Intrinsic Social Incentives in State and Non-State Armed Groups

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August 12, 2021

Abstract

How do non-state armed groups (NSAGs) survive and even thrive in situations where state armed groups (SAGs) collapse, despite the former's similar or greater material adversity? We present a model in which, optimizing under their different constraints, SAGs invest more in technical military training and NSAGs invest more in inculcation that enhances soldiers' intrinsic payoffs from serving their group. Therefore, over the course of their service, NSAG soldiers derive increasingly more intrinsic utility from contributing to their group, SAG members less so. Willingness to contribute to the group should be positively correlated with years of service in NSAGs but less so in SAGs. We confirm this hypothesis with lab-in-the-field and qualitative evidence from SAG and NSAG soldiers in Nepal, Ivory Coast and Kurdistan. The lab-in-the-field techniques offer better measures of intrinsic payoffs that are central to our argument. Each field study addresses a specific inferential weakness in the others. Assembled together, these cases reduce concerns about external validity or replicability. Our findings reveal how the basis of NSAG cohesion differs from SAGs, with implications for strategies to counter NSAG mobilization.

Keywords: Insurgency, rebellion, behavioral game theory, lab in the field.

Wordcount: 11,783 words in including the abstract, main text, notes, headers, equations, captions, and bibliography.

1 Introduction

> *The Maoist movement taught me that before I can change society I must first change myself.* Mid-level Maoist commander, author interview, January 2017

When the US invaded Iraq in the spring of 2003, many Iraqi soldiers simply stayed home. On May 23, 2003 the Coalition Provisional Authority (CPA) in Iraq issued its "Order Number 2," officially disbanding the Iraqi military (Chandrasekaran, 2006). A few weeks later the Iraqi cleric Muqtadr al Sadr established *Jaysh al-Mahdi* (the Mahdi Army), which, less than a year later, spearheaded the first major offensive against the US-led occupying force. Whereas the Iraqi army evaporated, *Jaysh al-Mahdi* and its successor group, *Saraya as-Salam*, fights on to this day (Fallows, 2005; CISAC Stanford University, 2019). A similar pattern can be observed in worries about how the Afghan National Security Forces (ANSF) will fare against the Taliban. No one predicts that the Taliban, an illegal group that does not enjoy the ANSF's strong material backing of Western powers, will crumble. Many fear precisely that outcome for the ANSF, however (Nossiter, 2021). Similar concerns exist about the conflict between Al Shabab and the Somali National Army if the African Union mission withdraws (Williams, 2019). Why do state armed groups (SAGs) sometimes collapse in response to such shocks while non-state armed groups (NSAGs) thrive?

In our argument the willingness to sacrifice exhibited by soldiers in the Taliban, the Mahdi army and Al Shabab does not occur by itself. It must be purposefully developed by a deliberate program of what we call *inculcation*: changing soldiers' preferences so that they intrinsically derive greater net utility from serving the group. We call deriving greater intrinsic utility from serving the group *pro-group preferences*.[1] We call serving the group *pro-group behavior* or, when

[1] See the model in the appendix for details. The Oxford Dictionary de-

referencing the group as a whole, *cohesion*. Our "inculcation" is similar to Checkel's (2017) "Type 2 socialization" and Hoover Green's "political education" which she defines as "formal instruction that explains specific social or political purposes of a particular conflict, and connects conflict purposes to specific behavioral norms." (Hoover Green, 2016, p. 624). Inculcation takes time and resources and thus comes at the expense of technical military training and tactics. Thus, in our model SAGs are acting rationally when they build less cohesion than NSAGs do. They are responding to opportunity costs: when legal means to use long term material incentives that induce cohesion extrinsically are available, SAGs can concentrate precious time on developing their technical capacity. When we consider the cases described above, it is worth remembering that it was through superior military capacity that Iraqi national forces sustained the regime until the external shock of the US-led invasion. In Afghanistan, prior to the withdrawal of US military support in 2021, the ANSF successfully gained and held territory from the Taliban through campaigns in which ANSF special forces coordinated with US and Afghan air power.

Our argument proceeds in several steps. First, for reasons we detail below, NSAGs' promises of rewards, if they win the war, are less credible than those of SAGs. Therefore NSAGs must offer greater immediate selective incentives, what Lidow (2016) calls *spot payments*, to make up for their credibility gap. One type of immediate selective incentive that groups can use are intrinsic social benefits: pride for a job well done and guilt for shirking. However these social preferences must be developed in soldiers through inculcation. Inculcation is costly in time and training resources.

fines inculcation, as "instill (an attitude, idea, or habit) by persistent instruction" (https://www.lexico.com/en/definition/inculcate). It is one of several words we could have chosen, including indoctrination, socialization, and discipline, which we do not use to avoid conceptual debates surrounding those terms.

NSAGs, needing more immediate (social and material) rewards to compensate for their lower credibility, find that investing more in inculcation is more worthwhile than SAGs do. As a result NSAG soldiers will be more inculcated than SAGs soldiers *ceteris paribus*. Our theory explains the difference in cohesion between SAGs and NSAGs as a result of the optimizing behavior of the two kinds of groups given their different credibilities.

We use our argument to hypothesize not just that NSAG soldiers are more cohesive than SAG soldiers but that soldiers' pro-group preferences increase more over time in NSAGs than in SAGs. We test our argument with new data from lab-in-the field activities with over 500 ex-combatants in four armed forces in three countries, Nepal, Ivory Coast and Iraqi Kurdistan. NSAG soldiers who served longer contributed more to their fellow soldiers in two social-dilemma games. SAG soldiers exhibited no such correlation.

Taken together, our three cases address other possible explanations and threats to the validity of our findings. Because of our multi-case research design, greater contributions by longer-serving NSAG soldiers cannot be accounted for by more prosocial people self-selecting into the movement earlier or less prosocial soldiers defecting earlier (Berman, 2009), nor can it be explained by greater feelings of guilt among NSAG members, many of whom are considered heroes in their communities (Bauer, Fiala and Levely, 2018). Our findings are also not plausibly an artifact of the clandestine nature of the groups we study (Shapiro, 2013), the groups' need to raise funds from the public (Weinstein, 2006) or their ideologies (Gutierrez Sanin and Wood, 2014; Hoover Green, 2016), which differ widely across our three cases. Our evidence indicates that even NSAGs that can compensate fighters with immediate *material* selective incentives, like the Ivorian militia we study, inculcate their troops more than equivalent SAGs. Our analysis of three diverse contexts also addresses concerns about external validity and replicability due to low-powered tests (Gelman

and Carlin, 2014).

Many studies have offered explanations for how NSAGs motivate their members, material selective incentives, like loot or security, being perhaps the most familiar (Lichbach, 1994, 1998; Collier, 2000; Le Billon, 2001; Ross, 2004; Kalyvas and Kocher, 2007). Others have argued that groups can piggyback on the enforcement mechanisms of religious and ethnic social structures (Berman, 2009; Berman and Laitin, 2008). Tamm (2019) and Sawyer, Cunningham and Reed (2017) study the role of foreign support. Gates (2002) and Haer, Banholzer and Ertl (2011) point to force and coercion, in Gates' case interacted with geography and ethnicity. A variety of scholars have examined the effect of battlefield outcomes (Christia, 2012; Lehmann and Zhukov, 2019; Lyall, 2016; Woldemariam, 2016). These are important contributions but none of them address our puzzle because none attempt to explain the differences between SAGs and NSAGs. Specifically, none of them explain the individual-level over-time increase in pro-group behavior by soldiers in NSAGs (but not SAGs) predicted by our model and observed in our laboratories. They all discuss NSAGs and cannot explain the differences in lab behavior between them and SAG members that we observe. Furthermore, if they do mention social motivations, they do not draw a sharp distinction between intrinsic or extrinsic incentives, and none of them use lab-in-the-field techniques or attempt to measure intrinsic motivations.

Scholars have recognized for some time that all armies "socialize" their soldiers to overcome collective-action and principal-agent problems (Shils and Janowitz, 1948; Davison and Zasloff, 1966; Bartov, 1989). Recently, armed-group socialization has enjoyed a resurgence of interest (Haer and Banholzer, 2015; Checkel, 2017; Bateson, 2017; Cohen, 2017; Fujii, 2017; Gates, 2017; Hoover Green, 2017, 2018; Manekin, 2017, 2020; Cantin, 2021). Most of these articles do not attempt to explain the difference in cohesion between SAGs and NSAGs or why NSAGs socialize

more than SAGs. Their purpose rather is to describe group socialization, often examining single cases. When they do make comparisons, they use differences in socialization as an independent variable to explain other group behavior, notably civilian abuse (Hoover Green (2017, 2018)). Gates (2017) could be interpreted to imply that groups that abduct soldiers will engage in more socialization but he does not compare SAGs and NSAGs. By contrast, we explain within a rationalist framework, why NSAGs socialize more than SAGs *ceteris paribus*.

The armed-group-socialization literature has been very enlightening, but it suffers from a well-known methodological shortcoming: To quote Checkel (2017), "Arguments about socialization often face a skeptical how-do-you-really-know reaction" or "how would I recognize socialization if I walked through the door?" (p. 598). This problem is acute with arguments about Checkel's Type 2 socialization (what we call inculcation), which is socialization that alters members' preferences and causes them to internalize the armed group's norms. Internalized norms typically cannot be inferred directly from observed behavior in real-world settings because it is unclear if a subjects' actions are due to internalized norms or some (possibly unobserved) external social or material incentive. These earlier studies have attempted to address this problem by eliminating alternative explanations and conducting process tracing (Checkel, 2017), which we also do, but they have not addressed the fundamental measurement problem directly.

We adopt a measurement strategy that is better suited to test hypotheses about internalized norms by observing subjects acting anonymously in a controlled setting that removes external pressures to act in a particular way. As Hoffman, McCabe and Smith (1998, p. 350) write: "A one-shot game in a laboratory is part of a life-long sequence, not an isolated experience that calls for behavior that deviates sharply from one's reciprocity norm. Thus, we should expect subjects to rely upon reciprocity norms in experimental settings [...]." For this reason, lab-in-the field activities are

a useful tool for measuring internalized norms. Our laboratory activities allowed us to isolate the tradeoff between the subjects' preferences for external rewards (provided solely by the laboratory game payoffs) and their desire to comply with the norms of appropriateness and a preference for "doing the right thing" that had developed over time outside the lab.

This methodological innovation over previous studies in the literature on armed-group socialization along with our theory that explains the differences in inculcation across groups with a model of the tradeoff between inculcation and technical training are our contributions. While other studies have shown that NSAGs inculcate more than SAGs (Hoover Green 2017, 2018), we provide a theory that explains that difference as the optimizing behavior of the two types of groups and we offer a method for measuring the results of that inculcation with lab-in-the-field activities that remove extrinsic confounders.

2 Inculcation

Extrinsic incentives to motivate troops require monitoring to deter shirking. Since monitoring is sometimes impossible, military organizations use inculcation to create intrinsic social rewards, which are effective even if soldiers' actions are unobserved. The distinction between guilt and shame is useful. Both are social punishments but the former is felt intrinsically regardless of whether the bad behavior is observed. The latter requires observation by society to be felt by the violator. As (Kandel and Lazear, 1992, p. 807) write:

> Guilt in the form of loyalty to ... comrades provides incentives that operate even in the absence of observability. Thus the military spends much time and money creating loyalty and team spirit. The up-front investment has a large payoff because shame,

which may be cheaper to create, cannot be used when actions are unobservable .

Benefits that are similar to the costs of guilt and shame might be called *pride* and *honor*. Honor is bestowed by society whereas pride is the positive feeling for a job well done regardless of whether it is recognized. Other examples of intrinsic rewards are Andreoni's (1990) "warm-glow" utility and Wood's (2003) "pleasures of agency." None of this is to claim that extrinsic incentives are never used. Rewards (like promotions) and punishments (extra duties) are common in military organizations. The point is that monitoring is difficult, particularly in the heat of battle, which makes these performance-base rewards less effective. Therefore, armed groups inculcate their soldiers so that they feel guilt for shirking and pride for valor even when their behavior is unobserved.

