

Would you fight?

An inquiry among high-risk youth in Eastern Congo

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Abstract

Why would an individual choose to take up arms and fight? Several decades of research on armed conflict have yielded relatively few quantitative analyses on the *individual* propensity to participate in collective violence. This paper studies the intention to fight among a high-risk population of miners in Eastern Congo. The majority of our respondents have been exposed to armed conflict in the past and some have participated in activities of armed groups. We inquire about their intention to fight at a time when their main income source is under threat because of the arrival of a large-scale mining company. We identify how their responses vary with four motivations that have been highlighted in the theoretical literature: grievances, material incentives, social incentives and previous exposure to conflict. The results suggest that all four motivations play a significant role.

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INTRODUCTION

In the past decade, the world witnessed an average of 41 armed conflicts each year. About one in five of these events surpassed the threshold of 1,000 battle deaths a year, thus qualifying as civil wars. The majority, 80%, were so called ‘minor conflicts’, surpassing the threshold of 25 battle deaths a year. Over the same time period, the world witnessed more than 28,500 riots – involving participants that engaged in violent acts. A significant share of these armed conflicts (37%) and riots (50%) took place in Africa.¹

Whether major or minor, these conflicts could not take place without the men (and women) who take up arms and fight. What motivates individuals to participate in acts of collective violence? This question has been at the center of a longstanding scholarly debate. Four main groups of motivations have been highlighted. A first school of thought focusses on *grievances* and feelings of discontent and frustration as the drivers of rebellious action (e.g. Gurr 1970; Lichbach 1989). Influenced by Olson's (1965) analysis of collective action, a second school of thought argues that rational individuals only participate when the individual benefits from participation outweigh the costs. Two types of ‘selective incentives’ may influence the cost-benefit analysis. *Material incentives* include material and financial benefits from participation, as well as having low opportunity costs (e.g. Lichbach, 1995; Tullock, 1971). *Social incentives* emphasize the importance of an individual’s social network and are largely non-material and psychological in nature (e.g. Muller, Dietz, and Finkel 1991; Muller and Opp 1986). Finally, recent experimental studies have built on evolutionary theories of human prosocial behavior, and indicate that experiences of victimization and *exposure to conflict* may affect the costs and non-material benefits of participation in collective violence (e.g. Bauer et al. 2014; Gneezy and Fessler 2011; Voors et al. 2012).

¹ Own calculations based on the UCDP/PRIO Armed Conflict Dataset (Gleditsch, Wallensteen, Eriksson, Sollenberg, & Strand, 2002; Pettersson & Eck, 2018) and the Armed Conflict Location and Event Data Project (ACLED) (Raleigh, Linke, Hegre, & Karlsen, 2010). ACLED defines a riot as “a violent form of demonstration where the participants engage in violent acts, including but not limited to rock throwing, property destruction, etc.” (ACLED, 2017).

We examine the empirical evidence for these motivations, relying on a unique database of ‘high-risk’ youth in the Eastern Democratic Republic of Congo (DRC). Our sample consists of 469 artisanal miners who live and work in Kamituga, a mining town in South-Kivu. The miners are all (young) men; the vast majority was exposed to the violence of the first and second Congo wars, and some participated in the violence. Despite the formal end of the war in 2003, pockets of chronic violence remained in the surroundings of Kamituga at the time of our survey in May 2015 (Stearns and Vogel 2015). Moreover, as the mining concession on which Kamituga is located was granted to a large-scale mining company, the miners faced an uncertain economic future – risking eviction once the company would move from the research to the production phase (Stoop et al. 2016). It is to these so-called ‘high-risk’ youth, who experienced violent conflict and were at risk of losing their employment, that we asked the question “would you fight?”. We framed this question as a manifestation against the large-scale mining company, and enquire about miners’ intention to engage in four concrete violent actions: destroying property, attacking employees, using fire arms and joining an armed group. We relate miners’ intention to participate in these actions with proxies for the four above-mentioned motivations. The associations that emerge allow us to sketch the profile of ‘would-be-fighters’.

Of course, ‘would-be-fighters’ are not per se ‘fighters-to-be’. In other words, the self-reported intentions that we pick up could differ from actual decision-making in the future. This discrepancy can result from untruthful answering (because of strategic or social desirability considerations) or because participating in violence is costly and risky, and the effect of the actual costs may only set in when decision time has come. We address both issues and argue that our measures pick up meaningful variation in the intention to fight. Our approach builds on prominent examples in the literature that measure the intention to participate in collective violence. This is the first strand of literature we contribute to. Muller et al. (1991) for instance, test theories of rebellion in Peru using data on the intention of rebellious political action, both in a national sample and a sample of students at a protest-prone university. MacCulloch (2004) tests the relation

between income and self-reported revolutionary support in a large sample of individuals taken from the World Values and Eurobarometer surveys. Exploiting the same data, Thyne and Schroeder (2012) investigate how marriage, unemployment and military involvement affect the individual-level taste for revolt. Finally, Argo (2009) and Ginges and Atran (2009) study the professed willingness to rebel in the context of the Israeli-Palestinian conflict.

A second relevant strand of literature has looked at ‘have-been-fighters’. Humphreys and Weinstein (2008) test for the theorized determinants of participation in Sierra Leone’s civil war, relying on a sample that includes both ex-combatants and non-combatants. McDoom (2013) and Verwimp (2005) study the characteristics of perpetrators in the Rwandan genocide relying on unique datasets of Rwandan households. Nussio (2017) compares characteristics across voluntarily and forcibly recruited members of Colombian armed groups. While observing past participants has its advantages, these studies have their own caveats: most importantly the non-randomness of the sample (due to attrition stemming from e.g. mortality or migration) and recall bias of pre-conflict characteristics (unless pre-conflict data is available). Overall, quantitative studies looking at past participation conclude that selective incentives perform better at predicting individual behavior than proxies for political grievances, but absence of evidence is not evidence of absence (Blattman and Miguel 2010).

In fact, most studies on ‘have-been-fighters’ are ethnographic in nature, and argue that grievances take a prominent place (e.g. Kalyvas & Kocher, 2007; Scott, 1977; Wood, 2003). The contrasting lack of evidence for grievances in quantitative studies could signify that it is very difficult to capture political deprivation and grievances with quantitative data, or – alternatively – a stronger social desirability bias in the qualitative interviews. Looking at studies on individual participation in violence in DRC, we find that they are all ethnographic in nature, and award a role to a range of possible motivations: greed, low opportunity costs, grievances, community cohesion and related non-material incentives, protection from harm and insecurity, and forced recruitment (Jourdan, 2011; Laudati, 2013; Richards, 2014; Van Acker & Vlassenroot, 2001).

