) attacks by armed groups perceived to be foreign against an individual's community are associated with a subsequent increase in the probability that the individual joins a militia chapter purportedly motivated by the desire for revenge, to protect the community; this effect is particularly strong if their kin was also attacked, in which case they join with the purported motive to protect the family; (v) using shocks to the demand for gold, a valuable mineral that cannot easily be taxed by armed groups, we document that one such attack in the kin induces motivations to join a militia whose opportunity cost equals 8 times the yearly p.c. income. Our findings suggest that, alongside selfish strategic motivations, parochial altruism and community coercion are crucial in explaining the origins, and success, of violent collective action.

KEYWORDS: Collective Action, Protests, Revolutions

*Sanchez de la Sierra: University of Chicago, and NBER (corresponding author, raul@uchicago.edu). Data collection was funded by Private Enterprise Development in Low-income countries (PEDL), National Science Foundation, and International Center for Taxation and Development (ICTD). We thank Aimable Lameke, Desire Basibuhe, Christian Bazuzi, Lewis Butinda, Emmanuel Kandate, Frederic Koleramungu, Simeon Lukeno, Floribert Lwaboshi, Jumapili Zagabe, and to Jean-Paul Zibika for outstanding research. Soeren Henn, Matthew Pecenco, Carlos Schmidt-Padilla, and Haoyang Xie provided extraordinary research assistance. We thank Francesco Ammodio, Christopher Blattman, Jean Decety, Paul Dower, Soeren Henn, Sergei Guriev, Laura Montenegro, Benjamin Marx, Eoin McGuirk, Priya Mukherjee, Vesall Nourani, Nathan Nunn, Dominic Parker, James Robinson, Santiago Tobón, Oliver Vanden Eynde, Juan Vargas, Noam Yuchtman, Austin Wright for comments.

1 Introduction

For all of recorded history, revolutions, protest movements, militias, and armies, which have crucially depended on the effort of those who join them, have produced violence or threats of violence that have shaped property rights over lands, goods, and people, as well as political outcomes, and thus have been critical drivers of economic, social, and political change (e.g., Aidt and Franck (2015); Acemoglu and Robinson (2019)). While participating in them creates benefits that are diffuse for the groups they represent, participating also entails a large private cost, the risk of death: it is a collective action problem. There is now a growing literature in economics seeking to answer why violent collective action succeeds. Inspired by methodological individualism, much of this literature has focused on explaining its success through its ability to solve the free rider problem, either through “selective incentives” (Popkin, 1979), or through the role of beliefs in contexts of strategic interaction (Cantoni et al., 2019).

However, a rich qualitative literature in other social sciences has long suggested that expressive pro-social motivations towards the group that stands to benefit from violence—parochial altruism—and community institutions are crucial to explain the success of violent collective action (eg. Wood (2003)). This is consistent with fundamental research in anthropology, psychology, biology, and economics, which has shown that humans have evolved moral systems (Enke, 2017) and institutions (Greif, 1993; Ostrom, 1999) to solve social dilemmas—the “fundamental problem of human existence.” A challenge to analyze the role of parochial altruism in violent collective action is that participation is typically risky and hence secretive, thus existing studies have often relied on eliciting it and its motives from ex-participants long after they joined, or in the lab.

In this paper, drawing on authorizations we obtained from active armed organizations as well as recall data collection methods, we document the historical patterns of participation in violent collective action in one of the longest violent conflicts of recent history, that in eastern Democratic Republic of the Congo, covering twenty years (1994-2014), to answer the following questions. Who are the violent organizations, what are their goals, how significant are they, what do they do? What is the role of community and of parochially altruistic motivations in explaining participation? To what extent can economic incentives outdo parochially altruistic motivations? Eastern DRC represents a unique setting to answer these questions. First, 122 armed organizations operate today (Vogel et al., 2021), and hundreds more have operated since

the 1990's. Second, while some of them emerged in neighboring countries (henceforth, foreign-led armed groups), many emerged from the communities of eastern DRC (henceforth, militias), with the stated mission to protect against, and sometimes eradicate, foreign-led armed groups. Militias often aimed at attaining fundamental social change, sometimes with xenophobic undertones, and achieved meaningful successes over the last 20 years at making some communities safer, including exacting revenge. They often have the support of the population and of village chiefs and have been compared to violent social movements (Stearns and Botiveau, 2013; Marchais, 2016). Third, one of the largest violent social movements in recent DRC's history, the Raia Mutomboki, formed in the months leading to our study (Okapi, 2013). After various months of establishing contact, we obtained authorization by the Raia Mutomboki's leadership to conduct surveys. This enabled not just conducting surveys, but also allowed us to gain the trust of its participants, and to interview them around the time at which they joined and non-participants from the same areas.

The key input into our analysis is a unique panel dataset on armed groups, villages, and households dating back to 1990, which we constructed, over four years, on the basis of investigative techniques applied to historical events in 239 villages in North and South Kivu, two of the most conflict-affected provinces of the DRC. The dataset contains 707 episodes of armed groups' governance in 239 villages, as well as details on each of 931 violent events and recruitment campaigns. It also contains histories of 6,809 individuals, obtained through interviews in 2,277 households, with details on armed group participation by 662 combatants. In addition, we also gathered *anonymized* village-year-level number of participants into armed groups, that we reconstructed with village specialists of local history in South Kivu. Individual reports of participation almost exactly match village aggregate participation numbers. This is consistent with our qualitative data, which suggested that participating in militia is a local phenomenon, and recent for the Raia Mutomboki (hence, subject to low survivor bias) and is a socially accepted life choice (hence, subject to low social desirability bias). This corroboration is the starting point of our analysis.

A crucial component of the dataset is information about participation into the Raia Mutomboki at the time of participation, allowing us to circumvent survivor bias by observing those who join, and those who do not, at the time at which they are active, soon after the group was formed. To obtain this information, we obtained the leadership's approval to ask questions about the movement and participation into it, in surveys that we conducted across most of the territory they controlled. This component is the pillar of our analysis of the rise of militia chapters.

The results we obtain using our new dataset paint a picture of violent collective action as fueled by parochial altruism. First, we analyze the militias, and the purported motivations of those who join them. The militias, who offer few material rewards, and whose stated objectives include *community* protection, account for 36% of violent events perpetrated by nonstate armed groups (the remaining are perpetrated by foreign-led armed groups), 94% of combatants, and 50% of all episodes of territorial control of a village by an armed group (henceforth, village control episode). Villagers tend to support them and, consistent with the militias' missions, the security they provide tends to be effective to protect the community. The majority of individuals joined them voluntarily, with the purported motivation to protect, and to exact revenge, for their community. The rest had been socially coerced by their own community to participate.

Second, we analyze how the *threat* of foreign-led violence against the *community*, a public goods problem, motivates community leaders' to mobilize violent collective action and leads to spikes in militia participation. One event—the Congolese Army's Regimentation policy of 2011—created a security vacuum in some areas, but not in others. The policy, extensively documented by qualitative researchers (Stearns, 2013; Vogel, 2014), consisted in relocating the Congolese army battalions from one district, Shabunda, into urban centers—where they waited to be streamlined into regiments for more than a year. This led to the influx of a foreign-led organization with particularly violent tactics, drastically increasing the risk of violence in vacated areas, sparking the rise of the Raia Mutomboki, which was successful in driving out the perceived invaders (Stearns and Botiveau, 2013). The timing and targeting of the policy provides an opportunity to analyze the channels through which the value of community protection triggers violent collective action.

Using quasi-experimental time and space variation caused by the Regimentation, we find that exposure of the villages to the risk of violence by the foreign-led organization leads to chief-initiated militia recruitment campaigns into Raia Mutomboki chapters, to the creation and spread of new Raia Mutomboki units in the villages (henceforth, militia *chapter*), fueled by participation that was predominantly voluntary or coerced by the community. Furthermore, the rise in community coerced enrollment is concentrated in villages where chiefs initiated recruitment campaigns. This is consistent with participation being driven, in part, by community institutions ability to coerce.

Third, we show that the desire for revenge can explain who, at a time of violent mobilization, participates. Specifically, we show that those whose community or kin has been attacked are much more likely to join a militia chapter in the years after the attack, to protect, or for revenge.

To establish this result, we combine the details of 296 episodes of individual participation, which include detailed data of their household social and economic history, in a dedicated data collection in the province of South Kivu. This allows us to document the types of people who joined militias and their motivations, and compare them, *in the years in which they did*, to those who, *in the same communities in the same years*, did not. We first document that those who joined were wealthier and better educated than those who did not, and their assets did not increase more than the rest after they joined, suggesting that joining was not predominantly driven by self-interested economic motives. In contrast, at the time of joining, those who joined were twice as likely to have a kin member who had previously experienced attacks by foreign-led actors. We find that prior victimization by foreign-led perpetrators increases the likelihood of militia participation in militia in subsequent years, lagged by a few years, concentrated around the rise of the Raia Mutomboki, and driven by those who join to exact revenge or to protect the community. Exploiting within *village-year* comparisons, we show that foreign-led armed group attacks on the kin lead individuals to join a militia with the purported motivation to protect their family; those on the community, but not on the kin, lead individuals to join with the purported motivation for revenge and protect the community only. This suggests that parochially altruistic preferences, formed through direct victimization of relatives or community members, are central to voluntary violent participation.

To obtain a dollar value for this victimization effect, we exploit US mineral price changes for gold, which armed groups cannot easily tax, but for which the sector constitutes a realistic economic alternative for young men in the rural areas we study (Sánchez de la Sierra, 2020). Combining its price change with the location of gold deposits, we find that the effect of one attack on the kin on the decision to join mirrors, in the opposite direction, that of an 8-fold increase of the yearly p.c. income in the gold sector. This result is consistent with victimization of the family leading to the formation of parochially altruistic motivations that outperform reasonable changes in economic incentives, consistent with deontological moral preferences (Enke, 2017; Kant, 2019).

A central actor in the DRC's conflict, the militias are best described as violent collective action sparked by community leaders and fueled by parochial altruism—solidarity with the family and the community, and hatred against foreign-led armed groups. Their success resembles violent organizations in other settings, including revolutionary movements, political protests, but also ethno-nationalistic violent movements based on hatred of groups perceived to be foreign (Fryer and Levitt, 2012). Their success also taunts foreign donors' attempts to improve social cohesion

presumed weak (Humphreys et al., 2013), yet our results suggest that communities are widely successful at collective action in response to insecurity and desire for revenge.

A growing literature in economics has sought to understand the fundamental determinants for the success of violent collective action, including in political protests, riots, and revolutions. Much of that literature has focused on solutions to the free rider problem based on selfish motivated individuals with their own agency. In our context, where the central state has largely withdrawn from most of the rural areas we study, violent participation is one of the only channels available to citizens to achieve lasting social, economic, and political change—including to aspire to a life in safety, but also, to exact revenge against perpetrators perceived to be foreign perpetrators. Our study complements this literature by introducing the notion that violent collective action can also be in part explained by parochial altruism and through agency-constraining community institutions. While our results do not discard that strategic considerations are important (González, 2020; Cantoni et al., 2019), we show that parochial altruism is central to the very existence of a violent social movement, of its chapters, and to participation into them. Our findings do not suggest that economic considerations are unimportant. On the contrary, the value of protecting the community also includes the protection of the community’s assets, a diffuse economic benefit. However, our results document the role of parochial altruism in informing the decisions to participate in violent collective action. In a seminal study of political protests, pro-social motives have been shown to be important correlates of participants in protests in Hong Kong (Cantoni et al., 2022). Our results complement Cantoni et al. (2022) by documenting that participation in violent forms of collective action, which is particularly risky, is motivated by the desire to achieve outcomes that benefit the community—often at the expense of individuals outside the community—and that, when this is insufficient, communities enforce participation.

In contrast to the dominant explanations for collective action in economics, a vast literature in other social sciences emphasizes that parochial altruism is crucial to the success of violent collective action. For example, scholars in sociology, political science, and anthropology, have documented that moral beliefs around justice (Gurr, 1970), ideology (Gutiérrez Sanín and Wood, 2014), “pleasure of agency” to collectively express identity (Wood, 2003), victimization and revenge (Balcells, 2012, 2017), are often crucial to the decision to participate into a violent social movement or a violent struggle (eg. Gould (1991, 1995); Barkey and Van Rossem (1997); Staniland (2014);

Scacco (2016); Marchais (2016)).¹ Rather than introducing a new notion, our study complements this vast literature with evidence based on a large quantitative dataset, using analysis based on a quasi-experimental design, and quantifying the magnitude of such preferences.

Seminal research in economics has shown that victimization causes support for parochially altruistic violent action. For instance, in a study for the effect of the war in Vietnam (Dell and Querubin, 2017), victimization through US bombing in Vietnam increased communist activity and fighting. In a study of immediate relevance today, Bursztyn et al. (2020) show that victimization through US drone strikes in Pakistan caused the formation of anti-American preferences, a form of parochially altruistic preferences. Our study complements this strand of the literature by providing micro-foundations for how victimization induces individuals to engage in violent collective action. Specifically, we show that violent participation is explained by kin and community members' victimization, and channeled through the formation of parochially altruistic preferences as well as community coercion. Furthermore, we extend the strand of this literature focused on survey-experiments by documenting real participation in violent collective action.

Finally, our study extends a large literature across the social sciences that has showed that war causes in-group cooperation (Cantoni et al., 2016; Bursztyn et al., 2019; Bauer et al., 2016). This literature has consistently found that individuals exposed to war are more likely to enter into politics, an activity with presumably an important pro-social component or diffused benefit, and also more likely to display parochially altruistic preferences in laboratory games. Our study complements this literature in two ways. First, we document the specific ways in which war may lead to the formation of parochially altruistic fundamental preferences. In doing so, we open the black box for “war exposure.” Specifically, we document that being in a village that has been victimized by foreign-led perpetrators leads individuals to join in order to protect the community and to exact revenge, and that this effect has two significant components: victimization of the kin, and of the community. Second, with the access we have established, we extend the measurement to outside of the laboratory, to decisions with real-life consequences: joining a militia, which has direct consequences for the risk of death. As a result, our study also complements laboratory results by expanding some of the dependent variables they often focus on, cooperation and altruism, to a real context with a credibly high cost of participation in violent collective action.

¹For related studies, see Kalyvas and Kocher (2007); Humphreys and Weinstein (2008); Arjona and Kalyvas (2012); Arjona (2008); Viterna (2013); Parkinson (2013); Atran (2016); Petersen (2001); Viterna (2006).

2 Brief Background of Violent Collective Action in the DRC

Today, there are 122 armed groups in eastern DRC (Vogel et al., 2021). Since the First (1996–97) and Second (1998–2003) Congolese Wars, rebel factions from Rwanda and Burundi have consolidated bases in rural areas of North and South Kivu, and some Congolese armed groups have been led and financed by foreign powers (henceforth, foreign-led armed groups). Their presence is said to have triggered preexisting divisions between so-called “autochthonous” communities and alleged “foreigners” (Vlassenroot, 2002; Jackson, 2006; Vogel and Stearns, 2018).² The violence of foreign rebel factions has motivated many Congolese to support, mobilize, and even enroll in militias (Marchais, 2016). Prominent among these are the so-called Mayi-Mayi militias, originally formed during the Congolese wars as part of a large-scale armed resistance movement, which later splintered into many smaller groups. Mayi-Mayis have a strong social basis in rural South Kivu (Hoffmann and Verweijen, 2018), where joining the Mayi-Mayi has become part of life for many men.³ The militias often have both a defensive and an offensive mission, protecting their communities by fighting foreign-led armed groups on the one hand, and tracking those groups where they are settled, attacking and dislodging them, disrupting their operations.

3 Motivating Example: The Raia Mutomboki

Consistent with the literature, we henceforth refer to the group of people who control a village as a chapter. In some cases, they emerge from a village as the village own militia. In others, they arrive by expansion of another militia. Village chapters are crucial to understand the community logic of the Raia Mutomboki.

At the end of the Second Congolese War (1998–2003), most of the armed factions who had been operating in rural South Kivu were incorporated into the new Congolese National Army, the Forces Armées de la République Démocratique du Congo (FARDC). Their withdrawal created insecurity in the territory of Shabunda, South Kivu. Factions of the Front de Liberation du Rwanda (FDLR), a Rwandan armed group whose origins date back to the Rwandan Civil War, increased violations on civilians in Shabunda. In response, a local religious Minister, Jean Musumbu, mobilized the

²Those divisions date back to the 19th century (Hoffmann and Vlassenroot, 2014; Hoffmann et al., 2017).

³For an in depth analysis of the causes of armed mobilization in eastern DRC, see the Usalama project studies (Stearns, 2012; Stearns et al., 2013; Vlassenroot, 2013; Verweijen, 2016a).

population to fight the FDLR. This sparked the emergence of the Raia Mutomboki ("outraged citizens"), which garnered popular support and drove out the FDLR (Stearns, 2013; Vogel, 2014).⁴ The Raia Mutomboki are one of the most successful Mayi-Mayi militias in recent Congolese history.

The Raia Mutomboki then stayed dormant, only to reemerge in 2011 in response to a larger security threat (Stearns, 2013; Hoffmann and Vlassenroot, 2014; Vogel, 2014). In 2011, a government policy called "Regimentation" led to a drastic security vacuum in Shabunda, which increased exposure to FDLR violence. In response, the Raia Mutomboki emerged and took control over most of the district of Shabunda (Okapi, 2013), expelling the FDLR (Stearns, 2013). This rise was larger, and spread into neighboring territories (Hoffmann and Vlassenroot, 2014; Vogel, 2014).

Two central features of the Raia Mutomboki crystalize the argument of this paper. First, in the wave of 2011, mobilization was driven by the community. Local Raia Mutomboki chapters emerged in villages and towns across the territory of Shabunda, often with the active support of local authorities and customary leaders (Stearns, 2013), and using traditional religious beliefs and protective amulets known as *dawa* (Hoffmann, 2015). Socially coercive forms of recruitment and retention were reported in our qualitative interviews for the second, more successful wave of 2012. While social coercion is a collection of social, economic, and even physical threats produced by communities, in most cases, it amounts to the threats of exclusion. Consider the following accounts:

"After having obtained the medication (*dawa*), the group of young men from Bunyakiri came back home and went to the church in Kombaki [...] The members of the community asked for the benediction of the pastors, the local [traditional] chiefs, the local leaders, all the strata of society came to encourage the movement Raia Mutomboki for the effort they made to obtain the *dawa*. " (Bunyakiri in March, 3rd 2015)

"Each village chief went to their village to sensitize the youth to liberation and peace. . . They created a committee to enroll the chapters to the larger Raia Mutomboki movement. Each chief organized voluntary contributions by the community [of food] and cooperated with the local market presidents to create a tax to buy ammunition and food for the Raia Mutomboki." (Bunyakiri in March, 4th 2015)

⁴We provide background on the FDLR in Webpage Appendix A. Figure F.3 shows Raia Mutomboki fighters.

Second, community-oriented motivations were crucial to understand why many joined voluntarily (Vogel, 2014). Demands for community justice after years of human rights abuse and protection of the people of Shabunda were integral to the Raia Mutomboki's appeal. Members interviewed for this study repeatedly stressed outrage and the desire to protect their community:

[The FDLR] acted as mercenaries, pillaging and carrying out massacres on the population . . . They became more and more harmful until the population organized themselves, given that the national army was incapable of stopping the attacks of the FDLR . . . The Raia Mutomboki emerged in this village in 2011, and was essentially composed of *autochtones*, with the objective of chasing away the [FDLR] . . . At first, they reacted when they learned that the FDLR were in the village, but with the increase in FDLR violence they started attacking them directly, and thanks to their *fétiches*, they were able to get some weapons from the FDLR and chased the FDLR out of Shabunda. (Interview carried out in September 2013 in Nyambembe).

This quote is also consistent with existing studies of the Raia Mutomboki, which have shown that pro-social motivations are important to explain the success at generating participation to their collective action (Vogel, 2014).⁵

The wealth of qualitative evidence we amassed compels us to consider the possibility that the forces that govern violent collective action reflect in part parochial altruism and a leading role of community institutions.

4 Constructing a Database of Violent Collective Action

We have developed a comprehensive database of rural membership in, and relationship with, armed groups in South and North Kivu, two of the most conflict-affected provinces of DRC. Our team had hundreds of conversations with former and current armed group members. They visited hundreds of villages in South and North Kivu to reconstruct their history and conducted qualitative interviews, household surveys, and cross-validated sources.

⁵Self-interest material incentives also played a role in the decision of individuals to participate, particularly as the movement expanded into the mineral rich areas and it became less likely that joining entailed a large economic cost.

The core sample comprises interviews conducted in 1,041 households, in 133 villages, in South Kivu.⁶ For each household, and for each village, we gathered the history of violence, armed group presence and relationships with the village and respondents' membership.

Our research team lived in each village during one week. In that week, they built relationships with respondents and local communities, collected qualitative information about the history of violence in the village, worked with the history experts of the village to reconstruct and verify the village history, and implemented eight day-long household surveys. In each household, we randomly sampled one available male adult to work with a researcher during one full day, with appropriate breaks, compensation and food. The survey reconstructed the household's and the respondent's history, dating back to at least 1995.⁷ We gathered yearly information about the respondents' history of participation in armed groups, data on the details and the dates of all violent attacks experienced by the household and any of its members, as well as of occupational choice, migration, and acquisition and liquidation of assets, and the village history. At the end of the week, the researchers held a day-long meeting with the history specialists and contrasted their data to that gathered by the specialists during the week. At this meeting, the researchers were able to detect and correct reporting errors about village outcomes among the specialists. Section A explains the classification of armed groups in our sample.

Complementing this procedure, the researchers conducted qualitative interviews aimed at gaining an understanding of the logic of the militias, their relationship with the population, and their recruitment practices. In each visited village, researchers prepared a 5 page qualitative report about the village history, based on conversations with selected individuals. Specifically, they identified additional individuals who were knowledgeable about the militia that operated in the area, often village authorities, militia leaders, and former militia members. We have examined each village's qualitative report to cross-validate participation data from the household survey. In addition, the authors also conducted dozens of in-depth interviews with fighters and ex-fighters, both in North Kivu and South Kivu. We refer to this body of information as our "qualitative data."⁸

⁶These data were collected between June 2012 and September 2013. Before, the research team spent weeks in the districts' (Chiefdoms) capitals and in the lower-level districts (Groupements) to draw lists of all villages by consulting state and customary authorities. In the lists, we identified villages with a natural resource as well as a matched sample of villages with no resources, matched using the Mahalanobis metric using the vector of all available geographic characteristics. Then, we randomly sampled 133 villages.

⁷To identify the households to be interviewed, in each village, researchers first drew a village list with the village chief, and implemented random selection using pre-selected random numbers. We randomly sampled eight households in each village of South Kivu, and six households per village in North Kivu.

⁸To gather this data, we obtained authorizations from provincial, territory, and village authorities. Ethical

Our design reflects our care to mitigate risks arising from the fact that the information we collect is sensitive. Violent participation in armed groups, and especially in militias, is commonplace in eastern DRC, hence discussing participation is conceivable with appropriate measures, without fear of retribution. Reflecting our learning in the preceding three years of prior research in this context, we designed the survey to consist in a day-long conversation, with breaks for shared meals and snacks, where trust and rapport is built between respondents and researchers. Although researchers lived in the city, several of the researchers were originally from the district to which they were deployed. This ensured that they spoke the local language and were able to build trust.⁹

Our design also addresses measurement error in the events' dates. We used three design strategies that are based on established methods in recall studies from eyewitnesses and three months of piloting, tailored to the cultural context.¹⁰ First, for each year, we identified time cues that respondents would remember from their experience of the regional history. When asking a question about a historical event such as an attack or the acquisition of cattle, the researchers first examined whether the event was before or after the time cues in order to identify the year in which the event took place. Respondents sometimes did not know the exact year, but recalled with certainty whether it was after or before a given time cue. Since we know the year of the cues, this allowed the field researchers to identify the exact years. Second, the surveys were designed with a built-in tool for the generation of person-specific time-cues, anchored to the common knowledge time cues. At the start of each survey, the field researcher asked about information easy to recall: when they were born, when they got married, when they migrated (if applicable), using the historical common knowledge time cues. These life events provided respondent-specific time cues that researchers used for the remainder of the survey. This made it easy to determine the years of the events discussed in the survey, even when respondents were not sure about the year.¹¹ Third, we administered working memory tests, which we use for robustness.¹²

guidelines were followed to ensure that respondents did not feel obliged to participate.

⁹Our measure does *not* include involvement as informants, covert supporters, tax collectors, business partners, or any other role (see Petersen (2001)'s classification). We define participation as the active involvement in the security-related activities of an armed group. We henceforth refer to this involvement as participation, and its start as enrollment or joining. To gather this measure, we first ask each household survey respondent to list the armed groups that have been in the village where they lived at the time of the interview. For each group, the respondent is asked whether he had participated in it and, and the start and end dates. Respondents were also asked to describe participation episodes in any other group.

¹⁰See Sánchez de la Sierra (2020) for a detailed discussion of similar methods.

¹¹For instance, respondents easily answered whether they had acquired a cow before or after their marriage.

¹²We use those to assess robustness of our regression results in Section C.3.

Our design tackled two concerns with the use of self-reported data to measure participation. First, respondents may be averse to revealing their participation. Second, we interviewed respondents in the year of the survey, so survivor bias could affect whether our sample is representative/

Anticipating these concerns, we also gathered, in the separate village data gathering exercise led by the village specialists, the anonymized aggregate number of villagers who joined each armed group, each year. Since villages rarely disappear, these are not subject to survivor bias. And since these data are collected without revealing participants' identity, they are immune to respondent social desirability bias arising from retribution or shame. Importantly, to avoid individual survey biases from influencing the village specialists report of that measure, the researchers did not use household participation reports to correct the report of the village specialists (let alone that the researchers only had private information about 8 households, and hence had no basis to correct anonymized aggregate reports provided by the specialists). The anonymized data and the individual reports are almost identical, providing reassurance in the individual reports data.¹³

Victimization. In a household attack history module, each respondent is asked to report up to nine attacks by armed actors that happened in the village where they live in. Each respondent

¹³Figure F.7, Panel A, compares the household reports to the aggregate data. For comparison, for this figure, we exclude enrollment outside village armed group episodes. To construct the village level estimates based on the household reports, we first obtain the share of respondents who report to have participated in a group during a group governance episode. Then, we use the village size we recorded in the village survey, and the number of surveyed villages in South Kivu ($n=133$) to construct a village-level estimate of the number of participants. The mean village size in South Kivu in our sample is 216 households. These represent only 8% of militia participants (see Figure 2). The estimated number of militia participants based on the anonymized aggregate reports is 55 (rose bar), against 53.4 from the household reports (dark blue bar). The third light blue bar excludes individual-year observations for which the respondent was living outside the village. The number remains almost identical. The data reported by Figure F.7, Panel A, provide support to our data collection and reassures that participation in militias, the focus of this study, is not subject to social desirability or survivor biases that may confound our conclusions. Since combating is a hazardous occupation, with truthful reporting and in the absence of recall bias one would expect that the representative household level survey should be missing those killed in action, while the village level survey would not. However, this result is not surprising, and our quantitative and qualitative data allow to reconcile it. First, the largest share of participation into militia, by large, is driven by the Raia Mutomboki mobilization, which started 1 year before our data collection. This ensures that any survivor bias arising from mortality will be very small. Second, it is a fundamentally local phenomenon, hence even survivors return to their household, and most of the time are working part-time as a militiaman (in our data, 40% of participants were active at the time of the survey). Section C provides a discussion. The conclusion from this triangulation exercise is also supported by our qualitative data. Hundreds of individuals spoke to us openly and in detail about their participation in militia, and were often keen to refer us to other members we could talk to, both combatants and commanders. Unlike other conflicts where participating in militia is considered as an act of rebellion against the state, militias in the DRC often collaborate with the army—although confrontations also exist. Appeasing concerns of survivor bias, in this context, militias are fundamentally local organizations, and since participation is not systematically stigmatized, fighters often return to their rural communities after their participation ends (Marchais, 2016). Participation episodes, furthermore, tend to be short: the mean duration is 2.68 years, and 45% of those who reported to have participated were actively participating at the time of the survey, potentially reducing the concerns arising from survivor bias.

on average reports 2.08 attack events; the 99th percentile is seven events. Thus, reporting limit did not lead to loss of data. For each event, we observe the perpetrators' group, the perceived intention, whether respondent was physically victimized, whether the household was pillaged, the number of fatalities in the village, the number of persons who suffered sexual violence in the village. In addition, for each household member, each respondent reported (1) up to three events in which armed actors victimized the household member directly, and (2) of these, up to three events in which the armed actor perpetrated sexual violence on the household member. For each of those events, we identify the year in which they took place. In the analysis that follows, we focus on whether any household member other than the respondent was victimized (henceforth, household victimization), to exclude confounds arising from the direct effect of violence on productive capacity (for instance, through disability). Specifically, we use the attack information on each household member from both attack modules to construct an indicator for whether a nonrespondent household member was attacked. The information on victimization was gathered prior to that about participation. This helped prevent against motivated recounting of attacks. Section A.1 in Webpage Appendix provides additional details on these data construction.