Shils and Janowitz (1948) have described how strong social bonds can be automatically created among small units, "primary groups," of soldiers who strive and take great risks together. That is not what we mean by inculcation. We are talking about deliberate costly training that groups undertake to increase social bonds between soldiers over and above what would occur automatically as part of their service. A good example of what we mean by inculcation is what Hoover Green calls "political education," which required devising and implementing a curriculum by specialists in ideological training, printing and distribution of materials to the soldiers and time dedicated to training soldiers in this material, time that could have been spent training and developing other war-fighting capabilities (Hoover Green, 2018, Chs. 3 and 4). Second we assume inculcation is *cumulative over time*, that is the more inculcation a person is subjected to the higher the intrinsic utility they will receive from pro-group behavior. Hoover Green (2018, pp. 44-45) made this same assumption and offers an argument for its appropriateness. Ultimately whether this assumption is plausible is an empirical question. If it is not then our hypothesis would be rejected by the data,

which, as we will show, it is not.

Finally, the important point about inculcation is that it increases *intrinsic* social incentives for soldiers to contribute to the group and refrain from shirking. In other words it changes soldiers' preferences so that they receive a higher "warm glow" payoff from contributing to the group. There are two important features of intrinsic social incentives for our analysis. First, only intrinsic incentives can explain the subjects' behavior in the laboratory. Subjects acted anonymously in these activities. Thus any social incentives at work among our subjects must have operated intrinsically because extrinsic incentives cannot be applied without observation of their actions. Second intrinsic social incentives are felt *immediately*. They are a kind of intrinsic social spot payment, to use Lidow's (*op. cit.*) term. As such they overcome shortcomings in credibility that NSAGs may experience more acutely than SAGs, a topic to which we now turn.

3 NSAGs credibility problems

There are undoubtedly several differences between SAGs and NSAGs. We focus on NSAGs' difficulty in making credible promises about future rewards, something SAGs can more easily do. Our argument centers on differences in what soldiers in the two types of groups can expect if their group wins the war. After a civil conflict a victorious state will continue to need armed forces. Systems of re-enlistment, promotions and pensions can be more-or-less expected to continue. The future is less certain for members of victorious non-state armed groups. NSAG leaders will undoubtedly have made many promises to their soldiers about the rewards they will receive if they win the war, but whether the leader is able to keep those promises will depend on factors that are unknown until

after the war is won.[2]

Well-known examples of revolutionary leaders betraying their cadres after the war provide a *prima facie* empirical case for this argument. Trotsky (1936) famously decried the betrayal of the Russian Revolution. To use Mallet du Pan's well-known adage, "revolution eats its children" rather frequently. This was no different in 21st-century Nepal than in post-revolutionary France or Russia. Among the of Maoist cadres in our sample, a sense of betrayal was widely shared, a point corroborated in the Nepali press (Jha, 2014). Lidow (2016) notes, as we do, that NSAGs promises of postwar rewards can be untrustworthy and that this untrustworthiness can tempt soldiers to shirk. In his data (p. 36), rebels leaders earned post-conflict rewards in fifty-six percent of cases and in only fifty-nine percent of those cases did rebel commanders receive a share of those rewards. In short, NSAG leaders are less certain to keep their promises and as a matter of history they have often failed to do so. This credibility problem, faced more acutely by NSAGs than SAGs, has important theoretical, empirical and policy implications.

If we are right, SAGs should possess methods of motivating their troops that are not available to NSAGs. Since their promises of payoffs in the future are less certain, NSAGs must pay for services in the present, through lootable resources, "pleasures of agency" (Wood, 2003) and other sorts of immediate selective incentives (both material and social), including the kinds of intrinsic social incentives described in the previous section. State groups, by contrast, can incentivize their soldiers with both payment in the present and more credible promises of awards, promotions, pensions and other benefits in the future. Even in cases where NSAGs are equal with SAGs in their

[2]In recent work, Sonin and Wright (2019) show that the Taliban has difficulty smoothing resources even across adjacent fighting seasons, highlighting their difficulties making credible intertemporal commitments.

ability to offer immediate material selective incentives, they are unequal in their inability to make credible promises about future rewards (Lidow, 2016). For this reason even NSAGs that can offer soldiers immediate material rewards (like the Gbagbo militias we discuss below) will still invest more in inculcation than equivalent SAGs according to our argument.

We think both SAGs and NSAGs must use inculcation to counteract the problems of unobservability of effort, but NSAGs must also use inculcation to provide immediate social incentives to compensate for the lower credibility of their promised future rewards. The difference, then, between SAGs and NSAGs is the *amount* of inculcation. Training time is scarce. Time spent on inculcation is time not spent on the technical aspects of warcraft. At the margin, armed group leaders must make trade-offs between these two important kinds of training. We claim that, at the margin, NSAGs will invest more resources in inculcation than SAGs to compensate for the lower credibility of their promises of future rewards. Over time, we would expect a greater development of pro-group preferences among NSAG members than among SAG members.

4 Training

The first step in our posited causal process is that NSAGs should engage in more inculcation than SAGs do. In this section we discuss existing and new qualitative evidence to suggest that that is the case. Hoover Green's (2017, 2018) comparison of SAGs and NSAGs in El Salvador provides strong evidence that SAGs did not inculcate moral and political social norms into their troops to the same extent as NSAGs: "Whereas military training was–as in most state militaries–highly routinized among Salvadoran forces, no regular-army ex-combatants in my interview sample reported receiving any formal, ongoing training in topics other than military skills, routines, or obedience"

(p. 90). SAG soldiers in her sample recounted little to no social or political training. The non-state FMLN (Farabundo Marti National Liberation Front) by contrast conducted extensive education on the political and social nature of their fight. Ninety-one percent of FMLN members she interviewed reported receiving "political education" while only 21 percent of regular army and 46 percent of special forces SAG members did. Sixty-one percent of FMLN interviewees received books or pamphlets for political education while only 12 percent (regular army) and 24 percent (special forces) of SAG members did. The lessons were more enduring for NSAG members as well: 30 percent of FMLN interviewees but only a little over ten percent of SAG members able to recall those written materials. (Hoover Green, 2018, p. 90). Salvadoran SAGs' focus on technical training at the expense of inculcation appears to have been militarily successful. As Hoover Green (2018, p. 95) points out "Most analysts ... agree that government gains in 1984-85 ... were due largely to improvements in air power, which destroyed the FMLNs ability to operate as a conventional army." Indeed some analysts hold up the "Salvadoran Option" as a model for other counterinsurgencies despite its atrocious human cost (D'Haeseleer, 2017; Crandall, 2015).

There are other clues in the literature. Hassan (2015) discusses the centrality of inculcation in the training of Islamic State soldiers. Although not explicitly, he implies that ideological socialization is a major portion, perhaps, *the* major portion of IS recruit training. Ugarriza and Craig (2012) argue that ideology was predominant in the training regimen of the FARC (the Spanish acronym of the Revolutionary Armed Forces of Colombia), stating (p. 453) "There is documentary and testimonial evidence of significant resources expended by the FARC on ideological training for its members." What is particularly important about their evidence is that the FARC's extensive ideological inculcation continued even after they could rely on immediate *material* incentives from narco-trafficking. The Colombian state military has no similar ideological program. Instead, their

training focuses on technical military skills (Marks, 2002; Naquin, 2020).

As further evidence for our claim that NSAGs focus on pro-group inculcation more than SAGs do, we conducted a qualitative inquiry with soldiers in each of the three countries in this study. For the NSAG members these discussions were obviously retrospective. To insure interviewees' anonymity we suppress any potentially identifying information.

According to the Maoist cadres we interviewed, Maoist leaders unceasingly inculcated Maoist social, political and military values into their troops. Each military unit contained a political officer to train soldiers in Maoist doctrine and to assure compliance with it. Lessons in Maoist social doctrine were conducted as soldiers were awakened, at bedtime and with each meal. Onesto (2006) describes the activities of "culture squads," Maoist units that traveled throughout a region shoring up support for the movement among the masses and the troops. We were given a performance by one of these squads after the war in January 2015. Their songs stressed the glories of martyrdom, the historical role of the Maoists in advancing the cause of the oppressed classes and the need for Maoists to do their part to advance the cause of the masses.

In a non-anonymous interview with Chief of the Maoist People's Liberation Army (and later Nepal's Vice President) Pasang in the summer of 2012, we asked him what were the most important traits for a Maoist fighter. Interestingly, he did not mention military know-how. Instead he stressed physical fitness and ideological commitment. Without ideological commitment he said, fighters would not be willing to persevere with the cause. Other lower-level commanders similarly emphasized the importance of ideological commitment more than military skills among their cadres. All of these efforts at inculcation appear to have paid off in terms of the effort put forward by the Maoists' troops. For example Cowan (2013, pp. 305, 330) rates Maoist cohesion and morale as extraordinary.

The Royal Nepalese Army (RNA), by comparison, was much less concerned about soldiers' social commitment. Band-of-brothers appeals were not uncommon of course but the RNA was much more concerned that its soldiers possessed the technical wherewithal to operate in the field than the Maoists were. As in most professional military organizations, soldiers were generally known not only by their ranks but also by their specialization: engineers, riflemen, machine-gunners, airborne troopers, and so on, so their technical military skills became part of their identity. RNA leaders believed counterinsurgency warfare requires special skill sets, so the RNA's operations against the Maoists were mostly conducted by a handful of special units directly trained and equipped by the US Army Rangers. Motivation by the RNA for officers focused on career considerations and for lower-ranked soldiers on job and economic security. Furthermore, even during the height of the insurgency, RNA training to focus on the technical needs of the RNA's peacekeeping mission[3] A current officer in the post-war Nepalese Army (NA) who had integrated in the Army from the Maoist People's Liberation Army (PLA) explained that Maoist inculcation was completely different from NA inculcation. The former was about the social good of the cause while the latter was only about the glory of NA. As mentioned above it was also more frequent than NA inculcation.

For the Gbagbo-militia members we interviewed in Ivory Coast, participating in the war was much more than a source of income. They described their participation as a "patriotic act," highlighting the ideological training that they had received. Inculcation was a large part of their training and, indeed, was more common than military training. Militia members we interviewed reported that they received ideological training quite frequently, in most cases daily, while their military

[3]These statements are based on the observations of one of the authors of this paper who served as an officer in the RNA during the Maoist insurgency. See also Mehta and Lawoti (2010).

training was only sporadic. For example, one commander reported that they received military training only once or twice a week, but they received ideological training twice per day. Other militiamen reported that they received a few weeks of basic training at the beginning of their service but then afterward received none. Meanwhile the ideological training continued on a daily basis.

The impact of this ideological training is clear in that all of the militiamen we interviewed could remember fine details of that training a decade later, including words to special patriotic and anti-Burkinabe songs that were used to inculcate them. We presented the interviewees with two hypothetical soldiers one who had been in the movement for a year and one who had been in for only a month. Who would be more committed to the movement and why, we asked. Commanders we interviewed all said that in their estimation longer serving members were more committed to the movement. When we asked why, one commander put it this way: "It is like with an education. A student who attends school for a year is going to know more than a student who attends for a month."

In her memoir of her days as a Peshmerga fighter in Iran, Dianna Nammi does not mention any military training she received but does describe a great deal of ideological training (Nammi and Atwood, 2020). Indeed, she served as an ideological trainer for most of her service. She recounts the tale of a young Peshmerga recruit who was so poorly trained with her rifle that she was killed in battle while repeatedly running to Nammi to get it unjammed. What is striking about this anecdote is that not only were the Peshmerga not as technically trained as the Iranian army soldiers they fought, but they were not even fully trained on the rudimentary weapons they did possess.