Our study adds to the small but growing quantitative literature that uses individual-level data to pin down individual motivations to fight. With the notable exception of the above-mentioned research, most quantitative studies on armed conflict have analyzed data at the country or regional level – a level of analysis that is not well-suited to pin down individual motivations to fight. For instance, one of the most robust empirical associations is the one between low GDP and the occurrence of civil war (Collier and Hoeffler 1998), but this does not mean that it is the poor who fight (Blattman and Miguel 2010). Low GDP could also point to weak state capacity to fight off rebels (Fearon and Laitin 2003). Another stylized fact in cross-country studies is the recurrence of civil war (Collier and Sambanis 2002). Without individual-level data, it remains guessing what drives this conflict trap: e.g. the mobilization of individuals following conflict-induced poverty or victimization, grievances about ‘victor’s justice’, or rebel networks? To a somewhat lesser extent, the same caveats apply to a more recent wave of papers that rely on within-country regional data (e.g. Daly, 2012; Dube & Vargas, 2013; Verpoorten, 2012). The bottom line is that we need individual-level data to test theories about individual behavior. The gap in the literature is understandable however, given the difficulty of approaching (past or potential) fighters and organizing large-N surveys in conflict and post-conflict areas.

We offer two contributions. First, by analyzing the intention to fight of high-risk youth in a *post*-conflict environment, we are at the intersection of studies that look at ‘would-be-fighters’ and studies that look at ‘have-been-fighters’. This allows us to empirically verify in a sizeable sample if and how past victimization and rebel networks are associated with the individual-level propensity to participate in future violent conflict. By doing so, we can start opening the black box of the micro-dynamics underlying the recurrence of armed conflict. We know of only one other quantitative study looking at this intersection. Blattman and Annan (2016) experimentally evaluated a program of agricultural training, capital inputs and counselling directed at ex-fighters in Liberia. The increased earnings potential and the expectation of future transfers was found to raise the opportunity cost to engage in mercenary activities in neighboring Côte d’Ivoire. The

findings indicate that participation in collective violence responds to material incentives, while no conclusive evidence was found with respect to grievances.

This brings us to our second contribution. The setting of artisanal miners in Eastern DRC provides for a ‘most likely case’ to pick up the role of grievances. Indeed, the concrete and imminent threat of the mining company and the associated perceived injustice allow us to sidestep the difficulty of measuring general and abstract grievances, and instead focus on concrete grievances. Judging from their use of language, miners experience the confrontation with mining companies as a war-like situation. For instance, Van Puijenbroeck & Schouten (2013, p. 29) quote a miner in Ituri Province, saying: “*Here it is war. When the mining company arrives to relocate us, we will be ready: even the mothers are angry and have their axes and spears ready*”. Geenen & Claessens (2013, p. 102) cite a miner in South-Kivu Province: “*They say they will give you work and the next day they chase you off. . . . They threatened us with policemen and dogs. We told them to do what they want, but we will not die because of hunger! [. . .] We would rather die by a bullet than die of hunger (Miners focus group 2011 int.)*”. If, despite the concrete grievances and specific framing, grievances do not turn up significant, we would move closer in the direction of ‘evidence of absence’, rather than merely ‘absence of evidence’.

We begin our analysis by discussing the background of mining and conflict in Eastern DRC. Drawing on theories of individual participation in armed conflict, we then formulate a number of hypotheses about the intention to fight. Next, we describe our research design and data, and present the results of the analysis. We conclude with a discussion of our main findings and their implications for policymaking.

BACKGROUND

Eastern DRC is home to many of the country’s untapped deposits of raw minerals, estimated to be worth US\$24 trillion (UNEP, 2011). Despite its vast mineral wealth, the majority of DRC’s population is dismal poor, as indicated by the country’s poverty headcount of 72.5%, and its bottom ranking on the Human Development Index – 176 out of 188 countries (UNDP, 2016).

Eastern DRC was also the scene of the first and second Congo wars (1996-1997 and 1998-2003). Both wars are described and discussed at length by among others Autesserre (2010), Reyntjens (2010) and Stearns (2011). Despite the formal end of the Second Congo War and a national unity government in 2003, violence continued. In 2015, the year of our interviews, more than seventy armed groups were active in Eastern DRC, and approximately 1.6 million people remained displaced (Stearns & Vogel, 2015, p. 7). Several factors explain the continued violence. For instance, due to the infusion of arms and rebels, many dormant local conflicts turned violent. These local conflicts were not addressed in the peace accords that focused on national and international issues (Autesserre, 2010). Furthermore, the government has proved inapt in turning the war logic around and transiting to a peace economy. In the words of Stearns & Vogel (2015, p. 8): *“the government and its foreign partners have been unable to create a virtuous cycle of economic development in the rural Kivus that could entice local leaders to invest in stability rather than conflict”*.

In 2002, a new Mining Code was developed under the guidance of the World Bank and the IMF. The Code was designed to restore DRC’s reputation in terms of business environment after the debacle of the nationalizations of mining companies by Mobutu in the 1970s. The Code succeeded in attracting FDI – by offering advantageous fiscal regimes to private companies – but has been criticized for remaining extremely vague on the use of mineral revenues, by the government or private companies, and how these revenues should benefit the Congolese population (Mazalto, 2005, 2009). Moreover, in its search to maximize fiscal revenue for the state, the Code has prioritized large-scale mining to the detriment of the sector’s artisanal mining segment. It limits artisanal mining to a handful of relatively small Artisanal Exploitation Zones (AEZ). As a result, the vast majority of artisanal miners operates illegally in large-scale mining concessions.

Kamituga is a mining town of about 190,000 inhabitants, located in the province of South-Kivu at 180 kilometers of the provincial capital Bukavu (see Figure 1). Gold deposits were discovered in the 1920s and the Belgian company ‘*Minière des Grands Lacs Africains*’ started

commercial gold exploitation in the 1930s (Kyanga Wasso, 2013; Vlassenroot & Raeymaekers, 2004). Due to Mobutu's disastrous economic policies, the instability of world mineral prices and the Congo wars, industrial production came to a halt, and artisanal mining got the upper hand. During the Congo wars, Kamituga was the scene of several atrocities, including public executions, massacres and mutilations of civilians (UN, 2010a). The town was also occupied by several armed groups that benefitted from the mineral sector by taxing artisanal miners and traders (Geenen, 2014; Vlassenroot & Raeymaekers, 2004). After the wars, armed actors continued to benefit from Kamituga's artisanal mining sector. The Congolese national army, the FARDC, took over the existing taxation systems, while the armed group FDLR (*Forces Démocratiques pour la Libération du Rwanda*) remained active in Kamituga's surroundings setting up 'tax barriers' and relying on ambush attacks against mineral traders (IPIS, 2014; UN, 2010b).

In 2002, a Canada-based multinational – Banro – acquired the right to exploit minerals in Kamituga. Banro started the research phase in 2011. At the time of our interviews they were hoping to move to the production phase. Between 13,000 and 15,000 artisanal miners were however operating within its concession.² While still tolerating artisanal miners, Banro already restricted their activities. Miners were not allowed to open new pits or make use of dynamite, crushing mills and electricity – all of which enhance the productivity of artisanal mining. To enforce these rules, Banro mainly relied on the Mining Police and at times on the FARDC. This often led to friction and incidents (Stoop et al., 2016).