Our design tackled possible measurement error arising from relying on individual self-reported data to measure attacks against the household and the village. For instance, respondents may be omit attacks on their village, or on their household, due to social desirability pressure or simply due to memory loss. Anticipating these concerns, and in order to assess the reliability of the respondents' attack data, we used two strategies. First, we also reconstructed this information during the end of week meeting with the history specialists. Second, we gathered the same information from each of the survey households. This allows us to verify whether reports of household (and of village) victimization correspond to reports of an attack taking place in the village in the same year, and by the same perpetrator, as reported by other households, and as reported through the village reconstruction of attacks implemented with the history specialists. Figure F.7, Panel B, conducts this triangulation exercise for attacks. We code one attack as verified by other households if at least one other household reports an attack by the same perpetrator taking place in the village in the same year. The same criterion is used for whether an attack is verified by the village chief survey. The vast majority of attacks reported by the household can be verified this way, ruling out that households are under-reporting attacks.¹⁴

¹⁴Since the data construction also includes victimization of household members, some of those can have taken

Household economic history. For each year since 1995, we observe how many cows, goats, and pigs the household bought or sold; how many fields the household bought or sold; whether respondent held a marriage; and whether the respondent worked in any of the following categories: agriculture, school student, mining, government-related jobs, or unemployment. Section A.2 in Webpage Appendix provides additional details of these data.

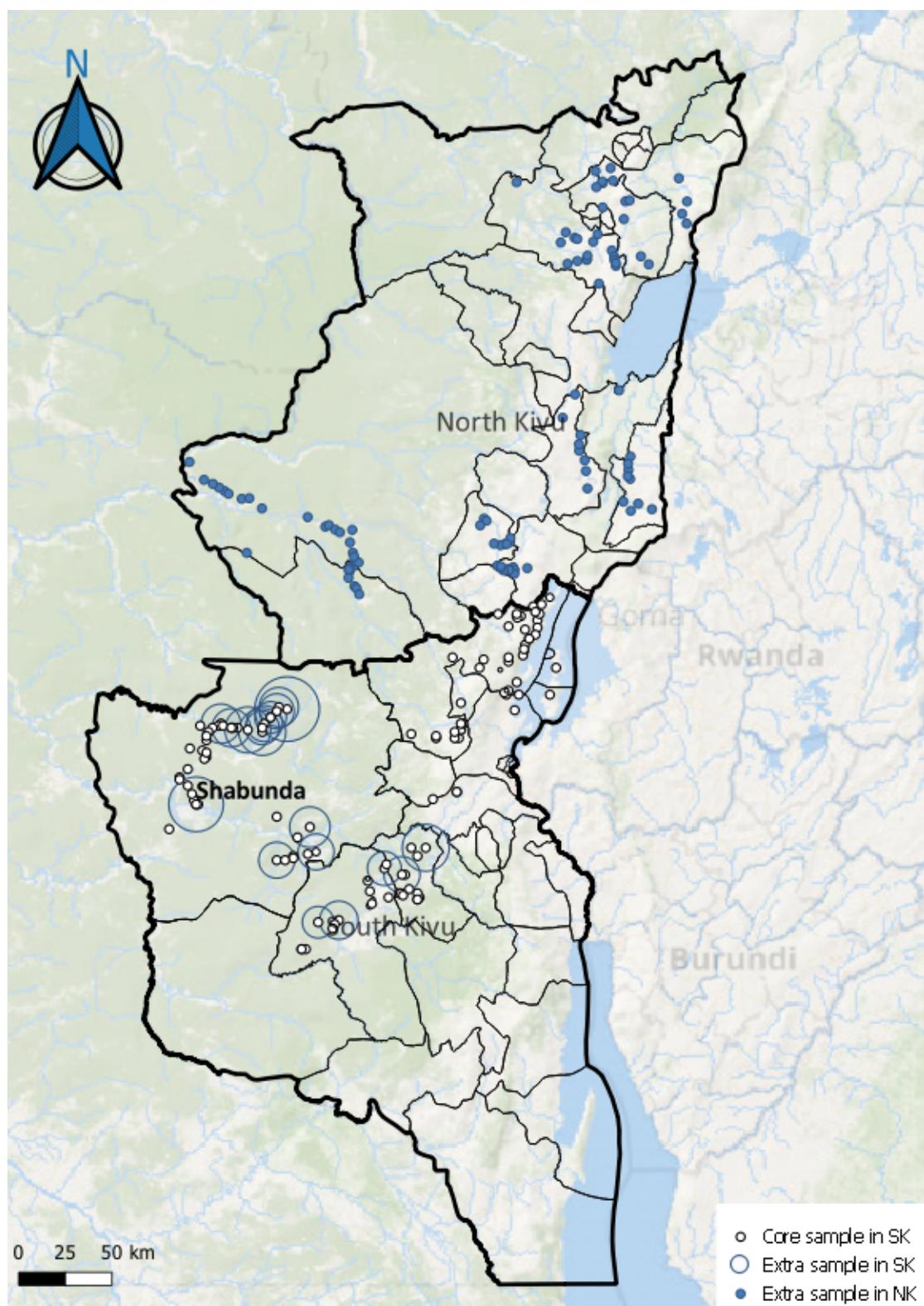
In addition to this dedicated procedure in South Kivu, we implemented four data collection exercises, which we are able to assemble to assess the robustness of our result. First, in the district of Shabunda, South Kivu, district of birth of the Raia Mutomboki, in addition to the 8 survey households per village, we interviewed an additional random sample of 32. Due to the fact that the logistics of the extra 32 households were designed for a separate study, only the module of any armed group participation were implemented (Chen et al., 2021). Second, we took advantage of a study we conducted in North Kivu in 2015 (Sánchez de la Sierra, 2020) to replicate some of the South Kivu data collection procedure in 591 households of 106 villages of North Kivu. This obtains a total of 239 villages of our sample. Due to time constraints, in this sample, we did not collect information on motives of participation nor household histories and assets. Third, we enhanced the data collection in North Kivu to also ask, to each of the 591 respondents, about the participation history of their household members. This provides participation histories of 2,705 household members, with no information on their motives. Finally, again for a different study, in 2016, we sampled 10 additional households in each of the 106 villages, and obtained the respondent's participation history. Due to time constraints, they provided very limited details.

Taken together, our samples constitute participation information of 6,809 individuals, collected in 2,277 households of 239 villages, covering the period 1990-2013 and including data on 662 individuals who, at some point, participated in armed groups. In the analysis that follows, we use the village-level data to provide a picture of armed groups in the region. Then, when analyzing individual motivations, we narrow the focus on the core sample.¹⁵ Figure 1 presents the different samples used in the paper.

place outside the village, hence some of those attacks that are not reported in the village data. When the data excludes those, the difference disappears. Cross-validation is also used for robustness in Section C.3.

¹⁵In Webpage Appendix C, we replicate each result from the analysis that follows including, for each result, all extra samples that are available for the analysis.

Figure 1: Study Samples



Notes. This Figure presents the study samples used in the paper. Data from all villages contain basic participation information. The core sample also contains information about the household economic history and the motivations to participate in militia.

5 The Militias as Violent Collective Action

In this section, we introduce the militias.¹⁶ The qualitative data suggest that the stated missions of militias are important to understand their behavior.¹⁷ Verweijen (2016b) presents documents describing the demands of militia in the DRC, so-called “cahier des charges”. For instance, the cahier des charges of the militia Mayi-Mayi Kapopo stated in January 2011:

“defend the territorial integrity and inviolability of the DR Congo against foreign forces; fight against injustices, dictatorship, values antithetical to democracy and for the establishment of the rule of law; protect the Congolese peoples and their goods.”

The militias’ missions appear motivated by community. Yet, the militias are an important actor of violent collective action. Figure 2 shows that, on average, in the period 1995-2013 a typical village of the sample including North Kivu and South Kivu produced 32.3 individual participants into militia. This accounts for 94% of all fighters.

Militias also account for a large share of the violence. Table 1, Panel A, presents the violent events in the sample. Violent events perpetrated by militias represent 36% of nonstate armed actor violent events that take place inside the sample villages (as recorded by our survey). They are five times more frequent than those by the DRC army.¹⁸ Militias also control territory. Militia chapters from the village represent a significant share of militia territory, comparable with other groups. Panel B.1 shows that there are 256 and 262 village control episodes of militia and foreign-led armed groups respectively. Of the militia episodes, 48% are by chapters formed in the village.

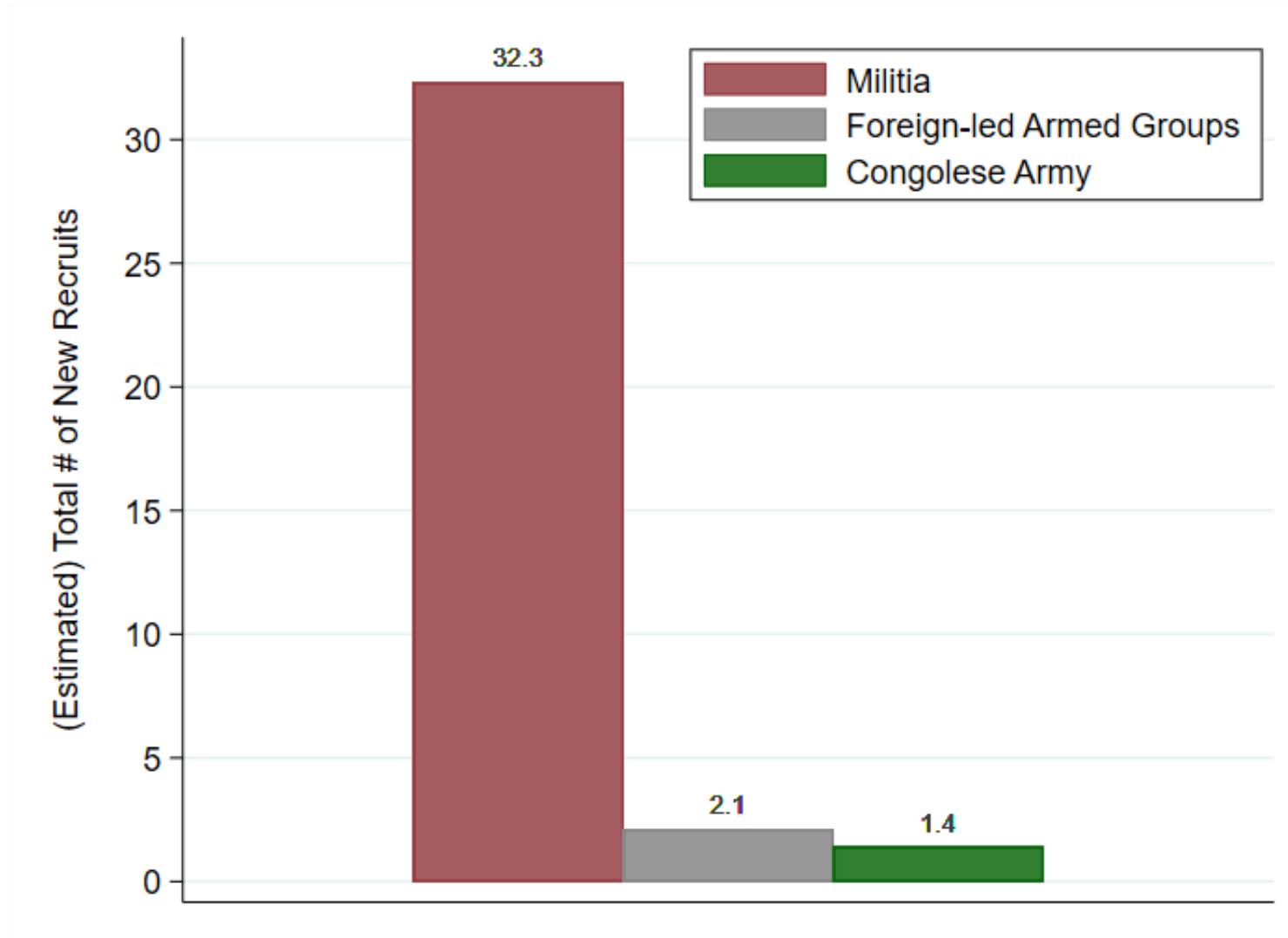
Panel B.2 shows that militias are just as able to raise taxes as any other armed group. Militia chapters, especially those formed in the village, are also widely more successful at obtaining popular support than any other group. Panel B.3 shows that militia chapters formed in the village face less

¹⁶The militias and other armed groups recorded in our sample are presented in Table A.1.

¹⁷Consider, for instance, the mission statement of the the Nduma Defense of Congo-Renewed (Figure F.4). Source: May 18th 2016 internal operations report. The NDC-Renewed (NDC-R) split from the Nduma Defense of Congo (NDC) in 2014, and defeated it in 2017

¹⁸Note that the number of violent events with sexual violence perpetrated by foreign-led armed groups is much larger than that of militias, so is their propensity to engage in sexual violence for a given violent event. However, this masks potentially important variation: the propensity to perpetrate sexual violence by militia chapters formed in the village in each recorded violent event is similar to that of foreign-led armed groups, and twice as large as that perpetrated by militia chapters formed outside. We note that our violence data is unable to determine whether the violent episode is perpetrated by a chapter from the village or from outside and that the origin in Panel A is manually inferred from the name of militias. Many militias with common names are coded as coming from outside, but could be a village chapter. For this reason, the comparison in this panel must be interpreted with caution.

Figure 2: The Predominance of Militias: Number of Recruits, by Armed Group Type



Notes. This Figure presents the average number of participants in each type of armed group for a village in the full sample including North and South Kivu. To construct the village level estimates based on the household reports, we first obtain the share of respondents who report to have participated in a group during a group governance episode. Then, we use the village size we recorded in the village survey, and the number of surveyed villages ($n=239$) to construct a village-level estimate of the number of participants. The mean village size in our full sample (comprising North Kivu and South Kivu) is 268 households. Figure F.8 in the Online Appendix shows that this difference cannot be explained by biased measure of participation in foreign armed groups. The estimated total number of new recruits, 32.3, differs from that in Figure F.7, 55, because in this figure we are able to use both North and South Kivu samples. In Figure F.7, which draws on the village aggregate anonymized data, we rely only on the core sample, where there is a higher propensity to participate.

opposition, enjoy more cooperation by chiefs and parents to encourage the youth to join, include the chief or his relatives as the chapter's leader half of the time, and rarely force the chief.

The stated objectives of militias emphasize the provision of security, but Militia's behavior could be just as that of any other armed group. Table 1, Panel B.4. shows that, for 52% of militia village control episodes, the protection they provided was perceived by the villagers to be effective. This contrasts with 40% for foreign-led armed groups. Importantly, this difference is *entirely* driven by militia chapters formed in the village, for whom, in 74% of episodes, they are perceived to provide effective security, against 29% for those formed outside. The reader may find it interesting that the Congolese army protection is perceived to be the most effective. This is unsurprising: the Congolese army is also the best equipped and trained of those groups. However, note that, from the number of Congolese army village control episodes and their average duration, the army is essentially absent in most of the sample, reflecting state weakness. Consistent with militia chapters formed in the village responding to community demands for protection, we find that chapter members attack villagers less.¹⁹

The motivations of those who join reflect militia's security provision objectives. Table 2 presents the means of indicators for whether the respondents who joined a militia reported to have been driven by economic gain (Panel A), community oriented motivations (Panel B), or were coerced to join (Panel C), for all combatants, and separately for those who joined a chapter formed in the village and those formed outside.

Consistent with the purported mission of militias, 76% of respondents reported to have joined for community-oriented motivations. These include, in order of importance: to protect the community, to protect the family, or for revenge. Protection of the community accounts for 57% of all combatants. In contrast, only 11% of respondents report to have joined for economic gain. Most of those were motivated by money. These data also suggest chapters formed in the village are the most successful in channelling community-oriented motivations.

Finally, 13% of respondents said they did not join voluntarily. The majority of those mentioned

¹⁹The preceding analysis suggests that militia chapters may be effective at providing protection. We informally examine this conjecture by exploiting variation in militias' chapters presence. Table E.9 presents the estimated coefficients of a regression of various indicators of violence by any armed group against the household on various forms of militia chapter presence. We separately analyze exposure to violent events, and to sexual violence perpetrated by armed actors. We confirm that the presence of militia chapters formed in the village and, in addition to this effect, participating in them, drastically reduces the propensity that a household member is the victim of sexual violence. This suggests that militia chapters protect the community members against gruesome violence.

Table 1: The Predominance of Militias: Violence, Territorial Control, and Popular Support

	Militia, From:			Foreign g.	Army	P-value
	Anywhere (1)	Village (2)	Outside (3)	(4)	(5)	(4)-(1) (6)
A. Violent Events (Bureau 3): # Events	274			499	51	
Fraction of Events With Sexual Violence	0.34	0.60	0.33	0.54	0.31	0.00
Fraction of Events With Village Fatality	0.47	0.80	0.46	0.56	0.31	0.02
Value Stolen in Attack (USD)	5.07	0.52	5.24	10.48	1.70	0.03
 B. Governance: # Village Control Episodes	256	129	127	262	189	
<i>B.1. Chapter's Duration</i>						
Episode Duration (# Years)	2.24	1.91	2.57	3.63	4.52	0.00
<i>B.2. Chapter's Finance (Bureau 1)</i>						
Taxed in the Village	0.83	0.71	0.94	0.79	0.40	0.32
Total Value Taxed, per year (USD)	59.45	65.01	54.43	75.02	33.60	0.08
<i>B.3. Chapter's Popular Support (Bureau 5)</i>						
There Was Opposition Against the Chapter	0.20	0.16	0.24	0.29	0.06	0.03
Parents Encouraged Their Children to Join	0.33	0.42	0.16	0.18	0.20	0.00
Chief Encouraged the Youth to Join	0.36	0.47	0.14	0.19	0.23	0.00
Chief or Relative is the Chapter's Leader	0.31	0.43	0.00	0.01	0.01	0.00
Chief was Forced to Support the Chapter	0.33	0.26	0.52	0.71	0.10	0.00
<i>B.4. Chapter's Security Provision (Bureau 2)</i>						
Provided Security Perceived to be Effective	0.52	0.74	0.29	0.40	0.83	0.01
A Chapter Member Attacked Villagers	0.51	0.32	0.70	0.73	0.13	0.00

Notes: Units for the number of observations are reported in the panel headers. This table presents basic characteristics of armed groups' violent events (Panel A) and governance episodes (Panel B), separately for militias (Columns 1-3), foreign-led armed groups (Column 4), and the Congolese army (Column 5). Column (6) reports the p-value for whether the difference between columns (1) and (4) is significant. Panel A does not dis-aggregate by attacks perpetrated by militia chapters formed in the village or outside because our data do not contain this information (see Section 4). Figure F.6 presents the functional hierarchy of one militia. As for many armed groups in eastern DRC, it mirrors that of conventional state armies. Bureau 3, led by commander T3, commands the operations, for which it needs human and financial resources. As in state armies, Bureau 1 provides Bureau 3 with personnel. Bureau 1 is also in charge of taxing civilians. Bureaus 2 and 4 provide intelligence and logistics. Our violence data source cannot distinguish whether the violent episode is perpetrated by a chapter from the village or from outside and that the origin in Panel A is manually inferred from the name of militias. Many militias with common names are coded as coming from outside, but could be a village chapter. For this reason, the comparison in this panel must be interpreted with caution.

Table 2: Militias' Community-Oriented Missions, Combatants Community-Oriented Motivations

	Participants in a Militia Chapter Formed:			
	Anywhere	Outside	Village	Villa-Outsi
Obs.	276	29	246	
A. Economic Incentives:	0.11	0.29	0.09	-0.20***
For Money	0.08	0.29	0.05	-0.23***
For Status	0.03	0.00	0.04	0.04
B. Non-Pecuniary Motivations:	0.76	0.50	0.79	0.29***
To Protect The Community	0.57	0.36	0.60	0.25**
To Protect The Family	0.10	0.07	0.10	0.03
For Revenge	0.09	0.07	0.09	0.02
C. Coercion	0.13	0.21	0.12	-0.10

Notes: This table presents the motivations to join militias as reported by the combatants. Observations are in number of respondents. Table D.16 shows that the conclusions are preserved including the only additional sample for which we also collected motivations, the extra 32 households in each village of the district of Shabunda. *Anywhere* reports the sample of individuals who joined a militia chapter, irrespective of where the chapter was formed. *Outside* reports the sample of individuals who joined a militia chapter, only for those who joined a chapter formed outside of the survey village. *Village* reports the sample of individuals who joined a militia chapter formed in the village of survey.

alleged social coercion, rather than abduction. In our data, abduction is virtually absent among militias.²⁰ Social coercion includes various forms of social pressures, the fear of being ostracized by the community, or even direct instructions from village powerholders, including the parents. In practice, the village chief acts as a public signal, causing subsequent social coercion by the village social and political institutions.

We provided evidence that the behavior of militias, which represent a significant share violent organizations, and the self-reported motivations of those who join, could be explained by community demands for protection. Confirming this conjecture requires a deeper investigation into the role of the community in mobilizing participation, and the types of people who join a militia.

6 How A Shock to Insecurity Leads to the Birth of A Militia

We have shown that community-oriented motivations and social coercion are prevalent in militia recruitment. In this section, we analyze the role of community demand for protection and two mechanisms that re-align individual incentives towards those of the community.

6.1 Proximate Causes and Mechanisms of Militia Recruitment

Militia recruitment is typically carried out through public meetings in rural areas (see Figure F.5 for an example of public recruitment campaign by another militia). These are often initiated by militia, but they can be the initiative of the chief. Demonstrating the importance of those campaigns, internal records of the Nduma Defense of Congo-Renewed (NDC-R) indicate that, in January 2018-June 2020, the NDC-R conducted 10 such village campaigns monthly in their territory of 97 villages (source: Dunia Butinda et al. (2021)), amounting to 1.2 recruitment campaigns per village per year on average.

To separate the campaigns initiated by the chiefs, we gathered detailed data on the type of campaigns (we present those in Table E.10). Militia chapters, especially those that are formed in the village, draw on recruitment campaigns during their governance episode. Militia chapters formed in the village are the only type of armed group chapter whose recruitment campaigns are

²⁰37% of those who were coerced said they were convinced by a villager, 23% mentioned social pressure, 14% said they were convinced by family or someone else, and 3% said they joined because everyone else participated. The remaining 23% provided no further details, making it impossible for us to categorize the types of coercion.

directly initiated by the chief himself. They are also more likely to rely on public meetings. Militia chapters formed in the village rely on public or chief-initiated campaigns in 64% of their years. This contrasts chapters formed outside, who do so only in 8.9% of their years.

There is extensive qualitative literature documenting the role of local institutions in the constitution of militia, but there has been little in the way of systematic quantitative analysis to substantiate such claims. Complicating this analysis is the fact that even if one found a positive correlation between chief-initiated campaigns and the militia participation, it is unclear whether this would be causal because chief-initiated campaigns may systematically occur in motivated communities, those whose members may join regardless of these campaigns.

We now take advantage of a dramatic historical event—the security vacuum created by the Regimentation Policy in 2011, which precipitated the birth of the Raia Mutomboki—to explore the role of community demand for security in militia recruitment. Studies of the Raia Mutomboki have argued that the Regimentation Policy was a necessary condition for the second rise of the militia. The policy, which was engineered by the central government to streamline the structures of command inside the army, and break parallel structures of command arising from foreign networks in the army, inadvertently caused the departure of the Congolese army from Shabunda in 2011. In response to the vacuum, the FDLR extended their violence in the district (Stearns, 2013; Vogel, 2014). The regimentation process consisted in the merging of existing brigades into regiments with the goal of streamlining the Congolese army’s organization. It resulted in the departure of all Congolese army units based in Shabunda territory to join regimentation in May 2011. A particularly attractive feature of the policy for our analysis is that the battalions that were withdrawn from Shabunda for being merged as regiments were not simultaneously redeployed to other areas. Instead, they were taken into training centers for the Regimentation policy in urban areas (Marchais, 2016). This ensures that the policy did not increase military presence in other areas outside Shabunda, amounting to interference to units not “treated” by the withdrawal.

In our study 50 villages of Shabunda are directly affected by the Regimentation policy. While the Regimentation left only one battalion of the Congolese army in charge for all of Shabunda, the security vacuum it created affected most of the villages of Shabunda, and most of the villages in our sample. Figure 3, Panel A, shows the presence of the Congolese army in a map, before and after the Regimentation policy: the Regimentation caused a security vacuum concentrated in Shabunda and not elsewhere. Panel B shows violent activity by the FDLR. As the map shows,

the Regimentation was also associated with a recrudescence of FDLR violent activity in Shabunda (as well as in other areas previously unprotected).

Existing qualitative evidence suggests that the Regimentation triggered the remobilization of the Raia Mutomboki, considerably larger in scale than its 2004-2005 precursor. Figure 4, Panel A, shows that both recruitment campaigns and militia enrollment spike just after the vacuum is created by the Regimentation policy in 2011, coinciding with the rise of the Raia Mutomboki. Panel B shows that these effects are essentially a Shabunda phenomenon, the only district in the sample in which the Regimentation created a security vacuum.²¹ While there is a mild rise in enrollment outside Shabunda, our data indicate that this rise is entirely driven by the Raia Mutomboki recruitment. Since the Raia Mutomboki emerged in Shabunda, and spread to neighboring areas due to its success, the presence of Raia Mutomboki recruitment outside Shabunda in 2012 and 2013 will only reduce the size of our estimated effects in the analysis that follows.

In sum, the patterns of recruitment campaigns and participation are consistent with insecurity *causing* chief-initiated recruitment, *and* social coercion to participate.

6.2 Quantifying The Role of Chief-Initiated Recruitment

To examine whether insecurity causes chief-initiated campaigns and participation, we use the historical event induced by the Regimentation. We estimate θ^{IV} in 2SLS:

$$Enroll_{ijt} = \theta^{IV} \mathbf{1}[Insecurity_{it} = 1] + \alpha_i + \alpha_j + \alpha_t + \alpha_a + \epsilon_{ijt} \quad (1)$$

$$\mathbf{1}[Insecurity_{it} = 1] = \theta' \mathbf{1}[R_{it} = 1] + \alpha'_i + \alpha'_j + \alpha'_t + \alpha'_a + \epsilon_{ijt} \quad (2)$$

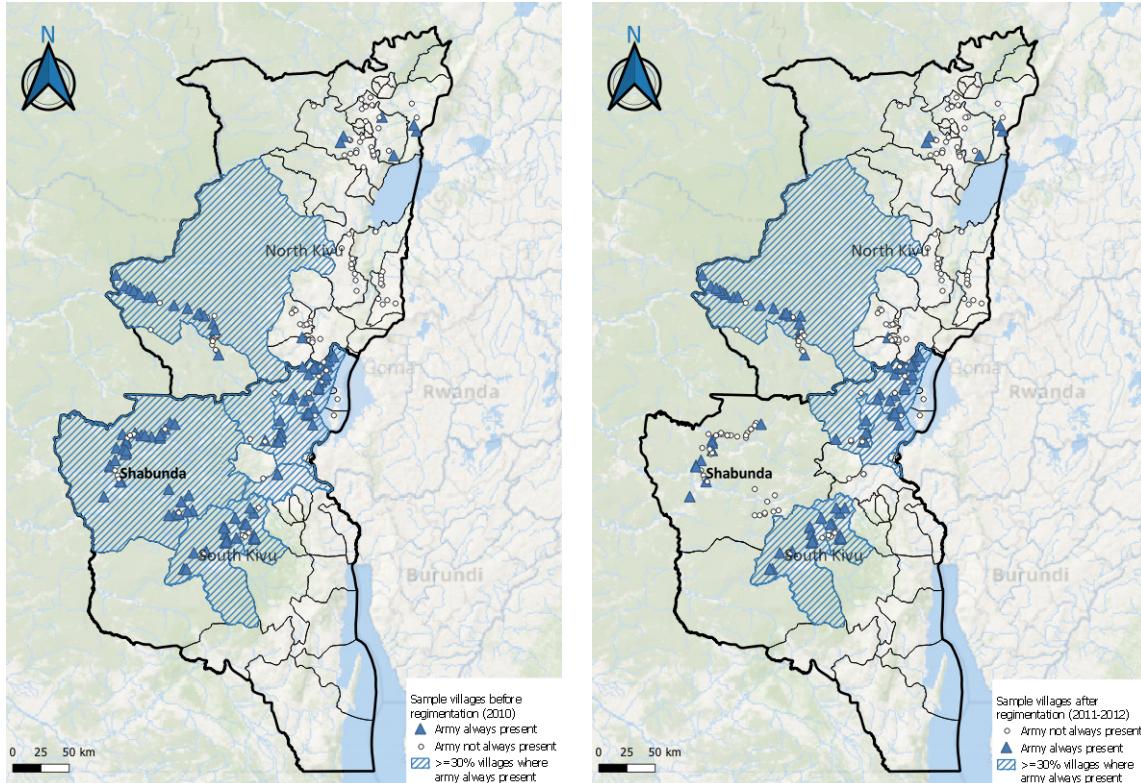
where i, j, t, a respectively index the individual, village, year, and age cohort, $\alpha_l, l = i, j, t, a$ are fixed effects for individual, village, year, and age, respectively, $\mathbf{1}[R_{it} = 1]$ is an indicator taking value 1 if village i in year t is affected by the Regimentation – the villages in Shabunda in 2012– $\mathbf{1}[Insecurity_{it} = 1]$ is an indicator taking value 1 if there is no armed actor providing security in the village, and $Enroll_{ijt}$ is an indicator for whether the respondent enrolls in a militia chapter from the village.²² We present the analysis without controls for whether the village is attacked. The results with such controls are identical.

²¹We present the times-series in the entire sample in Figure F.15.