In our own interviews with Peshmerga fighters, one soldier recalled "we had two to three sessions a month where we were updated about the developments in the city, ideas of our party

and the Kurdish liberation movement, and developments in the wider region" A different former fighter explained the rationale behind the greater emphasis on inculcation: "Revolution is about an intellectual process. Without intellectual education you cannot sustain your movement, especially with youths. ... You need to develop values. Without this you cannot sustain in the mountains." As another fighter put it "for us, the ideas, words and ideology were as important as the armed struggle. Because we also wanted to free people." As in the other cases we have discussed this ideological training has stuck with them. The following response was emblematic: "I do remember them very well, like it was last week. Especially, we were given lessons about how to behave with the people, ethical behaviors, how to treat the villagers, how to sit and talk when we were in a house and only women were there. So it was not all about politics and ideology, but also personal ethical behavior."

As stated in the introduction, SAGs inculcate less not because their leaders are ill-informed or irrational, but because they are sensitive to opportunity costs. With legal and material means to motivate recruits, SAGs have the opportunity to develop technical capacity and make the most of access to more advanced weaponry and other material inputs. The descriptions of experiences by old Peshmerga stand in sharp contrast to our observations of current Peshmerga training. We visited the Peshmerga training facility during our field work in the summer of 2016. By this time, the Peshmerga had transformed into a relatively well-resourced SAG defending the autonomous Kurdish region. We observed no instances of ideological inculcation at all, although we are sure some must have occurred, especially in these final weeks before the push on Mosul. Instead we observed training and facilities that resembled training camps we have observed in the United States. Soldiers were taught specific skills, often by NATO trainers: military police, medics and in explosive ordnance disposal. The character and culture of the facility was one of far-reaching

professionalism. As described above with respect to the RNA, soldiers self-identified with their areas of technical military specialization.

This qualitative summary provides prima facie validation for the first step of our argument, that NSAGs focus relatively more than SAGs on inculcation and less on technical military training. In our discussion with NSAG soldiers, they generally pointed to the importance of inculcation and not military training. SAG soldiers stressed the opposite. NSAG soldiers generally stated that this inculcation was necessary to evoke sustained effort from the troops. SAG commanders seemed much less concerned about needing inculcation to motivate their troops. Indeed, they never mentioned it. For SAG commanders, the motivation of their troops appeared to be an afterthought. Our argument suggests that they could do this because of the greater credibility of promises of future rewards and the power of those promises to educe effort. We now turn to our main evidence, soldiers' behavior in the lab.

5 Empirical Model

We have just provided some qualitative evidence to suggest that NSAGs spend relatively more time and resources on social inculcation than SAGs. The question remains whether this extra inculcation actually elicits relatively greater contributions from NSAG soldiers. In this section we will present the empirical model that we use to answer that question. To be as clear as we can about the process that we think is at work in our data we describe our hypothesized data-generating process in somewhat formal terms in the online appendix. Here we will only summarize.

We claim that NSAGs will typically have lower credibility than SAGs. High-credibility leaders elicit greater contributions from soldiers than low-credibility leaders, all else equal, because

soldiers' marginal expected payoff, if the group wins, is higher due to the leader's higher probability of keeping their promise. The leader chooses the training regimen that maximizes the group's probability of winning the war. Since that probability is concave in the soldier's contribution and high-credibility leaders already elicit larger contributions than low-credibility leaders, investing in inculcation produces a smaller increase in the probability of winning for high-credibility leaders. For these reasons there are cases where SAG leaders will choose technical training but NSAG leaders will not, but there are no cases where a NSAG leaders will choose technical training and SAG leaders will not *ceteris paribus*. The same is true *mutatis mutandis* for inculcation.

We assume inculcation is cumulative over time. As mentioned in section 2, this is the same assumption Hoover Green (2018) makes. Indexing a given soldier's first year of service with 1, the total amount of inculcation the soldier possesses in their Tth year of service is $sT = \sum_{t=1}^{T} \iota_t$ where $\iota_t > 0$ in periods when the group inculcates and zero otherwise. Define T_i as the total amount of time served by soldier i at the time of our laboratory session. We can observe immediately, then, that

Hypothesis 1 *For two soldiers i and j with lengths of service* $T_i < T_j$, $sT_i \leq sT_j$.

The model shows that there are cases where NSAGs will invest in inculcation and SAGs will not, but there are no cases where SAGs will invest in inculcation and NSAGs will not *ceteris paribus*, which implies:

Hypothesis 2 $s_{NSAG} \geq s_{SAG}$.

The discussion in the previous section provides some preliminary qualitative evidence for Hypothesis 2.

To test these hypotheses more rigorously we use two behavioral games to measure the soldiers' contributions to collective effort. Laboratory activities have provided great insight into the behavior of persons in various professions (Chiappori, Levitt and Groseclose, 2002; Fehr and List, 2004; Levitt and List, 2007; List and Mason, 2009). To our knowledge this is the first time they have been used with SAG and NSAG combatants. The laboratory is a fruitful place to measure effort induced by intrinsic social rewards: subjects' behavior is anonymous in the lab, so it is free from extrinsic social pressure. We understand that subjects bring with them into the lab heuristics and habits developed over their lifetimes and these may affect laboratory behavior. Some of these heuristics and habits may have been formed in response to prior exposure to extrinsic punishments and rewards. Indeed this is the point of our measurement strategy. We hypothesize that, NSAG soldiers' (and to a lesser extent SAG soldiers') inculcation, which may have included extrinsic rewards and punishments at the time it was conducted, created an *intrinsically motivated* reaction to the lab activities. Therefore longer-serving members should make larger contributions in the lab where their behavior is anonymous.

We call the first activity the pay-it-forward game. Each officer i was given a monetary endowment of amount E and randomly and anonymously paired with two other soldiers j and k ($j \neq k$). Soldier i was instructed that they could send any amount from E (including zero) to j.[4] We informed the subjects that we would double the amount they contributed and give it to j. Meanwhile we instructed i that some other soldier k would send some amount, including possibly zero, to i and we would double that amount and give it to i.

[4]In practice, of course, contributions were a discrete, not continuous, choice because the endowments were given in specific denominations of currency

The second laboratory activity was a standard public-goods game. Each subject i was again given a monetary endowment of amount E and told they could donate any amount of E, including zero to the group. Each subject, including i, would be awarded twenty percent of the total contributions regardless of whether they contributed to the pot or not. There were twelve subjects in each laboratory session, so a contribution of 10 local currency units yielded 24 for the whole group.

Both games create social dilemmas. Social optimality requires that all subjects contribute their entire endowment in both activities, but subjects' individual material incentives dictate contributing nothing. The two games appeal to different normative sensibilities. In the public goods game free riding hurts the group as a whole while in the pay-it-forward game free-riding hurts a single individual. In the public goods game free riding hurts individual people less but is hurts a larger set of people. Shirking in the pay-it-forward game hurts only one person but it hurts that person acutely. Our theory is silent on which, if either, of these social situations should invite larger contributions. We included both for completeness.

To test hypotheses 1 and 2 we use a simple model of the soldier's contribution decision. We describe the soldier's utility from contributing to the pay-it-forward game with the following equation:

$$U_i = E - c_i + 2c_k + S(sT_i, c_i) \tag{1}$$

where E is the endowment given to the soldier in the laboratory, c_i is the amount the soldier contributes to person j, c_k is the amount contributed by subject k and $S(\cdot)$ is i's social utility function which is increasing in the total amount of inculcation soldier i received from the group (sT_i) and i's contribution (c_i) and concave in c_i.

Similarly we describe the soldier's utility from contributing to the public goods game as fol-

lows:

$$U_i = E - 0.8c_i + 0.2C_{-i} + S(sT_i, c_i) \tag{2}$$

where the parameters are the same as described in Equation 1 with the addition of C_{-i}, the total amount contributed by the other subjects in the laboratory session except i.

For estimation we need to assume a functional form for $S(\cdot)$. For simplicity we assume that $S = \sigma sT_i ln(c_i)$, where $\sigma > 0$ is the rate at which inculcation produces intrinsic utility relative to income. We discuss in section 9 why differences in σ across groups cannot explain the results below. Maximizing this utility and solving for soldier i's equilibrium contribution yields

$$c_i = \sigma sT_i - 1 \tag{3}$$

for the pay-it-forward game and

$$c_i = 1.25\sigma sT_i - 1 \tag{4}$$

for the public goods game. In some estimations we include potentially confounding covariates $\mathbf{X_i}$, which means assuming $S = \sigma sT_i ln(c_i - \mathbf{X_i}\gamma)$ where γ is a vector of estimates of the effect of $\mathbf{X_i}$. The equilibrium contributions are then $c_i = \sigma sT_i - 1 + \mathbf{X_i}\gamma$ and $c_i = 1.25\sigma sT_i - 1 + \mathbf{X_i}\gamma$ respectively.

In the tests below we combine the amounts contributed in the two games so when we regress total amount contributed (across the two games) on years served we are actually estimating

$$\beta = 2.25\sigma s \tag{5}$$

for each armed group in our sample.

We can restate Hypothesis 1 in terms of the estimates that follow:

Hypothesis 1′ $\beta \geq 0$

and Hypothesis 2 as:

Hypothesis 2′ $\beta_{SAG} \leq \beta_{NSAG}$.

6 Evidence from Nepal

The insurgent movement of the Communist Party of Nepal–Maoist (henceforth "the Maoists") grew out of a factionalized communist movement that operated underground prior to democratization in 1990. Dissatisfied with the pace of change following the democratic changes of the 1990s, the Maoists splintered from the other communist factions that opted to operate peacefully (Lawoti, 2010, pp. 5-7; Thapa, 2004, pp. 20-29). In early 1996, they delivered a forty-point ultimatum calling for a host of progressive reforms. Seeing no movement on these demands they launched the "People's War" in February 1996 with a series of raids on police stations in the middle western part of the country. Beginning with a few dozen committed guerrillas and a sparse party network in 1996, by the end of the insurgency in 2006 the Maoists were estimated to have had between 5,000 and 10,000 armed guerrillas, 10,000 to 25,000 militia, plus tens or even hundreds of thousands involved in various party and front organizations (International Crisis Group, 2005; Joshi and Mason, 2007, p. 395).

The war caused approximately 13,000 deaths over ten years from a population of roughly 27 million people (Nepal, Bohara and Gawande, 2011; Thapa, 2004). According to detailed data gathered by the Nepalese non-governmental organization, Informal Sector Service Centre (1996-2006), the vast majority of fatalities (86 percent) took place in the Nepalese countryside after 2001, the year in which the Maoists organized a more formidable force under the banner of the People's Liberation Army (PLA)[5] and the Royal Nepalese Army (RNA) mobilized to fight them (prior to 2001 the regime's counterinsurgency campaign was conducted exclusively by the Armed Police Force). The war formally ended in November 2006 with the signing of the Comprehensive Peace Agreement between the Maoists and the government. The Maoist movement transformed into a legitimate political party and remains a central player in Nepalese politics.

We collected data from 17 different laboratory sessions each with 12 PLA officers for a total of 204 different subjects. Each subject the played the games described in the previous section once. We conducted fourteen sessions at six sites near Maoist cantonments throughout Nepal. We set up the lab in hotel meeting rooms in a town near a Maoist cantonment, invited all the officers that were available at that cantonment and bussed them from the cantonment to the lab location at the hotel. We used all available officers in each cantonment, lessening concerns about self-selection into the laboratory activities.[6] In three cases we implemented the sessions in Kathmandu with Maoists

[5]The Maoists did not use the name "People's Liberation Army" for their armed wing until 2001 (International Crisis Group, 2005; Mehta and Lawoti, 2010), but for simplicity we apply it here to characterize all Maoist combatants that would eventually participate in the PLA even if they joined before 2001.