Such tensions are likely to increase when Banro moves to the production phase. In two nearby mining sites where Banro already moved to the production phase, Namoya and Twangiza, the company faced fierce resistance by artisanal miners, the local population and armed groups. Appendix 1 provides detailed information on numerous occasions when the resistance turned violent, including: the destruction of Banro property; the forcible reoccupation of artisanal mining

² Representatives of local mining committees communicated that a census undertaken in 2013 counted 13,600 artisanal miners. During our fieldwork in 2015 we counted 15,250 artisanal miners on the combined membership lists of two local mining committees.

sites; violent attacks, ambushes and theft; and the kidnapping of Banro employees. As a result of the increasingly tense security situation, Banro evacuated its staff and temporarily suspended mining operations in Namoya in May and July 2017 (see Appendix 1).

WHY FIGHT?

A vast literature deals with theories of individual participation in collective violence. We focus on four main arguments brought forth in the literature and derive testable hypotheses.

Grievances

A first school of thought focusses on grievances and feelings of discontent as drivers of rebellious action. In an overview of these deprived actor theories, Lichbach (1989) highlights a number of underlying processes, such as frustration from unfulfilled needs, political alienation, and a sense of social injustice. Central is the idea that individuals form expectations about what they are entitled to. A discrepancy between their expectations and what they actually get, may make individuals frustrated and angry enough to fight (Gurr, 1970).

While empirical research on grievances originally focused on peasant revolt (Paige, 1975; Scott, 1976), recent studies indicate that they also play a role in conflicts between artisanal miners and mining companies. Relying on case studies across the developing world, Carstens & Hilson (2009) argue that artisanal miners' grievances – resulting from what they consider as unfair treatment and illegitimate claims to their land by industrial mining companies – lie at the basis of numerous conflicts that have led to casualties and costly damage to infrastructure. The United Nations Economic Commission for Africa also acknowledges that conflicts between large and small-scale miners arise among others from “*legitimate and illegitimate resource claims by the two groups*” and “*unfulfilled promises by large-scale mining companies*” (UNECA, 2003, p. 8).

To voice and claim their rights through peaceful means, miners count to some extent on local authorities. We thus hypothesize that artisanal miners' intention to fight increases the more

they are aggrieved with Banro and with the local authorities who could defend their interests in negotiations with the company. Miners' intention to fight increases with:

(H1) the level of grievances with Banro.

(H2) the level of grievances with local authorities.

Selective Incentives

A second school of thought, influenced by Olson's (1965) analysis of collective action, puts forward rational actor theories. These theories postulate that individuals will only participate in collective violence when the benefits from participation outweigh the costs. The costs are borne individually and can be high (e.g. involving the risk of personal injury); while the benefits of a successful revolt are largely available to all regardless of participation. Rational actors will therefore only participate if they expect to receive private benefits, called 'selective incentives' (Tullock, 1971).

The initial focus was on material incentives. Lichbach (1995) offers extensive examples of cases where money, loot and other material rewards motivated participation in various rebellious acts, including peasant resistance, protests, riots, strikes, revolutions and coups. On the cost side of collective action, the opportunity cost motive postulates that participation in the activities of armed groups is more likely for individuals who are unemployed or have little alternative economic opportunities (Blattman & Annan, 2016; Collier & Hoeffler, 1998).

The arguments and findings with respect to **material incentives** lead us to assume that artisanal miners' intention to fight:

(H3) increases, the greater the individual material benefits are in fighting against Banro

(H4) decreases, the higher the individual material costs are in fighting against Banro

Selective incentives may also be non-material. Muller & Opp (1986) argue that the relevant incentives must be psychological in nature, simply because it is unlikely that the average citizen

can expect substantial personal material gains from participating in collective violence. They put forward ‘social rewards’, stemming from feelings of solidarity with a group and gratification from conforming to a social norm. Similarly, Muller et al. (1991, p. 1264) argue that “*If an individual’s friends – or groups the individual belongs to or identifies with – believe that he or she ought to participate in collective action, then a social norm of participation exists. [...] The individual who is part of the social network will derive benefit in the form of social approval from conforming to the social norm.*” In line with this argument, Humphreys & Weinstein (2008) find that having social ties with rebels increases the likelihood of participation in the activities of a rebel group in Sierra Leone’s civil war.

Rejecting the standard rational actor model, Muller & Opp (1986) propose a model in which the public goods value of collective violence is a relevant incentive for participation. They argue that individuals may adopt a collectivist notion of rationality, recognizing that rebellious collective action will not succeed if everyone freerides, making it collectively rational for all to participate. This mechanism is especially supposed to operate when a group’s influence in attaining the public good is perceived to be high – which is more likely when similar dissident groups are perceived as having been successful in the past (Bandura, 1973; Muller & Opp, 1986).

Based on the arguments and findings with respect to these **social incentives**, we hypothesize that artisanal miners are more likely to display an intention to fight if:

(H5) they are more exposed to a social norm to fight.

(H6) they perceive previous collective violence as having been successful.

Exposure to Conflict

Evolutionary theories posit that war and intergroup conflicts played an important role in shaping human behavior. In an environment of lethal group competition over scarce resources, evolution may have favored groups that displayed high levels of within-cooperation and out-group hostility (Bowles, 2006; Choi & Bowles, 2007; Darwin, 1998). In line with these arguments, recent studies have shed light on how the experience of conflict may affect the cost of collective violence as well

as non-material benefits to participation. Experimental games indicate for instance that individuals exposed to war-related violence show an increased willingness to cooperate with their in-group and punish non-cooperation (Bauer et al., 2014; Gneezy & Fessler, 2011; Voors et al., 2012).

The findings of these studies thus award a role to experiences of victimization and exposure to violent conflict, which could influence the taste for revenge and justice for the community, but also foster the intra-group cohesion necessary to organize collective violence. We hypothesize that miners have a higher intention to fight if:

(H7) they have been exposed to violent conflict.