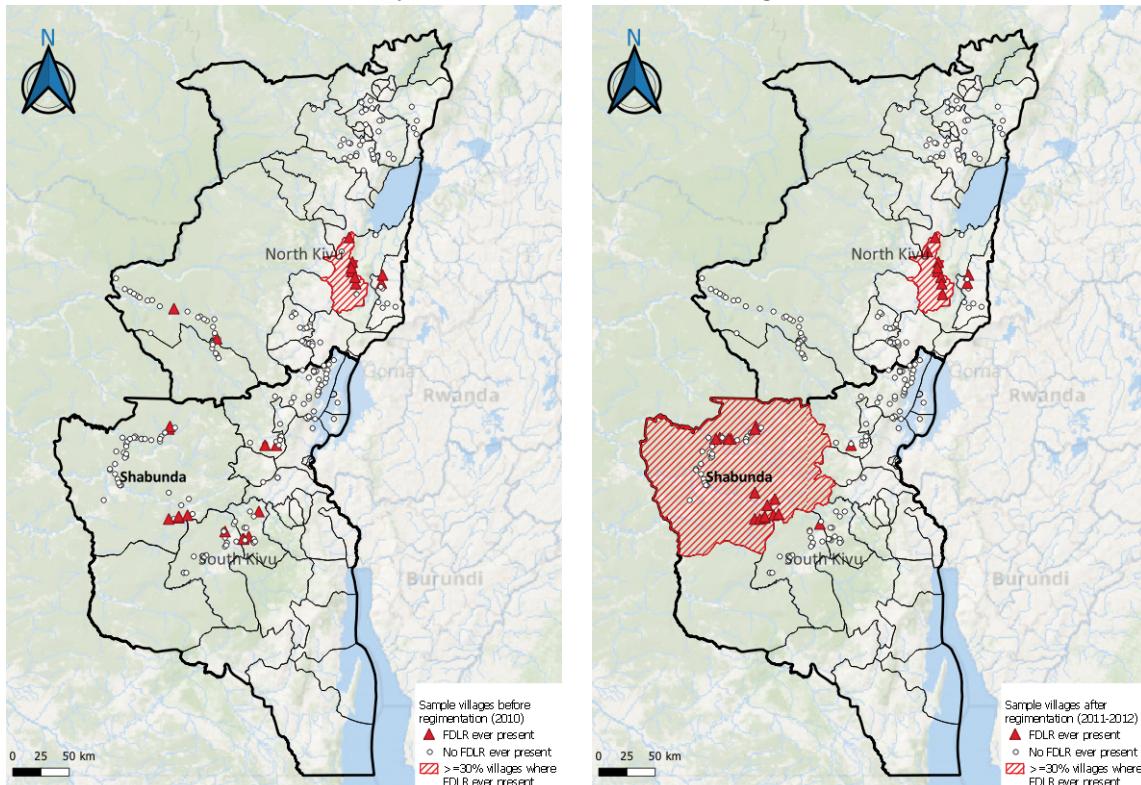
²²We include the national army, militia chapters from outside the village, and the RCD, who took over the state.

Figure 3: The Regimentation: State Vacuum and Rise in Insecurity

A. Presence of the Congolese Army, Before and After the Regimentation



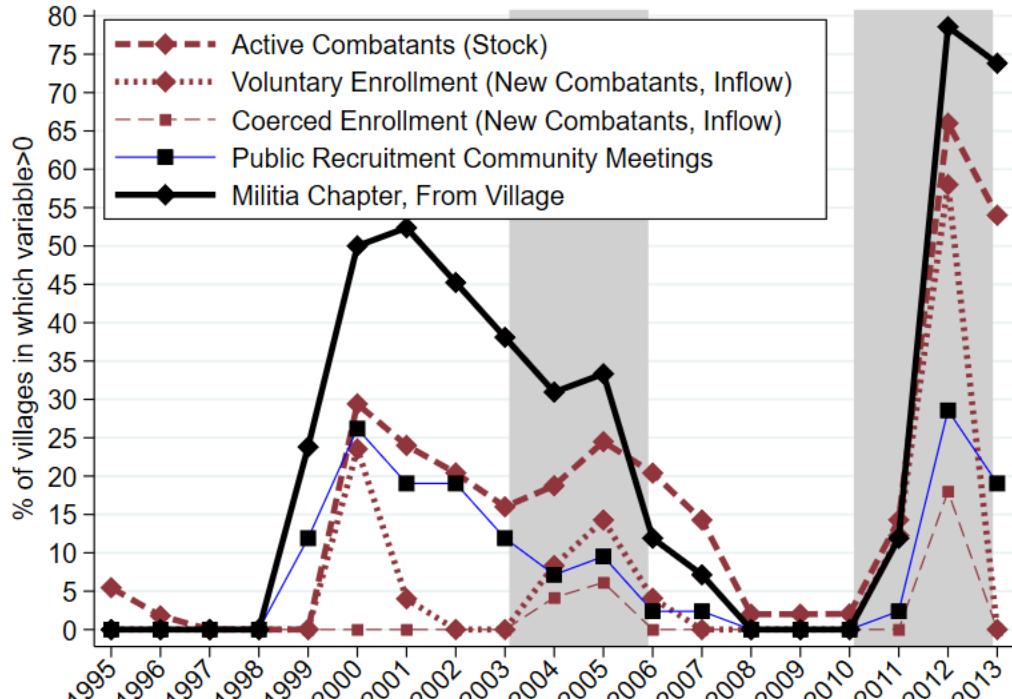
B. Insecurity, Before and After the Regimentation



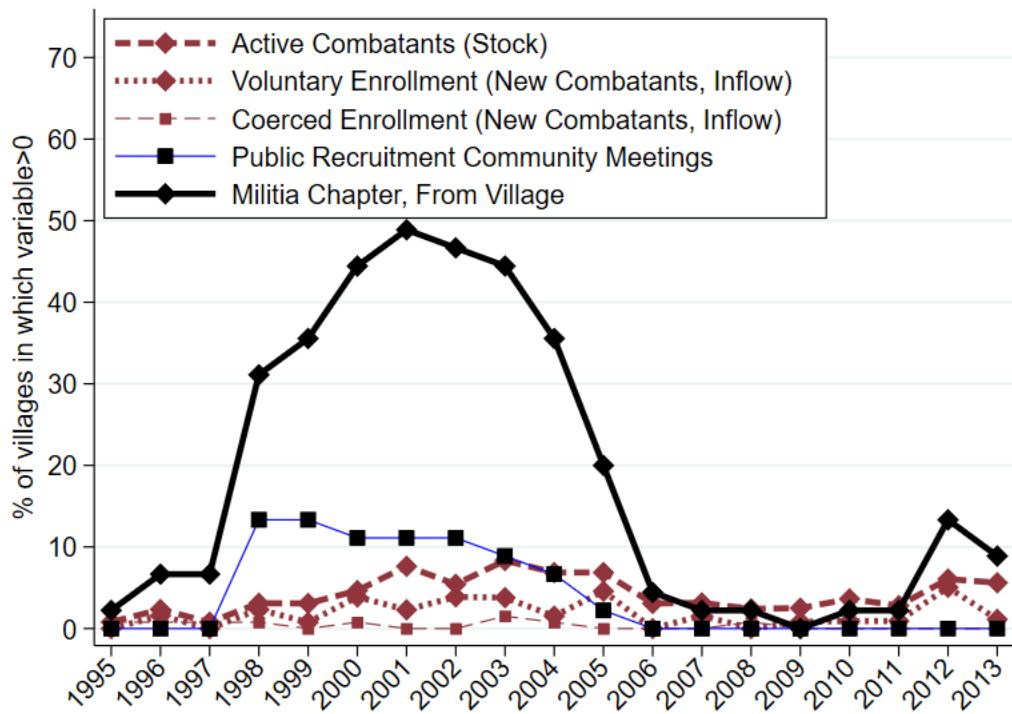
Notes: This figure presents the timing and targeting of the Regimentation policy through the corresponding presence of the Congolese army in our sample (Panel A), and the associated insecurity induced by FDLR's presence (Panel B), before, and after the Regimentation. Since the Regimentation took place in 2011, our indicator of Congolese army presence in 2011 captures the presence of the Congolese army in the months of 2011 leading up to their removal. Among territories where Congolese army is present, on average 30% villages are controlled by Congolese army (hence the cutoff). Among territories where FDLR is present, on average 30% villages are controlled by FDLR .

Figure 4: Insecurity, Recruitment Campaigns and The Birth of a Militia

A. Villages in District Affected by Military Policy-Induced Security Vacuums (Shabunda)



B. All Other Villages



Notes: This figure presents the presence of militia village chapters and militia recruitment over time in Shabunda and other districts. In both panels, the black thick solid line, the thick red dashed line, the red thick dotted line, the thin red dashed line, and the thin blue solid line represent, respectively, the fraction of villages in which a village militia chapter was present, at least one respondent was actively participating in that year in a village militia chapter, a respondent in the sample voluntarily enrolled by a militia village chapter as a new combatant, a respondent in the sample was coerced to enroll in a militia village chapter, and a public militia recruitment community meeting was documented. Panel A restricts the sample to Shabunda, the district affected by the military policy-induced security vacuum of 2011. Panel B shows this for the remaining of the core sample. Left and right grayed areas indicate years in which documented policy-driven security vacuums were associated to the rise of the first (2005) and the second, larger, Raia Mutomboki, respectively.

Table 3: Insecurity, Recruitment Campaigns and The Birth of a Militia

A. First Stage				B. Reduced Form						
Protection, by:				Insecurity		Campaigns		Participation in Militia Chapter		
	None	Army		Attacked	FDLR Present	Chief-Ini	Any	Voluntary	Coerced	
	(1)	(2)		(1)	(2)	(3)	(4)	(5)	(6)	
Regimentation _{jt}	27.63*** (8.61)	-25.35*** (8.02)		6.45 (5.28)	15.43*** (5.86)	4.75* (2.81)	10.33* (5.68)	9.54* (5.15)	1.02* (0.61)	
Pre-2011 Mean	42.97	57.03		17.78	9.35	0.00	0.00	0.00	0.00	
Obs.	2564	2564		2353	2564	2600	2600	2600	2600	

C. IV Estimates					D. OLS Estimates				
Campaigns		Participation in Militia Chapter			Campaigns		Participation in Militia Chapter		
	Chief-Ini	Any	Voluntary	Coerced		Chief-Ini	Any	Voluntary	Coerced
	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
No Protection _{jt}	18.67** (8.83)	40.24** (18.22)	37.09** (16.55)	3.99** (1.93)		1.15* (0.64)	1.74*** (0.61)	1.46*** (0.54)	0.33** (0.14)
Pre-2011 Mean	0.00	1.22	1.02	0.06		0.00	1.22	1.00	0.06
Obs.	2564	2564	2564	2564		2320	2320	2320	2320
F-Stat	10.30	10.30	10.30	10.30					

Notes: This table presents the estimates of Equations (1) and (2) using the core sample of 133 villages in all panels. The unit of observation is the village-year. All regressions include village and year fixed effects, and standard errors are clustered at the village level. Standard errors are clustered two-way at the village level and at the chiefdom-year level. The Mean Dependent Variable is computed in the sample of villages of Shabunda in 2010. Individual-year observations are averaged at the village-year level. Panel A presents the first stage (Equation (2)). The dependent variable in column (1) is an indicator for whether there was no armed force protecting the village. That in Column (2) is an indicator for whether the state forces were present protecting the village. Column (2) is included to demonstrate that the security vacuum created by the Regimentation arises almost entirely due to the displacement of Congolese army battalions. Panel B presents the reduced form estimates, obtained from regressing the dependent variable of Equation 1 (*Enroll*) on the explanatory variables of Equation 2. We present two families of outcomes separately. In Columns (1) and (2), the dependent variables are indicators for whether the village suffers an attack, and for whether the FDLR is present in the village. The coefficients in those columns can thus be interpreted as the effect of the Regimentation on insecurity, through its effect on violence and on violent threats. In Columns (4)-(6), the dependent variables are indicators for whether the village respondents is actively participating in that year and in that village in a militia village chapter, irrespective of motivations, voluntarily, or coerced, respectively (aggregated to the mean at the level of the village-year). Panel C shows the IV estimates of Equation 1, obtained in 2SLS. In Column (1), the dependent variable is an indicator for whether a chief-initiated campaign was documented to take place in that village and year. In columns (1)-(3) the dependent variables are indicators for whether the village respondents is actively participating in that year and in that village in a militia village chapter, irrespective of motivations, voluntarily, or coerced, respectively (aggregated to the mean at the level of the village-year). Panel D presents the OLS estimates of Equation 1. The dependent variables in Columns (1)-(4) are the same as those in Panel C. The IV estimates are orders of magnitude larger because most militia participation occurs during the insecurity years caused by the Regimentation (as shown in Figure 4) and because of reverse causality in the OLS estimation: while lack of protection causes participation, in the whole sample, occupying forces follow the militia due to the fact they are at war.

Panel A presents the first stage (Equation (2)). The Regimentation is associated to a significant increase in the fraction of villages that are unprotected (Column (1)). This effect is driven by a departure of the National Army (Column (2)).

Panel B shows the reduced form estimates. The Regimentation leads to a mild increase in the number of attacks in the villages (Column (1)), and to a significant increase in the presence of the FDLR (Column (2)). The rise in insecurity is unlikely to have been caused by other channels than the departure of the army. Clearly, the Regimentation caused insecurity in the affected villages.

Yet the Regimentation led to a rise in both chief-initiated recruitment campaigns (Column (3)) and militia enrollment (Columns (4)-(6)), driven by voluntary and coerced enrollment (Columns (5), (6)). This analysis suggests that the Regimentation-induced security vacuum *caused* chief-initiated recruitment campaigns and enrollment, consistent with existing qualitative evidence. The next panels estimate the magnitude of this effect.

Panel C presents the IV estimates. Having no protection, hence increasing the value of security provision, increases the fraction of villages that have a chief-initiated recruitment campaign from 0 to 18.67% (Column (1)), indicating that chief campaigns respond to community demands for security provision. Columns (2)-(4) show that the value of security provision is associated with a rise in militia enrollment (from 1.22% to 41.46%), driven both by voluntary and coerced enrollment (Columns (3) and (4)). Panel D, for comparison, presents the estimated OLS coefficients. The OLS coefficients are all significantly smaller than the IV coefficients, consistent with positive sorting of state forces to villages that have more militia activity—a very natural result of state attempts to assert the monopoly of violence by crushing nonstate forces. In sum, the results suggest that insecurity is a driver of militia participation, both through the activation of community coercive forces, and independently through individual motivations.

Part of the increase in enrollment in Shabunda following the implementation of the Regimentation Policy could potentially be explained by economic motives. For example, it could be driven by competition between the FDLR and militias over natural resources. The increase in enrollment would then be explained by citizens' and local leaders' desire to control mineral areas. However, additional analysis available upon request demonstrates that, while it is also driven by economic motivations, the effect of the Regimentation on militia enrollment is predominantly driven by community-oriented motivations. This is consistent with the security vacuum creating a momentum for mobilization, which in turn alters the relative prices that are relevant for those who

Table 4: Effect of Security Vacuum on Militia Enrollment, by Chief-Initiated Campaign

	Dep. Var.: Enrollment in Chapter		
	Any (1)	Voluntary (2)	Coerced (3)
Regimentation _{jt}	8.53* (5.00)	8.02* (4.60)	0.73 (0.49)
Regimentation _{jt} * Chief-Ini _{jt}	35.31*** (8.44)	29.92*** (7.54)	5.58*** (1.24)
Mean Dep. Var.	0.83	0.65	0.10
Obs.	2600	2600	2600

Notes: This table present the estimates of the reduced form regression, including an interaction term between Regimentation and Chief-initiated recruitment campaign. All regressions include village and year fixed effects. Standard errors are clustered two-way at the village level and at the chiefdom-year level.

would only join for economic gain – a general equilibrium effect within the affected villages. Since this is beyond the scope of our paper, we only mention it.

Since chief recruitment campaigns are endogenous to the security vacuum, we can only document whether the security vacuum caused motivations to join in places that had a chief-initiated campaign, more than in the rest. Table 4 presents the reduced-form regression, in which the indicator for the Regimentation is multiplied with an indicator for whether a Chief-initiated campaign takes place in that year. The coefficient on $Regimentation_{jt} \times Chief - ini_{jt}$ thus indicates how much larger was the increase in enrollment in response to the regimentation in places where the chief-initiated a recruitment campaign. Since chief campaigns are endogenous, the coefficient does not have a causal interpretation, but helps identify the association between the campaigns and different types of enrollment. The Regimentation-induced rise in militia enrollment is four times larger in village-years in which a chief-initiated recruitment campaign takes place. The role of chief initiated recruitment campaigns is especially pronounced for individuals who were coerced to enroll. Indeed, the effect of the security vacuum on this type of enrollment is entirely channeled through chief-initiated campaigns.

That is, the security vacuum has no effect on coerced enrollment in places that do not have a chief-initiated campaign that year. Coerced enrollment reflects social coercion that must be, generally, validated by the village chief, and since the coefficient on $Regimentation_{jt}$ is six times smaller and indistinguishable from zero. This is suggestive evidence that Chief-initiated recruitment campaigns, which rise in response to community demands for security, are a necessary condition for the

rise of coerced enrollment in response to insecurity. That is, a channel through which chief actions influence recruitment is likely through creating conditions for social coercion into participation.

Overall, we have shown that the value of security at the community is important to explain violent participation. Since most militia chapters operate in the village, their members are able to, at the same time work part-time in other productive occupations. Using our household economic history, we find evidence to support our qualitative data that most participants of the Raia Mutomboki also often work in other occupations.

This analysis suggests that the decision to participate in violent collective action can be explained partly through community institutions' coercion and through parochially altruistic preferences. We now formally analyze how those community motivations form.

7 Who Joins Voluntarily, and How do their Motivations Form?

In this section, we analyze how voluntary motivations to participate in a militia form. We first present the combatants' own self-reported motivations for why they joined. We then test whether those self-reported motivations are supported by an analysis of who joins militia and when. The evidence we present is consistent with the self-reported motives, that past foreign-led armed group victimization creates community-oriented motivations to join a militia chapter. Finally, we examine whether victimization does create motivations.

7.1 Who Joins the Militia?

We now analyze the patterns of sorting into militia to elicit whether the types of individuals who join are consistent with their self-reported motivations, by revealed preference.

Table 5 presents basic characteristics of the individuals who participated in a militia, the year prior to joining, and compare those to the individuals who, in the same communities and in the same year, did not join. The panels report demographic characteristics (Panel A), productive capacity in the nonviolent sector (Panel B), average future increase in assets over the current level of assets (Panel C), victimization background (Panel D). There are 276 episodes in which an individual participates in a militia, of which 246 are in chapters formed in the village and 29 in chapters from outside. In terms of social background, militia members, at the time of joining,

Table 5: Predictors of Militia Membership, at Time of Recruitment

	Participants in Chapter Formed:			Non-participants in The Same:		
	Anywhere	Outside	Village	Village	Chiefdom	Territory
# of individual-year obs.	276	29	246	787	11632	12891
<i>A: Demographic Characteristics</i>						
In the Family of the Village Chief	0.12	0.21	0.11	0.11	0.10	0.09
Age in year t	30.11	20.97	31.15	27.07	26.86	26.80
Married in year t	0.15	0.21	0.15	0.20	0.37***	0.39***
<i>B: Productive Capacity in Nonviolent Sector</i>						
Unemployed in year t-1	0.22	0.21	0.22	0.26	0.27	0.27
Father's Wealth Index	0.10	-0.34	0.16	-0.14***	-0.20***	-0.21***
# Plots Owned in year t-1	0.83	0.38	0.89	0.55**	0.46***	0.46***
Farm Animal Index in year t-1	0.22	-0.11	0.26	0.01	0.05	0.04
Primary Education Complete	0.58	0.62	0.58	0.52	0.50*	0.50
Secondary Education Complete	0.20	0.10	0.21	0.14	0.14	0.14
Tertiary Education Complete	0.04	0.00	0.04	0.03	0.02	0.02
Working Memory Score	0.56	0.51	0.56	0.52**	0.47***	0.47***
<i>C: Average Increase in Future Assets</i>						
# Plots Owned	0.17	0.40	0.14	0.19**	0.18**	0.18**
Farm Animal Index	0.18	0.42	0.15	0.21*	0.23	0.23*
<i>D: Victimization Background</i>						
Foreign armed group attacked HH before	0.22	0.07	0.24	0.09***	0.07***	0.07***
Congolese Militia attacked HH before	0.03	0.03	0.03	0.03	0.02	0.02

Notes: This table shows descriptive statistics for observations where respondents from South Kivu start participating in a militia chapter (anywhere, outside of the village, or formed in the village) versus those where respondents do not participate in any militia chapter. We indicate the difference between Column 1 and 4, 5, and 6 (P-value: *** 0.01, ** 0.05, * 0.10), computed after including year FE, and clustered two-way at the individual respondent and the village*year level. Construction of economic indices is made using principal component analysis on following variables. For father's wealth index, we use whether respondents reported their fathers are rich, stock of plots at birth, and number of father's wives. For the farm animal index, we use stock of cows, goats, and pigs. In Panel C, we calculate the mean of asset stock after year t and subtract from the asset stock in current year t . Table D.15 replicates this table using all of the extra samples.

were similar to the rest (Panel A).

The patterns of sorting suggest other factors than individual gain must explain participation into violence. First, it would be reasonable to expect that, if individual economic gain predominates, the militia fighters should have lower productive capacity than the rest. In contrast, we find that militia fighters have more, not less, productive capacity. Panel B shows that those who join tend to come from families with larger value of inherited assets, currently own more land and farm assets, have higher levels of education, and have better working memory than the rest. Second, if individual economic gain predominates important, joining should be a profitable investment, hence leading to higher present discounted value of assets owned than not joining. Panel C shows the increase in the average yearly household assets for subsequent years. Although the comparison in Panel C is only suggestive due to the fact that it may capture sorting, it suggests individual economic gain cannot alone explain participation.

However, the patterns of sorting suggest that violence by foreign-led armed group violence is an important driver. Panel D shows that, at the time of joining, the household members of individuals who join a militia are 3.14 times more likely to have been previously victimized by foreign-led armed groups. This is driven by fighters who join a militia chapter formed in the village. Those who joined were just as victimized by militias than those who did not, suggesting that this pattern does not reflect a general effect of “exposure to violence.” These patterns are consistent with the combatants’ own reported motivations and the militias’ missions: revenge and protection against foreign-led armed groups.

In sum, the sorting into participation is consistent with foreign-led armed group attacks target richer households, causing them to develop community-oriented motivations to join a militia chapter. However, for this to hold true, it must be that attacks cause motivation to join, i.e. $h > 0$. We now exploit variation in foreign-led armed group violence within and across villages to formally test it.

7.2 Quantifying The Effect of Household Victimization on Motivations

If foreign-led armed group violence on the household leads to motivations to participate in a militia chapter formed in the village, it should increase the propensity that a household member participates. We estimate the following equation:

$$Part_{ijt} = \sum_{h=-10}^{h=10} (\gamma_h \mathbf{1}[K_{it} = h]) + \gamma_{h+1} \mathbf{1}[K_{it} > 10] + \alpha_i + \alpha_j + \alpha_t + \alpha_a + \epsilon_{ijt} \quad (3)$$

where i, j, t index, individuals, villages, years, respectively. $\mathbf{1}[K_{it} = h]$ is an indicator variable that equals 1 if other members in the household of individual i are attacked at period $t' = t + h$, and zero otherwise. Parameters α_i , α_j , α_t , α_a are fixed effects for individual, village, year, and age, respectively.²³ $Part_{ijt}$ is an indicator variable taking value 1 if respondent i in village j participates in a militia chapter formed in the village in year t .²⁴ To account for serial correlation and village-year shocks, standard errors are two-way clustered at the individual and at the village*year (respectively, 1,537 and 9,061 clusters). Since exposure to household victimization is staggered, in what follows, we implement Borusyak et al. (2020) estimator.

Figure 5 reports the coefficients for the leads and lags of the attack indicator. Examining the leads, we see no significant pre-existing trends. The coefficients for the lagged values of the indicator suggest that household victimization by foreign-led armed groups increases the propensity that the respondent joins a militia chapter formed in the village in subsequent years.²⁵

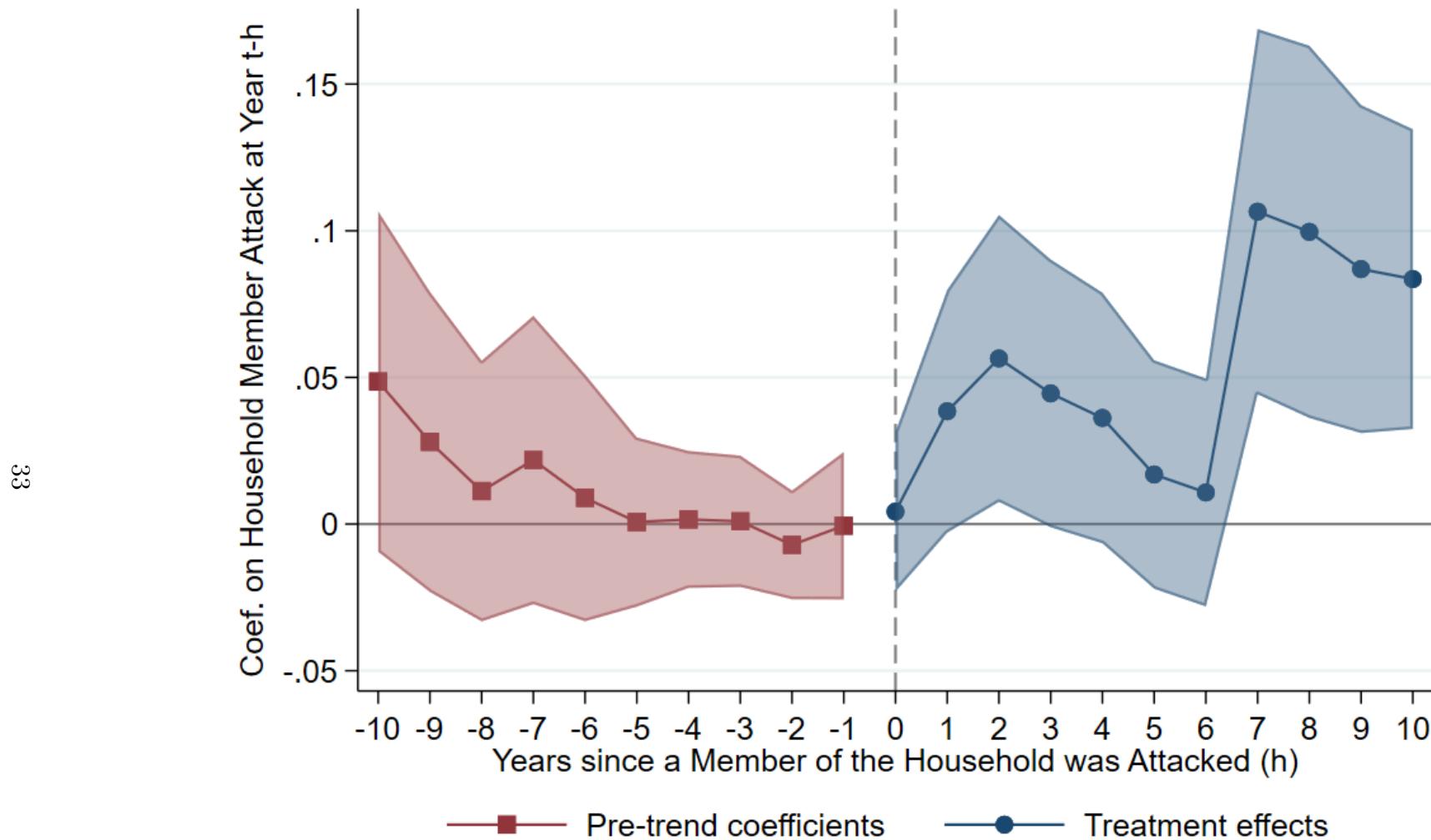
If protection against foreign-led armed groups and revenge are the main determinants of individuals' decision to enroll in the militia, it would be natural to expect an increase in enrollment immediately following FDLR attacks. However, Figure 5 shows a delayed response: the treatment effects increase over time and are significant in years 3 and 7-10. This effect reflects the analysis of community mobilization of the previous section. Indeed, additional analysis indicates that the effect of past victimization is channeled into enrollment predominantly in years in which the community mobilizes. Since most attacks occur during the First and Second Congo Wars, and since mobilization spikes in 2012 and 2013 but, the effect tends to be lagged. This is consistent with attacks seeding community-oriented motivations, but those only being expressed when the institutional environment allows for their expression – for instance, outside the mobilization waves, it is likely that participation is almost impossible as it could be repressed by the occupying forces.

²³All villages contain individuals who are observed in another village in some year.

²⁴Figures F.9, F.10, and F.11 show characteristics of the spatial distribution of participation episodes, and of attacks, as well as the distribution of perpetrators and their motives in detail, respectively. In Webpage Appendix D Table E.16 shows additional characteristics of the attacks.

²⁵Figure F.12 replicates this analysis including the 29 episodes of participation in militia for chapters not formed in the village. The results are identical.

Figure 5: Effect of Household Victimization by Foreign-led armed groups



Notes: This figure shows Borusyak et al. (2020)'s event study estimators of the coefficients in Equation (3), γ_h , for $h \in [-10, 10]$. The dependent variable is an indicator taking value one in years and villages observations in which the respondent participates in a militia chapter formed in the village, and zero otherwise. We include observations between 1995 and 2013. All regressions include individual FE, village FE, year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. We show 95% confidence intervals.

This analysis suggests that foreign-led armed group household victimization creates community oriented motivations to join a militia in subsequent years, and that those motivations are sufficiently strong to increase participation.