[6]A few non-commissioned officers inadvertently made it into our sample. Our results are robust to their exclusion.

who were in the capital on party business. We conducted the laboratory activities from late July 2012 through March 2013. Following the lab sessions we surveyed subjects' personal attributes and backgrounds (all pre-treatment variables) to use as controls in the analysis that follows. The sample includes officers of various ranks, ethnicities, and regions of Nepal. We present summary statistics and the distribution of the subjects' ranks for our Maoist sample in the appendix in Tables A2 and A3. The participants' endowments in Nepal were 100 rupees for each of the two activities described in the previous section. At the time of our field research 100 rupees was worth about one US dollar. Soldiers stationed in the cantonments received about 25 US dollars per month food allowance, so the subjects' endowments across the two activities corresponded to over two days' food allowance. The dates and locations of all the sessions are listed in the appendix in Table A1.

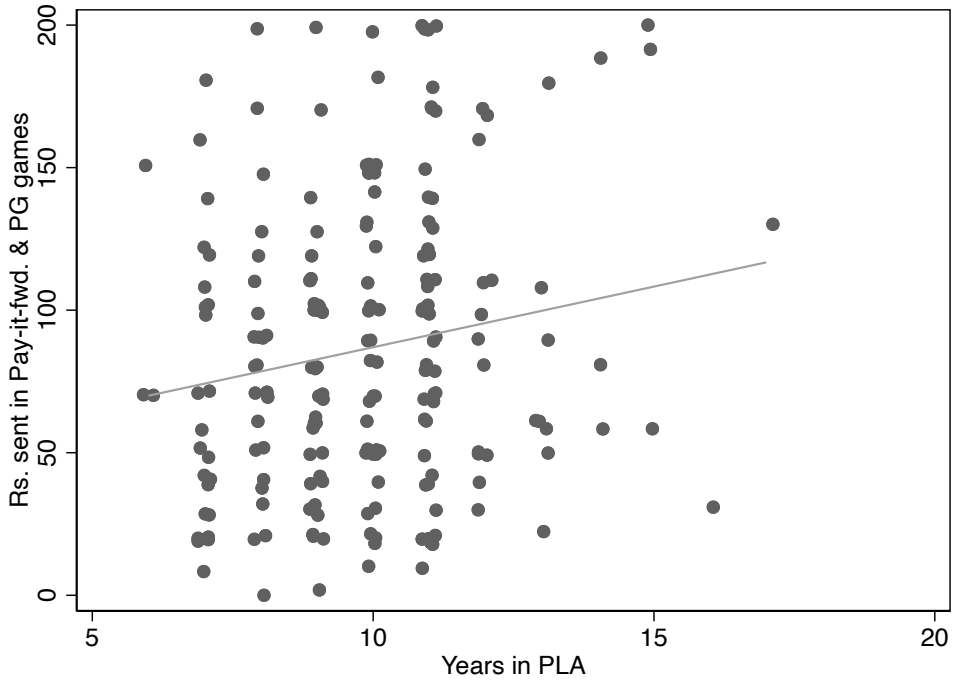
Our empirical expectation is that soldiers who participated in the insurgency longer should, all else equal, be more inculcated, exhibit stronger prosocial norms and contribute more in the laboratory session. To test our hypothesis we fit the following regression model,

$$c_i = \alpha + \beta \text{Years served}_i + \mathbf{X_i}\gamma + \varepsilon_i, \tag{6}$$

where c_i is the amount they contributed and ε_i is a well-behaved error term.. The key independent variable is years served in the PLA (T_i in the notation in the previous section) and $\mathbf{X_i}$ is a vector of control variables. From **Hypothesis 1′** that we expect $\beta \geq 0$.

Figure 1 displays the bivariate relationship and Table 1 shows the estimates, using as the dependent variable the combined amount the subject contributed in the two games, with and without covariates controlling for age, father's education level, lab session fixed effects, caste/ethnicity fixed effects, and urban/rural home village fixed effects. Even though age varies at the individual

Figure 1: Contributions and years served in PLA



level, at the bottom of the table we report wild-cluster bootstrap p-values that cluster by laboratory session for robustness. The results verify the expected positive relationship. The specification in last column indicates that, controlling for the other factors, subjects gave about six more rupees for each extra year in the Maoist insurgency. A soldier who served ten years (roughly the average for our sample) gave on average an extra 60 rupees, nearly one-third of the entire endowment.

Selection effects due to desertion are an alternative explanation for the results in Table 1. If less pro-social soldiers deserted at higher rates, then the positive relationship shown in Table 1 could have nothing to do with inculcation by the Maoists but could simply reflect that more pro-group soldiers stayed in the movement longer, leaving a self-selected more pro-group sample of longer-serving soldiers at war's end. To test this alternative explanation we surveyed 100 former Maoists and asked them to list all of the people in the first platoon they served. We asked them

Table 1: Contributions and years served in PLA, regression estimates

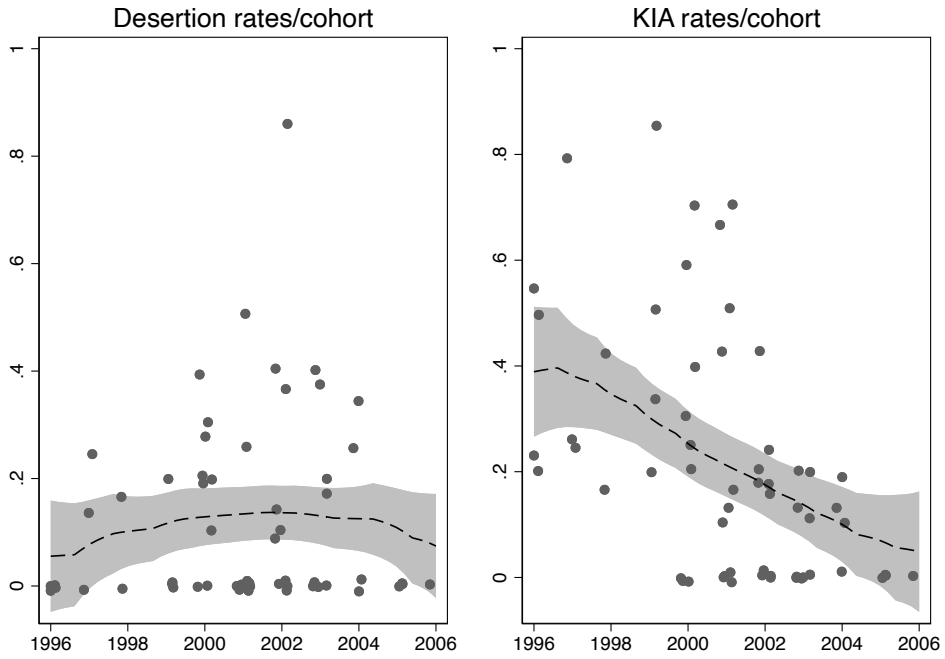
	(1) No covars.	(2) w/ covars.
Years in PLA	4.25**	6.19***
	(1.93)	(2.19)
Observations	204	203
Wild cluster bootstrap p-value	0.09	0.02

Robust standard errors in parentheses.
OLS estimates; outcome variable is combined amount sent in games, in rupees.
Wild cluster bootstrap is clustered by 17 laboratory sessions.
One observation dropped because of missing data on father's education.
Two-sided tests: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

what became of each soldier they listed, prompting them with several options including desertion, killed in action and several others. We purposefully asked them about the first platoon in which they served because we believed their memories of those people would be stronger than memories of other soldiers they served with later. Figure 2 dispels any concerns that desertion rates were higher earlier in the war. The figure shows that the rate of accumulated desertions over the course of the war is about the same for those who joined earlier as those who joined later. This actually means that the year-by-year desertion rate was lower for the platoons of early joiners as compared to later joiners. Accumulated death rates were higher for early joiners, which makes sense if year-by-year death risk was steady. Our theory suggests that willingness to take risks that could lead to death would be increasing in pro-group preferences. If so, the selection effect would work against our result by dampening the relationship between years of service and contribtions.

Another possible explanation for the findings is that Maoist were contributing more to compensate for feelings of guilt they had about the war (Bauer, Fiala and Levely, 2018). We could find no evidence for this concern. At the time of our research, Maoists were far from pariahs. They were a legitimate, politically victorious party and their leader was the Prime Minister of Nepal. While

Figure 2: Desertion and killed-in-action rates among Maoist soldiers by year of joining



Notes: Points are jittered in the graphs so that masses of observations are visible. For the left graph, a point at, say, (1996, 0) corresponds to a respondent who joined in 1996 and for whom none of their original platoon-mates deserted throughout the war. Values greater than 0 mean that some share deserted at some point during the war. The right graph can be interpreted similarly for accumulated killed-in-action (KIA) rates. A local (first-degree) polynomial fit estimates average desertion and KIA rates for cohorts who joined at different years from 1996 to 2006. The gray area is a 95% confidence band on the local polynomial fit.

some Maoists in our sample may have killed or tortured (we did not ask out of ethical concerns), in general the war was low intensity. Most casualties were inflicted by the RNA.

Several further threats to the validity of our findings remain. First Maoist ideology is egalitarian. How generalizable are the results from Maoists to other NSAGs? Would, say, an ethnic-based NSAG, whose purpose was to arrogate privilege to its ethnic group, exhibit the same correlation between time of service and contributions? Second, our argument makes a *comparative* claim that soldiers in NSAGs should be more inculcated than soldiers in SAGs. Unfortunately, we were unable to obtain permission to study members of the Nepalese state forces. If we had been allowed to

conduct the same analysis with the Nepalese Army would we have found, as we hypothesize, that the relationship between time served and contributions was weaker than it was for the Maoists? Third, Shapiro (2013) shows that NSAGs' clandestine character varies across cases with important implications for their organizational structure. To allay any suspicions about this issue we present results for a group that was not underground in the next section. Fourth, might the Maoists' habits of greater sociality have been caused not by inculcation but by having to coax resources from the rural population of Nepal? Weinstein (2006) argues that groups that cannot rely on lootable resources (like the Maoists) have to treat civilians more gently knowing that they rely on civilians for material support. These more positive interactions with civilians may have fostered generally pro-social (but not necessarily pro-group) habits. Fifth, statistical power is always an issue with small sample sizes. Results may be less likely to replicate when statistical power is low (Button et al., 2013). Sixth, micro-level studies like ours always raise questions of external validity. Seventh, we have shown that length of service in the Maoist movement is positively correlated with contributions in the lab. Does that finding by itself indicate that the greater contributions of longer serving members was due to inculcation by the Maoists or could it instead be that people with greater pro-group preferences joined the movement *earlier*? If so, the movement may have caused no change in members' sociality and we are simply observing self-selection effects. We defer a fuller discussion of these issues until after we have presented evidence from the Ivory Coast and the Peshmerga.

7 Evidence From the Ivory Coast

To address these concerns we returned to the field in the summer of 2015 to extend our analysis to combatants in the Ivory Coast's civil war. The Ivory Coast offers a compelling case to address the threats to validity discussed at the close of the previous section. We gathered data in the Ivory Coast to test a *specific directional hypothesis*. We use this fact to increase our statistical power, which is crucial given that data on NSAG and SAG soldiers are extremely difficult to collect. Results opposite in the hypothesized sign fail to reject the null. Thus, one-tailed tests are substantively appropriate, increase the power of our tests, and are what we report below.

At the risk of oversimplifying, the war in Ivory Coast was an ethnically charged conflict between the largely Muslim Burkinabe people who resided in the northern part of the country and the largely Christian people who resided in the southern part of the country. The former were led by Alassane Ouattara, the latter by Laurent Gbagbo, who became Ivory Coast's president in 2001. Under the 33-year presidency of Felix Houphouet-Boigny (1960-93) these two ethnicities lived in relative peace. After his death, southern Ivorians' resentment of northern "foreigners" produced increasing political tension, discrimination and occasional violence. War finally erupted in 2002 when Ouatarra was barred from running for president because of his Burkinabe heritage. Northern elements of the National Army mutinied and along with fresh northern recruits created the Force Nouvelle to fight the southern Ivorian forces. Christian Ivorian soldiers in the national army did not mutiny and continued to fight for Gbagbo. In addition Gbagbo raised paid militias to fight on his behalf and certain Ivorian citizens resentful of northern "foreigners" also formed militias of their own accord to fight against Force Nouvelle. A peace agreement was signed in 2008 providing for new elections in which Outtara was allowed to run. Gbagbo whose term ended in 2005 postponed

the elections several times until 2010. Gbagbo lost that election to Outtara in late November 2010 but refused to step down, reigniting the civil war. Gbagbo's militias committed various atrocities (Human Rights Watch, 2011). In April 2011 Outtara's forces captured Abidjan, the capital city, and arrested Gbagbo, ending the war.