DATA COLLECTION

We aimed to reach a representative sample of artisanal miners in Kamituga. As there was no reliable list that would allow us to draw a random sample, we had to establish one. To do so, we took advantage of the hierarchical structure of the mining site, which is divided in different zones (headed by ‘zone managers’), that consist of several mining pits (supervised by ‘pit managers’) who have a number of miners working with them. We first constituted a list of all active mining zones in Kamituga. From the resulting list of forty mining zones, we selected nine zones, seeking variation in terms of geographical location, the number of miners and the presence of Banro. In a second step, we asked zone managers in the selected zones to provide us with a list of all pit managers, who in turn provided us with a list of all miners working with them. The complete list for the nine zones consisted of 1,254 miners, working in 72 pits. We randomly selected half of the pits in each zone, and – in each of the selected pits – randomly selected ten or fifteen miners to be included in the survey.³ The pit managers of selected pits were also included. Our final sample comprises 430 miners and 39 pit managers. All selected miners were individually interviewed with

³ The average pit on the list counts 17 miners. For selected pits with more than 30 miners, we randomly selected 15 instead of 10 miners. When a pit with less than 10 miners was selected, we randomly selected an additional pit in the same mining zone.

a structured survey.⁴

The questionnaire was shaped by several practical and security challenges. The initial plan was to survey miners not only in Kamituga, but also in Twangiza – where Banro already moved to the production phase and miners resisted dislocation. The climate in Twangiza proved too tense however, making it impossible to draw a random sample and conduct independent research. Although Kamituga was relatively safe, it was not safe enough to walk around with a lot of cash. In the absence of a single bank in Kamituga, we had to drop most incentive-compatible games that we designed to measure attitudes (such as trust, fairness and cooperation). Finally, because a pilot revealed the short attention span of the gold miners, we had to limit interview time to maximum one hour, which led us to drop several more time-consuming items of the questionnaire.

The survey team was drawn from a large pool of candidates with extensive experience in conducting surveys in Eastern DRC. Fifteen potential enumerators were selected and took part in a three-week training program. Based on their performance, we selected twelve enumerators for the actual fieldwork. The survey was conducted in Swahili, using tablets.

DATA DESCRIPTION

Self-reported Motivations to fight

To study why individuals may participate in collective violence, we first used a direct approach by asking miners the following question: *“I will now read several motivations that could explain why people may join an armed group. Could you please indicate how important each of these reasons is in your opinion?”* We presented respondents with six motivations: ‘defend the community against external aggression’, ‘fight against injustice, for the rights of the community’, ‘personal insecurity’, ‘to gain respect’, ‘forced participation’, and ‘to gain money’. The answer categories were: not at all important, very little importance, rather important, important, very important and refuse to respond.

⁴ In total, we made 21 replacements (4% of our sample). The large majority of the miners who were replaced (86%) were not found by the enumerators. In most cases, these miners no longer worked in the selected pit.

Table 1 gives an overview of the answer distribution. Interestingly, even when talking about people's motivations in general, respondents award more importance to the somewhat more laudable motivations 'defend the community against external aggression' and 'fight against injustice, for the rights of the community' than to the more selfish motivation 'to gain money'. When asked in an open follow-up question if there were other important reasons, 131 responded affirmatively. Strikingly, 85 mentioned revenge as an important reason. Furthermore, 26 mentioned that bandits seek refuge in armed groups (i.e. those who risk being convicted may flee and join an armed group to escape a prison sentence), and 20 mentioned a lack of employment or poverty, which suggests need rather than greed as a motive. Overall, this direct line of questioning awards some importance to all motivations, yet gives more prominence to motivations that can be linked to grievances, social incentives and victimization.

To study the determinants of participation in a more indirect way, we measured miners' individual intention to fight, and relate it to proxy measures for grievances, material incentives, social incentives and exposure to conflict.

Intention to Fight

We framed the intention to fight as a reaction against Banro. We first asked our respondents to imagine the following realistic scenario: *"Imagine a situation where Banro moves to the production phase in Kamituga. Imagine that they organize professional training programs and authorize some artisanal miners to continue operating in selected mining sites at Kamituga. However, their budget is not sufficiently large to accommodate all miners in the training programs, and the selected mining sites are not sufficiently large to accommodate all artisanal miners."* We asked if such a situation would lead to a conflict between the company and artisanal miners. Answer categories included: refuse to respond (0), certainly not (1), probably not (2), maybe (3), probably (4) and certainly (5). We additionally asked if they thought the conflict would be violent. The large majority of miners indicates that the above scenario would certainly lead to a conflict (72%) and that it would be violent (64%).

Next, we presented each miner with the following violent actions and asked about their intentions to engage in them: (1) destroying Banro property; (2) attacking Banro employees; (3) using fire arms; and (4) joining or revitalizing an armed group or local defense force (“like Mai-Mai Shikito”)⁵. Panel A of Figure 2 displays the answer distribution, indicating that a substantial group of miners would ‘probably’ or ‘certainly’ destroy Banro property (48%), attack Banro employees (36%), use fire arms (29%), or join an armed group (19%). From these answers, we construct two dummy variables that proxy the individual intention to fight (see Panel B of Figure 2). The first equals one for miners who display a ‘probable’ or ‘certain’ intention to destroy Banro property, attack Banro employees and use fire arms. This is the case for 108 miners or 23% of the sample. A second proxy looks at a more organized form of violence, and equals one for miners who display a ‘probable’ or ‘certain’ intention to join an armed group. This is the case for 87 miners or 19% of the sample. Of course, would-be-fighters are not per se fighters-to-be. The self-reported intentions that we pick up could differ from actual decision-making in the future. This discrepancy can result from untruthful answering (because of strategic considerations) or because participating in violence is costly and risky, and the effect of the actual costs may only set in when decision time has come. We now address both issues.

Since the question is framed with respect to a concrete threat and enemy, and because negotiations between Banro and the community are ongoing, miners may strategically overstate their intention to fight. To elicit truthful and accurate answers, we strongly invested in establishing a relationship of trust. To do so, we relied on the extensive local network of our colleague [Sara Geenen](#), who had been working with miners in the area for over five years (see e.g. [Geenen, 2013, 2014](#)). Moreover, prior to the implementation of the actual survey in May 2015, we conducted two rounds of exploratory fieldwork in June and December 2014, allowing us to get a good understanding of the research context and build the necessary trust and network. Each interview

⁵ Mai-Mai are community-based self-defense militia. See *infra* for detailed information on Mai-Mai Shikito.

was conducted one-on-one and started with a standardized introduction in which we presented ourselves, the research and its purpose, and guaranteed anonymity to the respondent as well as the option to refuse to respond to questions or abort the interview at any point. We directly encouraged respondents to give truthful answers by stating: *“It must be said that this research has no direct benefit for you. If you decide to participate and respond frankly, you will help us to better understand the situation of miners in Kamituga.”*

To further reduce the probability of strategic responses in our variables of interest, we first asked respondents if miners in general would engage in each of the above-mentioned violent actions. Strategic respondents could hence overstate the general intention to fight, while there was no need to overstate their personal intention. Table 2 shows summary statistics for both the general and personal intention to fight. While the general intention averages ‘probably’, the personal intention is lower, averaging between ‘probably not’ and ‘maybe’. Yet, our two proxy variables indicate that about one in five miners do display a personal intention to fight.

Actual behavior of miners also suggests that the intention to fight is real. As described in the Background section and detailed in Appendix 1, miners have undertaken very concrete violent actions against Banro and other mining companies. Banro acknowledges this threat. Their 2014 Annual Information Form mentioned: *“Some or all of the Company's properties are inhabited by artisanal miners. These conditions may interfere with work on the Company's properties and present a potential security threat to the Company's employees. There is a risk that operations of the Company may be delayed or interfered with, due to the conditions of political instability, violence and the inhabitation of the properties by artisanal miners.”* (Banro, 2014, p. 16).