7.3 Separating the Effect of Household and Village Victimization

A limitation with this analysis is that, in addition to the effect of attacks on the household, our estimate could also capture the effect of attacks on the village, or on other households of the village, an omitted variable. In this section, we first analyze the effect of an attack being recorded in the village, which includes the effect of collective victimization and, for the subset of victimized households, the effect of household victimization. Then, we break down this effect, separately analyzing the effect of the village being attacked independently of its effect through household victimization, and the effect of the household being attacked, comparing victimized to non-victimized households of the same village-year. This enables us to separately analyze the effect on joining through the different reported motivations.

We begin our analysis of victimization examining the effect of a foreign-led armed group attack on the village—agnostic about the channel through which it may lead to participation. For compactness of presentation, we present the differences-in-differences equivalent of the previous event study coefficients.²⁶ In this case, we replace $\sum_{h=-10}^{h=10} (\gamma_h \mathbf{1}[K_{it} = h]) + \gamma_{h+1} \mathbf{1}[K_{it} > 10]$ in Equation 3 with the cumulative count of recorded attacks on the village of individual i , as recorded in the village survey, for all periods $t' < t, t' > 1990$. Since village attacks vary at the village-year level, we collapse the data at the village-year level.

Table 6, Panel A, reports the estimates. Columns (1) uses as dependent variable whether the individual participates in a militia chapter formed in the village. Column (2) replicates this with all extra samples. Columns (3)-(8) use as dependent variables indicators for whether the individual participates for each motive analyzed in Table 2.

One additional foreign-led armed group attack on the village rises the fraction of villagers who participate in a militia chapter formed in the village by 1.37pp. for each subsequent year (column 1). Given that the mean participation is .59%, this coefficient implies that, on average, one additional attack increases participation by 232% of its sample mean. Column (2) replicates the

²⁶We estimate coefficients using OLS. Borusyak et al. (2020) estimator produces almost identical results.

main analysis including all available extra samples in addition to the core sample. The coefficient remains large and significant including these samples.

Columns (3)-(8) allow to decompose this effect by the components of motivation. The largest component of this increase arises from respondents who are motivated to protect the community and for revenge. Taken together, those motives account for .85 out of 1.37 percentage points of the baseline coefficient, i.e. 62%. To a lesser extent, one attack on the village increases motivations to protect their family or for money. A limitation of this analysis is that this effect captures the joint effect of the attack on participation through the collective victimization channel and, for the subset of households who were also directly victimized in those attacks.

We first isolate the component of this effect arising from victimization of the village (collective victimization). In Panel B, we hold constant household victimization to isolate the effect of one attack on the village through collective victimization—individually of whether the household is victimized. To conduct this analysis, we dis-aggregate the data at the level of household-year observations. The explanatory variable remains the village-level cumulative foreign-led armed group attacks. We use, as dependent variable, the indicator $Part_{ijt}$ taking value 1 if, and only if, individual i participates in a militia chapter formed in the village in year t , and include, as control, indicator $\mathbf{1}[K_{it} \geq h]$ for whether the household of individual i has previously been victimized by foreign-led groups. The coefficient estimated on the cumulative count of recorded attacks on the village of individual i thus captures the effect of one additional attack against the village on subsequent individual participation, *holding constant whether the household was victimized*.

Column (1) shows that the coefficient on victimization is 1.27 pp. and remains statistically significant. This suggests that a significant share of the effect in Panel A is explained by collective victimization. Column (2) replicates this result with the extra samples

Columns (3)-(8) allow to decompose the effect of collective victimization by the components of motivation. The effect is almost entirely driven by individuals who report to be motivated to protect the community and those who report to be motivated by revenge. This suggests that collective victimization creates community protection and revenge motives.

We then isolate the component arising from victimization of the household, which we referred to as household victimization, formally testing whether $h > 0$, in Panel C. To conduct this analysis, we replace the village victimization cumulative explanatory variable with village-year fixed effects,

Table 6: Motivations Arising from Household vs. Village Victimization

A. Effect of Collective Victimization, Including Household Victimization

	General	Incl. Extra. Samples	Economic Inc.		Community-oriented Motivation			Involuntary
	(1)	(2)	Money	Status	Prot, Comm	Prot, Fam	Revenge	Coerced
Attacked	1.36*** (0.49)	1.01*** (0.31)	0.13* (0.07)	0.03 (0.04)	0.49 (0.31)	0.11 (0.11)	0.36*** (0.14)	0.06 (0.07)
Control mean	0.59	0.42	0.23	0.02	0.06	0.01	0.07	0.00
Obs.	2289	4018	2289	2289	2289	2289	2289	2289
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Village FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at the Village level	Y	Y	Y	Y	Y	Y	Y	Y

B. Effect of Collective Victimization, Controlling for Household Victimization

	General	Incl. Extra. Samples	Economic Inc.		Community-oriented Motivation			Involuntary
	(1)	(2)	Money	Status	Prot, Comm	Prot, Fam	Revenge	Coerced
Attacked	1.28* (0.61)	1.14** (0.54)	0.07 (0.06)	0.02 (0.04)	0.60 (0.36)	0.07 (0.09)	0.42** (0.16)	-0.04 (0.07)
Control mean	0.82	0.72	0.40	0.04	0.10	0.02	0.02	0.00
Obs.	13826	16203	13826	13826	13826	13826	13826	13826
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Village-year FE	N	N	N	N	N	N	N	N
Cluster individual level	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y	Y	Y	Y	Y	Y	Y

C. Effect of Household Victimization, Within Village-Year

	General	Incl. Extra. Samples	Economic Inc.		Community-oriented Motivation			Involuntary
			(1)	(2)	Money	Status	Prot, Comm	Prot, Fam
Attacked	3.01** (1.26)	1.55** (0.63)	0.01 (0.45)	-0.32 (0.22)	-0.02 (1.04)	2.26** (0.90)	0.62 (0.45)	0.95* (0.52)
Control mean	2.14	0.54	1.32	0.13	0.15	0.13	0.09	0.02
Obs.	17832	72869	17832	17832	17832	17832	17832	17832
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Village-year FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster individual level	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y	Y	Y	Y	Y	Y	Y

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Notes: This table presents OLS estimates of equation 3. Panel A presents OLS estimates of equation 3 where the data has been collapsed at the village-year level. The dependent variable is the fraction of respondents who, in that year and village, participate in a militia chapter formed in the village. The explanatory variable is the number of attacks the village has been previously victimized by a foreign-led armed group. The regression includes village and year fixed effects. Standard errors are clustered at the village-year level. The results are identical if they are clustered at the village level. Panel B uses the village chief survey data on attacks on the village, and controls for whether the household has previously been victimized by a foreign-led armed group. Since the explanatory variable of attacks affecting the village varies at the village-year level, we do not include village-year fixed effects. Standard errors are clustered at the individual and at the village-year level. The results are identical if standard errors are clustered at the village level. Panel C uses household-year panel data and includes age, individual, and village-year fixed effects. In effect, the coefficient captures the comparison between households who have been attacked by foreign-led armed groups, and households who, in the same village, have not been attacked by foreign-led armed groups. Standard errors are clustered two-way at the individual and the village-year level. In all panels, we include observations between 1995 and 2013. In all panels, the dependent variable in column (1) uses the individual level data for whether the respondent participates in a militia whose chapter was formed in the village (*General*). Column (2) replicates column (1) including all of the available extra samples we have assembled that contain both the dependent and the explanatory variable (*Incl. Extra Samples*) for column (1). The dependent variables in Columns (3)-(8) are indicators for whether the respondent participates *and* was driven by one of the following motivations, respectively: money, status (both of which under the header *Econ Inc.*, for economic incentives) protection of the community, of the family, and revenge (all three under the header *Community Oriented Motivations*), coerced (under *Involuntary*). Control mean is computed among observations where respondents never experienced an attack on household from any armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

and report the coefficient on previous household victimization. This specification thus allows to produce an estimator that compares, within village-year, the households that have been victimized previously, to those that have not, thus holding constant any omitted variable that varies at the village-year level, notably, whether the village was victimized.

The coefficient on household victimization is 2-3 times larger than the effect of collective victimization shown in Panel B. Again, Column (2) shows that the result fully replicates when including the extra samples even if, in this case, the sample increases from 17,841 to 73,448, reflecting the fact that it adds individual-year observations for various other households as well as of multiple individuals in the additional households. The robustness of our result to inclusion of those samples is nonetheless extremely reassuring. This shows that, while the share of victimized households is small, and thus accounts for a small share of the effect of an attack in the village on participation in militia chapters formed in the village, the effect of household victimization is larger than that of collective victimization. Columns (3)-(8) show it is driven by individuals who join in order to protect their family.

We now tackle an obvious challenge to a causal interpretation of this analysis. We have shown in Section 7.1 that foreign-led armed group attacks disproportionately affect households of with higher productive capacity. Thus, our results may capture selection of attacks into households: households who are more likely to be attacked, for instance wealthier households, may also be more likely to join militia in the future independently of the attacks. Specifically, we replicate the analysis of Table 6 but include, as control, the predicted probability that a household has previously been victimized by foreign-led armed groups.²⁷

We analyze selection of attacks, include instrumental variable strategies, robustness to non-classical measurement error using cross-validation of attacks and weighting by working memory, selection bias arising from migration, persistence, alternative standard errors clustering strategies, and robustness to effects arising from military conquest instead of violence against civilians in Section C. We find no evidence of confounding.

We provide evidence against other plausible channels in Section D.²⁸ We include, as control, the lagged household capital stock. We also examine additional alternative causal channels and

²⁷We regress victimization in each year on indicators of household productive capacity, and then use the yearly predicted probability of an attack to compute the probability that a household has previously been victimized. Table C.1 shows that this explanation is discarded by the data.

²⁸Section D presents a household dynamic optimization model to guide this discussion.

include, as controls, whether the respondent over-reports attacks, and whether the respondent is physically harmed. Through all analyses, we find no evidence that foreign-led armed group attacks influence participation through any of these channels.

7.4 Pricing Victimization-Induced Community-Oriented Motivations

We now compare the magnitude of our effect to the opportunity cost channel for occupational transitions into the violent sector. To quantify the effect of non-armed group income on the propensity to participate in a militia, we exploit the presence of large variations in the world price of gold.²⁹ The share of gold value that armed groups can tax is small (Sánchez de la Sierra, 2020), thus, in gold mining villages, the world price of gold passes through down to miners' net income, but has a weak effect on the revenues armed groups can hope to tax. We estimate:³⁰

$$Part_{ijt} = \alpha + \gamma I_{it}^{Victim} + \gamma^E I_j^m \times \log(P_t^m) + \alpha_i + \alpha_j + \alpha_t + \alpha_a + \mathbf{X}'_{it} \Gamma + \epsilon_{ijt}, \quad (4)$$

where I_j^m is an indicator taking value 1 for all years if village j has mineral m deposits and P_t^m is the world price of mineral m in year t . As before, we include year, age, and village fixed effects and standard errors are clustered two-ways at the individual and the village level. Absent spatial spillovers and if the world price is exogenous, γ^E measures the effect of a 100% increase in the world price of m on the probability of participation in militia.

We find that a rise in the price of gold draws individuals away from militias into the mining sector. We then compare the magnitude of this effect to that of foreign-led armed groups' violence on the household.³¹ First, we quantify the effect of changes in the *local* price of gold. We use the average yearly local price of gold from our survey, and instrument it with the world price of gold. One foreign-led armed group attack on the household requires an increase in US\$24.1 in the local price per gram of gold to be undone, in gold villages, equivalent to 2.9 standard deviations, and an increase in almost 100% of the local price of gold. Second, we estimate the equivalent rise in per capita income outside the armed groups that would be necessary to undo the effect of household victimization by foreign armed actors. We use information on the daily production of gold by a

²⁹Figure F.13 presents the world and the local price of gold.

³⁰There is also coltan. Coltan is bulky, and thus prone to taxation by armed groups. As a result, the price of coltan does not offer a useful benchmark.

³¹Figure F.14 presents the estimates from Equation 4. Table E.12 presents the conclusions of this exercise.

gold miner (Geenen, 2013), our data on gold taxation by local authorities, the GDP per capita of the DRC in that period (in year 2005), and assume miners work 300 days a year. We find that it would take a *permanent* increase in 8 times the yearly per capita income to undo the magnitude of the effect of *one* foreign-led armed group attack. This high implicit price is consistent with “deontological” motivations to fight (Bénabou et al., 2018; Kant, 2019).³²

8 Conclusion

We suggest two deviations from methodological individualism to explain individual participation in violent collective action: parochial altruism and community institutions that constrain individual agency, in the context of one of the longest conflicts in recent history, that of the Democratic Republic of the Congo. Using both self-reported motivations and a revealed preference approach, we documented that community-oriented motivations are the most prevalent explanation for the rise of militia chapters. Using village-level data on the type of recruitment campaigns and self-reported motivations, we documented that village leaders play an important role in influencing social coercion to induce violent participation.

Second, we provided an explanation for how both of those form using empirical evidence in our sample. Using the timing and spatial targeting of a historical event that drastically increased insecurity, the Regimentation policy of 2011, we also provided an explanation for why village institutions mobilize, and quantified the role that those may play. Our results also suggest that village leaders are able to mobilize participation by inducing social coercion. Using variation in exposure to attacks by foreign-led groups within and across villages, we showed that community-oriented motivations arise from victimization of kin relatives and of community members.

The strength of militia lies in their capacity to channel community-oriented social motivations related to justice, revenge and the desire to protect the family or the community, created by past victimization by aggressors perceived as foreign to the entities in which the militia mobilise. Joining a militia constitutes an important life decision for individuals who experience the extreme violence of civil war. We show that, while individual gain to joining a militia is limited, membership in those organizations is motivated by community-oriented motivations similar to those that scholars

³²We show in a webpage appendix (Webpage Appendix E) that community-oriented motivations and village mobilization complement the interpretation of a standard test of an established framework in economics for violence.

typically attribute to social movements, protests, and political movements. This is consistent with the qualitative empirical literature on the eastern Congolese recent history, which has documented the importance of community for armed mobilisation (including for the case of the Raia Mutomboki (Vogel, 2014)), as well as accounts of the lives of Congolese ex-combatants (Stearns, 2011; Brabant, 2016; Dunia Butinda, 2021). It is also consistent with a large body of literature in the social sciences that has explored political, social and emotional motivations for armed mobilisation, as well as novels that describe the personal process that leads to taking up arms (Hemingway, 1995; Guevara and Ortiz, 1969; Barea, 1984; Malraux, 1938; Kourouma, 2000).

Militias, who recruit 94% of rural armed group labor, are accountable for 36% of violent events and half of the village governance episodes, are thus better understood as violent social organizations that channel the collective motivations of rural populations faced with exceptionally difficult circumstances. Militia are often supported and even initiated by village institutions in order to provide protection to their communities. Although the protection they create can be short lived, our data showed that they are effective at reducing exposure of households to the most gruesome forms of violence. Village institutions play a role in recruiting, through their ability to mobilize voluntary motivations, but also, to induce coercion.

The conclusions of our study resonate with a large body of literature in the social sciences and in autobiographies that has explored political, social and emotional motivations for armed mobilisation. They also resonate with accounts of violence and civil war across the world today. In Mexico, where violence has reached unprecedented levels, similar dynamics explain the constitution of grassroot violent movements. In a documentary, the late Dr. José Manuel Mireles Valverde, one of the leaders of the Autodefensas movement in Michoacán, Mexico, explained that every single one of the members of his armed self-defence militia has lost a relative or close friend to the drug cartels. That experience, he explains, was the foundation of their commitment (Heineman, 2015). In a documentary on Afghanistan (Knappenberger, 2021), Hilaludin, the son of Malik Jalaludin, a tribal elder of North Waziristan in Pakistan, confesses *“I had lots of friends in the village. I have seen many of them getting amputated because of the [US drone] bombing. Their bodies would be covered in blood, they had no hands nor feet [...] I will not forget this suffering even if I live 100 years. We will take our revenge, God willing.”* His father then explains: *“You see how their mind is full of hatred now. You create terrorists [...] They say that ‘If death is our only fate, we would rather die fighting back.’ So, they join the Taliban.”*

The recent events in Ukraine underscore the importance of understanding how the relationship between the individual, and the community where it belongs, through ideals, community-oriented motivations, and potentially community mechanisms that supersede individual agency, are important to explain the success of violent collective action. Multiple commentators have speculated that, despite Russia is much better equipped, the motivations of Ukrainians, and potentially the community mechanisms that promote and organize violent participation, may be an important determinant of that struggle, which may determine the next phase in European history.

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Online Appendix

A Classification of Armed Organizations in the Sample

Table A.1: Armed Organizations in the Data, and Classification

Name in Dataset	Classification	Comments
Alliance des Forces Démocratiques pour la Libération du Congo (AFDL)	Foreign	The AFDL was a a politico-military coalition supported by Rwanda, Uganda Burundi and Congolese dissidents, widely perceived as a foreign led
Alliance of Democratic Forces (ADF) - Nalu	Foreign	An armed group that originated in Uganda and operates in Congolese territory
Batiri	Popular Militia	Mayi-Mayi militia from Masisi driven by the Hunde
Bwende	Popular Militia	Mayi-Mayi militia
Combattants	Popular Militia	Militia from the Congolese Hutu communities
Congolese Army (Before 1996: Forces Armées Zairoises. After 2004: Forces Armées de la République Démocratique du Congo)	Congolese state	These are the Congolese Armed forces
Congolese State Agencies: Police, Intelligence Agency (Agence Nationale des Reueignement, ANR)	Congolese state	By definition
Congrès National Pour la Défense du Peuple (CNDP)	Foreign	Armed group supported by Rwanda
Desertors	Ambiguous	Armed actors who deserted the Congolese army. This is recorded only in one episode of village control, in the district of Beni in 1998. We coded it as foreign-led, but this has no impact on any result.
Force vive	Popular Militia	Civil Society group
Foreigners	Foreign	This was only reported in one episode of village control, in one village of the district of Rutshuru between 2012 and 2013, and one attack in the same district in 2012. While the origin is ambiguous, given the historical context, this is likely to be the M23 (See M23).
Front de Libération du Rwanda	Foreign	The FDLR was created in 2000 bringing together multiple Rwandan Hutu militias, including the Interahamwe
Front de Libération du Rwanda - Tanganyika	Foreign	The FDLR split into various factions, Tanganyika is one of them
Hunde combattants	Popular Militia	Mayi-Mayi militia, recorded attacking two villages in 1993 in the district of Masisi. The Hunde is an "ethnic" group originating from North Kivu
Hutu combattants	Foreign	Hutu fighters, most likely FDLR otherwise would be Nyatura or Magrivi
Hutu or Magrivi	Popular Militia	Congolese Hutu militia
Hutus	Ambiguous	These are only recorded in three attack episodes, taking place in three villages of the district of Masisi in 1993 and 1996. It is likely that those in 1993 are a Congolese militia called Magrivi and that that in 1996 may be the Interahamwe (See Interahamwe)
Interahamwe	Foreign	The Interahamwe were Rwandan Hutu militia who took part in the Rwandan genocide
Katanguese	Popular Militia	Combatants from Katanga
Katanguese military	Congolese state	By definition
Katuku	Popular Militia	The Katuku are a local self-defense militia created in the 1990's in Walikale
Local defense	Popular Militia	These are decentralized, village-level militia during the Second Congo War, initiated by the RCD
M23	Foreign	Tutsi-led group armed group reportedly supported by Rwanda (March 23 mouvement)
Magrivi	Popular Militia	Congolese Hutu militia
Mainual sirimukoko d'isangi	Popular Militia	Mayi-Mayi is a term broadly used to indicate community based popular militia
Mayi-Mayi	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Geremie	Popular Militia	Mayi-Mayi militia called APCLS led by Janvier Karai
Mayi-Mayi Janvier (Alliance patriotique pour un Congo libre et souverain, APCLS)	Popular Militia	Mayi-Mayi militia
Mayi-Mayi kabuchifuchi	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Kachigumaka	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Kagunga	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Kasindens	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Katuko	Popular Militia	Mayi-Mayi militia led by Vita Kambala
Mayi-Mayi Kifufua	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Kirikichwa	Popular Militia	Mayi-Mayi militia from Masisi
Mayi-Mayi Lafontaine	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Lulwako	Popular Militia	Mayi-Mayi militia from Lubero
Mayi-Mayi Mudohu	Popular Militia	Mayi-Mayi militia from Ituri
Mayi-Mayi Mze	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Ngilima	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Nyakiliba	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Padiri	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Sam	Popular Militia	Mayi-Mayi militia
Mayi-Mayi Simba	Popular Militia	Mayi-Mayi militia from Ituri, under General Morgan
Mayi-Mayi Sirimukogo	Popular Militia	Mayi-Mayi militia from Isangi
Mayi-Mayi Surambaya	Popular Militia	Mayi-Mayi militia
Mayi-Mayi-KAG	Popular Militia	Mayi-Mayi militia
Mayi-Mayi-WEM	Popular Militia	Mayi-Mayi militia
Mbarwe	Popular Militia	Mayi-Mayi militia
Mbwane	Popular Militia	Mayi-Mayi militia
Mercenaries of the AFDL which we call Banyamulenge	Foreign	See AFDLR
Mongore	Popular Militia	Other name for Local Defense, encouraged by the Rassemblement Congolais Pour la D'émocratie but village initiated mobilization (RCD)
MONUC/MONUSCO	Congolese state	UN Mission in the DR Congo
Mouvement de Libération du Congo (MLC) - Jean Pierre Bemba	Foreign	Large armed group led by JP Bemba and supported by foreign powers
Mundudu 40	Popular Militia	Armed group formed in Bukavu and Walungu
Nduma Defense of Congo (NDC) - Sheka	Popular Militia	Armed group born in Walikale
Nyatura	Popular Militia	A local militia of Congolese Hutu
Patriotes Resistants Congolais (PARECO)	Popular Militia	Comprised of a mixture of Mai Mai and Hutu (Congolese and Rwandan)
Police d'intervention rapide	Popular Militia	Rapid Intervention Police
Raia Mutomboki	Popular Militia	The Raia Mutomboki emerged in Shabunda among lega populations
Raia Mutomboki - Eyadema	Popular Militia	Largest faction of the Raia Mutomboki in 2013
Rassemblement Congolais Pour la D'émocratie (RCD)	Foreign	Large rebel group during the second Congo war, supported by Rwanda and Uganda
Rassemblement Congolais Pour la D'émocratie (RCD) - Goma	Foreign	The RCD split into a Ugandan-supported (Kisanganani) and a Rwandan-supported faction (Goma)
Rassemblement Congolais Pour la D'émocratie (RCD) - Kisangani	Foreign	The RCD split into an Ugandan-led (Kisanganani) and a Rwandan-led faction (Goma)
Rassemblement Congolais Pour la D'émocratie (RCD) - Mon	Foreign	The RCD split into a Ugandan-supported (Kisanganani) and a Rwandan-supported faction (Goma)
Rassemblement congolais pour la democratie-Kisangani-Mouvement de libération (RCD-K-ML)	Foreign	Rebel movement backed by Uganda
Rondo	Popular Militia	Term used for neighborhood autodfense groups
Rwandan Army (Rwandan Patriotic Front)	Foreign	The Rwandan national army
Rwandese	Foreign	Unidentified Rwandese armed men
Thief	Other	By definition
Ugandan military	Foreign	By definition
Unidentified Congolese armed group	Popular Militia	By definition
Unidentified Rwandan armed group	Foreign	By definition
Unknown people	Unknown	By definition
Village autodfense group with no other name	Popular Militia	By definition
Villagers	Popular Militia	Term used for neighborhood autodfense groups

Notes: This table presents all the armed organizations that we record in our dataset. The sources used in consolidating this list of names are the module of attacks experienced by the household, organizations to which the individual has participated, and organizations that ever controlled the village. The classification follows the existing qualitative research on the DRC (Marchais, 2016; Sánchez de la Sierra, 2020; Vogel, 2014; Vogel et al., 2021; Stearns, 2013; Vogel and Stearns, 2018), and, except for two armed groups who are almost absent in our sample, is uncontroversial. These are: a. the Nyatura, a Congolese popular militia that merged in Masisis, a land predominantly inhabited by Congolese Hutu (which we classify as militia) and b. the "local defense," which are Congolese village militias that were nonetheless encouraged through the foreign-led armed group Rassemblements Congolais pour la Démocratie (which we also classify as militia).

B Roy Model Proofs

Proof that $w < \bar{w}$ when v is large. Consider first that there are no community-oriented preferences. The proof with victimization-related community-oriented preferences is identical. Then, an individual chooses to join the militia if, and only if $U_0 = w + \epsilon_0 < m = U_1$. Thus, the mass of individuals who join a militia is $\Phi(m - w)$. We can rewrite social welfare as:

$$W = v\Phi(m - w) + w\Phi(w - m) + \int_{m-w}^{+\infty} \epsilon_0 dF_{\epsilon_0} + m\Phi(m - w)$$

With some algebra, it follows that:

$$\frac{d}{dw}W(v) = \phi'(m - w) \cdot (w - m - v) + \Phi(m - w) + \epsilon_0$$

We have $\frac{d}{dw}W(v) = -\phi'(m - w)$. First, Since $w > m$, we have $\frac{d}{dw}W(0) < 0$, thus if $v = 0$, $w = \bar{w}$. Furthermore, $\phi'(m - w) > 0$ is a constant. Taken together, these two results imply that $\exists \bar{v} > 0$ such that, $v > \bar{v}$, $\frac{d}{dw}W(v) < 0$. Furthermore, $\bar{v} = w - m + \frac{\Phi(m - w) + \epsilon_0}{\phi'(m - w)} > 0$.

□

Consider the Roy model presented in Section 7. We have:

$$U_1 = \underbrace{m + h \cdot \bar{a} + \bar{c} \cdot \bar{a}}_{\mu} + \underbrace{h(a - \bar{a}) + (\tilde{c} - \bar{c}) \cdot \bar{a} + \epsilon'_1}_{\epsilon'_1}$$

where $\epsilon_0 \sim N(0, \sigma_0)$, $\epsilon_1 \sim N(0, \sigma_1)$, $a \sim N(\bar{a}, \sigma_a)$, $\tilde{c} \sim N(\bar{c}, \sigma_c)$, and $\epsilon'_1 \sim N(0, \sigma'_1)$, $\sigma'^2_1 = h^2\sigma_a^2 + \bar{a}^2\sigma_c^2 + \sigma_1^2$ and $\mu = m + h \cdot \bar{a} + \bar{c} \cdot \bar{a}$.

Proof of sorting in the Roy model. Results from Roy Model:

$$E(U_0 | \text{Join}) = w + E(\epsilon_0 | \frac{v}{\sigma_v} > z) = w + \sigma_0 E\left(\frac{\epsilon_0}{\sigma_0} \middle| \frac{v}{\sigma_v} > z\right)$$

Notice that $E(\epsilon_0 | v) = \frac{\sigma_{0v}}{\sigma_v^2}v$. Apply this we get:

$$\begin{aligned} E\left(\frac{\epsilon_0}{\sigma_0} \middle| \frac{v}{\sigma_v}\right) &= \frac{\sigma_{0v}}{\sigma_v^2} \frac{1}{\sigma_v^{-2}} \frac{1}{\sigma_0 \sigma_v} \frac{v}{\sigma_v} \\ &= \rho_{0v} \frac{v}{\sigma_v} \end{aligned}$$

Therefore, we can rewrite $E(U_0|\text{Join}) = w + \rho_{0v}\sigma_0(\frac{\phi(z)}{1-\Phi(z)})$. Similarly, $E(U_1|\text{Join}) = \mu + E(\epsilon'_1|\frac{v}{\sigma_v} > z) = w + \rho_{1'v}\sigma'_1(\frac{\phi(z)}{\Phi(-z)})$. After some algebra, we have: $\rho_{0v}\sigma_0 = \frac{\sigma_0\sigma_{1'}}{\sigma_v}(\rho - \frac{\sigma_0}{\sigma_{1'}})$

where the equality is from $\text{cov}(v, \epsilon_0) = \sigma_{0v} = E[(\epsilon_{1'} - \epsilon_0)\epsilon_0] = \sigma_{01'}\sigma_0^2$. Similarly, we have: $\rho_{1'v}\sigma_{1'} = \frac{\sigma_0\sigma'_1}{\sigma_v}(\frac{\sigma'_1}{\sigma_0} - \rho)$. It follows that:

$$\begin{aligned} E(U_0|\text{Join}) &= w + \frac{\sigma_0\sigma'_1}{\sigma_v}(\rho - \frac{\sigma_0}{\sigma'_1})(\frac{\phi(z)}{1-\Phi(z)}) \\ E(U_1|\text{Join}) &= \mu + \frac{\sigma_0\sigma'_1}{\sigma_v}(\frac{\sigma'_1}{\sigma_0} - \rho)(\frac{\phi(z)}{1-\Phi(z)}) \end{aligned}$$

$$\text{where } \rho = \frac{\sigma_{01'}}{\sigma_0\sigma'_1}, z = \frac{w-\mu+C}{\sigma_v}.$$

Implications of positive sorting on productive capacity

$$E(\epsilon_0|\text{Join}) > 0 \implies \rho > \frac{\sigma_0}{\sigma'_1} \quad (5)$$

$$\implies \text{cov}(\epsilon_0, \epsilon'_1) > \sigma_0^2 \quad (6)$$

$$\implies \cdot \text{cov}(\epsilon_0, a) + \bar{a} \cdot \text{cov}(\epsilon_0, \tilde{c}) + \text{cov}(\epsilon_0, \epsilon_1) > \sigma_0^2 \quad (7)$$

□

Proof that household attacks cause participation if, and only if, $h > 0$. An individual joins if, and only if:

$$\mu - w - C + \epsilon'_1 - \epsilon_0 > 0$$

First, $P := Pr(\text{Join}) = Pr(\frac{v}{\sigma_v} > \frac{w-\mu+C}{\sigma_v})$ ①. where $v = \epsilon'_1 - \epsilon_0 = h(a - \bar{a}) + (\tilde{c} - \bar{c}) \cdot \bar{a} + \epsilon_1 - \epsilon_0$

- Consider two realized values $a^H > a^L$, $P(a^H) - P(a^L) > 0$ if $h > 0$; $P(a^H) - P(a^L) = 0$ if $h = 0 \rightarrow$ household attacks cause participation if, and only if, $h > 0$;
- $\frac{\partial P}{\partial \bar{a}} > 0 \rightarrow$ collective attacks increase individual participation if, and only if, $\tilde{c} > 0$;

□

C Examining potential confounders

C.1 Endogeneity of foreign-led armed group attack: Control Strategy

Table C.1 replicates Table 6 controlling for predicted probability that the household has previously been victimized by a foreign-led armed group.