We studied the laboratory behavior of members of Gbagbo's militias and members of the Ivorian military who remained loyal to Gbagbo. In many ways these two groups form an ideal comparison to test our model. Both fought on the same side and shared an ethnic identity, but the Army was obviously a SAG and the pro-Gbago militias were a NSAG. For SAG members, fighting for Gbago was a *career*. For militia members it was a *cause*. Our theory predicts that militia members should have become more inculcated compared to members of state forces, and this difference should be reflected in the contributions in the lab. There should be a stronger positive correlation between time served and contributions among the militiamen than among the state forces.

We conducted the same two activities described above, the pay-it-forward game and the public goods game. Each subject was given an endowment of 500 CFAs in 50 CFA coins for each activity.[7] We conducted five sessions with members of the Ivorian military (four army and one marines) and five sessions with Gbagbo militias. All sessions were conducted in the capital, Abidjan, or one of its close suburbs. The SAG sessions were conducted on military bases; the Gbagbo sessions were conducted in primary schools on weekends in the suburb of Yopougon, a Gbagbo stronghold.

Tables A5 through A8 in the appendix present descriptive statistics of the two subsamples. Table A7 shows that some background characteristics differ across the two subsamples: militia

[7]At the time of our research 500 CFAs were worth about one US dollar and the GDP per capita was about four dollars per day. Thus subjects were playing with roughly a half-day's wages in a one hour session.

participants are five years younger on average, are less likely to have originated from Abidjan, are more likely to have literate fathers, but their own educational levels tend to be lower (as expected given educational requirements for entry into the state forces). Ethnic and religious characteristics, however, are quite balanced across the two subsamples. Still, we include all of the background characteristics in Table A7 in specifications in Table 2, as indicated, for robustness.

Table A8 shows how the SAG and NSAG subsamples differ in terms of wartime experiences like years served, rank, number of combat engagements, and number of times wounded. These variables in Table A8 are post-treatment to our explanatory variables so we do not use them as covariates. We restrict our SAG sample to those who had joined subsequent to the onset of civil war in 2002 so the supports of years served match across the two subsamples. Ranks obtained by militia members tend to be lower (based on a coding that aligns the ranks as best as possible), but militia members were involved in more combat and tended to be wounded more often. To the extent that these latter two indicators are "real world" measures of effort they corroborate our model.

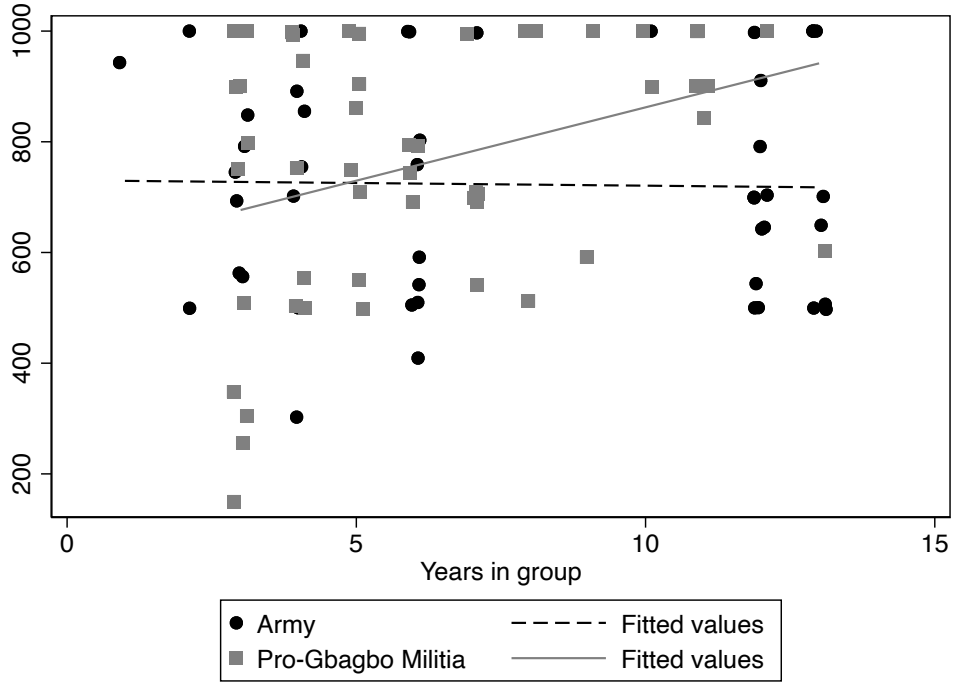
Turning to the lab data, we estimate the following equation:

$$c_i = \alpha_1 + \beta_1 \text{Years served}_i + \beta_2 \text{Years served}_i \times \text{SAG member}_i$$

$$+ \alpha_2 \text{SAG member}_i + \mathbf{X_i}\boldsymbol{\gamma} + \varepsilon_i, \tag{7}$$

The definitions are the same as those described in equation 6 except that now we can derive separate estimates of the effect of the length of service for SAG and NSAG soldiers. β_1 is the estimated average amount that NSAG members gave per year served and $\beta_1 + \beta_2$ is the estimated average

Figure 3: Lab contribution and years served in Ivorian Army and Gbagbo militia



amount that SAG members gave per year served. From **Hypothesis 1′** we expect $\beta_1 > 0$ and from **Hypothesis 2′** we expect $\beta_2 < 0$.

Figure 3 shows bivariate relationships and Table 2 displays OLS estimates of the coefficients in equation 7. For robustness we present wild-cluster bootstrap p-values for the estimates of β_1 and β_2 at the bottom of the table. As discussed above, because we had a directional hypothesis, we can use one-sided tests and achieve reasonable statistical power despite a modest sample size. In line with our hypothesis, militia members gave more to the group the longer they served. Professional military members exhibited no such correlation. The findings suggest that militia members gave about 26 CFAs combined in the two games for each extra year served while the amount given by professional military did not increase with years served. Militia members who served the average of about six years contributed on average about 150 CFAs more than a comparable SAG member.

Table 2: Lab contributions and years served in Ivorian Army and Gbagbo Militia, regression estimates

	(1) No covars.	(2) w/ covars.
Years in mvt.	26.50*	23.45*
	(11.27)	(12.10)
Army (SAG) × yrs. in mvt.	-26.14*	-25.35*
	(11.69)	(12.60)
Army (SAG)	138.49	141.50
	(97.73)	(101.64)
Observations	110	110
Wild cluster bootstrap one-sided p-value (NSAG)	0.11	0.05
Wild cluster bootstrap one-sided p-value (SAG-NSAG)	0.09	0.07

Robust standard errors in parentheses.

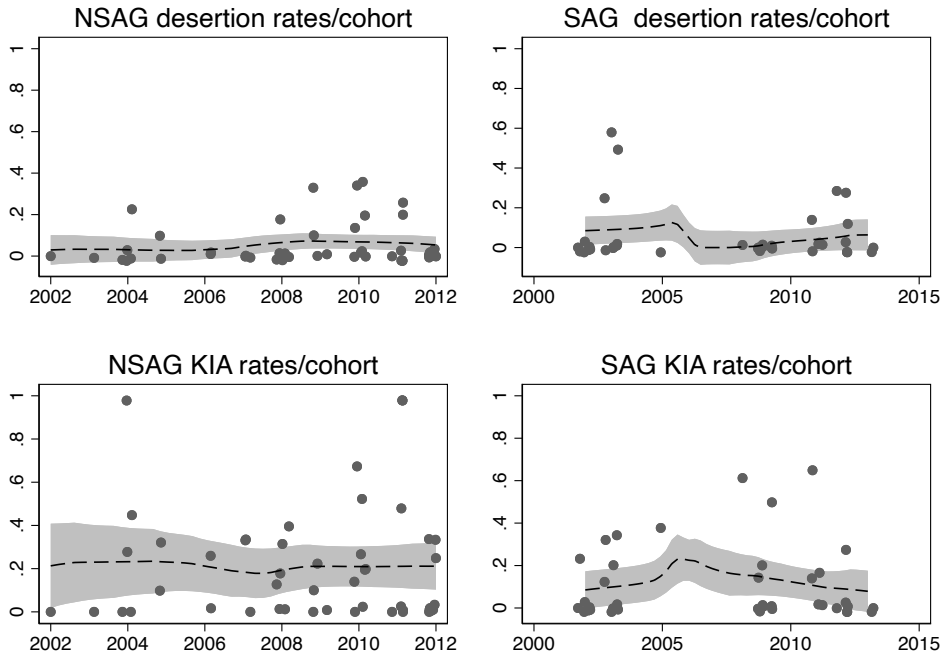
OLS estimates; outcome variable is combined amount sent in games, in CFA.

Wild cluster bootstrap is clustered by 10 laboratory sessions.

One-sided tests: * $p < 0.05$, ** $p < 0.01$

Figure 4 illustrates desertion and killed-in-action rates for the first platoonmates of the Ivory Coast sample. Neither exhibit clear trends in either the SAG or NSAG subsamples. Unsurprisingly killed-in-action rates rose for SAG members at the end of the first period of hostilities (2005-8). There is a slight bump in the desertion rate of Gbagbo militia members who joined during the hiatus in the fighting from 2008 to 2010 but it fell again once hostilities resumed at the end of 2010. Desertion rates were particularly low for Gbagbo militia who joined in the early part of the period we study, eliminating fears that the results in Table 2 were due to high desertion rate of less pro-group types early in the sample.

Figure 4: Desertion and killed-in-action rates in Ivorian Army and Gbagbo militia



Notes: See notes to Figure 2 for an explanation of the graphs. The left graphs show desertion and KIA rates for the NSAG (Gbagbo militia) and the right graphs show it for the SAG (Ivorian Army).

8 Replication with the Peshmerga

To further address issues of external validity, replicability and other threats to validity, we returned to the field in the summer of 2016 to gather the same lab-in-the-field measures from Peshmerga fighters in Iraqi Kurdistan. The Peshmerga provide a useful test case because they transformed from a NSAG to a *de facto* SAG after the American-led invasion of Iraq in 2003. As with our Ivory Coast data we are testing a specific directional hypothesis. We capitalize on this by using a one-sided test, which offers reasonable statistical power given the challenges of obtaining a large sample size.

The Peshmerga were formed after World War II as the military arm of the Kurdish Democratic Party (KDP) to fight a guerrilla war for Kurdish independence. In 1975 a breakaway party, the

Patriotic Union of Kurdistan (PUK), developed its own Peshmerga forces, and also engaged in a guerrilla campaign against the Iraqi state. After the first Gulf War in 1992 Peshmerga forces of the KDP and PUK waged a civil war over control of the more autonomous Kurdish region of Iraq. The Washington Agreement of 1998 brought an end to that civil war, although there was little cooperation between the two parties' forces. After the US-led invasion in 2003 destroyed the Iraqi state, the Peshmerga took over all security functions in Iraqi Kurdistan, including an intelligence service and a gendarmerie. Peshmerga forces are now paid by the Kurdish state under the Ministry of Peshmerga affairs, but most units are still associated with a party and are still primarily loyal to their party (BBC, 2014). Both main parties have training centers for their troops. We visited the KDP's training center and observed it to be very modern and professional. Trainers from several NATO countries were present to instruct recruits.