In sum, we argue that our proxies provide meaningful variation in the intention to fight, and that the likelihood of violent action on the part of miners is real.

Determinants to Fight

Grievances

Hypotheses (1) and (2) postulate that the intention to fight increases as miners are more aggrieved with Banro and local authorities. While Banro refers to their legal right to exploit minerals, miners refer to their traditional rights to live and work on the land of their ancestors (Geenen & Claessens, 2013). And, while Banro's presence already depressed revenues of artisanal miners, the expected compensation for such losses is not forthcoming (Kilosho Buraye, Stoop, & Verpoorten, 2017). The relevant local authorities that could defend miners' interests in negotiations with Banro are the *Chef de Poste* and the *Mwami*. The Mwami is the 'traditional' local chief that played (and can sometimes still play) an important role in the allocation of land. The Chef de Poste is the 'modern' local authority.

Respondents were asked: *"Now I would like to ask some questions about actors that play a role in the management of mineral resources in Kamituga. How do you think these actors contribute to the well-being of artisanal miners?"* They were then shown a set of five smileys, corresponding to the opinions: very negative (1), rather negative (2), no effect (3), rather positive (4), very positive (5). To capture grievances, we create dummy variables indicating respondents holding a 'very negative' opinion about the contribution of Banro (77%), the Chef de Poste (19%) and the Mwami (17%). We further asked to what extent respondents agreed with the following statements about Banro's potential future contributions: *"Banro is important for the development of Kamituga"*, *"Banro offers opportunities for artisanal miners of Kamituga"*, and *"Banro offers opportunities for myself"*. Answer categories included: strongly disagree (1), rather disagree (2), indifferent (3), rather agree (4), strongly agree (5). We create an alternative measure of grievances with Banro, indicating respondents who 'strongly disagree' with each of these statements. This is the case for 40% of respondents (see Table 3).

Material incentives

According to hypothesis (3), the intention to fight increases with individual material benefits. There is a group of miners that stands to lose more should Banro move to the production phase, and therefore has more to gain from successful rebellious actions against the company. They operate in the zones that are of most interest to the company. These zones are frequently visited by Banro employees, for purposes of geological exploration. To capture variation in benefits from fighting against Banro, we purposefully stratified our sample across zones suited for industrial exploitation and other zones. In addition, we asked each respondent how often Banro employees visited their zone in the month prior to the interview. The answers range from 0 to 31, with an average of 3 (see Table 3).

Fourth, we hypothesize that the intention to fight decreases with miners' personal costs. While the risk of injury may be similar across miners, we do have a proxy for a cost that varies across miners, namely foregone employment opportunities at Banro (assuming that Banro will not hire miners who engaged in violent actions against the company). We asked respondents whether they would be interested in working for Banro if artisanal mining would no longer be possible in Kamituga. Answer categories included: very interested (1), interested (2), rather indifferent (3), not interested (4). Just over half of the miners (55%) expressed interest, choosing options (1) or (2). We create a dummy variable that equals one if a miner is interested in working for Banro; thus indicating relatively high costs to fighting (see Table 3).

Social incentives

Hypothesis (5) conjectures that the intention to fight rises with exposure to norms that value violent resistance. Such exposure is more likely if a miner's network includes (former) rebels. We asked respondents if they had ever participated in the activities of an armed group: 3.2% indicated they had. Since miners who work together in a mining pit form a close network, we defined a variable that indicates whether a miner works in a pit that includes at least one self-reported

(former) rebel. This is the case for 29% of our respondents; we assume they have a stronger rebel network (see Table 3).⁶

According to Hypothesis (6), the intention to fight increases if previous violent resistance is perceived as having been successful. In the case of Kamituga, we evaluate how the actions of Mai-Mai Shikito are perceived. In focus group discussions miners referred to Mai-Mai Shikito as an armed group that attracted many young men of Kamituga in the past. Allegedly the group was created by the vice-president of a local mining committee and consisted mainly of miners from Kamituga (focus group discussion, December 2014). In 2008, the Harvard Humanitarian Initiative interviewed 25 members of Mai-Mai Shikito in Kamituga and surroundings. The militiamen stated that their aim was to protect Congo's population from foreign invaders: *"we came to realize that our country has been invaded by foreign troops, and that we needed, ourselves, to fight for our country ... us ... we have waited for government support for so long, it did not come, so we decided to fight ourselves for the country"* (Harvard Humanitarian Initiative, 2009, p. 33). Moreover, they stress the importance of natural resources: *"The goal of this group is to protect natural resources that are in this part of the country. We know already that natural resources are what motivate the enemy to come here. [...] So it is mostly to protect natural resources and protect those who are weak and fearful, those who say they can't do that."* (Harvard Humanitarian Initiative, 2009, p. 34). The interviews further indicate that these militiamen supplemented their income with artisanal mining activities. According to our focus group discussions, most members had returned to mining, but reportedly still have their arms at home and could pick them up when necessary. One miner said: *"If you take about 100 miners today, you may find 3 to 5 who were part of Shikito. But if we are all chased away in the future and Banro does not leave us with any alternative, everyone could join"* (focus group discussion, December 2014).

To measure the perceived successfulness of previous violent resistance, we asked respondents to evaluate the impact of Mai-Mai Shikito's actions on the well-being of miners in

⁶ 2.8% of miners refused to answer the question on participation in the activities of an armed group. If we assume that these respondents did participate, 48% of miners works in a pit with an ex-combatant. All results are robust to using this alternative specification of having a rebel network.

Kamituga. The answer categories included: very negative (1), rather negative (2), no effect (3), rather positive (4), very positive (5). On average, their impact is evaluated at 2.8, between having a rather negative effect and no effect at all (see Table 3). Yet, about 14% indicates that Mai-Mai Shikito had a positive impact.

Exposure to conflict

Finally, we hypothesize that the intention to fight rises with exposure to violent conflict. Nearly all respondents had been exposed to some form of violent conflict. The large majority (79%) were at some point internally displaced due to armed combat. Four out of ten were forced to perform labor under armed threat (41%), or had relatives who were physically hurt during armed combat (40%). About one third witnessed killings or rape (29%), were forced to give away revenue under armed threat (29%), or had their house pillaged by an armed group (28%). About 25% have close family members who were physically hurt during armed combat and about 5% were physically hurt themselves. Nearly all (93%) respondents were exposed to at least one of these events, while 65% were exposed to one or more of the most extreme events (i.e. having close family members or relatives who were physically hurt during armed combat, being physically hurt themselves, or having witnessed killings or rape). Bauer et al. (2014) find that the impact on behavior is largest when traumatic conflict events are experienced within the developmental age window of 7 to 20 years. We therefore create a dummy variable to capture exposure to the most extreme conflict events between the age of 7 and 20; it equals one for 36% of the sample (see Table 3).