Table C.1: Separating Household and Collective Victimization, Controlling For Targeting

*A. Effect of Household Victimization, Within Village-Year

	General	Incl. Extra. Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)	Money	Status	Prot, Comm	Prot, Fam	Revenge	Coerced
Attacked	2.99** (1.27)	2.99** (1.27)	-0.01 (0.45)	-0.31 (0.23)	-0.02 (1.05)	2.28** (0.91)	0.58 (0.44)	0.97* (0.52)
Control mean	2.14	0.54	1.32	0.13	0.15	0.13	0.09	0.02
Obs.	17832	17832	17832	17832	17832	17832	17832	17832
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Village-year FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster individual level	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y	Y	Y	Y	Y	Y	Y

*B. Effect of Collective Victimization, Controlling for Household Victimization

	General	Incl. Extra. Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)	Money	Status	Prot, Comm	Prot, Fam	Revenge	Coerced
Attacked	1.28** (0.60)	1.28** (0.60)	0.07 (0.06)	0.02 (0.04)	0.60 (0.35)	0.07 (0.09)	0.41** (0.16)	-0.04 (0.07)
Control mean	0.82	0.72	0.40	0.04	0.10	0.02	0.02	0.00
Obs.	13826	13826	13826	13826	13826	13826	13826	13826
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Village-year FE	N	N	N	N	N	N	N	N
Cluster individual level	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y	Y	Y	Y	Y	Y	Y

*C. Effect of Collective Victimization, Including Household Victimization

	General	Incl. Extra. Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)	Money	Status	Prot, Comm	Prot, Fam	Revenge	Coerced
Attacked	1.42*** (0.50)	1.01** (0.42)	0.17* (0.09)	0.02 (0.04)	0.52* (0.31)	0.13 (0.10)	0.36*** (0.13)	0.04 (0.08)
Control mean	0.59	0.42	0.23	0.02	0.06	0.01	0.07	0.00
Obs.	2289	2319	2289	2289	2289	2289	2289	2289
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Village FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at the Village level	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table presents OLS estimates of equation 3, controlling for predicted likelihood of being victimized in the past. Detailed specifications are in the notes of Table 6. We first estimate the likelihood of being targeted in the current year using variables. Control mean is computed among observations where respondents never experienced an attack on household from any armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

C.2 Endogeneity of foreign-led armed group attack: IV Strategy

Table C.2, Panel A, presents the robustness analysis. Panel A implements three different instrumental variable approaches that exploit plausibly exogenous sources of variation for attacks. Column (1) is the benchmark. In column (2), we instrument whether the household has been attacked in year t with whether the household lived in in a village controlled by a foreign-led armed group, interacted with an indicator for whether the household originates from a rich family. Presence of foreign armed groups is predictive of exposure to violence in the previous years by foreign-led armed groups, the endogenous variable. The estimated IV coefficient is large and significant, and the first stage is strong. Column (3) restricts foreign-led armed groups' presence to the RCD, the predominant force during the second congo war. Column (4) restricts foreign-led armed groups' presence to the FDLR, the main perpetrator of violence against civilians. While the first stage F-statistic is sometimes above 10, the analysis shows a large and positive estimated coefficient.

C.3 Nonclassical measurement error

In Table C.2, Panel B, we examine the role of measurement error. Column (1) presents the estimates for Equation 3 as benchmark. Column (2) estimates Equation 3 using cross-validated attacks. Figure F.7, Panel B, showed the distribution of cross-validated attacks. For each attack reported by the respondent, we cross-validate the attack by looking at whether more than half of the other respondents who live in the same village in the same year also reported an attack on the village, or whether the chief reported an attack on the village in the same year: of the 475 attack episodes, 34.5% can be verified in this way.³³

Column (3) estimates Equation 3 weighting observations by the respondent's working memory score. We assign a larger weight to observations from respondents with high scores in the working memory tasks. Figure C.1 shows the distribution of the scores.³⁴

³³Many non-cross validated attacks happen in the same village but in a different year, indicating that they are measurement error of the year rather than mis-reporting. Among observations where respondents live in the current village, 126 out of 260 (48%) of the attacks are cross-validated. Only 20 out of 192 attacks where respondents live elsewhere can be cross-validated, since they report about attacks in other locations. For attacks in the in-survey villages, 142 out of 332 attacks can be verified in the chief survey.

³⁴Memory tests were only conducted in South Kivu. We constructed an index for accuracy using two tests. In a first test, the respondent is asked to repeat a predetermined sequence of randomly drawn digits multiple times, at increasing lengths. For instance, if the sequence is 5293746, the researcher first asks to repeat 5, then 52, then

Table C.2: Examining Potential Confounders

	General Participation Militia Formed in the Village			
	(1)	(2)	(3)	(4)
<i>A. Endogeneity of armed group attack, IV approach</i>				
Attacked	3.01** (1.26)	29.87** (12.84)	27.44 (16.86)	63.34* (33.38)
F-stat		18.70	10.29	6.39
Control mean	2.32	2.69	2.70	2.71
Obs.	17832	15183	15145	15011
Instrument	Main	Rich Father * Lived under control of Foreign group	RCD	FDLR
<i>B. Measurement error</i>				
Attacked	3.01** (1.26)	2.46* (1.27)	2.52** (1.27)	
Control mean	2.32	2.46	2.54	
Obs.	17832	17832	13726	
Robustness test	Main	Cross-validated attacks	Weighted by working memory	
<i>C. Selection bias of migration</i>				
	3.01** (1.26)	4.90** (2.13)	4.16** (1.87)	
Control mean	2.32	2.32	2.32	
Obs.	17832	8721	17832	
Robustness test	Main	Villagers who never leave the sample	Control out-of-sample migration	
<i>D. Other threats to inference</i>				
Attacked	3.01** (1.26)	0.92 (0.60)	3.01** (1.42)	3.03** (1.26)
Control mean	2.32	1.30	2.32	2.32
Obs.	17832	17832	17832	17832
Robustness test	Main	Persisting participation	Cluster at Chiefdom-year	Control conquest
Age FE	Y	Y	Y	Y
Individual FE	Y	Y	Y	Y
Village-year FE	Y	Y	Y	Y
Cluster at Village-year level	Y	Y	Y	Y

Notes: This table estimates equation 3 using different specifications to examine potential confounders of main specification 3, focused on attacks on household by foreign-led armed group and participation in a militia. We include observations between 1995 and 2013 at year t . All regressions include individual FE, village-year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced an attack on household from foreign-led armed group before year t , controlling other variables at mean values. P-value: *** 0.01, ** 0.05, * 0.10.

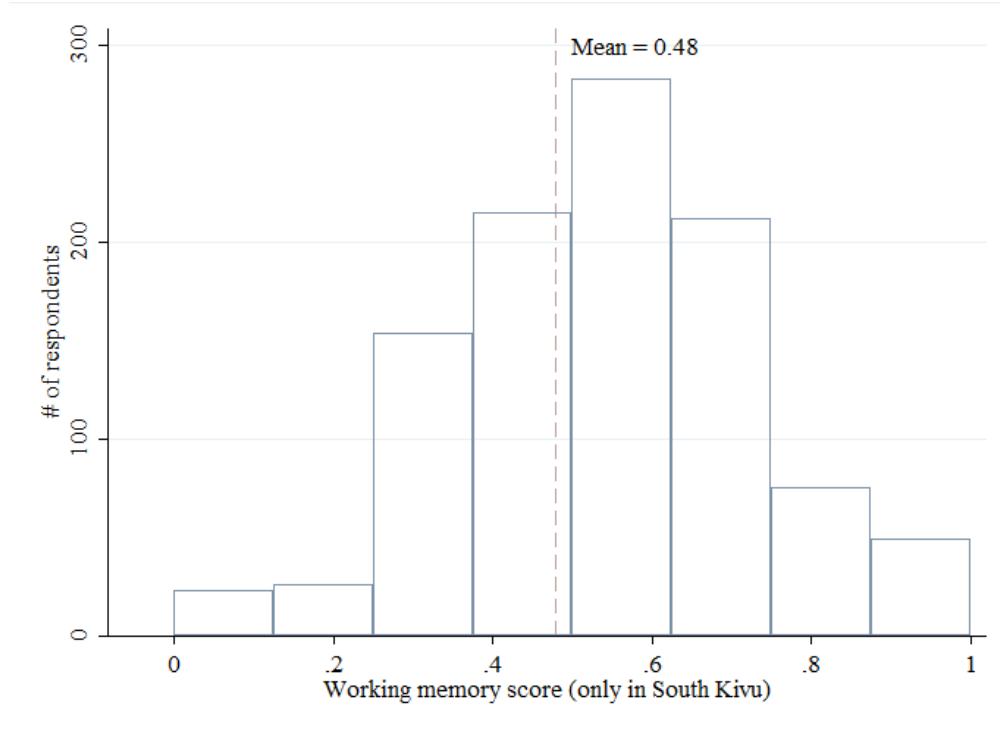
Panel A: Column (2)-(4) use as instrument whether respondent with a rich father lived in a village controlled by foreign-led armed group or two major foreign-led armed groups (RCD, FDLR) in the past.

Panel B: Column (2) uses only cross-validated attacks. Column (3) weights observations by working memory test.

Panel C: Column (2) uses only observations where respondent stayed in the sample of interview villages. Column (3) uses the full sample but controls for whether the respondents lived outside the interview villages.

Panel D: Column (2) uses only the start of each participation episode as dependent variable. Column (3) clusters at Chiefdom-year level. Column (4) controls for territorial conquest.

Figure C.1: Distribution of Working Memory



Notes: This figure shows the distribution of working memory used as weights in Table C.2, Panel B. Working memory is constructed from two memory tests described in Section C.3. The mean is 0.48.

C.4 Selection Bias and Out-of-Sample Migration

In what follows, we consider the biases that may ensue if individuals who were previously in the village have left the village, and those that may ensue if individuals who are today in the village come from other areas. These patterns of selection can arise from death, migration, or active involvement in armed groups in other areas. They can threaten the validity of our main coefficient if, for instance, individuals who are more likely to have migrated out of the sample are also more (or less) likely to have been attacked, and also to have participated in armed groups. We refer to all of these sample selection issues as migration in what follows. Migration can affect external validity of our results if the selection of households present today is not representative of those who were present in the past. In that case, we estimate the effect for a population subset. We now formally analyze migration.

529, etc. The researcher notes the first length at which the respondent failed to remember the sequence fully. In a second test, we asked them to count how many years had passed since Mobutu was no longer president.

C.4.1 Difference between migrants and stayers

We first analyze whether villagers who migrated are systematically different. Table C.3 compares individual-year observations where villagers moved to a new village in year t versus those where villagers stay in the same village. In total there are 1,389 migration episodes. Migrants tend to be younger, less likely to have married, more likely to be unemployed before moving, more educated, and have higher working memory score. They do not differ in the father's wealth index, number of plot, or farm animal index, although they invest more in plots and farm animals after they migrate. One potential concern is that villagers may migrate to find a safer location because of past attack history or to avoid being targeted because of past participation history. This is not the case in Panel D: there is no systematic difference in past victimization or participation background.

Table C.3: Characteristics of Migrants (1,389 migration episodes)

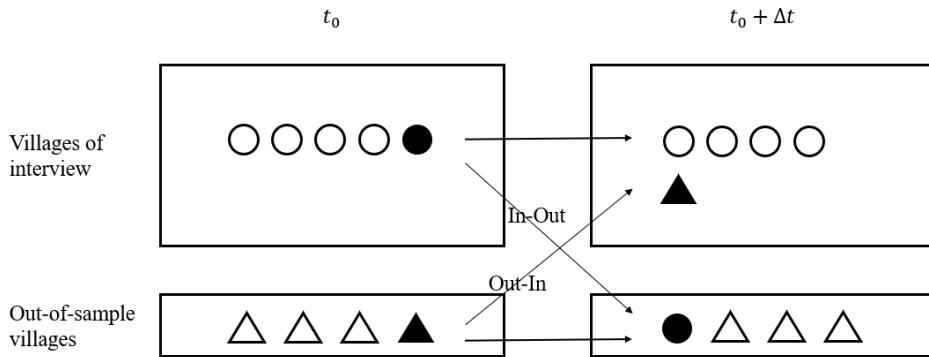
	Nonmigrant	Migrant
# of individual-year obs.	18326	1389
<i>Panel A: Demographic Characteristics</i>		
In the Family of the Village Chief	0.10	0.11
Age in year t	26.75	26.52*
Married in year t	0.36	0.34*
<i>Panel B: Productive Capacity in Nonviolent Sector</i>		
Unemployed in year $t-1$	0.27	0.30***
Father's Wealth Index	-0.20	-0.17
# Plots Owned in year $t-1$	0.51	0.48
Farm Animal Index in year $t-1$	0.09	0.04
Primary Education Complete	0.50	0.59***
Secondary Education Complete	0.13	0.19***
Tertiary Education Complete	0.02	0.03***
Working Memory Score	0.48	0.50***
<i>Panel C: Average Increase in Future Assets</i>		
# Plots Owned	0.18	0.25***
Farm Animal Index	0.22	0.31***
<i>Panel D: Victimization and Participation Background</i>		
Foreign group attacked HH before	0.07	0.08
Militia attacked HH before	0.03	0.03
Participated in Foreign armed group before	0.00	0.00
Participated in Militia before	0.09	0.07

Notes: This table shows descriptive statistics for observations where respondents move to a new village versus those where respondents stay in year t . We indicate the difference between Column 1 and 2 (P-value: *** 0.01, ** 0.05, * 0.10), computed after including year FE, and clustered two-way at the individual respondent and the village*year level.

C.4.2 Migration as a source of selection bias

To discuss selection bias resulting from migration, we first define the average treatment effect (ATE) estimand. Suppose at t_0 we have a representative sample from the villages we interview, and we want to estimate the treatment effect of past attack on villagers from the villages of interview. After a period Δt , however, some villagers emigrate to an out-of-sample village (In-Out migration), and some villagers migrate into a village of interview (Out-In migration). A random draw from the interview villages in $t_0 + \Delta t$ will not be representative of villagers from the villages we interview at time t_0 . Notice that some villagers migrate within villages of interview, but this does not cause the selection bias because they do not alter the composition of villagers from the survey villages. See Figure C.2.

Figure C.2: Illustration of Selection Bias



Notes: This figure presents schematically the sample selection we address in this section.

1. Suppose villages of interview (Group A) constitute proportion $a \in [0, 1]$ of the East Congo population.
2. Within villages of interview, proportion $1 - \pi$ of the villagers will never migrate outside (A_1). Proportion π of the villagers will migrate to out-of-sample villages at least once throughout the period (A_2) with probability p .
3. Within out-of-sample villages (Group B), proportion $1 - \pi$ of the villagers will never migrate outside (B_1). Proportion π of the villagers will migrate to villages of interview at least once throughout the period (B_2) with probability p .

Assume the real treatment effect of each group is $T(X)$, and past attack does not change the composition of different subgroups. Treatment effect of interest:

$$ATE(A) = (1 - \pi)T(A_1) + \pi T(A_2).$$

Estimate of the treatment effect:

$$\begin{aligned} ATE(\hat{A}) &= \frac{a(1 - \pi)}{a(1 - \pi) + (1 - a)p\pi} T(A_1) + \frac{(1 - a)p\pi}{a(1 - \pi) + (1 - a)p\pi} T(B_2) \\ &= \frac{1}{1 + (\frac{1-a}{a}p - 1)\pi} ATE(A) + \frac{(1 - a)p\pi T(B_2) - a\pi T(A_2)}{a(1 - \pi) + (1 - a)p\pi}, \end{aligned} \quad (8)$$

There are at least two different ways that selection bias affects the estimation of ATE (through the coefficient term and constant). If, however, we assume that past attack does not affect the composition of migrants and nonmigrants, one can at least estimate the treatment effect on villagers who never migrate outside sample villages without bias ($T(A_1)$).

Table C.4 estimates the effect of past attack by Foreign-led armed group on participation in a militia. Column (1) shows the benchmark of the main result. Column (2) implements the main specification 3 within villagers who never migrate outside of the villages of interview. The effect on these villagers are larger and remain statistically significant. This is an unbiased estimate of the effect of past attack on villagers who never migrate outside of the villages of interview if past attack does not affect the composition of migrants ($T(A_1)$). Columns (3) and (4) implements the main specification but controls for different types of migrants. The estimates of $T(A_1)$ remain largely similar.

Results in Columns (3) and (4) also suggest that migrants from outside of the villages of interview, if anything, are negatively selected. Those who are less likely to participate tend to migrate into the villages of interview. Remember, however, that villagers who migrated from outside of the villages of interview are not representative of Out-In migrants or In-Out migrants, and thus these are potentially a biased estimate of $T(B_2)$ and $T(A_2)$.

Table C.4: Effect of Past Attack on Migration, on Villagers Who Never Migrated Outside of Sample

	Participation Militia Formed in the Village			
	(1)	(2)	(3)	(4)
Past attack on HH by Foreign group	3.01** (1.26)	4.90** (2.13)	4.16** (1.87)	4.15** (1.88)
Past attack * Migrants			-2.60 (2.32)	
Past attack * Out-In migrants				-1.37 (2.50)
Past attack * In-Out migrants				-3.31 (2.54)
Past attack * Yet-to-be migrants				-1.06 (2.31)
Only within non-migrants			✓	
Control mean	2.92	3.58	2.92	2.93
Obs.	17832	8721	17832	17790

.5Notes: This table presents OLS estimates of equation 3, controlling for migration. The dependent variable is an indicator for whether the respondent participates in a militia formed in the village. The main explanatory variable is an indicator for whether the respondent's household has been attacked by foreign-led armed groups. We include observations between 1995 and 2013 above age 15 at year t . All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced an attack on household by foreign-led armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

C.4.3 Calibration of real ATE

We conduct a simplified calibration exercise using the results above, assuming migration does not affect migration likelihood (more discussion in the next subsection).

Migration likelihood for each migrant p : On average, each migrant is observed for 16 years in the sample, and moves on average twice. We calibrate $p = \frac{1}{8}$.

Proportion of villagers in the villages of interview a : According to village chief survey, on average, there are 427 villagers in a village of interview in South Kivu. Consider the total population in South Kivu in 2015 to be 5,772,000, and apply the average number of villagers to all 133 villages in South Kivu and North Kivu. We calibrate $a = 0.98\%$.

Proportion of villagers who migrate at least once throughout the observation period π : Out of 1,041 respondents, 590 have never migrated outside of the sample once. We calibrate $\pi = 1 - 590/1041 = 43\%$.³⁵

³⁵This is not the perfect calibration because the denominator does not consider villagers who have emigrated. It is hard to observe emigrants who left the sample; the closest data we have is how many villagers emigrated from each village every year. On average, a village of interview in South Kivu sees 61 in-migrants and 64 out-migrants every year.

Now we can apply these parameters to Equation 8. We have an imperfect estimate of $T(B_2)$ and $T(A_2)$ from Table C.4, Column 4 ($\hat{T}(B_2) = 4.15 - 1.37 = 2.78$, $\hat{T}(A_2) = 4.15 - 3.31 = 0.84$), and an estimate of $\hat{ATE}(A) = 3.01$. Putting all the calibrated parameters together, we have $\hat{ATE}(A) = 0.167ATE(A) + 0.905T(B_2) - 0.0717T(A_2)$.

Suppose all In-Out migrants do not react to past attack at all; that is, $T(A_2) = 0$. To make the real $ATE(A)$ zero, one needs the effect on Out-In migrants $T(B_2)$ to be at least 3.33. This is different from $\hat{T}(B_2) = 2.78$ with statistical significance (p-value 0.2331). To justify the empirical result, one needs to assume that the representative migrant from outside of the sample reacts more strongly to the past attack, but we only observe the left tail of the distribution.

Suppose all Out-In migrants do not react to past attack at all; that is, $T(B_2) = 0$. To make the real $ATE(A)$ zero, one needs the effect on In-Out migrants $T(A_2)$ to be at least -41.98. This is drastically different from $\hat{T}(A_2) = 0.84$ (p-value 0.0000). To justify the empirical result, villagers who tend to migrate outside of the villages of interview should be strongly discouraged from participation if they have experienced any past attack by foreign group, but we only observe the extremely right tail of the distribution.

C.4.4 Migration as an alternative channel

Selection bias aside, migration can confound the main result in the following way. Attack history in the past might affect the propensity of migration, and migration leads to a different participation rate through another channel that we did not discuss in the main text.

Table C.5 regresses different migration indicators on whether respondent experienced an attack by foreign-led armed group before. Column (1) suggests that a past attack leads to lower propensity of migration, both from outside the sample or from within the villages of interview. Column (5) and (6) control for migration history in the past. Although migration within the villages of interview seems to be positively correlated with higher participation rate in a militia, the main effect of past attack remains largely unaffected, suggesting that migration does not explain the effect of past attack on participation.

Table C.5: Migration as a Potential Channel on Participation

	Migration				Participation	
	All (1)	In-Out (2)	Out-In (3)	In-In (4)	M in Village (5)	M in Village (6)
Past attack on HH by Foreign group	-4.61*** (1.73)	0.30 (0.38)	-2.24** (1.12)	-2.80** (1.17)	2.97** (1.26)	2.94** (1.27)
Ever migrated before					1.10* (0.58)	
Ever migrate from Out to In						1.17 (0.95)
Ever migrate from In to Out						-3.05** (1.30)
Ever migrate within villages of interview						1.53* (0.86)
Control mean	6.97	1.12	3.05	2.24	2.69	2.61
Obs.	17790	17790	17790	17790	17790	17790

Notes: This table presents OLS estimates of equation 3. Column (1) to (4) use different migration indicators as the dependent variable (migration in general, migration from a village of interview to an out-of-sample village, migration from an out-of-sample village to a village of interview, migration between the villages of interview). In Column (5) and (6), the dependent variable is an indicator for whether the respondent participates in a militia formed in the village. The main explanatory variable is an indicator for whether the respondent's household has been attacked by foreign-led armed groups. Column (5) and (6) control for whether respondent has migrated in the past. We include observations between 1995 and 2013 above age 15 at year t . All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced an attack on household by foreign-led armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

C.4.5 Implications for Robustness of The Main Coefficient

We have just shown that the coefficient γ of equation 3, in the sample of respondents who never leave the interview villages, is an unbiased estimator of the ATE in that sample.

Table C.2, Panel C, shows the analysis. Column (1) shows the baseline estimate as a benchmark. Column (2) estimates equation 3, but conditions the sample on villagers who never leave the sample of interview villages. The coefficient is 5.18, almost twice as large than the baseline estimate, and is significant. Column (3) estimates equation 3 in the full sample, but controls for whether the respondent lived outside the interview villages for at least one year in the study period. Similarly, the coefficient is doubled and significant.

In sum, we obtain a similar coefficient estimate with the population of households who never left the 133 interview villages in South Kivu. This corresponds to 590 out of 1,041 respondents in the sample, suggesting that, for such well-defined population, in addition to being unbiased, our estimate is also a close estimate for the households living today in the interview villages. This reassures that migration does not affect external validity.

C.5 Other possible confounds

We now examine additional leading confounds due to mis-specification. Table C.2, Panel D, presents this analysis. Column (1), which presents the baseline estimate, the benchmark.

We first account for the possibility that, since the average participation episode lasts 2.34 years, persistence of participation may confound the analysis. For instance, once an individual joins, the cost of leaving could be high. If this were the case, the baseline estimate may overestimate the effect of household victimization on the probability to join. Column (2) presents the estimates of equation 3, but in which the dependent variable takes value 1 only if the observation is the first year of a participation episode, zero otherwise. If the respondent participated twice, the first year for each episode takes value 1, the remaining years take value 0. The coefficient remains large and statistically significant. This provides reassuring evidence that persistence of participation cannot explain our result.

Another possibility is that our estimates capture coincidental aggregate shocks in the Chiefdom. This could be concerning for Shabunda, the Raia Mutomboki recruited in large numbers at the end of the period. In column (3), we estimate equation 3 including as controls indicators for Chiefdom interacted with years (the district of Shabunda has two Chiefdoms, and only one is in our sample). The coefficient remains similar, and p-value is 0.10.

A remaining possibility is that attacks by foreign-led armed groups on the household are simply a proxy for war in the village. Column (4) includes an indicator for whether a territorial conquest occurs in the village as control. If foreign-led armed group attacks on household members simply capture the effect of war through other channels, the coefficient on foreign attack should vanish. The coefficient is slightly larger, and remains statistically significant. Thus, recrudescence of violence due to war cannot explain our results.

Section E in the Webpage Appendix shows that the main result is also robust to changing the definition of who is victimized in the household.

D Alternative Causal Channels

In Webpage Appendix F, we develop a simple dynamic optimization problem for the household finance and labor supply guides the analysis of alternative causal channels.

Table D.6: Motivations arising from Household vs. Village Victimization, Controlling Wealth Channel

*A. Effect of Household Victimization, Within Village-Year

	General	Incl.	Extra.	Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)			Money	Status	Prot,	Comm	Prot, Fam	Revenge
					(3)	(4)	(5)	(6)	(7)	(8)
Attacked	3.01** (1.27)	3.01** (1.27)			-0.01 (0.46)	-0.31 (0.23)	0.04 (1.05)	2.24** (0.90)	0.58 (0.45)	0.95* (0.52)
Control mean	2.14	0.54			1.32	0.13	0.15	0.13	0.09	0.02
Obs.	17790	17790			17790	17790	17790	17790	17790	17790
Year FE	Y	Y			Y	Y	Y	Y	Y	Y
Individual FE	Y	Y			Y	Y	Y	Y	Y	Y
Village-year FE	Y	Y			Y	Y	Y	Y	Y	Y
Cluster individual level	Y	Y			Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y			Y	Y	Y	Y	Y	Y

*B. Effect of Collective Victimization, Controlling for Household Victimization

	General	Incl.	Extra.	Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)			Money	Status	Prot,	Comm	Prot, Fam	Revenge
					(3)	(4)	(5)	(6)	(7)	(8)
Attacked	1.26** (0.59)	1.26** (0.59)			0.07 (0.06)	0.02 (0.04)	0.59 (0.35)	0.07 (0.09)	0.42** (0.16)	-0.05 (0.07)
Control mean	0.82	0.72			0.40	0.04	0.10	0.02	0.02	0.00
Obs.	13798	13798			13798	13798	13798	13798	13798	13798
Year FE	Y	Y			Y	Y	Y	Y	Y	Y
Individual FE	Y	Y			Y	Y	Y	Y	Y	Y
Village-year FE	N	N			N	N	N	N	N	N
Cluster individual level	Y	Y			Y	Y	Y	Y	Y	Y
Cluster at village-year level	Y	Y			Y	Y	Y	Y	Y	Y

*C. Effect of Collective Victimization, Including Household Victimization

	General	Incl.	Extra.	Samples	Economic Inc.		Non-Pecuniary Motivation			Involuntary
	(1)	(2)			Money	Status	Prot,	Comm	Prot, Fam	Revenge
					(3)	(4)	(5)	(6)	(7)	(8)
Attacked	1.33*** (0.48)	0.97** (0.40)			0.14* (0.08)	0.02 (0.04)	0.48 (0.30)	0.11 (0.10)	0.35*** (0.13)	0.04 (0.08)
Control mean	0.59	0.42			0.23	0.02	0.06	0.01	0.07	0.00
Obs.	2288	2318			2288	2288	2288	2288	2288	2288
Year FE	Y	Y			Y	Y	Y	Y	Y	Y
Village FE	Y	Y			Y	Y	Y	Y	Y	Y
Cluster at the Village level	Y	Y			Y	Y	Y	Y	Y	Y

Notes: This table presents OLS estimates of equation 3, controlling for stock of farm animals and plots in year $t - 1$. Detailed specifications are in the notes of Table 6. Control mean is computed among observations where respondents never experienced an attack on household from any armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

Table D.7: Assessing Alternative Explanations

	Participation Militia Formed in the village				
	(1)	(2)	(3)	(4)	(5)
Attacked	3.01** (1.26)	3.53** (1.37)	3.04** (1.27)	3.03** (1.26)	3.58*** (1.38)
Investment in current year		0.03 (0.13)			0.03 (0.13)
Over-reporting tendency			1.14 (1.25)		1.59 (1.33)
Attacked on respondents, not on other HH members				1.87* (0.99)	1.47 (0.99)
Control mean	2.32	1.84	2.30	2.18	1.72
Obs.	17832	16432	17832	17832	16432

Notes: This table presents OLS estimates of equation 3 for attacks controlling for alternative mechanisms. The dependent variable is an indicator for whether the respondent participates in a militia formed in the village in a given year. The explanatory variable is an indicator for whether the respondent's household has been attacked by foreign-led armed groups. We include observations between 1995 and 2013 above age 15 at year t . Column (2) shows benchmark results only in South Kivu. Column (3) controls for investment and asset stock in current year t (only coefficient of current investment is shown). Column (4) controls for whether respondent overreports any violent event on village in year t . Overreporting is defined as whether respondent reports a violent event on village in year t , but less than half of the other contemporary villagers observed in the sample report so and there is no corresponding record in village chief survey. Column (5) controls for whether respondent experienced an attack in the past on himself but not on other household members (more discussion in Appendix F). Column (6) controls for all three alternative channels. All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced a corresponding type of attack on household before year t . P-value: *** 0.01, ** 0.05, * 0.10.