The make-up of the Peshmerga changed dramatically in January 2014 and after when the Islamic State invaded Iraqi Kurdistan, quickly capturing large swaths of territory. The Peshmerga were flooded with volunteers eager to liberate ancestral lands and farms. At the same time Peshmerga ranks swelled with Syrian Kurds fleeing IS oppression. Given the very different populations that joined the Peshmerga after the IS invasion any differences between the pre- and post-2013 make-up of the Peshmerga are overdetermined. We did not have any specific hypotheses about how those differences would manifest in the lab (if at all) but we thought it was appropriate to control post-2013 recruitment in light of the very different circumstances in which recruits from that period joined.

We implemented the same two laboratory activities we conducted in Nepal and the Ivory Coast. We gave each subject an endowment of 2500 Iraqi dinars for each activity, which in total was worth about five US dollars in the summer of 2016. Peshmerga soldiers reportedly receive a monthly

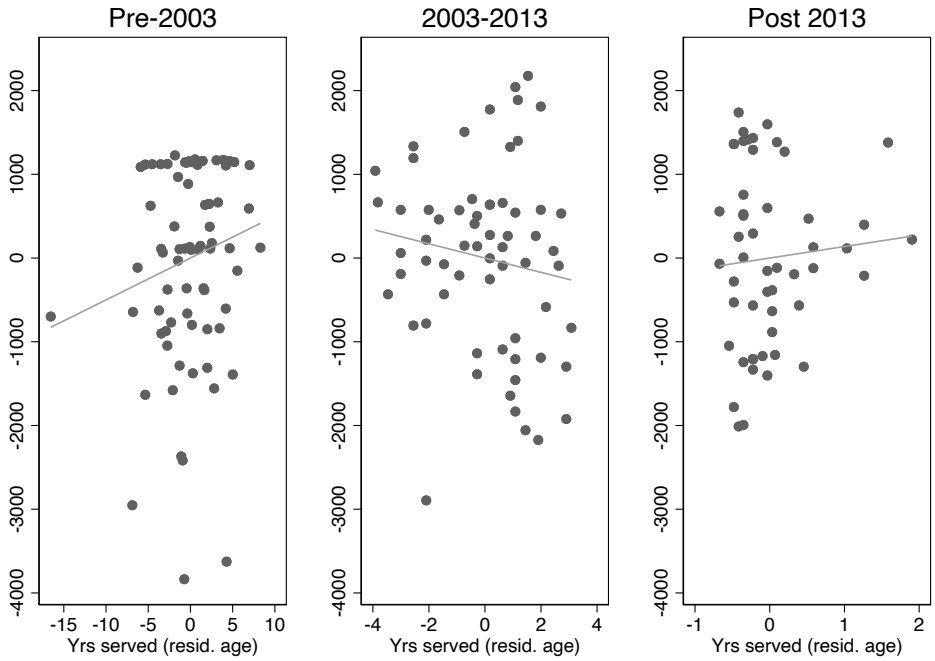
stipend of about 200 to 300 US dollars, so their total endowment over both activities represented about a half-day's pay for roughly two hours of their time. We conducted 17 different sessions, which due to some missing data yielded 192 different participants. Sessions were generally conducted in Kurdish. Sessions with Syrian refugees were conducted in Arabic. We held nine at a Peshmerga training facility, seven in political party halls and one on the front lines at a Peshmerga forward operating base.

According to our argument the Peshmerga should have spent relatively more scarce training resources on inculcation prior to the American-led invasion and then switched to relatively more intensive technical training after. As a result an individual soldier's pro-group preferences should increase relatively more rapidly during their service prior to the American-led invasion and then those increases should slow after that (controlling for the period of the Islamic State invasion as mentioned above). We do not have over-time observations of each soldier's behavior pre- and post- the American-led invasion however. The best we can do is estimate the increase in soldiers' pro-group behavior per year of service controlling for whether they served prior to the American invasion or not. If our hypothesis is correct those who joined after the American invasion should exhibit slower per-year increases in their pro-group preferences (measured by laboratory contributions) than those who joined earlier, but the per-year estimate of those who joined prior to the American-led invasion is a weighted average of the Peshmerga's two different hypothesized training regimens and therefore is smaller than the actual per year growth during the pre-invasion period.

We estimate the following equation:

$$c_i = \alpha_1 + \beta_1 \text{Years served}_i + \beta_2 \text{Years served}_i \times \text{joined after 2003}_i$$

Figure 5: Lab contribution and years served in Peshmerga for various cohorts



Notes: Residual-residual plots, controlling for age, of the relationship between combined amounts given and years served for pre-2003, 2003-13, and post-2013 entry cohorts. Figure A3 in the supplemental information presents a version of this graph without the Pre-2003 outlier point, showing very similar results.

$$+ \alpha_2 \text{joined after } 2003_i + \mathbf{X_i}\boldsymbol{\gamma} + \varepsilon_i, \tag{8}$$

Definitions are the same as those in equations 6 and 7. β_1 is the effect of each successive year of service on the contributions of Peshmerga who joined before 2003 and $\beta_1 + \beta_2$ is the effect of each successive year of service on the contributions of Peshmerga who joined after that start of 2003. From **Hypothesis 1′** we expect $\beta_1 > 0$ in equation 8 and from **Hypothesis 2′** we expect $\beta_2 < 0$.

Figure 5 shows bivariate relationships for joiners from the pre-2003 era, between 2003 and 2013, and then post 2013. Given that these periods cover different decades, it is obvious that age might confound the analysis. Thus, the graphs are residual-residual plots, controlling for age. Table 3 presents estimates of the key coefficients from equation 8. As above, we use wild-cluster

Table 3: Years served and laboratory contributions among Peshmerga cohorts

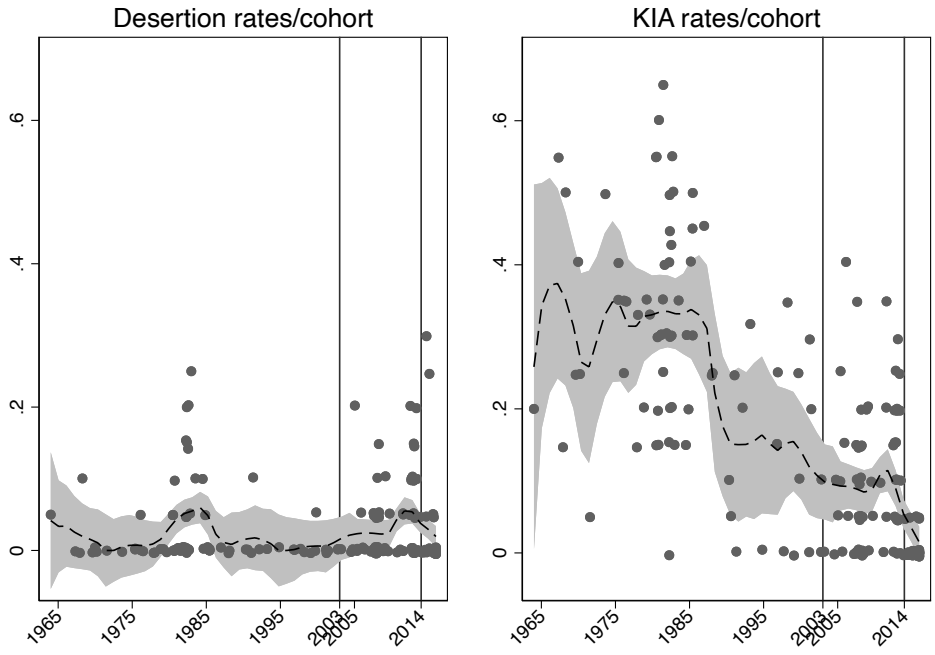
	(1) Full sample	(2) Pre-2013 only	(3) Full sample
Years in mvt.	53.23*	51.41*	52.86*
	(31.34)	(30.66)	(31.40)
Post-2003 × years in mvt.	-21.59	-141.68*	-139.85*
	(46.00)	(76.83)	(76.07)
Post-2003	-3364.62**	-4938.08**	-4871.14**
	(1079.60)	(1351.76)	(1344.67)
Post-2013 × years in mvt.			218.90
			(203.92)
Post-2013			3068.89*
			(1327.38)
Observations	192	141	192
Wild cluster bootstrap one-sided p-value (NSAG)	0.02	0.03	0.02
Wild cluster bootstrap one-sided p-value (SAG-NSAG)	0.29	0.05	0.06

OLS estimates; outcome variable is combined amount sent in games, in dinars.
Wild cluster bootstrap is clustered by 17 laboratory sessions.
One-sided tests: * $p < 0.05$, ** $p < 0.01$

bootstrap to account for clustering by session, and present one-sided tests given our directional hypotheses. The results confirm our expectations once we control for post-IS-invasion recruits. The first row shows that soldiers who joined before 2003 contributed 50 dinars more for each year they served. This estimate is significant at the five-percent level in a one-tailed test. We expected the results to be somewhat weaker for this group than for NSAG groups discussed above because the estimate is a weighted average of the effect of the NSAG training regimen, and the post-2003 SAG training regimen which we hypothesize stressed inculcation relatively less. Still, the effect of inculcation during the pre-2003 period appears to have been substantial enough to generate a large, positive weighted-average estimate.

Also as hypothesized, the relationship for the soldiers who joined after 2003 is significantly

Figure 6: Peshmerga desertion and killed-in-action rates with various key dates



Note: See notes to Figure 2 for an explanation of the graphs. Two key dates, the coalition invasion in 2003 and the Islamic State invasion in 2014 are indicated with vertical lines

lower compared to pre-2003 recruits. In fact the estimated trend for post-2003 joiners (adding β_1 and β_2 from equation 8) is smaller and even negative when we account for the post-2013 joiners. We can infer from these results that soldiers who joined after the Peshmerga became a *de facto* SAG in 2003 did not become more pro-group over time, suggesting that inculcation became a more minor part of their training compared to those who joined when the Peshmerga were clearly a NSAG. The second and third columns of Table 3 show that failing to control for the Post-IS invasion period introduces bias in characterizing differences before and after 2003. Either dropping the post-2013 observations (column 2) or including the post-2013 interactive term (column 3) increases the magnitude of post-2003 interactive term by a factor of almost seven.

As in Nepal and the Ivory Coast early joiners do not appear to be any more likely to desert.

There is no clear trend in the desertion rates of Peshmerga who joined before 2003 or those who joined in 2003 or after, as shown in Figure 6. There is a bump in the time series in the early 1980s when the Peshmerga took advantage of Saddam Hussein's focus on the Iran-Iraq War to step up the rebellion. The time series also shows some increased volatility around the time of the IS invasion but it does not change the key interpretation. Parenthetically killed-in-action rates match expected patterns. The rate dropped dramatically after the first Gulf War when the US enforced a no-fly zone over northern Iraq. The rate dropped a bit again after the end of the Kurdish civil war in 1998 and then again after the US-led invasion in 2003. Finally, feelings of guilt is not a plausible explanation for these findings. Unlike the soldiers studied by Bauer, Fiala and Levely (2018), Peshmerga hold hero status in Kurdistan. We saw no indication that they feel they have committed past misdeeds for which they must compensate society, on the contrary.

9 Addressing possible threats to validity

The Ivory Coast and Peshmerga results address the potential concerns raised at the close of section 6. First we compared the behavior of NSAG and SAG members to show that, as hypothesized, SAG members did not make greater contributions for longer years of service, but the NSAG members did. Second, our case selection addresses ideological content as a potential confound: Gbagbo's militias' ideology was xenophobic and exclusionary, not universalistic and egalitarian like the Maoists. The two NSAGs used dramatically different messages to instill intrinsic motivations, but the behavior of the two groups in the lab was strikingly similar.