Control variables

We further control for other variables that may enter a monetary cost-benefit calculation, but can also constitute sources of grievances (see Table 3). To account for economic deprivation, we

calculate an asset index as the principal component of several household assets.⁷ We further control for the respondent's level of education, by adding a dummy that indicates whether he finished high school. This is the case for 19% of respondents. Next, we control for two variables that proxy for alternative economic opportunities outside the mining sector: a dummy indicating whether the household owns agricultural plots (29% do), and a dummy indicating whether the household has an income source outside the mining sector (16% do).

We further consider family responsibilities and community ties. These characteristics are important according to social control theory, which focuses on factors that are likely to produce conformity with norms and laws and may constrain motivated actors from participating in collective violence; such as social attachments and community involvement (Thyne & Schroeder, 2012). We proxy family responsibilities by age, marital status, and number of children. Nearly half of the respondents are married and about one in three lives together with his partner without being married. Most respondents (84%) have children and about half of them have three or more. On average, the respondents are 33 years old, with ages ranging from 16 to 65 years. Community ties are captured by ethnicity and place of birth. Half of respondents (52%) was born in Kamituga, and the majority (84%) belong to the Lega ethnic group.

Finally, we include a dummy indicating whether a respondent is a pit manager; this is the case for eight percent of respondents. Pit managers are often wealthier and well-connected, which may increase the opportunity cost to fight. On the other hand, they stand to lose most, because many have made substantial investments in the exploration and preparation of a mining pit. As long as the pit has not produced sufficiently, they are often indebted to money lenders and have most at stake should artisanal mining be prohibited.

⁷ A household was defined as the group of individuals who usually sleep in the same house and share their meals. The calculation of the index included: the ownership of a house and the number of rooms; the quality of the walls and the floor; and the ownership of a mattress, radio and television.

EMPIRICAL STRATEGY AND DATA ANALYSIS

We test our hypotheses by estimating the following equation:

$$\begin{aligned} FIGHT_{iz} = & \alpha_0 + Grievances'_{iz} A + Material\ incentives'_{iz} B + Social\ incentives'_{iz} \Gamma \\ & + Conflict\ exposure'_{iz} \Delta + C'_{iz} E + Z'_z \Theta + \varepsilon_z \end{aligned} \quad (1)$$

where i indexes the 469 miners and z the 9 mining zones. The outcome variables, denoted by $FIGHT_{iz}$, are the two proxies for a miner's intention to fight. $Grievances'_{iz}$, $Material\ incentives'_{iz}$, $Social\ incentives'_{iz}$ and $Conflict\ exposure'_{iz}$ are vectors containing the variables that correspond to the different theories of individual participation in collective violence, while C'_{iz} contains the control variables. To account for unobserved characteristics that may influence miners operating in a particular zone, we add mining zone fixed effects (Z'_z). Standard errors (ε_z) are clustered at the level of mining zone to account for within-zone correlation of residuals. The equation is estimated using a probit model, while we provide robustness checks with different model specifications.

It is likely that unobserved characteristics simultaneously influence the explanatory variables and miners' intention to fight. Lacking a suitable instrument for identifying exogenous variation, we turn to the procedures suggested by Oster (2015) to formally assess omitted variable bias.

Results

Since the two measures for grievances with Banro are significantly correlated, we estimate two sets of specifications. Table 4 presents the results when including 'grievances with Banro 1'. Table 5 reports the results when including 'grievances with Banro 2'.

We find empirical support for each group of motivations. First, grievances with Banro matter significantly. Respondents holding a very negative opinion about Banro's contribution to the well-being of artisanal miners are 20 percentage-points more likely to participate in violent

actions against the company (see Table 4). Moreover, miners who strongly disagree with all statements regarding Banro's potential future contributions are 14 percentage-points more likely to participate in violent actions against the company and 13 percentage-points more likely to join an armed group (see Table 5). These findings are significant at the 1%-significance level. On the other hand, we don't find strong evidence that grievances with local authorities matter for the intention to fight. Miners who are aggrieved with the Chef de Poste are 9 percentage-points more likely to join an armed group, but this result is only significant at the 10%-level.

Besides grievances with Banro, material incentives are important. First, miners' intention to behave violently toward Banro is significantly higher when they have more to gain from rebellious action. With each additional visit that Banro employees make to a mining zone, miners' intention to destroy Banro property, attack Banro employees, use fire arms and join an armed group rises by about 1 percentage-point (significant at the 1%-level). Moreover, higher personal costs to participation depress the intention to fight. Miners interested in working for Banro are 12 percentage-points less likely to display an intention to participate in violent actions or join an armed group (significant at the 5%-level and 1%-level, respectively).

Social incentives have a significant role to play as well. Miners operating in a pit with a self-reported ex-combatant are between 13 and 14 percentage-points more likely to display an intention to engage in violent actions or join an armed group. The intention to fight further increases with a positive evaluation of Mai-Mai Shikito's actions. A one-unit increase in the appreciation of Shikito raises the intention to engage in violent actions (with 5 percentage-points) and join an armed group (with 4 percentage-points). These findings are significant at the 5%-level.

Finally, we find that miners who were exposed to extreme conflict events display a significantly higher intention to engage in violent actions against Banro (10 percentage points) and join an armed group (7 percentage points). These findings are significant at the 1%- and 5%-level, respectively.

Correlation Versus Causation

Given the lack of exogenous variation, the above results merely provide evidence of correlations, not of causal relations. The main difficulty to infer causation lies with miners' unobserved characteristics that may influence both the explanatory and dependent variables, thus causing spurious correlation. This issue is particularly relevant in the case of previous conflict exposure and having a rebel network. Victimization only partly relates to random bad luck, and partly to unobserved war-time decisions and behavior of our respondents. Moreover, miners with a larger rebel network may be more likely to have participated in the activities of an armed group themselves, even if they report otherwise. Past participation, except in the case of forced recruitment, clearly is a decision variable and thus highly prone to endogeneity.

To formally assess omitted variable bias, we follow the approach suggested by Oster (2015). It uses selection on observable variables as a guide to assess the potential bias from unobserved variables. Put very simply: if adding a battery of *relevant* observables does not affect our coefficient of interest much, then the confounding effect of unobservables would have to be very large relative to that of observables to completely cancel out our results. Appendix 2 provides detailed information on the methodology and reports results. The findings suggest that our results are robust to omitted variable bias.

Robustness Checks

We run two additional checks to gauge the robustness of our findings. First, we estimate equation 1 using a logit model. Table A.3 in Appendix three reports the results; they are highly comparable to the results reported in Tables 4 and 5. Second, we additionally control for individual risk- and time preferences. Risk preferences were elicited using a simple incentive-compatible Eckel and Grossman lottery game, while time preferences were elicited using a hypothetical game (see Appendix four). The elicited risk- and time preferences do not turn up significant in any of the

model specifications, and including them does not affect the baseline findings (results not reported, but available upon request).