Table D.8: Examining Alternative Channels

	Investment (z-score $\times 100$) (1)	Overreporting any violent event (%) (2)
Attacked	-4.25 (7.36)	-2.30*** (0.83)
Control mean	1.79	1.09
Obs.	16,432	17,832

Notes: This table presents OLS estimates of the effect of past attack on alternative mechanisms. The explanatory variable is an indicator for whether the respondent's household has been attacked by foreign-led armed groups. We include observations between 1995 and 2013 above age 15 at year t . Dependent variable in Column (1) is current investment z-score. Dependent variable in Column (2) is whether respondent overreports any violent event on village in year t . Overreporting is defined as whether respondent reports a violent event on village in year t , but less than half of the other contemporary villagers observed in the sample report so and there is no corresponding record in village chief survey. All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced a corresponding type of attack on household before year t . P-value: *** 0.01, ** 0.05, * 0.10.

E Additional Appendix Tables

Table E.9: What Are Militias Maximizing? The Role of Security Provision

	<i>Dep. Var.: Attack On Village</i>		<i>Dep. Var.: Attack On Household Member</i>		<i>Dep. Var.: Attack With Sexual Violence</i>	
	(1)	(2)	(3)	(4)	(5)	(6)
Presence of Chapter	0.02 (0.03)		-0.43 (0.71)		-0.23* (0.13)	
Participation in Chapter		0.01 (0.03)		-5.39** (2.29)		-1.68** (0.80)
Observations	46,101	46,101	47,604	72,869	47,604	72,869
R-squared	0.14	0.13	0.10	0.31	0.09	0.20
Mean. Dep. Var	0.09	0.09	2.33	2.38	0.24	0.24

Notes: This table presents the estimated coefficients of a regression of indicators of violence against household members on indicators militia chapters formed in the village. The dependent variable in columns (1) and (2) is an indicator for whether the village experiences an attack, in columns (3) and (4) for whether a household member is attacked and in (5) and (6) for whether a household member experiences sexual violence. The explanatory variable in columns (1) and (3) is an indicator for whether there is a chapter in the village and in columns (2) and (4) for whether the respondent participates in it. Columns (1) and (3) include controls for whether an armed group is stationed in the village. Columns (2) and (4) include village-year fixed effects. All regressions include respondent, village, and year fixed effects.

Table E.10: Types of Recruitment Campaigns in the Village: The Role of Village Chiefs

# Village Chapter Episodes	Militia, From:			Foreign g.	Army	P-value
	Anywhere (1)	Village (2)	Outside (3)	(4)	(5)	(4)-(1) (6)
<i>Frequency (% Years of Village Chapter Episode)</i>						
Recruitment Campaigns, All	84.65	94.40	60.29	26.81	7.70	0.00
, Private	13.39	12.87	14.68	0.00	0.16	0.00
, Circumventing Chief	20.66	14.87	35.16	9.95	1.16	0.04
, Coercing Chief	7.07	9.68	0.53	8.92	0.00	0.65
, Public Village Meetings	40.87	53.67	8.86	8.14	2.35	0.00
, Chief-Initiated	11.90	16.67	0.00	2.92	1.16	0.04
, Chief-Initiated or Public	48.35	64.15	8.86	9.81	3.50	0.00

Notes: This table shows the frequency of different types of recruitment campaign by different types of village armed group chapters in the core sample. There are 199 episodes of recruitment reported by either households or by village history specialists. The numbers reported in the columns are the fraction of chapter episode years (in %) in which at least one recruitment campaign of each corresponding type takes place.

Table E.11: Economic Incentives as Benchmark|Price Shocks

	Participation in t (%)			Occupation in t (%)				
	M in Village (1)	M Outside (2)	Foreign (3)	Ag (4)	Mining (5)	Govt (6)	School (7)	Unempl (8)
Gold _j * log(P_t)	-3.22*** (1.18)	0.58 (0.37)	-0.05 (0.18)	-2.71 (1.69)	5.44*** (1.69)	-0.96 (0.94)	-2.77** (1.38)	1.01 (1.65)
Attacked by Foreign	6.16*** (1.88)	0.73 (0.72)	-0.76 (0.59)	-1.91 (3.07)	0.45 (2.70)	4.96* (2.80)	-5.48** (2.61)	1.99 (2.63)
Control mean	3.19	0.90	0.10	45.05	9.48	5.43	14.01	26.03
Obs	15067	15067	15067	13860	13860	13860	13860	13860
Village FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Age FE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster at village-year	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table presents OLS estimates of equation 4. The dependent variables are (a) indicators for whether the respondent participates in any armed group, a militia, or a foreign-led armed group, respectively, in a given year, and (b) indicators for whether the respondent works in agriculture, mining sector, government office, is still a student or unemployed. The explanatory variable are world (log) price for gold interacting with gold endowment of the village, and an indicator for whether the respondent's household has been attacked by foreign-led armed groups. We include observations from South kivu between 1995 and 2013. All regressions include individual FE, village FE, year FE, age FE, and cluster two-way at the individual respondent and the village levels. Control mean is computed among observations where respondents never experienced any attack on household by foreign-led armed group before year t and did not live in a village endowed with gold. P-value: *** 0.01, ** 0.05, * 0.10.

Table E.12: Benchmarking Exercise: The Price of Radicalization

	Part Militia Formed in the village
<i>Control mean:</i>	
Never experienced an attack on HH by foreign armed group	2.31
<i>Effect of experienced shock:</i>	
An attack on HH by foreign armed group before year t	3.01** (1.26)
Local gold price increased in year t (Use world gold price as an IV)	-0.30** (0.10)
(a) by \$1 per g.	-2.49** (0.83)
(b) by 1 s.d. of local gold price	-7.23** (2.53)
(c) by 100% (using log P_t)	
⇒ One past attack on HH by foreign armed group has an equivalent effect of an decrease in local gold price by:	\$10.4 per g.
Daily production of gold miner (Geenen 2013)	1 g
Total number of work days per year (Assumed)	300 d
Tax by local authority (Own data)	45%
⇒ Decrease in yearly income by:	\$1,716
GDP per capita in 2005 in DRC (World Bank)	\$218
⇒ Decrease in yearly income as in GDP per capita:	7.9 times

Notes: This table compares the effect of past foreign-led armed group attack on household to the effect of gold price shock on participation in a militia form in the village. The dependent variable is an indicator for whether the respondent participates in a militia in a given year, residualized after controlling individual FE, village FE, year FE, and age FE. The explanatory variable are (i) an indicator for whether the respondent's household has been attacked by foreign-led armed groups and (ii) local gold price in a given year, instrumented by international gold price, all residualized after controlling the same set of fixed effects. The regression clusters two-way at the individual respondent and the village*year levels. We compute the effect of increase in local gold price by 1 s.d. (Row (b)) simply by scaling the coefficient in Row (a) by s.d. of local gold price (\$8.3 per gram). We compute the effect of increase in local gold price by 100% (Row (c)) by replacing gold price level with log of gold price in the regression. Coefficient of past foreign-led armed group attack on household remains almost the same in both specifications. Control mean is computed among observations where respondents never experienced a corresponding type of attack on household before year t and state force is present. P-value: *** 0.01, ** 0.05, * 0.10.

F Additional Appendix Figures

Figure F.3: The Outraged Citizens



Notes. Source: Photography taken by Diana Zeyneb Alhindawi, which is publicly available at <https://www.dianazeynebalhindawi.com>. Zeyneb Alhindawi describes the image as follows: “Raia Mutomboki fighters gather, wearing leaves for camouflage, after going on a patrol through Lulingu’s surrounding areas [...] Dec. 27, 2013. Lulingu, South Kivu.”

Figure F.4: Example of a Militia’s Mission Statement

OBJECTIFS

Contribuer à la pacification des communautés locales

Collaborer avec toutes les forces légales susceptible de contribuer la promotion du mouvement au niveau national qu'international ;

Appliquer les règles du droit international humanitaire

Participer aux différents forums des paix afin de donner notre contribution sur la résolution de certaines problématiques sécuritaires de la région ;

combattre dans le cas échéant toutes les antivaleurs de la mauvaise gouvernance ;

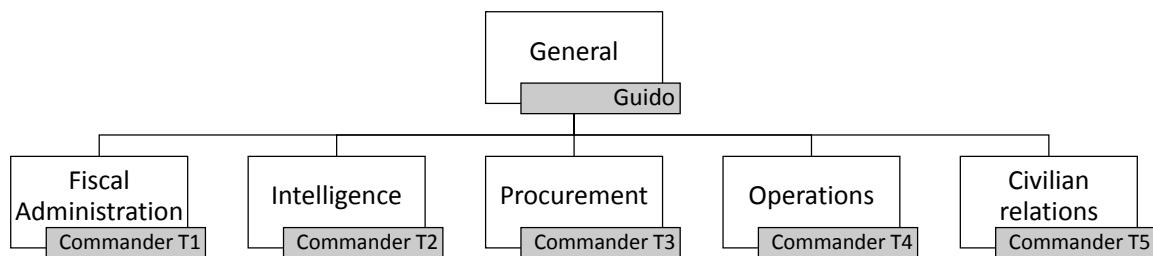
Notes: This figure presents excerpts from the Nduma Defense of Congo–Renewed mission statements in 2015. Source: group documents obtained by one of the authors.

Figure F.5: An NDC Recruitment Campaign Organized by a Village Chief



Notes: Sheka, former NDC's General, in a recruitment campaign organized by the village chief. The village chief presides over the campaign and sits at the back. Source: NDC media obtained by one of the authors.

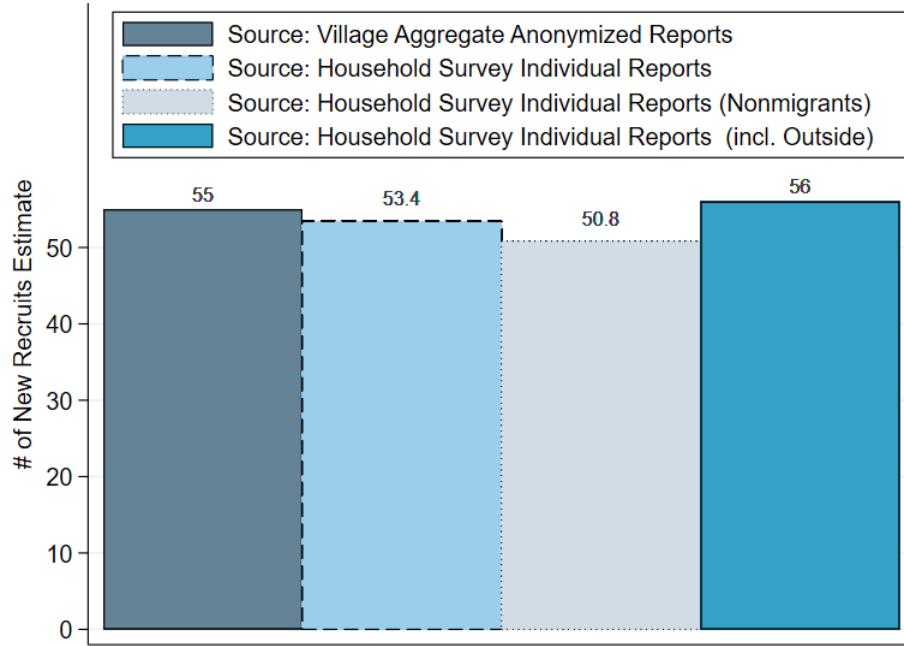
Figure F.6: Example of a Militia's Functional Hierarchy



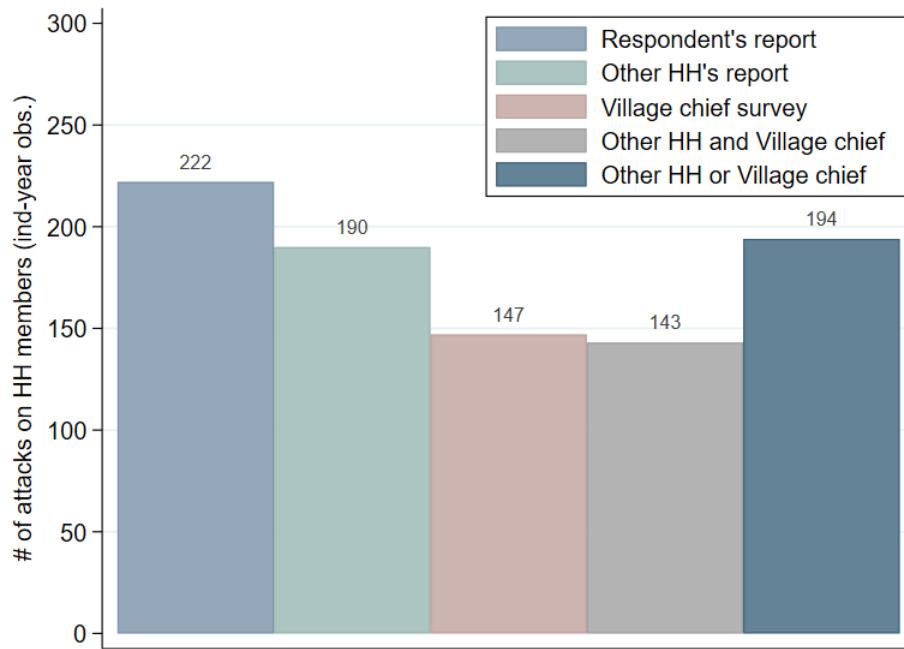
Notes: Panel A presents excerpts from the Nduma Defense of Congo–Renewed mission statements in 2015. Source: group documents obtained by one of the authors. Panel B a typical organigram among militias, using as example a simplified version of that of the Nduma Defense of Congo–Renewed in 2021.

Figure F.7: Corroboration of Militia Participation and of Violent Events Reports in the Data

A. Estimated Mean Number of Militia Recruits per Village, 1995-2013, by Source

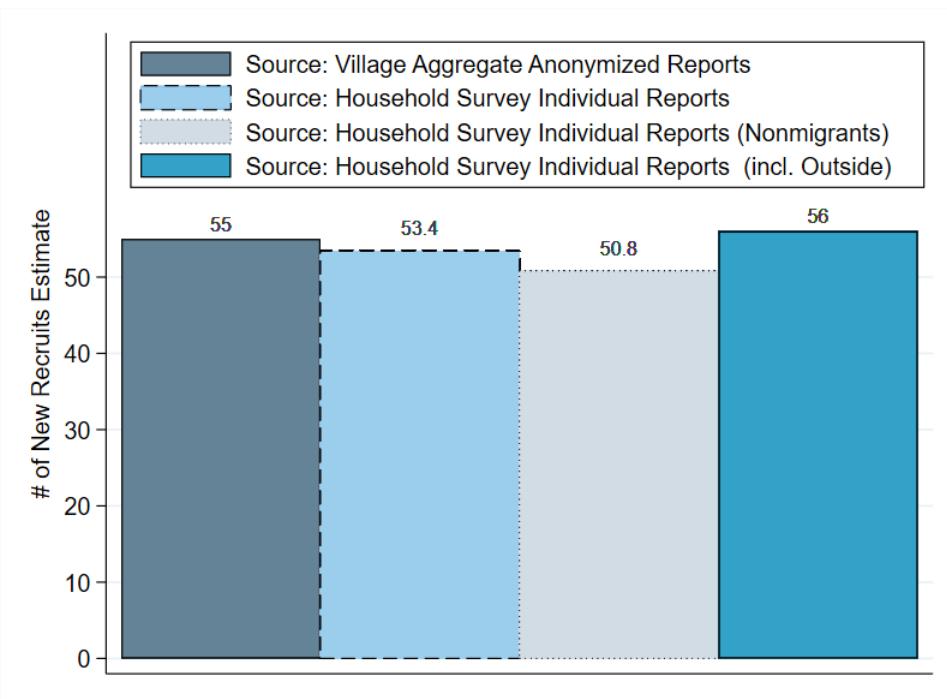


B. Attacks on the Household that are Reported by the Respondents



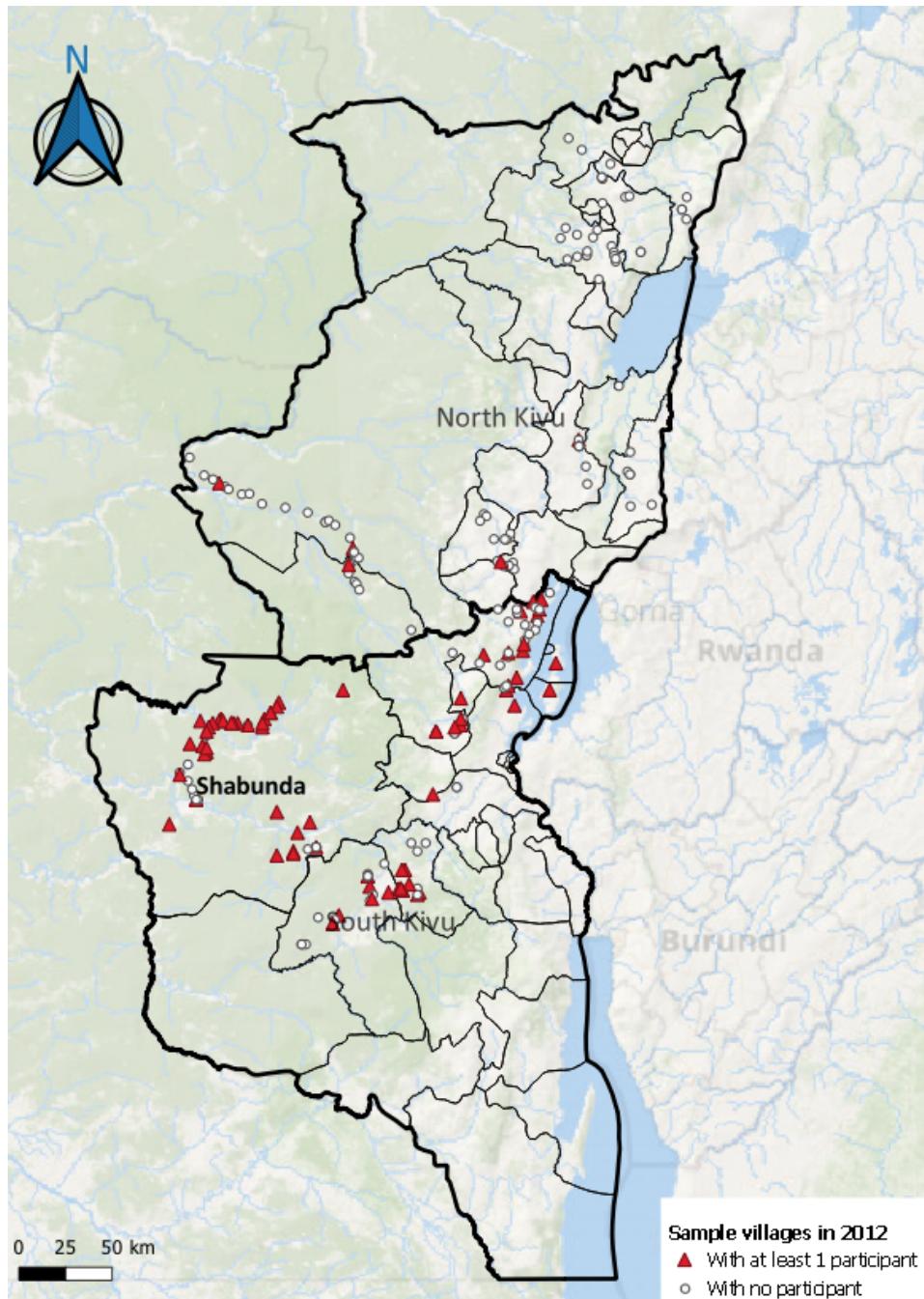
Notes. Panel A presents the estimates for the number of recruits obtained by each type of armed group in South Kivu. Dark blue bar with solid outline on the left is the estimate obtained from the village aggregate anonymized reports. The aggregate village data report number of individuals who participated in armed groups as gathered in detail for each village control episode. The second, light blue bar with dashed outline is the estimate obtained from the household individual report, restricted to enrollment during an episode in which an armed group controls the village, for comparison with the village aggregate anonymized reports. To construct the village level estimates based on the household reports, we first obtain the share of respondents who report to have participated in a group during a group governance episode. Then, we use the village size we recorded in the village survey, and the number of surveyed villages in South Kivu ($n=133$) to construct a village-level estimate of the number of participants. The mean village size in South Kivu in our sample is 216 households. The third, gray bar with dotted contour, does the same as the previous but excludes from the estimation all respondent-year observations for years in which the respondent did not live in the village. To implement this exclusion, we use information on the history of migration for each respondent. The last, blue bar with solid contour, are the household reports, including those for participation events that took place outside of the recruitment obtained from the detailed data gathered separately for each village armed group control episode. The last bar is included to analyze whether restricting the comparison to episodes of enrollment that took place during armed group control episode in the village does not lead to loss of data. Panel B shows the cross-validation of main attack variables from South Kivu. We exclude 46 attack events when respondents lived outside of the sample and thus cannot be validated using the village chief survey. Light blue bar are reported attacks on household between year 1995 and 2013 from respondents' report. Green bar show attacks on household that are also reported by at least 1 other respondents observed in the sample who lived in the same village within 1 year ($t - 1, t, t + 1$). Red bar show attacks on household that are also reported in village chief survey within 1 year. Gray bar show attacks on household that are cross-validated by both village chief survey and at least 1 other contemporary respondents. Dark blue bar show attacks on household that are cross-validated by either village chief survey or at least 1 other contemporary respondents.

Figure F.8: Estimated Mean Number of Militia Recruits per Village, 1995-2013, by Source, All armed actors



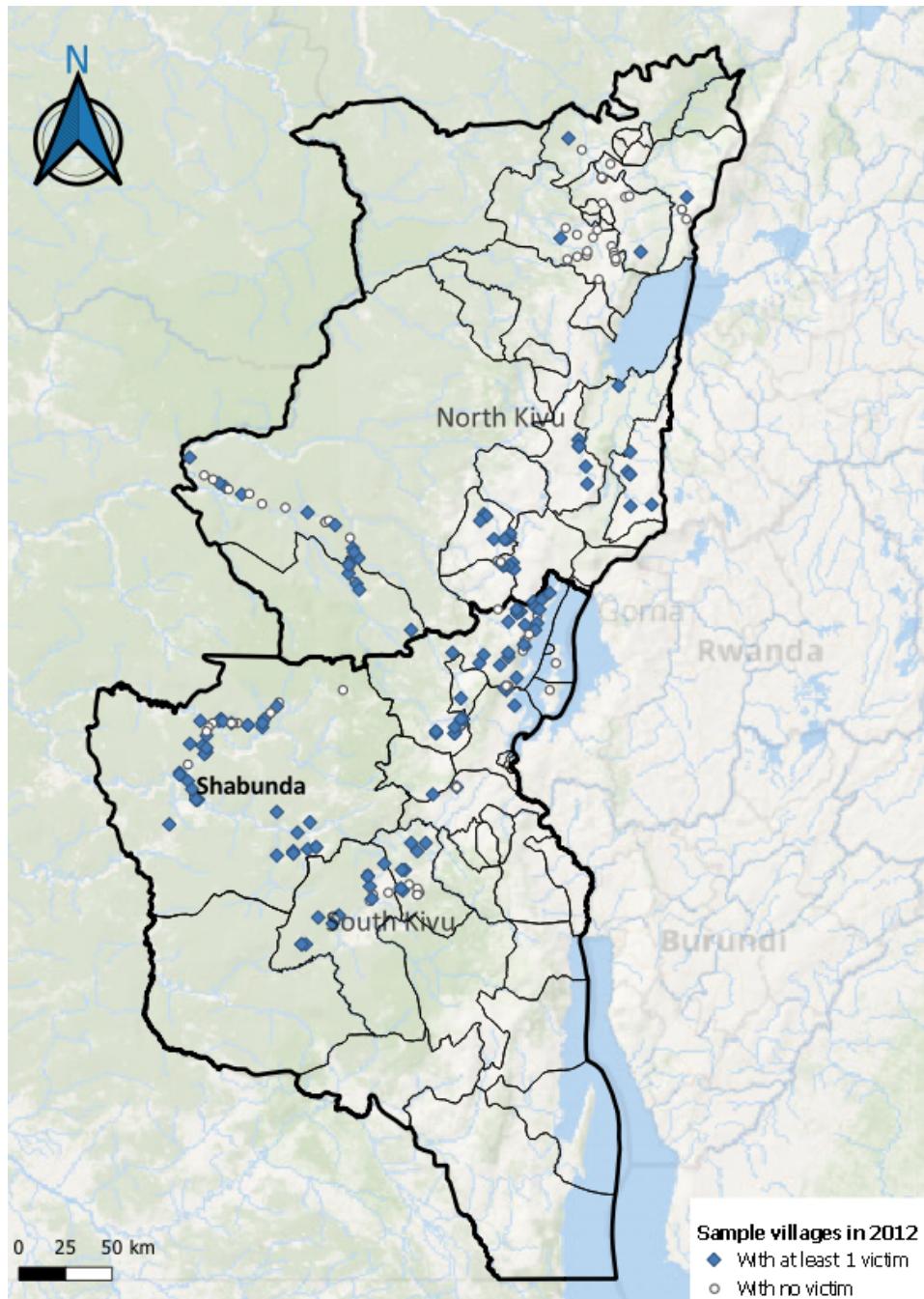
Notes. This Figure replicates Figure F.7 panel A for all types of armed actors in the sample.

Figure F.9: Spatial Distribution of Participation Episodes in Militias



Notes: This figure shows spacial distribution of sample villages in year 2012. Red triangles are villages in 2012 where at least one respondent has participated in any armed group up to 2012.

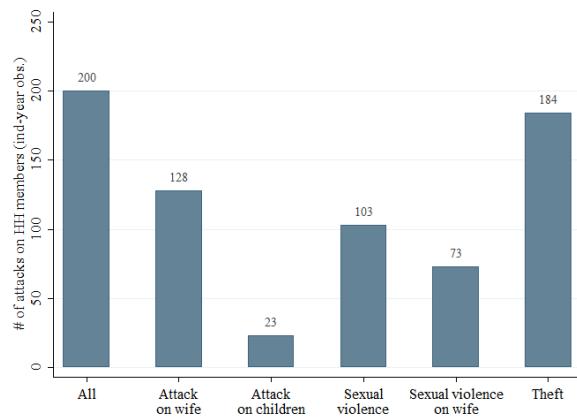
Figure F.10: Spatial Distribution of Attacks against the Sample Households



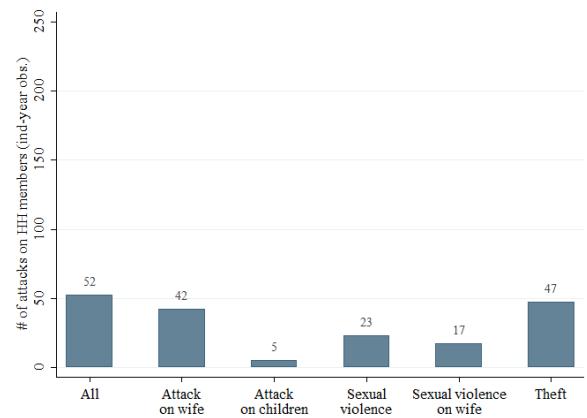
Notes: This figure shows spacial distribution of sample villages in year 2012. Blue diamonds are villages in 2012 where at least one respondent has experienced an attack on household up to 2012.