Third, our Ivory Coast results cannot be due to the clandestine nature of the NSAG because the Gbagbo militias were not covert and were indeed supported by the Gbagbo regime. Fourth,

Gbagbo's militias did not need popular support to fund their war effort. Gbagbo paid and equipped the militias with the sale of "blood diamonds" and by siphoning money from the national treasury (Hinshaw, 2011; McClanahan, 2011). Indeed, consistent with Weinstein's prediction for a group that did not rely on public support for resources, Gbagbo's militias were abusive of the civilian population (Human Rights Watch, 2011). Still, Gbagbo militia members exhibited behavior in the lab that was strikingly similar to that of the Maoists. Fifth, external validity is now less of a worry because we found the same patterns of behavior in a Maoist insurgency in South Asia, an ethnic militia in West Africa and a nationalist secessionist movement in Kurdistan. Sixth our evidence from Kurdistan was within group assuaging fear about comparing across groups and showing that our logic applies even when the same group transitions from NSAG to a de facto SAG. Finally, our results address possible concerns about low statistical power leading to non-replicable results because the NSAG results replicated as expected in the Ivory Coast and Kurdistan.

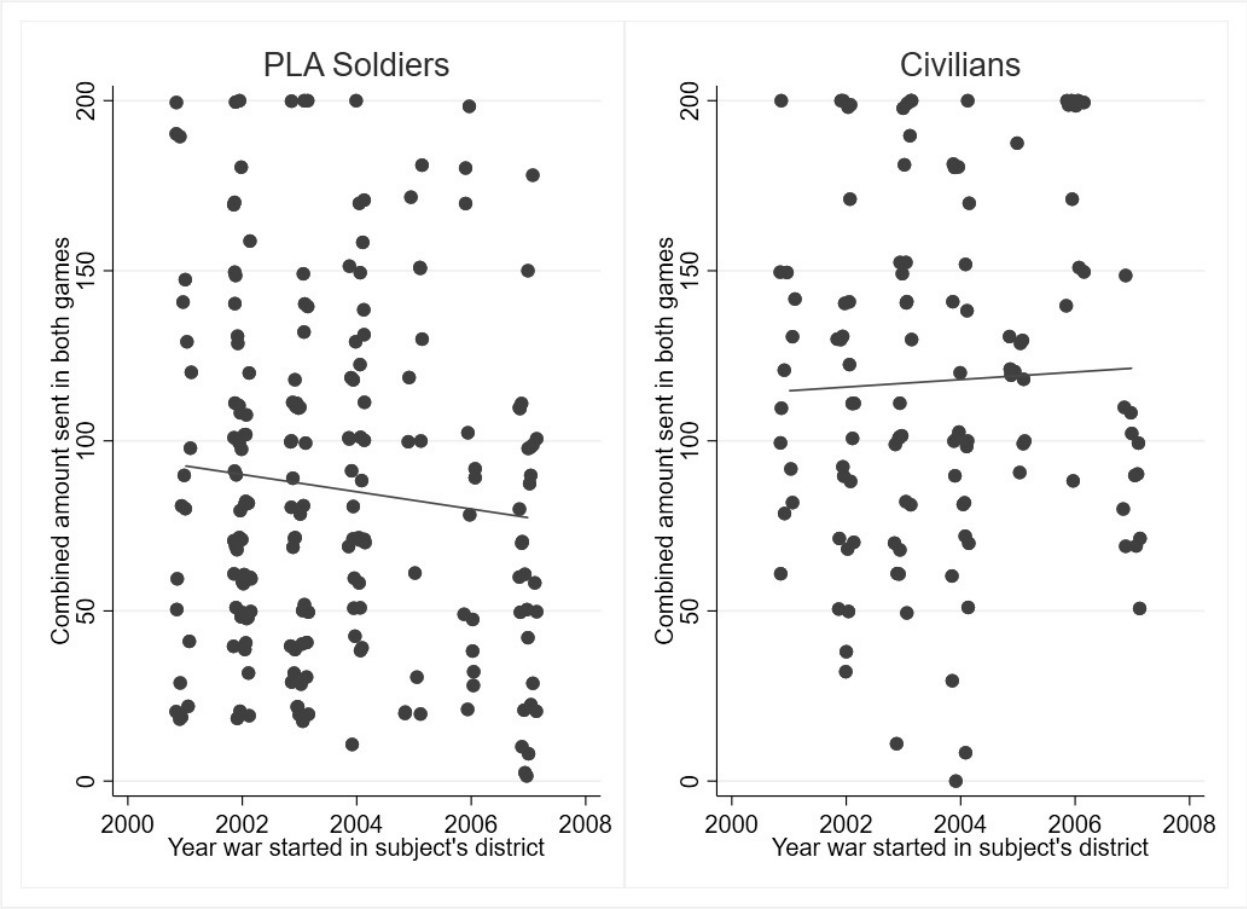
We can now return to a fuller discussion of whether the greater sociality exhibited by longer-serving NSAG members in our sample was due to self-selection rather than inculcation. To summarize the self-section argument, if people who derived greater social utility from being a member of these organizations joined earlier, it is possible that the relationship between time served and contributions in the lab was not due to inculcation but simply an artifact of their joining earlier, and thereby, serving longer. The pro-group self-selection argument must explain why people who did not have sufficient reason to join early in the cause found it worthwhile to do so later. We can think of two such explanations. First anecdotal reports indicate that the Maoists engaged in inculcation among civilians in the areas that they controlled. Indeed gaining popular support among civilians is a centerpiece of Maoist strategy. This inculcation of civilians may have increased the support among some who were previously unwilling to fight for the movement above the necessary level

for joining later in the war.[8] If this phenomenon were occurring, a random sample of civilians from areas where Maoists operated longer should exhibit greater pro-sociality through higher contributions in the lab. We do not find this to be the case. Indeed, as shown in Figure 7, if there is a relationship between Maoist control and contributions in the lab, it is in the wrong direction: civilians from areas where the Maoists operated later gave more in the laboratory activities than civilians where the Maoists operated earlier *ceteris paribus*.

A second possibility is that NSAG success over time raised the expected material benefits of being a member of the movement, thus affecting the profile of those who joined over time. Later joiners may have joined for the greater expected material rewards even though their base level of pro-group preferences (before they were inculcated by the NSAG) was not by itself sufficient to induce them to join. This explanation would require a different theoretical model than we have in mind, one in which NSAG leaders' promises of future rewards were credible. While such a theoretical model could undoubtedly be constructed the larger problem for this explanation is that it is inconsistent with the patterns in the Ivory Coast data. Whereas the Maoist probability of winning the war may have improved over time Gbagbo's militia's fortunes worsened. Thus if pro-group self-selection into Gbagbo's militias did vary over time, those who joined later would have to be more pro-group, "heroically" joining an increasingly desperate cause. Pro-group self-selection would work against the pattern in Table 2, providing greater confidence that the results from Nepal are due at least in part to inculcation as well. While it is possible that the data-generating processes in the two cases are idiosyncratic, an explanation that is consistent with both simultaneously is

[8]This argument would require that inculcation of civilians was less powerful than inculcation of soldiers, a plausible argument given that soldiers lived together and inculcation was part of daily life whereas civilians would only receive inculcation at specific events designed for that purpose.

Figure 7: Timing of Maoist Activity in Home Region and Laboratory Contributions



that the positive relationship between contributions in the lab and years served is due to cohesion-creating inculcation by the groups themselves. In short explaining the patterns in both the Nepal and the Ivory Coast requires that the greater contribution for each year served was at least in part due to positive changes in sociality while the soldiers served in the movement.

A further potential threat to validity is that the marginal effect of inculcation (σ in the model in section 5) may be higher in NSAGs than for SAGs. This could occur for two reasons. First people with larger σs may select (or be selected into) NSAGs more than SAGs. Put another way NSAG soldiers may be more susceptible to inculcation than SAG soldiers. Note we are *not* saying

that more pro-group people are nonrandomly selecting into NSAGs. We dismiss that possible explanation for our findings in the discussion above. Instead the mechanism would be that people who will obtain greater intrinsic utility as a result of inculcation once they are in the group are somehow nonrandomly selected into NSAGs. How such nonrandom selection would occur is a bit problematic: it would have to distinguish and select recruits based on their future response to inculcation, that at the time of recruitment, is unknown because inculcation has not yet begun.[9]

Alternatively NSAGs' σs might also be larger simply because they are better at converting inculcation into changes in their soldiers' preferences. This argument has difficulty explaining the Ivory Coast results. Both the SAG and the NSAG were motivated by the same ideology. Why the pro-Gbagbo militias would be better than state forces at converting that ideology into pro-group preferences is unclear. This explanation has an even harder time explaining the Peshmerga results in which we observe the predicted change in contributions *within the same group* as it changed from a NSAG to a *de facto* SAG. To claim otherwise would be to imply that the Peshmerga leadership (who served across this period) somehow forgot how to convert as effectively inculcation into preference change as they transformed from a NSAG to a *de facto* SAG.

Finally NSAGS frequently possess less sophisticated weaponry than SAGs. If so then the marginal benefit for NSAGs to invest in technical training may be lower. We discuss this point more fully in the online appendix. The problem with this explanation is that, for SAGs at least, the sophistication of their weaponry is endogenous. Thus, this explanation does not fully answer our puzzle. This explanation would require an answer not only to whether and why SAGs are less

[9]Obviously we are not claiming that members are randomly selected into groups (clearly they are not), only that it is hard to see how any selection process could be correlated with σ.

cohesive than NSAGs but also why SAGs chose weaponry that produces less cohesiveness even when less sophisticated and (presumably) less expensive weaponry is available.

10 Conclusion

Non-state armed group (NSAG) cohesion, despite material adversity, is a central puzzle in the study of insurgency (Blattman and Miguel, 2010). This puzzle is all the more striking when one considers the rapid disintegration of state armed groups (SAGs) in contexts of state collapse, such as in Iraq, Afghanistan, and Somalia. We argue that NSAG's inability to credibly promise future rewards forces them to rely more heavily than their state counterparts on immediate social selective incentives *ceteris paribus*. In order to increase these social selective incentives NSAGs must inculcate their troops more heavily than do SAGs. The result is higher levels of intrinsic social motivation in NSAGs as compared to their SAG counterparts. We provide evidence for this hypothesis from the behavior of state and non-state soldiers in Nepal, the Ivory Coast and Kurdistan using laboratory activities to uncover their underlying social rewards for pro-group behavior. We also presented qualitative evidence that NSAGs stressed inculcation over technical military training to a greater extent that SAGs did.

Our findings have potentially important implications for counterinsurgency strategy and post-conflict ex-combatant reintegration. Scholars have noted the durability of NSAG networks as well as the varied political, economic, and social roles that such networks take on after ostensible demobilization (Themnér, 2015; Daly, 2016; Reno, 2010; Daly, Paler and Samii, 2020). If we are right that members of NSAGs are more highly inculcated than soldiers in SAGs, *ceteris paribus*, then countering insurgency and violent extremism and reintegrating former members of these groups

into society will require more than appeals to their material interests. If these militants have been inculcated into thinking that they are doing good by committing acts of violence they will have to be disabused of those beliefs. Programs will have to be designed to help these former militants find new, non-violent, social causes to replace the one with which they have forged strong social ties. The burden of countering these combatants' extensive social inculcation perhaps brings with it an opportunity though: these militants have exhibited an extraordinary willingness to sacrifice themselves for a cause. If that same spirit of self-sacrifice can be turned toward non-violent pursuits for the good of society then the violence these groups have committed may to some extent be rectified.