DISCUSSION

Our study has three distinctive features. First, by analyzing data from a representative sample of high-risk youth, we contribute to the small body of quantitative studies that studies individual motivations to fight. Second, the data were collected in a post-war context, at the intersection of have-been and would-be fighters. This allows us to study not only the usual material and non-material incentives, but also the role of past victimization and rebel networks. Third, given that the presence of Banro is perceived as illegitimate in the eyes of the miners and poses a concrete and imminent threat to their livelihoods, our case study is arguably a worst-case scenario on both the front of the rational- and deprived actor theories. While it remains a challenge to distinguish correlations from causations with non-experimental data, we believe that these three features allow us to provide important insights.

First, past victimization and rebel networks turn out to be fairly strong predictors of the intention to fight. Self-reported motivations further suggest that revenge, a feeling closely related to victimization, plays an important role. These results start to open the black box of the micro-dynamics behind the stylized fact of armed conflict recurrence. The ‘conflict trap’ is unlikely to be driven only by post-war poverty; instead psychological and social processes likely play a role as well. Such processes align well with recent studies showing a positive effect of war exposure on intra-group cohesion and pro-social attitudes. These attitude changes could constitute the mechanism linking up victimization and rebel networks with the intention to fight.

Second, in our worst-case scenario, we find that all four groups of incentives significantly contribute to explaining miners’ intention to fight. Thus, in contrast to most quantitative analyses, we find that miners’ grievances also play a significant role. While we find that these different mechanisms operate at the same time, they seem to do so without much interdependencies.

Finally, compared to our direct questioning about the motivations to join a rebel group, our quantitative analysis reveals a larger relative importance of material incentives. Indeed, when asked about the motivations to fight, respondents award most importance to rather laudable motivations such as protecting the community from harm and injustice. This difference in result across both approaches is in line with the general gap in findings between largely quantitative and largely qualitative studies. We speculate that one explanation for the gap lies in social desirability bias. In terms of future research, these insights lead to a plea for more work on how exactly rebel networks and victimization affect the intention to rebel; for more effort to measure (concrete) grievances in surveys; and for experimenting with a mixed methods approach that combines the best of both methodological worlds.

Turning back to the context of eastern DRC, it should be highlighted that Kamituga's mining site is far from unique in its tension between artisanal and industrial mining. Artisanal mining is an important livelihood strategy in DRC. The World Bank (2008, p. 7) estimates that up to 10 million people, or 16 percent of DRC's population, are dependent on artisanal mining. Yet, their livelihood is under pressure, as the Congolese state prioritizes the development of industrial mining (Stoop et al., 2016). Stoop, Verpoorten, & Van der Windt (mimeo) estimate that approximately 61% of artisanal miners in eastern DRC operate in concessions that have been granted to large-scale mining companies – creating a palpable tension between both modes of production.

In terms of policy recommendations to keep eastern DRC safe, our findings support a focus both on the creation of employment and on the fight against impunity.

The first of these recommendations is hardly new. The US general in Iraq said in 2006 that finding jobs for “*angry young men*” was “*absolutely critical to lowering the level of violence*” (Department of Defence, 2006). This recommendation also finds support in a recent study by Blattman & Annan (2016), who experimentally evaluate a program of agricultural training, capital inputs, and counselling directed at ex-fighters in Liberia. The men included in the program showed reduced

interest to engage in mercenary activities in neighboring Côte d'Ivoire. In the context of Kamituga and eastern DRC in general, policymakers should safeguard employment in the ASM sector and provide young men losing their livelihood with alternative opportunities. In Stoop et al. (2016) we detail how this can be done according to our respondents.

Regarding transitory justice, the DRC has achieved very little. The various peace building interventions have given priority to the disarmament, demobilization, and reintegration (DDR) of fighters, often at the expense of justice. On this, Autesserre writes that “*high-profile perpetrators of past war crimes not only enjoyed impunity, but were also rewarded with positions of authority*” (Autesserre, 2010, p. 141). Apart from impunity overshadowing the DDR programs, there is also a general failure of the national justice system. It is understaffed and underfunded, has little independence from the executive power, operates fees that are unaffordable for most ordinary Congolese, and is prone to bribing. Because of these hurdles, Congolese do not count on justice as administered by the state, and communities feel they need to take their protection in their own hands, which constitutes a disincentive for local militia to disarm (Autesserre, 2010). Despite the challenges involved, rebuilding the local and national justice system is absolutely essential, in order to allow communities to overcome resentment over past injustices and human rights violations, end impunity and deter violence.

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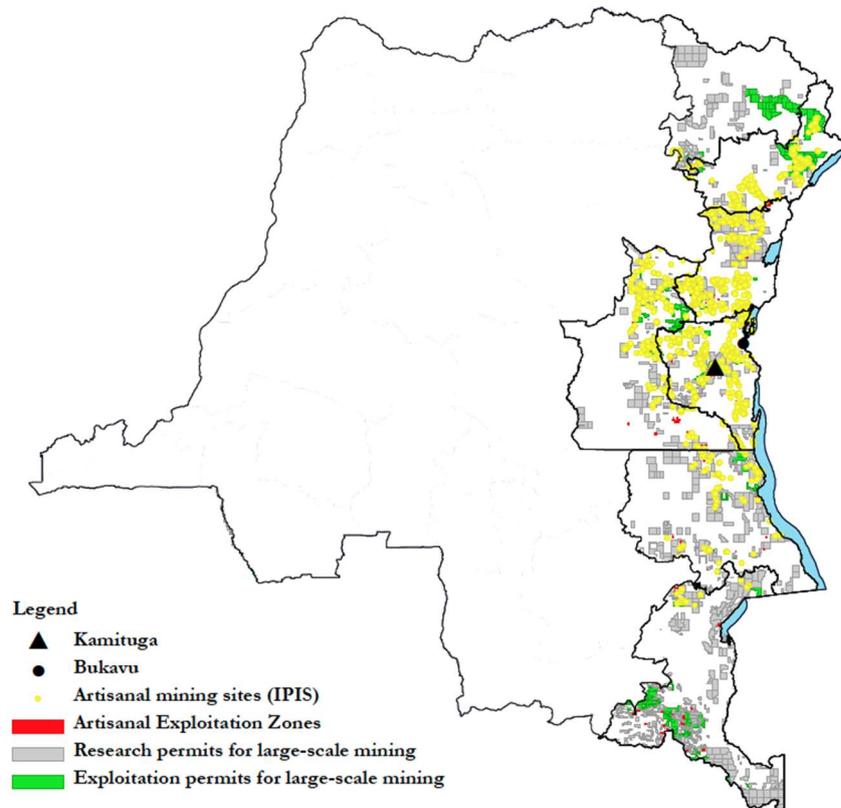
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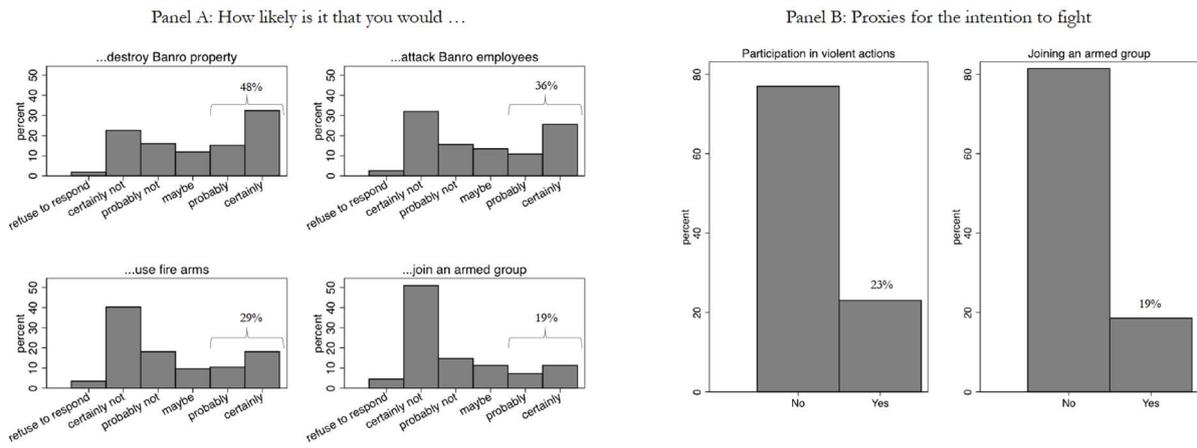
Figures