Figure F.11: Descriptive Summaries of Attacks by Type

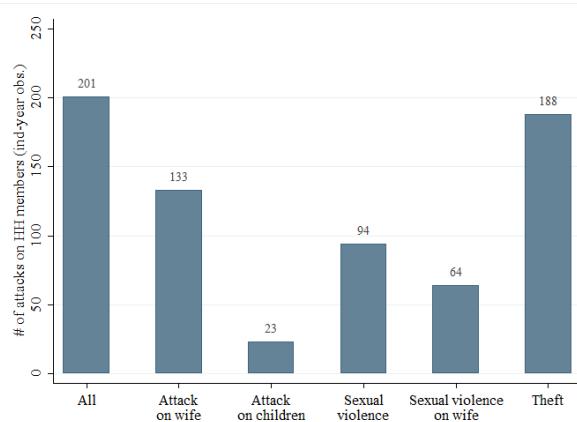
A. Attack by Foreign-led Group



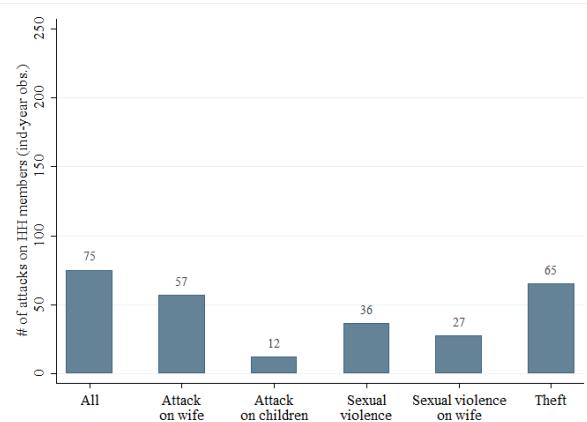
B. Attack by Militia



C. Intention: Pillage

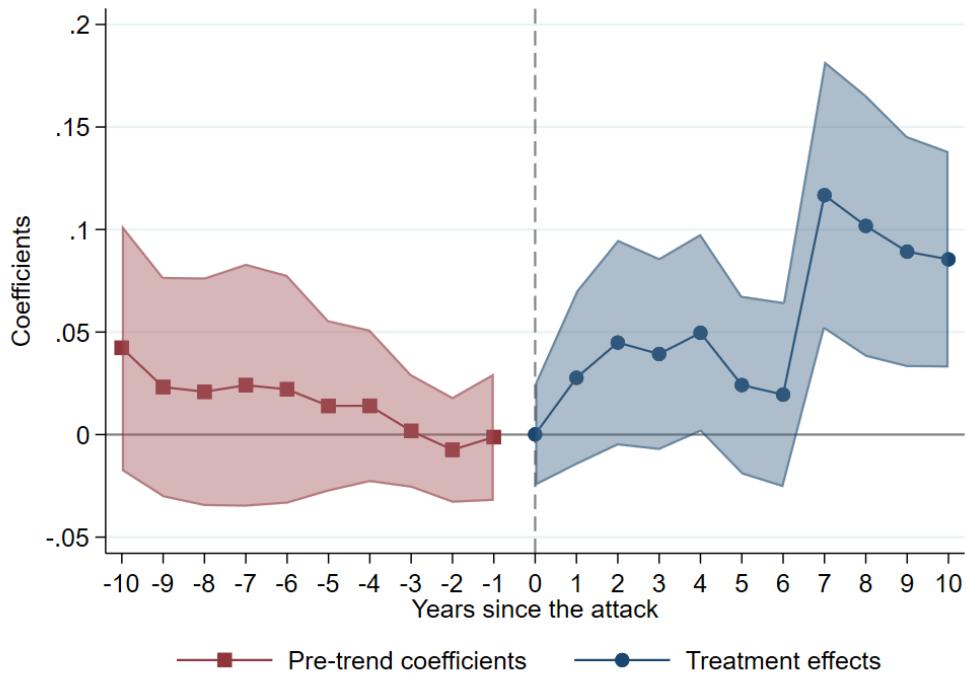


D. Intention: Punishment



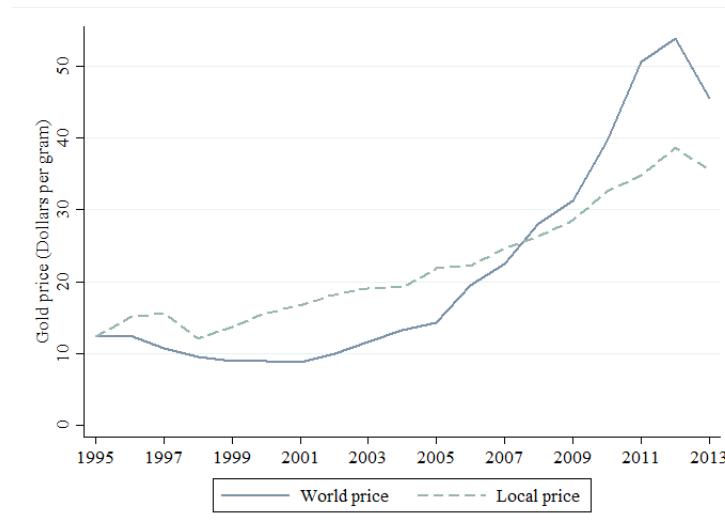
Notes: This figure decomposes different types of attacks on the household by the type of actions that were conducted (not mutually exclusive), respectively: attacks on the spouse, attack on children, attack with sexual violence, attack with sexual violence on spouse, attack in which household property was stolen. We look at four types of attacks respectively: attacks by foreign-led armed group, attacks by militias, attacks with intention to pillage, attacks with intention to punish civilians.

Figure F.12: Effect of Victimization by Foreign-led armed groups on Participation in a Militia,
Irrespective of Where The Militia Chapter is Formed



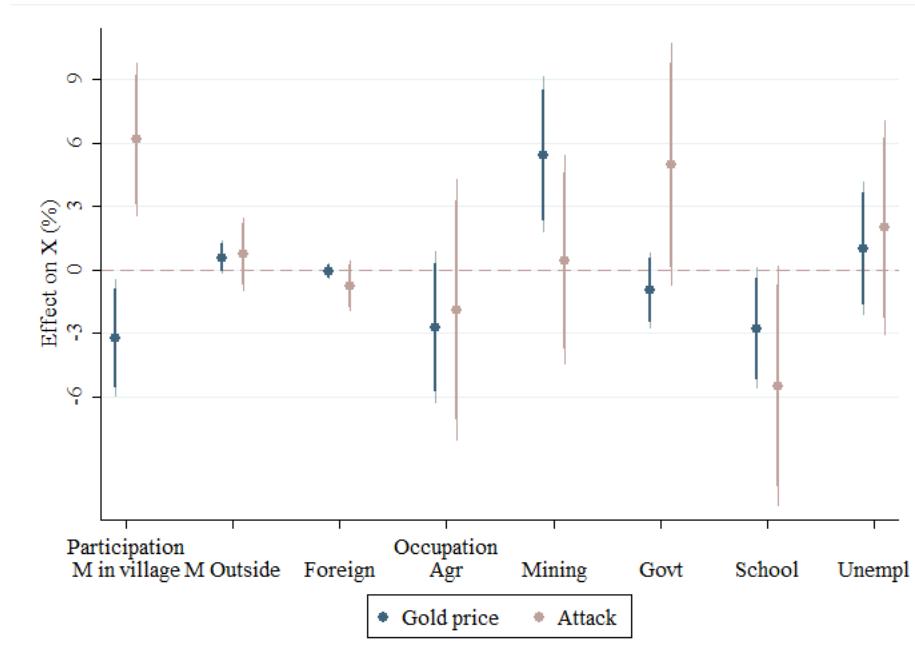
Notes: This figure shows the event study analysis of equation 3. The dependent variable is an indicator for whether the individual participates in a militia chapter formed in the village. We include observations between 1995 and 2013 and exclude individuals with no record of foreign-led armed group attack on household throughout the whole period. All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. We show 95% and 90% confidence intervals for each coefficient.

Figure F.13: Times-series of World and Local Gold Prices



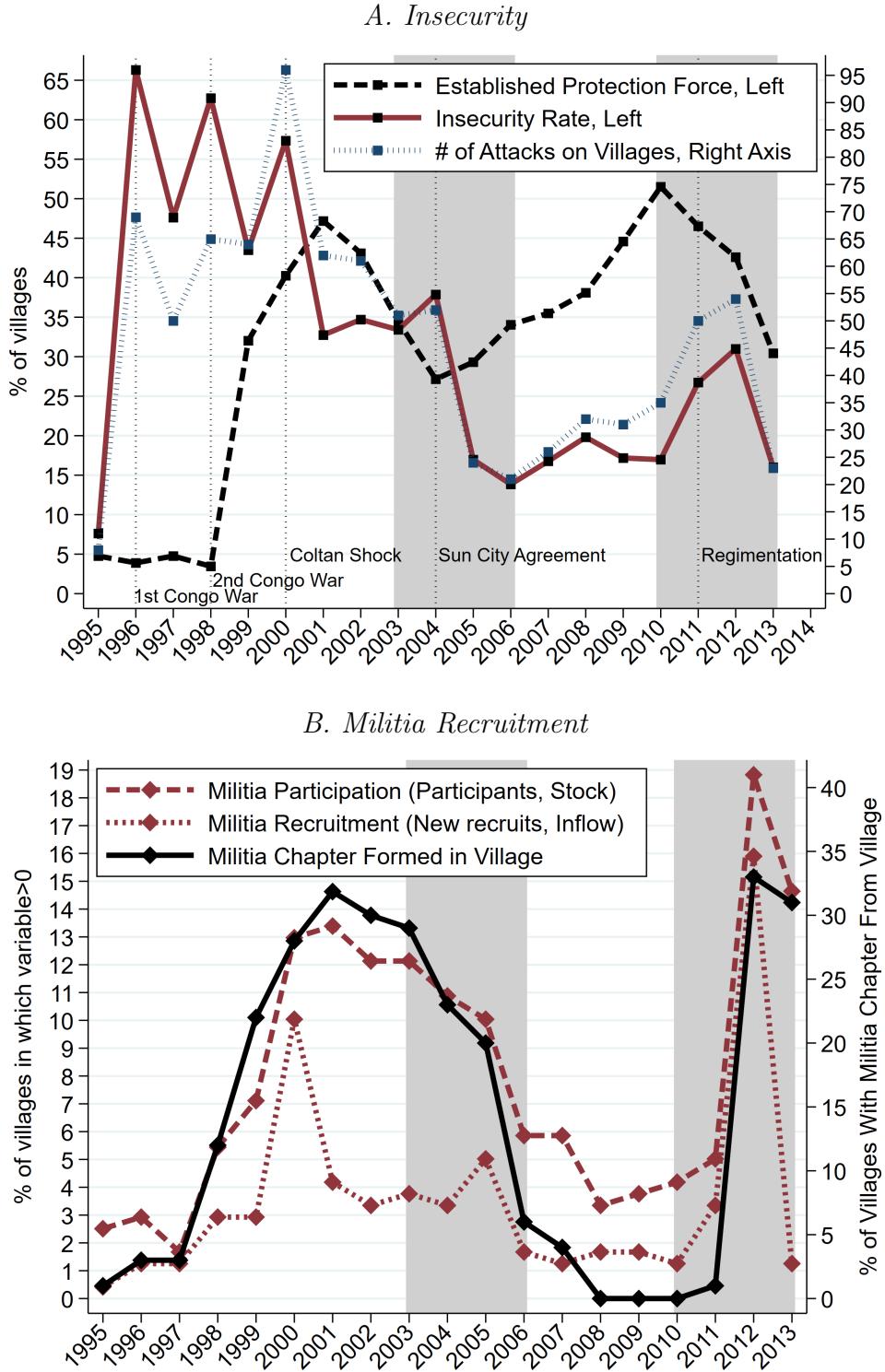
Notes: This figure shows the yearly world and local gold prices between 1995 and 2013.

Figure F.14: Reduced Form Coefficient of the World Price of Gold on Occupational Choice



Notes: This figure shows the analysis of equation 4. Blue dots show the coefficient on world gold prices interacted with gold endowment, with different participation indicators and occupational choices as dependent variables. Red dots show the effect of past attack on household by foreign-led armed group on the same set of dependent variables. We include observations between 1995 and 2013 above age 15 at year t . All regressions include individual FE, village FE, year FE, age FE, and cluster two-way at the individual respondent and the village levels. We show 95% and 90% confidence intervals for each coefficient. Table E.11 presents this result in a table.

Figure F.15: Insecurity and Militia Recruitment in the times series



Notes. Panel A shows the number of attacks against the sample villages (blue dotted line), the presence of a protection force (black dashed line), and an index of insecurity (red line). To measure the presence of a protection force, we code as 1 any village-year observation in which an armed group controls the village that year. Since many armed groups who establish themselves in a village enter through conquest and violence, we code only as 1 observations in which the armed group controlling the village has also been there the previous year. This allows us to exclude years in which an invading armed group attacks the village and subsequently settles. The index of insecurity is the number of attacks multiplied by the fraction of villages that has no protection force in that year. Panel B shows yearly militia participation (red dashed line), militia recruitment (red dotted line). In both panels, grey areas indicate state vacuum periods: Congolese Wars (1995–2001), Sun-City Peace Agreement (2003–2005), “Regimentation” process (2011). Since the RCD took over the state institutions during the Second Congo War, we code RCD as a state force.

Webpage Appendices

A Data Description and Data Construction

In this section, we describe how the survey was phrased, and we construct the indicators based on the data produced by the survey responses.

A.1 Constructing a Household Attacked Indicator

Table A.13 presents the survey questions used for reconstructing whether an individual household was previously victimized.

Table A.13: Description of Survey Questions on Individual Attacks

Variable	Survey question	Code
Module: Respondent attack history (Up to 9 attack events)		
A_{jt}	<i>Was there any violent event in village j where you lived in year t?</i>	= 1 if resp. reported a violent event in village j in year t
$Perp_{jt}$	<i>Who was the perpetrator?</i>	= F/M/CA if resp. reported a violent event where perpetrator was a foreign-led armed group, a militia, or the Congolese national army
Mot_{jt}	<i>What was the attack motive?</i>	= p/s/c if resp. reported a violent event where the motive was pillage, sanction, or conquest
A_{ijt}	<i>Were you physically assaulted during the attack?</i>	= 1 if resp. reported a violent event where resp. was physically assaulted
$Theft_{f(i)jt}$	<i>Was any property of your household stolen during the attack?</i>	= 1 if resp. reported a violent event where any property of his household was stolen
$Chief_{jt}$	<i>Was the village chief assaulted during the attack?</i>	= 1 if resp. reported a violent event where the village chief was attacked
Module: Household information		
$A_{f(i)t}$	<i>For each of your household members, including yourself, list three episodes he/she was assaulted</i>	= 1 if any of the household members (excluding resp. himself) reported being assaulted in year t
$Viol_{f(i)t}$	<i>For each of your household members, including yourself, list three episodes he/she was sexually victimized</i>	= 1 if any of the household members (excluding resp. himself) reported being sexually victimized in year t

Notes: This table presents the survey questions used in this paper. Subscript j indicates that information comes from respondent attack module where respondents are asked about violent events in contemporary villages. The information can vary across different respondents who live in the same village in the same year, but for concise notation we do not add additional individual subscript. Subscript i indicates the action imposed on respondent i . Subscript $f(i)$ indicates the action was imposed on respondent i 's other household members, excluding respondent himself. In the next subsection, subscript o indicates the action was imposed on other households in the same village in year t .

Table A.14 presents the procedure we apply on the survey data to construct the household attacked indicator. The main definition of attack in this paper focuses on reported violent events with nonconquest motives on other household members, excluding attacks that affect the respondent only. Violent events with conquest motives mainly involve combatants during war, thus they do not capture the type of victimization that our qualitative data suggests is important. We focus on attacks that affect any member of the household. Section C.3 presents a detailed discussion about the cost of this data construction decision and shows that the result is maintained when including attacks that affect the respondent only.

The main explanatory variable in specification 3, I_{it}^{Victim} , is constructed as an indicator for whether respondent i reported any attack on his household in the past. Subscript $j(it')$ indicates that reported attacks took place in villages where respondents lived in year t .

The fact that the main attack variable is constructed by combining information from different modules might complicate the interpretation in at least two scenarios:

- Suppose a respondent reports two violent events in the same year, both with pillage motive. The first event was perpetrated by a foreign-led armed group, the second event was perpetrated by a militia. The respondent also reports an attack on his spouse in the same year, and in reality his spouse was attacked in the second event. Our construction of main attack variable, however, would create a “false” attack on respondent’s spouse by a foreign-led armed group. This scenario, however, is infrequent. In total, 873 respondents from South Kivu have reported 2,803 nonconquest violent events, and 70.2% are reported in the year when the respondent does not report any other nonconquest violent events.
- Other household members might live in a different locations than the respondent in year t . This is also infrequent: the majority of the households observed in the data are nuclear family households. Out of 1,038 households from South Kivu that have detailed rosters of current family members that live with the respondent, 71.7% of the households do not include family members other than spouse and children. If the respondent reported that his spouse or children were attacked in year t , we assume that his spouse or children were living with the respondent in the village.

Table A.14: Construction of Household Attacked Indicator

Variable	Construction	Interpretation
$AA_{f(i)jt}$	$= A_{jt} \times (Mot_{jt} \neq c) \times A_{f(i)t}$	Whether resp. i reported an attack in year t in village j with nonconquest motive, and in which year any of the household members, other than the respondent only, reported being assaulted
I_{it}^{Victim}	$= 1(\exists t' < t, AA_{f(i)j(it')t'} = 1)$	Whether resp. i reported an attack on household before year t (j depends on i 's living history)

Notes: This table presents the construction of household victimization indicator from the survey questions.

A.2 Constructing Histories of Assets and Land Ownership

Each respondent in South Kivu is asked to list yearly purchase and sales for farm animals (cows, goats, and pigs) and fields since 1990. For asset stock at birth, we ask how many cows, goats, pigs, and fields the respondent's father had when the respondent was born. We also farm animals owned at the survey year, but not fields. We adopt the following approach to construct the yearly household asset stock.

If the respondent is not married at year t , for farm animals and lands, we start from respondent's current asset stock and calculate respondent's asset stock in previous year by subtracting respondent's net purchase of asset this year from current asset stock. We calculate respondent's asset stock in each year backward up to year 1995.

If the respondent is married at year t , we calculate the asset stock backward up to the year when he was first married (89.9% of respondents who have hold marriages are only married once). Before the year respondent was first married, we start from respondent's asset stock at birth and calculate the asset stock in following years by adding net purchase of asset up to the year before respondent was first married. The reason is that a respondent that gets marries separates from his original household and starts a new household.

For plots, we calculate respondent's stock of plots starting from his stock of plots at birth and adding net purchase of plots in the years that follow. We assume that when the respondent gets married, he acquires one extra plot of land.

The construction of wealth variables above does not take into account the potential effect of attack on asset stocks—they are based on asset acquisition and asset liquidation, but do not

include direct measurement of households' assets lost to theft. To impute the value of assets lost for a household during theft, and update our measure of the capital stock, we use the following method to account for the loss of properties during a violent event. We first calculate the average loss in farm animals across all recorded violent events, and assume that each household would lose the average amount of farm animals if their household suffers from theft. Then, during the years when respondent reports a violent event with theft on the household, we decrease the total asset by the assumed amount of loss of farm animals. We assume that violent events do not affect the stock of fields owned.

We then extract the principal component from the computed asset stock of cows, goats, and pigs, to construct our farm assets variable (see Table D.7). The results are unchanged whether the calculation of the asset stocks account for loss of properties. For investment, we compute the principal component from the purchase of cows, goats, pigs.

For the wealth of birth, we compute the principal component from the amount of cows, goats, pigs, and fields the respondent's father had at the respondent's birth, and the number of wives of his father and whether the respondent is a relative of the village chief.

B Additional Details on the Origins of the FDLR

The armed group known as the Front de Liberation du Rwanda (FDLR) is an ethnic Hutu group. In July 1994, a rebel movement took power in Rwanda, ending the genocide that had been perpetrated by government supported Hutu dominated militias, the Interahamwe, and the government forces, against the Tutsi. In response to the change of power, two million Rwandans, mostly Hutus, fled into eastern DRC, specifically North Kivu. Among them were the Interahamwe, but also former Rwandan state bureaucrats and armed forces. They formed the Armée de Libération du Rwanda (AliR), predecessor of the FDLR.

In 1996, the Rwandan government launched a military campaign that started the First Congo War (1996–97). One of the goals was to eliminate the insurgent threat coming from the Kivus. Rwandan rebel activity in eastern DRC was not defeated.

Failed negotiations between the new Congolese government and its Rwandan and Ugandan backers in 1998 plunged the DRC into the Second Congo War (1998–2004). During this war,

Rwanda backed a rebel group, the Rassemblement Congolais pour la Democratie (RCD), that quickly controlled the eastern half of the country, where it overtook the apparatus of the state and all urban areas. In the countryside, resistance militias had formed, which the RCD fought through counterinsurgency operations. The state had no control over the east in this period (Verweijen and Vlassenroot, 2015, Clark, 2002, Ngonzola-Ntalaja, 2002).

Instead, the Congolese government supported various armed groups and provided them with funds and ammunition to fight the RCD. Among them were the former Rwandan government forces and militia members, AliR, who in 2000 formed the FDLR. By 2004, all major armed groups, except the FDLR, vacated the east in exchange for benefits precluded in a peace agreement (Sun City peace agreement). The Congolese state struggled to regain control over the eastern provinces and the FDLR expanded their territory. The FDLR became notorious as one of the most violent groups. The Rwandan government continued to support armed groups who fought against the FDLR, while the Congolese state alternatively tolerated or actively supplied the FDLR.

C Social Desirability Bias in Reporting Participation

The survey protocols were designed to minimise involuntary omissions, but voluntary omissions can occur on a sensitive topic like participation. Indeed, the measurement of participation through self-reports can be subject to bias arising from the respondent's perceived risks in disclosing past, or present, participation to an unknown researcher. Specifically, respondents can choose not to disclose participation in armed groups generally because they fear it might expose them to risks, such as retaliation or arrest. More concerning to our analysis is that respondents may omit participation in *specific* groups. This is a real concern, as our survey protocols encouraged respondents not to disclose participation if they felt it could expose them to such risks, to protect the safety of respondents and researchers.

Qualitative fieldwork and existing literature suggest that respondents can be less likely to report participation in groups that have behaved violently or badly with the population, as well as less socially accepted group. In our sample, this is likely to be the case for foreign groups, which, as we show in this paper, behave more violently and are less supported.

Given the anonymity inherent to the aggregate measures, we collected information on participation into militias and foreign armed groups through an alternative channel for comparison. Specifically, we obtained the total number of individuals, for each village control episode, which participated in the corresponding group. Contrary to the household reports, this measure is anonymized, hence protects the reports against any sort of social desirability bias that may arise from respondents fearing about individual consequences of reporting participation. Its average can thus be expected to be a more unbiased estimator of participation numbers (even as it may have larger classical measurement error due to recall). We can then compare those to the subset of individual reports that arise from participation in armed groups governing the village.

To examine this possibility, Figure F.7 compares, back to back, the individual reports of participation into militia, and into foreign armed group, to the aggregate reports that we collected from the village chief survey. This analysis has three take-aways.

C.1 No Evidence of Under-Reporting on Average

First, the estimated number of participants in any armed group, obtained through village chief survey aggregate reports is comparable to that estimated based on the individual reports in household surveys. Contrary to what individual under-reporting in the household survey would suggest, we find that the estimated numbers are even slightly higher than those estimated through village anonymized aggregates. This provides confidence that households do not under-report participation in armed groups on average.

C.2 Potential Under-Reporting of Participation in Foreign Armed Groups

Second, disaggregating this analysis by type of armed group, we find that the estimated numbers of foreign armed group participation through respondent reports is somewhat smaller than those estimated through village-level aggregates. This is consistent with respondents potentially under-reporting participation in foreign armed groups. It could also indicate, instead, that individuals who have participated in foreign armed groups may be less likely to have returned to their village.

A number of reasons could explain this conjecture: they may fear to be ostracized, they may be more likely to die in combat, or they may be more likely to be actively fighting in other areas — all of which are weaker concerns for militias. Whatever source of bias may explain this lower estimated numbers based on the household survey, it suggests that the estimates of average participation in foreign armed groups constructed based on individual reports collected through the household survey may be biased downwards.

C.3 No Evidence of Under-Reporting of Participation in Militias

Third, disaggregating the analysis by type of armed group, we find that the estimated number of participants into militia, as estimated using the household survey self-reports, is considerably larger than that estimated using the village aggregates. This provides confidence that respondents do not feel compelled to hide their participation history in the survey (and that survivor bias is unlikely to be a concern for this analysis).

This finding is also consistent with a wealth of qualitative evidence we have amassed, which shows that participation into militia is a natural life decision akin to participation to the army

in the United States, or in conventional national armies in Europe today. In many cases in the Congolese war, militia replaced the state, and participating in militia was tagged with the same patriotic connotations as those of participating in the army. In general, participating in militia is a normal occurrence in rural life in this region, and is absolutely not subject to taboos in our experience talking to hundreds of fighters, their friends, their families, their village authorities, many of which themselves proudly belonged to some of these militias.

Individuals spoke to us very openly about having participated in militia, and about who else had participated, and we obtained very easily referrals to other militia members, fighters, and commanders, who had no issue in disclosing their participation. Unlike many other contexts where participating in militia is only an affront against the state, in this case, militia always emerge as a substitute for the state in areas of state absence. Even if they at times fight the state, they often collaborated with the state, and were even armed and logistically supported by the government during the First and Second Congo wars.

This provides reassurance that social desirability bias is not a concern in our measure of participation in militia, which is precisely the focus of this paper.

D Replication Using Additional Samples

Table D.15: Predictors of Militia Membership, at Time of Recruitment

	Start participation in Militia, From:			Non-participants in the same		
	Anywhere	Outside	Village	Village	Chiefdom	Territory
# of individual-year obs.	276	29	246	777	11729	12940
<i>A: Demographic Characteristics</i>						
In the Family of the Village Chief	0.12	0.21	0.11	0.11	0.10	0.09
Age in year t	30.11	20.97	31.15	27.08	26.89	26.81
Married in year t	0.15	0.21	0.15	0.20	0.38***	0.39***
<i>B: Productive Capacity in Nonviolent Sector</i>						
Unemployed in year t-1	0.22	0.21	0.22	0.26	0.27	0.27
Father's Wealth Index	0.10	-0.34	0.16	-0.15***	-0.19***	-0.20***
# Plots Owned in year t-1	0.83	0.38	0.89	0.55**	0.46***	0.46***
Farm Animal Index in year t-1	0.22	-0.11	0.26	0.01	0.05	0.04
Primary Education Complete	0.58	0.62	0.58	0.51*	0.50*	0.50
Secondary Education Complete	0.20	0.10	0.21	0.14	0.14	0.14
Tertiary Education Complete	0.04	0.00	0.04	0.03	0.02	0.02
Working Memory Score	0.56	0.51	0.56	0.52**	0.47***	0.47***
<i>C: Average Increase in Future Assets</i>						
# Plots Owned	0.17	0.40	0.14	0.19**	0.18**	0.18**
Farm Animal Index	0.18	0.42	0.15	0.21*	0.23	0.23*
<i>D: Victimization Background</i>						
Foreign armed group attacked HH before	0.22	0.07	0.24	0.08***	0.07***	0.07***
Congolese Militia attacked HH before	0.03	0.03	0.03	0.03	0.02	0.02

Notes: This table shows descriptive statistics for observations where respondents start participating in any armed group versus those where respondents do not participate in year t . We exclude from comparison 488 observations where participants stay in the armed group after the first year. Economic indices are only computed in South Kivu, where the data are available. We indicate the difference between Column 1 and 2 (P-value: *** 0.01, ** 0.05, * 0.10), computed after including village FE and year FE, and clustered two-way at the individual respondent and the village*year level. Construction of economic indices is made using principal component analysis on following variables. For the wealth at birth index, we use stock of cows at birth, stock of goats at birth, stock of pigs at birth, stock of lands at birth, relation to village chief, number of father's wives. For the asset stock index, we use stock of cows, stock of goats, stock of pigs, stock of lands. For the investment index, we use purchase of cows, purchase of goats, purchase of pigs, purchase of lands.

Table D.16: Motivations for Joining Militia

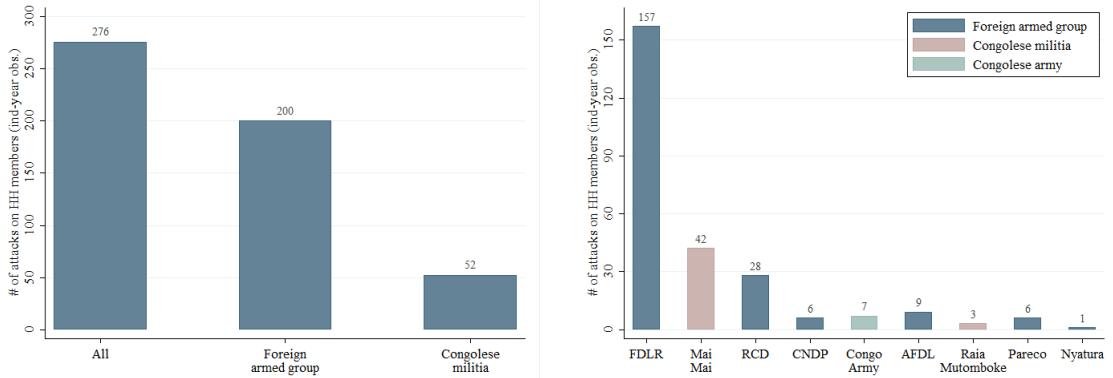
	All	From Village	From Outside Village			-
			Outside			
# of obs.	547	421	89	40	20	-
A. Economic Incentives:	0.10	0.08	0.32	0.28	0.50	-0.25***
For Money	0.05	0.03	0.26	0.28	0.00	-0.23***
For Status	0.05	0.04	0.06	0.00	0.50	-0.02
B. Non-Pecuniary Motivations:	0.73	0.77	0.44	0.48	0.25	0.33***
To Protect The Community	0.48	0.53	0.32	0.34	0.25	0.21**
To Protect The Family	0.12	0.12	0.06	0.07	0.00	0.06
For Revenge	0.13	0.11	0.06	0.07	0.00	0.05
C. Coercion:	0.17	0.15	0.24	0.24	0.25	-0.08
Forced	0.03	0.02	0.15	0.17	0.00	-0.12***
Social Pressure	0.13	0.13	0.09	0.07	0.25	0.04

Notes: This table presents the motivations to join armed groups as reported by the fighters themselves, including all extra samples for robustness.

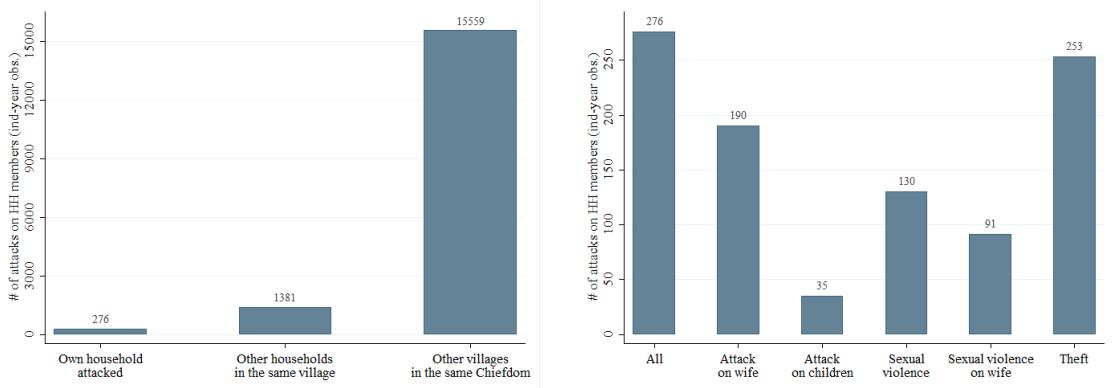
E Additional Supporting Analysis

Figure E.16: Attack Characteristics

A. Perpetrators

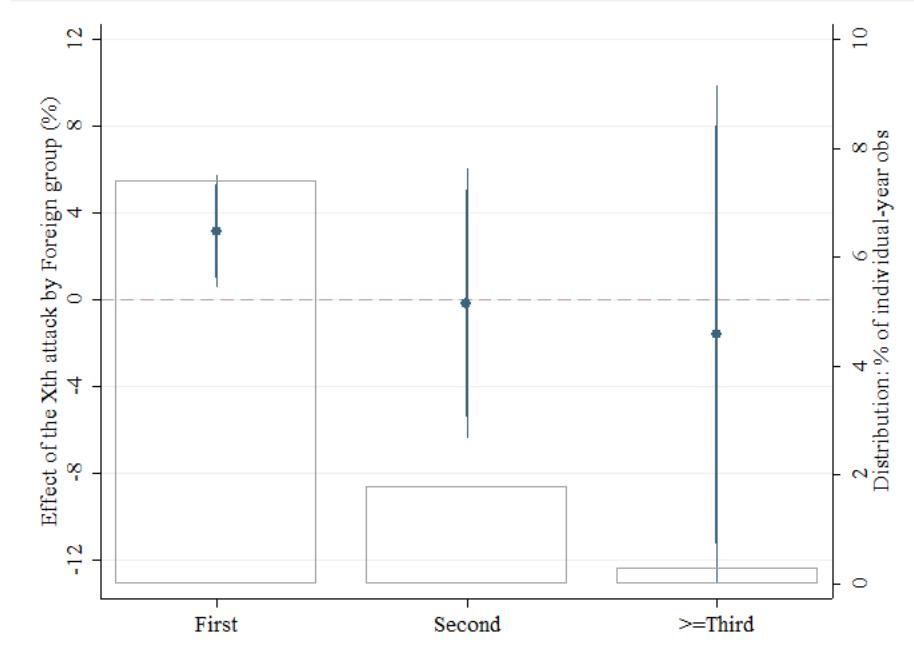


B. Actions and Victims



Notes: This figure shows the distribution of village attack observations with different characteristics. Panel A describes the perpetrators of the attacks. It uses the sample of 276 reported attacks that targeted the households of the respondents from South Kivu and shows their distribution by perpetrator. The left quadrant shows the overall distribution and the right quadrant the raw data. Blue bars refer to foreign-led armed groups; Red bars refer to militias; Green bar refers to Congolese national army. Panel B describes the actions taken and the individuals victimized for each of these attacks. The left quadrant uses the whole sample of attacks to have happened in each village reported by respondents and other households of the sample in the villages in the same Chiefdom. Based on this information, it shows the fraction of individual-year observations in which the own household was attacked, other households in the village were attacked, or other villages in the Chiefdom were attacked. The right quadrant decomposes all attacks on the household by the type of actions that were conducted (not mutually exclusive), respectively: attack on the spouse, attack on children, attack with sexual violence, attack involving sexual violence on respondent's spouse, attack in which household property was stolen. The figure does not show events of sexual violence directed against children, which amount to 30 cases.

Figure E.17: Order Analysis: The Main Result is Concentrated on the First Attack



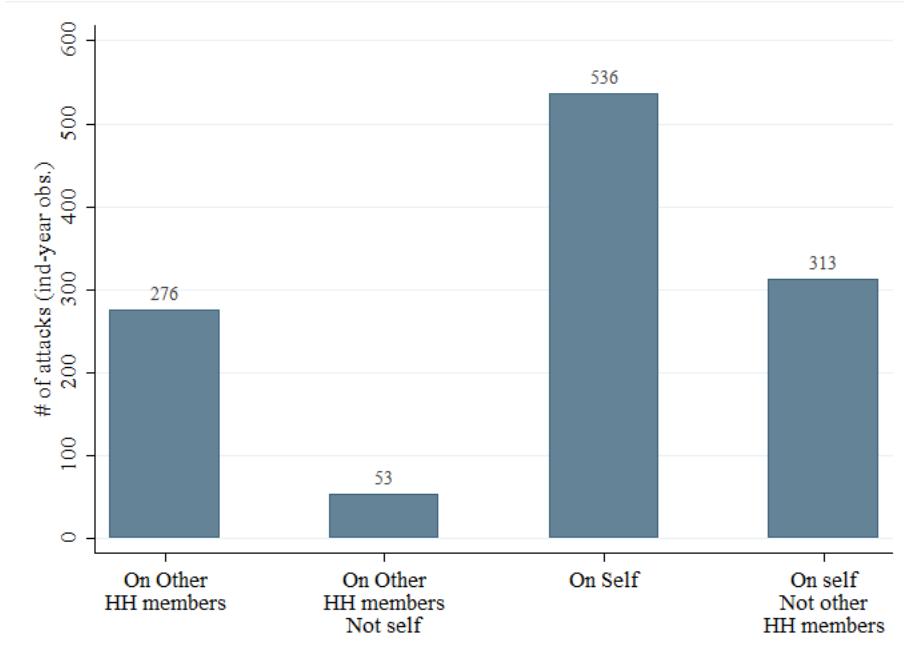
Notes: This table presents OLS estimates of equation 3 for attacks by foreign-led armed groups and on participation in a militia chapter formed in the village. The dependent variable is an indicator for whether the respondent participates in a militia in a given year. The explanatory variables are whether the respondent's household has been attacked by foreign-led armed groups for the first, second, and third (and more) time. The bars show the fraction (in percentage) of individual-year observations in which respondents have experienced the first, second, and third (and more) foreign-led armed group attack on household. We include observations between 1995 and 2013. All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. We show 95% and 90% confidence interval. See Table 6 for more discussions.

F Robustness to Including the Respondent in the Set of Victimized Household Members

In the main text, we choose attacks on other household members as main attack definition instead of attacks on respondents themselves. The main concern of using attacks on respondents themselves, as we have discussed in Section 4, is that attacks on respondents themselves can possibly affect respondents' physical capabilities of participation. The effect of past attack on respondents themselves is likely a mix of the negative effect from decreased physical capabilities and the positive effect from motivation.

Figure F.18 shows the distribution of attacks on other household members and attacks on self in South Kivu. Out of 276 attacks where respondent's other household members are attacked, most of them involve respondent themselves being attacked; only 53 of these episodes do not involve respondent themselves being attacked. There are 536 episodes where respondents reported themselves attacked during the violent events; 313 of them do not involve other household members being attacked.

Figure F.18: Distribution of Attack on Other HH Members and Self



Notes: This figure shows the distribution of attack observations where other household members or respondent himself was attacked.

Table F.17 replicates the main results in Table 6 but breaks down the effect by attacks on

other household members and on respondents themselves. We only examine attacks by foreign-led armed group and participation in a militia. Column (1) is the benchmark regression. Column (2) breaks down the main attack variable into attacks only involving other household members and attacks involving both other household members and respondents themselves. The effect of attack on both is statistically significant. The effect of attack only on other household members is less precisely estimated due to the insufficient number of such events (only 87), but the coefficient remains similar to the main result.

Column (3) examines the effect of attack on respondents themselves. The effect is significant but half the size of the benchmark estimate. Column (4) breaks down the effect into attacks only involving respondents and attacks involving both other household members and respondents themselves. The two effects are both significant, but attacks on both respondents and other household members lead the main effect. Column (5) includes attacks only involving other household members, attacks only involving respondents and attacks on both. The main conclusion remains unchanged. All the evidence suggest that although attacks only on respondents can potentially capture part of the motivation, it also potentially affects respondents' physical capabilities to join an armed group and complicates the interpretation. We thus adopt attacks on other household members as the main definition of attack throughout the paper.

G A Dynamic Model for Alternative Channels of Attacks on Household Choices

A unitary household makes decision for infinite time horizon. At time t , the household head decides (1) consumption and investment for all periods (but cannot commit to the plan), and (2) participation into an existing armed group for all periods.³⁶ We denote C_{it} the consumption at time t for household i , and P_{it} the indicator of whether household head i decides to join an existing armed group at time t . The flow utility is defined as follows:

$$U(C_{it}, P_{it}) = u(C_{it}) + [\theta_{it}(A_{i0}, A_{i1}, \dots, A_{i,t-1}) - \phi_t(\bar{\theta}_t, M_t) - \zeta_{it}] \cdot 1(P_{it} = 1). \quad (9)$$

³⁶We abstract from the framework endogenous formation of armed groups and leave it for future research.

Table F.17: Main Regression, Separating Attacks on Other HH Members and Respondents

Attack by Foreign Group	Participation Militia Formed in the Village				
	(1)	(2)	(3)	(4)	(5)
On other HH members	3.01** (1.26)				
On other HH members, not on self		3.18 (2.27)			3.27 (2.27)
On self			1.47* (0.88)		
On self, not on other HH members				1.81* (0.99)	1.86* (0.99)
On self and on other HH members		2.78** (1.41)		2.81** (1.40)	2.75* (1.41)
Control mean	2.32	2.32	2.20	2.20	2.18
Obs.	17832	17832	17832	17832	17832

Notes: This table presents OLS estimates of equation 3, with different attack definitions. The dependent variable is an indicator for whether the respondent participates in a militia formed in the village. The main explanatory variable is an indicator for whether the respondent's household has been attacked by foreign-led armed groups. We include observations between 1995 and 2013 above age 15 at year t . All regressions include individual FE, village*year FE, age FE, and cluster two-way at the individual respondent and the village*year levels. Control mean is computed among observations where respondents never experienced an attack on household by foreign-led armed group before year t . P-value: *** 0.01, ** 0.05, * 0.10.

$u(C_{it})$ is a generic concave function satisfying Inada conditions. θ_{it} is the intrinsic utility of joining armed group, depending on household head's past attack history $A_{i0}, A_{i1}, \dots, A_{i,t-1}$, which can be interpreted as "revenge utility."³⁷ ϕ_t is the cost of participation. It depends on two factors: (1) Exogenous constraint M_t . For example, if state force is present, villagers are discouraged to participate in a militia. In the meantime, state force might recruit more villagers, so the effect of M_t on ϕ_t can be ambiguous. (2) Average revenge utility $\bar{\theta}_t$. We assume that if villagers enjoy higher utility from revenge on average, the psychological cost for participation is lower, which is designed to capture spillover effect. ζ_{it} is an idiosyncratic utility shock to participation, following some distribution $G(\cdot)$. Revenge (dis)utility is realized if, and only if, the household head participates.

Attack is realized after household head makes participation decision. We assume each attack event is individually and independently distributed across all t and all i and follows some distribution $F(\cdot)$ with mean a_{it}^1 if household head participates or a_{it}^0 if not.³⁸

³⁷We assume attack is a continuous variable for simple math derivation. Higher value of A_{it} can be also interpreted as more violence involved. We remain agnostic as to the effect of past attack on intrinsic utility.

³⁸We assume idiosyncratic attack likelihood for two reasons. First, individuals with different characteristics might be targeted differently. Second, a_{it} can be interpreted as subjective expectation of attack likelihood, which varies for different individuals. We also remain agnostic whether $a_{it}^1 > a_{it}^0$ or not. If $a_{it}^1 > a_{it}^0$, then participation may lead to more targeting. If $a_{it}^1 < a_{it}^0$, then participation may provide more protection for the household.

We consider a possibility of terminating all flow utility after attack is realized. We assume the *expected* survival rate μ is a decreasing function of the attack likelihood a_{it} . For simplicity, we assume $\mu(a_{it}^1) - \mu(a_{it}^0) = \eta(a_{it}^1 - a_{it}^0)$ for some non-increasing function $\eta(\cdot)$.

If household head survives, he earns labor income w through production, or T through appropriation by participating in armed group. We assume $T > w$.

Household invests the rest of the labor income on capital. Household possesses initial capital K_{it} . Capital depreciates at the rate of δ_{it} . Depreciation rate is higher if household suffers an attack: $\frac{\partial \delta_{it}}{\partial A_{it}} > 0$. Household earns capital gain r from each unit of current remaining capital.

Timing. (1) Household decides whether or not to participate, upon which intrinsic revenge utility θ_{it} , participation cost ϕ_t and idiosyncratic utility shock ζ_{it} are immediately realized. (2) Attack A_{it} is drawn from $F(\cdot | a_{it}^0)$ or $F(\cdot | a_{it}^1)$ depending on participation status. (3) If household survives, then household decides consumption C_{it} and investment I_{it} . (4) Household enters the next period. Proposition 1 decomposes the effect of past attack .

Proposition 1. *Suppose attack A_{it} is a continuous variable, capital depreciation rate δ_{it} , intrinsic utility θ_{it} , attack likelihood a_{it}^0 and a_{it}^1 , and survival function $\mu(\cdot)$ are differentiable with regard to A_{ik} , $\forall k \leq t$. Then the effect of A_{ik} on participation likelihood p_{it} can be decomposed into a linear combination of the following three components:*

1. motivation: $\frac{\partial(\theta_{it} - \phi_t)}{\partial A_{ik}}$
2. Wealth effect, positive if marginal utility of contingent consumption weighted by attack likelihood is lower when participating;
3. Protection effect

Proposition 2 characterizes the effect of past attack.

Proposition 2. *Suppose attack A_{it} is a continuous variable, capital depreciation rate δ_{it} is differentiable with regard to A_{ik} , $\forall k \leq t$. Then consumption C_{it} and capital $K_{i,t+1}$ decrease in A_{ik} , $\forall k \leq t$, whether participating or not.*

G.1 Dynamic Model Proofs

We solve this problem by writing Bellman equation first. Some notations for simplicity:

$V_t^{N,s}(K)$: Present value if not participating in period t , after household head survives

$V_t^{P,s}(K)$: Present value if participating in period t , after household head survives

$V_t^N(K)$: Present value if not participating in period t , before attack is realized

$V_t^P(K)$: Present value if participating in period t , before attack is realized

$V_t(K)$: Present value before household head makes participation decision

Let β be the discount rate, and suppose household survives. The continuation utility from not participating is as follows:

$$\begin{aligned} V_t^{N,s}(K_t) &= \max_{C_t, I_t} u(C_t) + \beta E_t[V_{t+1}(K_{t+1}) | P_t = 0] \\ \text{s.t. } C_t + I_t &= w + r(1 - \delta_t)K_t, \quad K_{t+1} = (1 - \delta_t)K_t + I_t. \end{aligned}$$

The first order condition is:

$$u'(C_t^N) = \beta E_t[V'_{t+1}(K_{t+1}^N)], \quad (10)$$

where $C_t^N, K_{t+1}^N = (1 - \delta_t)(1 + r)K_t + w - C_t^N$ is the optimal choice given nonparticipation.

For the continuation utility from participation, similarly,

$$\begin{aligned} V_t^{P,s}(K_t) &= \max_{\{C_t\}} u(C_t) + \beta E_t[V_{t+1}(K_{t+1}) | P_t = 1] \\ \text{s.t. } C_t + I_t &= T + r(1 - \delta_t)K_t, \quad K_{t+1} = (1 - \delta_t)K_t + I_t. \end{aligned}$$

The first order condition becomes:

$$u'(C_t^P) = \beta E_t[V'_{t+1}(K_{t+1}^P)], \quad (11)$$

where $C_t^P, K_{t+1}^P = (1 - \delta_t)(1 + r)K_t + T - C_t^P$ is the optimal choice given participation.

Let's move backward before attack is realized. Household head would weight the present value

by survival likelihood:

$$\begin{aligned} V_t^N(K_t) &= \mu(a_t^N)V_t^{N,s}(K_t) \\ V_t^P(K_t) &= \theta_t - \zeta_t + \mu(a_t^P)V_t^{P,s}(K_t). \end{aligned}$$

And household chooses to participate when $V_t^P(K_t)$ is larger:

$$V_t(K_t) = \max[V_t^N(K_t), V_t^P(K_t)].$$

Hence, at the beginning of each period, the probability of household participating would be:

$$\begin{aligned} p_t(x) &\equiv Pr[V_t^P(x) > V_t^N(x)] \\ &= Pr[\zeta_t < \theta_t + \mu(a_t^P)V_t^{P,s}(x) - \mu(a_t^N)V_t^{N,s}(x)] \\ &= G\left[\underbrace{\theta_t}_{\text{Intrinsic utility}} + \underbrace{\mu(a_t^P)V_t^{P,s}(x) - \mu(a_t^N)V_t^{N,s}(x)}_{\text{Protection and wealth}}\right] \end{aligned} \tag{12}$$

Before we prove the two propositions, we claim that there is no clear prediction on the effect of participation on consumption or investment. Since value function $V_{t+1}(\cdot)$ is the maximum of $V_{t+1}^P(\cdot)$ and $V_{t+1}^N(\cdot)$, the expectation of $V'_{t+1}(\cdot)$ depends on the likelihood of participating in $t+1$. Break down $E_t[V'_{t+1}(x)]$:³⁹

$$\begin{aligned} E_t[V'_{t+1}(x)] &= E_t p_{t+1}(x) \frac{\partial E_t(V_{t+1}^P)' }{\partial x} + (1 - E_t p_{t+1}(x)) \frac{\partial E_t(V_{t+1}^N)' }{\partial x} \\ &= E_t p_{t+1}(x) E_t [\mu(a_{t+1}^P)(1 - \delta_{t+1})(1 + r) u'(C_{t+1}^P(x))] \\ &\quad + (1 - E_t p_{t+1}(x)) E_t [\mu(a_{t+1}^N)(1 - \delta_{t+1})(1 + r) u'(C_{t+1}^N(x))], \end{aligned}$$

where $p_{t+1}(x)$ is defined as equation 12, and the second line comes from Envelop Theorem and

³⁹Derivation of $\frac{\partial E_t p_{t+1}}{\partial x}$ also depends on the difference between marginal utility of contingent consumption, weighted by protection of participation:

$$\frac{\partial E_t p_{t+1}}{\partial x} = (1 + r) G'(\cdot) E_t [(1 - \delta_{t+1})(\mu(a_{t+1}^P) u'(C_{t+1}^P) - \mu(a_{t+1}^N) u'(C_{t+1}^N))]$$

Euler equations. Take the derivative of $E_t[V'_{t+1}(x)]$:

$$\frac{1}{1+r} \frac{\partial E_t[V'_{t+1}(x)]}{\partial x} = \underbrace{G'(\cdot) (E_t[(1 - \delta_{t+1})(\mu(a_{t+1}^P)u'(C_{t+1}^P) - \mu(a_{t+1}^N)u'(C_{t+1}^N))])^2}_{> 0} \quad (13)$$

$$+ \underbrace{p_{t+1} E_t[(1 - \delta_{t+1})\mu(a_{t+1}^P)u'' \frac{\partial C_{t+1}^P}{\partial x}]}_{< 0} + \underbrace{(1 - p_{t+1}) E_t[(1 - \delta_{t+1})\mu(a_{t+1}^N)u'' \frac{\partial C_{t+1}^N}{\partial x}]}_{< 0} \quad (14)$$

The second and third terms are negative because consumption is a normal good, and thus given the expected participation likelihood, if household has more capital, regardless of participation status, household would consume more in $t + 1$ and marginal expected present value would decrease. The first term, however, is positive. This is because the expected difference in marginal utility of contingent consumption (weighted by protection effect of participation, mathematically, $\mu(a_{t+1}^P)u'(C_{t+1}^P) - \mu(a_{t+1}^N)u'(C_{t+1}^N)$) also affects the expected participation likelihood $E_t p_{t+1}$ in the same direction. Intuitively, when marginal utility of consumption when participating in $t + 1$ is higher (lower) from that of nonparticipating, household will have a higher (lower) likelihood of participation in $t + 1$, which in turn increases the marginal expected present value. If the difference in marginal utility of contingent consumption is stark enough, the expected value function would exhibit nonconcavity for some range of capital value, in which case it is possible that $E_t[V'_{t+1}(K_{t+1}^P)] > E_t[V'_{t+1}(K_{t+1}^N)]$, thus not violating Euler equations.

Therefore, there is no clear prediction on the effect of participation on consumption or investment.⁴⁰ One possible scenario of a drastic difference in marginal utility of contingent consumption is that when participation brings a much higher (lower) protection effect—that is, $\mu(a_{t+1}^P) \gg (\ll) \mu(a_{t+1}^N)$. If there is no protection effect of participation detected, given proper assumption of utility function and density function of idiosyncratic intrinsic utility ζ_t , it is less likely to observe nonconcavity in the expected value function, and thus household would behave more normally (consumption increases in t when participating t).

⁴⁰The logic on investment is similar. Suppose participants overconsume t so that they have lower capital level in $t + 1$, that is, $K_{t+1}^P \leq K_{t+1}^N$, $C_t^P \geq C_t^N + T - w$. With concave utility function, Euler equations and Mean Value Theorem,

$$\exists \theta \in [C_{t+1}^N, C_{t+1}^N + T - w], \text{ s.t. } E_t[V'_{t+1}(K_{t+1}^P)] - E_t[V'_{t+1}(K_{t+1}^N)] \leq u''(\theta)(T - w) < 0.$$

If the expected value function exhibits sufficient nonconcavity, the condition above is possible.

Proof of Proposition 2. Rewrite the budget constraint for participation:

$$C_t^P + K_{t+1}^P = T + (1+r)(1-\delta_{it})K_t.$$

Take derivative with regard to A_k :

$$\frac{\partial C_t^P}{\partial A_k} + \frac{\partial K_{t+1}^P}{\partial A_k} \equiv (1+r)\left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right]. \quad (15)$$

Take derivative of Euler equation 11 with regard to A_k :

$$u''(C_t^P)\frac{\partial C_t^P}{\partial A_k} \equiv H(K_{t+1}^P) \cdot \frac{\partial K_{t+1}^P}{\partial A_k}, \quad (16)$$

where $H(x) \equiv \frac{\partial E_t[V'_{t+1}(x)]}{\partial x}$. Solving equation 15 and 16:

$$\frac{\partial C_t^P}{\partial A_k} = \frac{1}{1 + u''(C_t^P)/H(K_{t+1}^P)} \cdot (1+r)\left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right]. \quad (17)$$

Likewise, one can derive $\frac{\partial C_t^N}{\partial A_k}$ by simply replacing superscript P with N . To simplify the question, assume $u''(C_t^P)/H(K_{t+1}^P) = u''(C_t^N)/H(K_{t+1}^N) \equiv \gamma \in (0, +\infty)$.⁴¹ Thus, the effect of attack on consumption, capital, and investment are as follows (superscripts are omitted because we assume participation does not influence the effect of attack on these variables):

$$\frac{\partial C_t}{\partial A_k} = \frac{1+r}{1+\gamma} \cdot \left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right] \quad (18)$$

$$\frac{\partial K_{t+1}}{\partial A_k} = \frac{1+r}{1+1/\gamma} \cdot \left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right] \quad (19)$$

$$\frac{\partial I_t}{\partial A_k} = \frac{r-1/\gamma}{1+1/\gamma} \cdot \left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right] \quad (20)$$

The term $\left[-\frac{\partial \delta_t}{\partial A_k}K_t + (1-\delta_t)\frac{\partial K_t}{\partial A_k}\right]$ is always negative because either attack increases current depreciation rate ($\frac{\partial \delta_t}{\partial A_k} > 0$ if $k=t$), or past attack decreases past capital, which decreases current capital accumulation ($\frac{\partial K_t}{\partial A_k} < 0$ if $k < t$ by induction). Given the assumption $\gamma \in (0, 1)$, the effect of past

⁴¹Intuitively, γ measures the difference between concavity of consumption in t and that of continuation value in the future. $\gamma > 0$ is predicated on expected value function being concave (see the discussion above). If γ is higher, household's utility of consumption today reacts more to the exogenous shock than consumption tomorrow.

attack on consumption and capital should be unambiguously negative. The effect on investment, however, depends on the comparison between the return to investment r , versus the concavity of value function $1/\gamma$, which determines the difference in marginal value between consuming today and in the future. \square

Proof of Proposition 1. Take differentiation of equation 12 with regard to A_k :

$$\begin{aligned}\frac{\partial p_t}{\partial A_k} &= G'(\cdot) \left[\frac{\partial \theta_t}{\partial A_k} + \frac{\partial (\mu(a_t^P)V_t^{P,s} - \mu(a_t^N)V_t^{N,s})}{\partial A_k} \right] \\ &= G'(\cdot) \left[\underbrace{\frac{\partial \theta_t}{\partial A_k}}_{\text{motivation}} + \underbrace{\left(\mu(a_t^P) \frac{\partial V_t^{P,s}}{\partial A_k} - \mu(a_t^N) \frac{\partial V_t^{N,s}}{\partial A_k} \right)}_{\text{Wealth effect}} + \underbrace{\left(\frac{\partial \mu(a_t^P)}{\partial A_k} V_t^{P,s} - \frac{\partial \mu(a_t^N)}{\partial A_k} V_t^{N,s} \right)}_{\text{Protection effect}} \right]\end{aligned}$$

where the second equation comes from Envelop Theorem and Euler equations. By assumption, motivation would increase if household head experienced a past attack which leads to higher participation likelihood.

Wealth effect: Use Envelop Theorem and Euler equations, for $k \leq t$, the difference between contingent present values of participation vs. nonparticipation:⁴²

$$\begin{aligned}&\mu(a_t^P) \frac{\partial V_t^{P,s}}{\partial A_k} - \mu(a_t^N) \frac{\partial V_t^{N,s}}{\partial A_k} \\ &= (1+r) \left[-\frac{\partial \delta_t}{\partial A_k} K_t + (1-\delta) \frac{\partial K_t}{\partial A_k} - \frac{\partial C_t^P}{\partial A_k} \right] \mu(a_t^P) u'(C_t^P) \\ &\quad - (1+r) \left[-\frac{\partial \delta_t}{\partial A_k} K_t + (1-\delta) \frac{\partial K_t}{\partial A_k} - \frac{\partial C_t^N}{\partial A_k} \right] \mu(a_t^N) u'(C_t^N).\end{aligned}$$

Substitute equation 18 into the equation,

$$\begin{aligned}&\mu(a_t^P) \frac{\partial V_t^{P,s}}{\partial A_k} - \mu(a_t^N) \frac{\partial V_t^{N,s}}{\partial A_k} = \\ &\underbrace{(1+r) \left(\frac{1}{1+1/\gamma} \right)}_{>0} \underbrace{\left[-\frac{\partial \delta_t}{\partial A_k} K_t + (1-\delta) \frac{\partial K_t}{\partial A_k} \right]}_{<0} \cdot (\mu(a_t^P) u'(C_t^P) - \mu(a_t^N) u'(C_t^N)).\end{aligned}\tag{21}$$

⁴²We assume here that attack does not affect labor income T or w . It is possible that past attack might affect respondents' productivity in different sectors, for instance, through handicap, and thus past attack might affect labor income. Our empirical analysis shows no additional effect of past attack that only affects respondents, and our main analysis focuses on attacks on other household members, which arguably does not affect the labor income of household head in principle. More discussion in Appendix F.

Therefore, the wealth effect of attack depends on the term of $\mu(a_t^P)u'(C_t^P) - \mu(a_t^N)u'(C_t^N)$, i.e., difference in marginal utility of contingent consumption weighted by protection of participation. Intuitively, given the protection effect of participation, if household thinks participation brings higher consumption and thus lower marginal utility of consumption, it is more likely that he switches from nonparticipation to participation status, and vice versa.

In addition, wealth effect of attack on participation can be expressed in terms of the effect of attack on investment:

$$\mu(a_t^P)\frac{\partial V_t^{P,s}}{\partial A_k} - \mu(a_t^N)\frac{\partial V_t^{N,s}}{\partial A_k} = \frac{1+r}{r-1/\gamma}(\mu(a_t^P)u'(C_t^P) - \mu(a_t^N)u'(C_t^N)) \cdot \frac{\partial I_t}{\partial A_k}.$$

Therefore, if $\mu(a_t^P)u'(C_t^P) - \mu(a_t^N)u'(C_t^N)$ does not vary much, one can control for investment in time t to control for wealth effect of past attack on participation.

Protection effect: The direction is ambiguous. If expected function is well-behaved and concave, it is easy to show $V_t^{P,s} > V_t^{N,s}$ because participation given survival brings higher labor income and thus higher expected continuation value. If the subjective survival likelihood does not vary much with past attack, then protection effect is positive. If, however, the subjective survival likelihood decreases sufficiently when household experienced a past attack, household head would be less likely to participate. In the main analysis, we control for whether respondent overreports any violent event as a proxy to subjective survival likelihood to control for the protection effect.

□