Figure 1: Mining in Eastern DRC



Notes: This figure shows the location of artisanal mining sites registered by the International Peace Information Service, as well as Artisanal Exploitation Zones and large-scale mining concessions registered by the Congolese Mining Cadaster. It further shows the location of Kamituga and Bukavu, as well as the boundaries of the Eastern DRC provinces.

Figure 2: Intention to fight



Notes: Panel A displays miner’s individual intention to engage in four violent actions should they have to leave the artisanal mining site. Panel B displays our proxies for the intention to fight. The first proxy equals one for miners that display a ‘probable’ or ‘certain’ intention to destroy Banro property, attack Banro employees and use fire arms. The second proxy equals one for miners that display a ‘probable’ or ‘certain’ intention to join an armed group.

Tables

Table 1. Self-reported motivations for participation in the activities of an armed group

	refuse to respond	not at all important	little importance & rather important	important & very important	total
N=469					
to defend the community against external aggression	0.9	13.7	19.6	65.9	100%
to fight injustice, for rights of the community	0.2	12.2	21.3	66.3	100%
to gain respect	0.2	21.5	29.2	49.0	100%
personal insecurity	0.9	21.8	28.6	48.8	100%
forced participation	0.4	25.0	38.0	36.7	100%
to gain money	0.4	36.0	30.3	33.3	100%
Other reasons					
revenge (N=85)	1.2	0.0	18.8	80.0	100%
safe haven for bandits (N=26)	0.0	0.0	3.9	96.2	100%
lack of employment, poverty (N=20)	5.0	0.0	15.0	80.0	100%

Table 2. General and personal intention to fight

		Obs.	Mean	Std. Dev.	Min	Max
destroy Banro property	general	469	4.2	1.1	1	5
	personal	469	3.1	1.6	0	5
attack Banro employees	general	469	4.0	1.2	1	5
	personal	469	2.7	1.7	0	5
use fire arms	general	469	3.7	1.4	1	5
	personal	469	2.4	1.6	0	5
join an armed group	general	469	3.6	1.3	1	5
	personal	469	2.0	1.5	0	5

Table 3. Summary statistics

		obs.	mean	st.dev.	min.	max.
Intention to fight	Participation in violent actions	469	0.23	0.42	0	1
	Joining an armed group	469	0.19	0.39	0	1
Grievances	Grievances with Banro 1	469	0.77	0.42	0	1
	Grievances with Banro 2	469	0.40	0.49	0	1
	Grievances with Chef de Poste	469	0.19	0.39	0	1
	Grievances with Mwami	469	0.17	0.37	0	1
Material incentives	Nr. Banro visits to zone last month	469	2.9	4.5	0	31
	Interested in working for Banro	469	0.55	0.50	0	1
Social incentives	Ex-rebel in pit	469	0.29	0.46	0	1
	Favorable to Mai-Mai Shikito	469	2.8	1.0	1	5
Exposure to conflict	Extreme exposure to conflict 7-20	469	0.36	0.48	0	1
Control variables	Asset index	469	0.0	1.7	-3.3	6.6
	Household owns plots	469	0.29	0.45	0	1
	Finished high school	469	0.19	0.39	0	1
	Household has income source outside artisanal mining	469	0.16	0.36	0	1
	Age	469	33	10	16	65
	Lives with partner	469	0.79	0.41	0	1
	Children younger than 10 in household	469	0.70	0.46	0	1
	Was born in Kamituga	469	0.52	0.50	0	1
	Belongs to Lega ethnicity	469	0.84	0.37	0	1
	Is a pit manager	469	0.08	0.28	0	1

Table 4. Determinants of the intention to fight

		(1)	(2)
		Participation in violent actions	Joining an armed group
Grievances			
H ₁	grievances with Banro 1	0.202*** (0.052)	-0.032 (0.056)
H ₂	grievances with Chef de Poste	0.030 (0.058)	0.092* (0.048)
H ₂	grievances with Mwami	0.011 (0.039)	-0.032 (0.045)
Material Incentives			
H ₃	nr. Banro visits to zone last month	0.011*** (0.002)	0.011*** (0.003)
H ₄	interested in working for Banro	-0.124** (0.051)	-0.123*** (0.044)
Social incentives			
H ₅	ex-rebel in pit	0.127** (0.050)	0.141*** (0.046)
H ₆	favorable to Mai-Mai Shikito	0.053** (0.024)	0.044** (0.021)
Conflict exposure			
H ₇	extreme exposure to conflict 7-20	0.103*** (0.035)	0.076** (0.036)
	control variables	Yes	Yes
	mining zone fixed effects	Yes	Yes
	clustered s.e.	Yes	Yes
	Observations	469	469
	Pseudo R2	0.19	0.17

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01; standard errors in parentheses; the coefficients represent marginal effects calculated after estimating a probit model; marginal effects for the control variables can be consulted in Table A.2 in the Appendix.

Table 5. Alternative measure of grievances with Banro

		(1)	(2)
		Participation in violent actions	Joining an armed group
H ₁	grievances with Banro 2	0.136***	0.126***
		(0.028)	(0.037)
	H ₂ – H ₇ variables	Yes	Yes
	control variables	Yes	Yes
	mining zone fixed effects	Yes	Yes
	clustered s.e.	Yes	Yes
	Observations	469	469
	Pseudo R2	0.19	0.20

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; standard errors in parentheses; Tables 4 and 5 represent results from the same model specification, while using different measures for ‘grievances with Banro’; marginal effects for the other variables remain qualitatively unchanged and can be consulted in Table A.2 in the Appendix.