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A Formal Presentation of the Argument

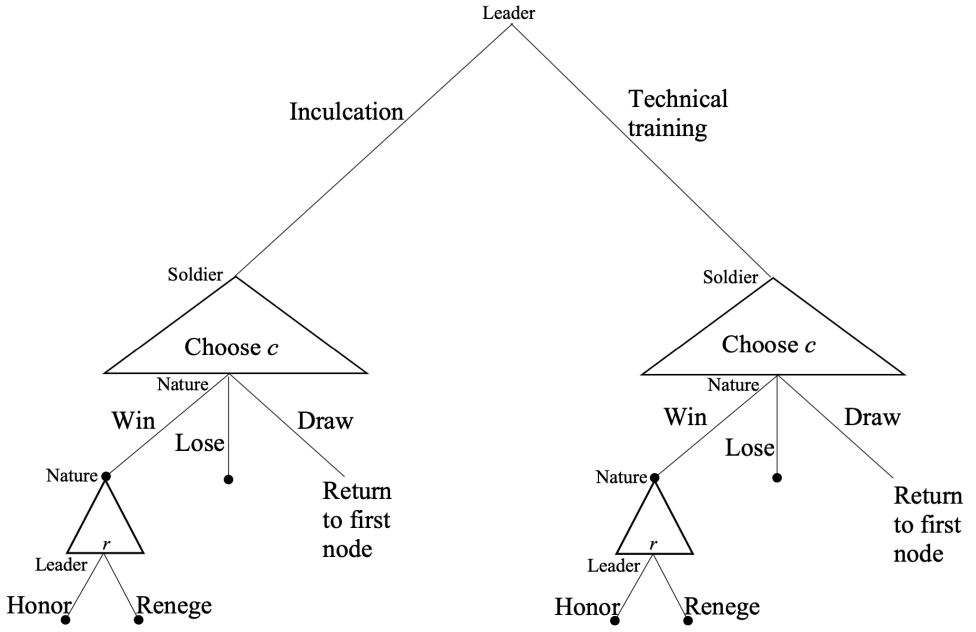
Whether NSAG members are more pro-group than SAG members is an empirical question. We want to be as clear as we can about the process we think is at work in our data, so, in this appendix, we describe our hypothesized data-generating process in somewhat formal terms. Our hypothesis is that NSAGs will compensate for the lower credibility of their promises by spending more time on inculcation than SAGs do. Therefore NSAG soldiers will receive higher immediate intrinsic social rewards and punishments for contributing effort to the group and as such will contribute more to the group ceteris paribus. We use a simple game to clarify our argument. The game is similar in spirit to Lidow (2016)'s excellent theoretical analysis of insurgent leader credibility in the context of the Liberian civil war, although he focuses on pro-group preferences among leaders, while we focus on the inculcation of pro-group motivations among recruits. This game is not intended to paint a completely realistic picture of the incentives inside armed groups but only to describe, as clearly as we can, the process that we hypothesize is generating our data. The purpose of the model is not to prove theorem but to illustrate the process that we think is generating our data.

We discuss the interaction between a military leader and a representative soldier. The game is repeated indefinitely until the group either wins or loses the war. The stage game is illustrated in Figure A1. There are three possible outcomes at the conclusion of each stage of the game: the group can win in which case the game ends, the group can lose the war in which case the game ends or the group can draw in which case the game repeats from the first node of the stage game. At the first node of the game the military leader chooses how to allocate a marginal amount of training of a representative soldier. For simplicity we will assume the soldiers are identical in the parameters of the model. The leader can choose Inculcation or Technical training. The amount of technical training and socialization are cumulative so the total amount of socialization that the soldier possesses in period t is $sT = \sum_{t=1}^{T} \iota_t$ where t is the time-period index, and ι_t is an indicator equal to one in periods when the group inculcates and zero otherwise. The total amount of technical training the soldier has received by time T, then, is $\tau_T = \sum_{t=1}^{T} 1 - \iota_t$. After the leader selects the type of training, the soldier chooses their contribution $c_t \in \mathbb{R}^+$, knowing that their choice cannot be observed. We suppress temporal subscripts where doing so is not confusing.

The probability that the group wins (loses) the war is a strictly increasing (decreasing) function of c_t and τ_t. If the group neither wins nor loses the war in period t we say that the group *draws* in that period. Call the probability that the group wins in period t $p_t(\cdot)$ in periods where the group chooses to inculcate and $\pi_t(\cdot)$ in periods where the group chooses technical training. Call the probability that the group loses in period t $\ell_t(c, \tau)$ in periods where the group chooses to inculcate and $\lambda_t(c, \tau)$ in periods where the group chooses technical training. For ease of exposition call the probability that the group draws in period t $d_t = 1 - p_t - \ell_t$ in periods where the group chooses to inculcate and $\delta_t = 1 - \pi_t - \lambda_t(c, \tau)$ in periods where the group chooses technical training.

The leader has promised the soldier pensions or other rewards with a value of one if the group wins the war. The leader's value of winning the war is $V > 1$. The payoff of losing the war is zero for both players. If the group loses the war the leader does not have to pay the promised rewards. Both players are risk neutral. In each period t, the soldier receives social utility $S(st, c_t)$. The soldier's per period social payoff, $S(\cdot)$, is an increasing function of the soldier's accumulated socialization and their contribution in that period. To avoid corner solutions we assume $S(\cdot)$ is concave in c_t. Define $U_t = p_{t+1} - c_{t+1} + S_{t+1}(\cdot) + \phi d_{t+1}(p_{t+2} - c_{t+2} + S_{t+2}(\cdot) + \phi^2 d_{t+2}(\ldots$ and $\Upsilon_t = \pi_{t+1} - c_{t+1} + S_{t+1}(\cdot) + \phi\delta_{t+1}(\pi_{t+2} - c_{t+2} + S_{t+2}(\cdot) + \phi\delta_{t+2}(\ldots$, where ϕ is the inter-temporal

Figure A1: Game form of the stage game

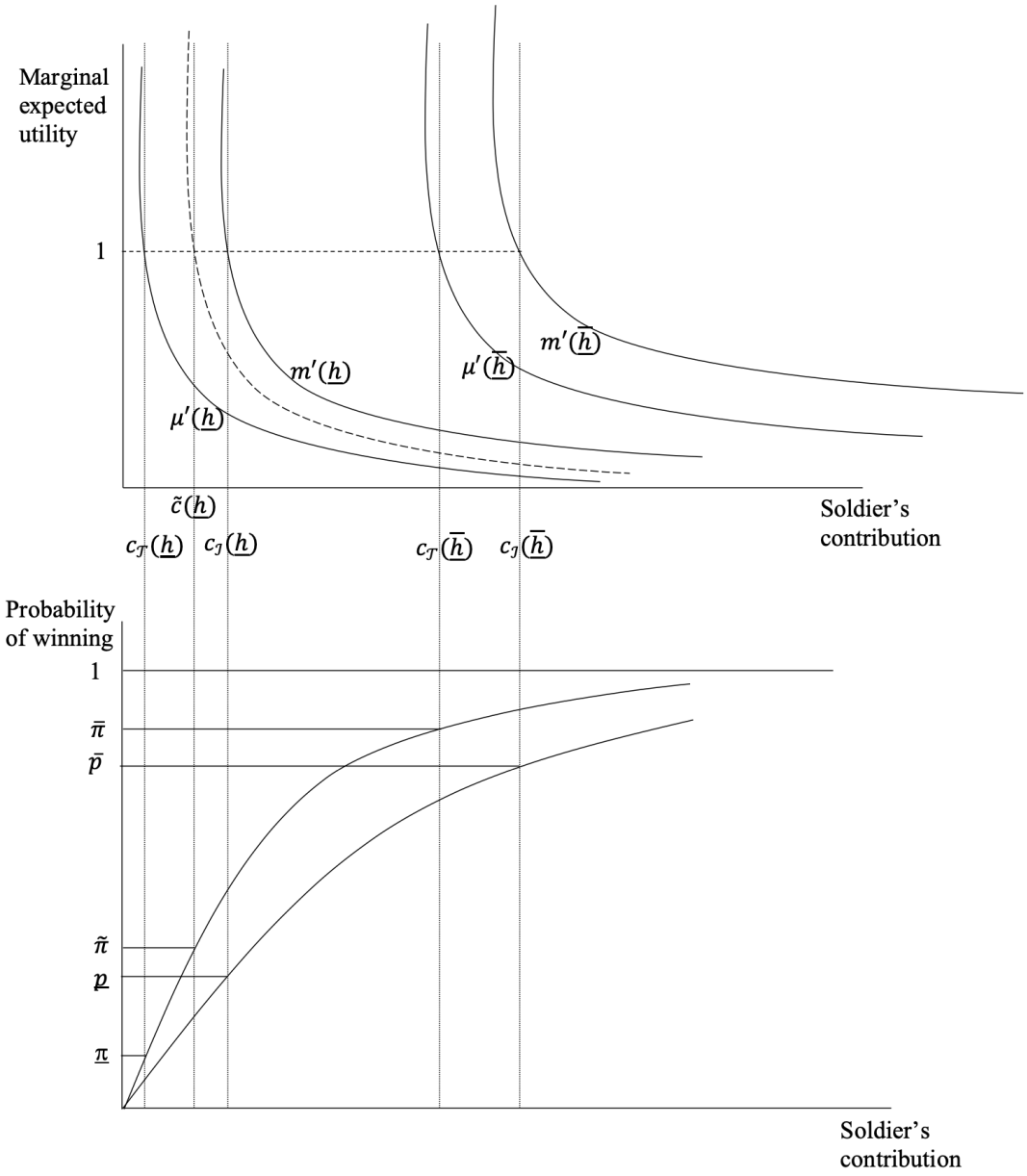


discount factor.

The leader will only have to keep its promise of a post-war reward to some subset of their cadres. Think of this subset as the group's minimum winning coalition or, alternatively, the set of soldiers to whom the group is legally required to keep its promises. Define $r \in [0, 1]$ to be the share of soldiers to whom the leader honors their promises; thus r is also the probability that the leader will honor their promises to an individual soldier. The players do not know the value of r unless and until the group wins the war, but they do know $f(r)$, the distribution of r. Define $h = \int_0^1 rf(r)dr$, which is the expected probability that the leader will honor their promises to an individual soldier. The soldier's choice of effort affects the probability of winning the war. Nature chooses the winner of the war based on that probability. If the group wins the war nature chooses r and the leader decides probabilistically whether to Honor or Renege on their promise to the soldier. We assume $m(c_t, \tau_t) = hp_t + d_tU_t$ and $\mu(c_t, \tau_t) = h\pi_t + \delta_t\Upsilon_t$ are strictly increasing and concave in c_t and τ_t.

The soldier will choose their contribution to maximize their utility: $m(\cdot) - c_t$ or $\mu(\cdot) - c_t$ depending on whether the leader chose to inculcate or technically train in period t. To do so they set $m'(\cdot)$ or $\mu'(\cdot)$ equal to one (depending on the leader's training decision). In Figure A2 we present illustrative soldier contributions for each of the two possible training decisions and for each of two levels of leaders credibility: $\underline{h}$ when the leader has low credibility and $\overline{h}$ when the leader has higher credibility. In the example, when the leader has low credibility, the soldier will offer a contribution like $c_{\mathcal{T}}(\underline{h})$ when the leader chooses to technically train but will contribute $c_{\mathcal{I}}(\underline{h})$ when the leader inculcates. When the leader has high credibility, by contrast, the soldier will offer a contribution like $c_{\mathcal{T}}(\overline{h})$ when the leader chooses to technically train but will contribute $c_{\mathcal{I}}(\overline{h})$ when the leader inculcates. These contribution levels will result in probabilities of winning of $\overline{\pi}$, $\overline{p}$, $\underline{\pi}$ and $\underline{p}$ respectively as shown in the lower panel.

Figure A2: Illustrative training and contribution equilbria



High-credibility leaders elicit greater contributions from soldiers than low-credibility leaders do, all else equal, because the soldier's marginal expected payoff if the group wins is higher due to the leader's higher probability of keeping their promise. The leader chooses the training regimen that maximizes the group's probability of winning the war. Since that probability is concave in the soldier's contribution and high-credibility leaders already elicit larger contributions than low-credibility leaders, investing in inculcation produces a smaller increase in the probability of winning for high-credibility leaders. Therefore there are cases where a high-credibility leader

will choose technical training but a low credibility leader will not but there are no cases where a low-credibility leader will choose technical training and a high-credibility leader will not *ceteris paribus*. For the reasons mentioned in the main text, we hypothesize that NSAG leader's promises will have lower credibility than SAGs leader's promise so there may be cases where NSAG leaders will choose inculcation and SAG leaders do not, but not vice versa.

A second reason that SAG leaders may choose technical training relatively more frequently is that they obtain higher marginal returns from technical training because they possess more technical equipment. If this were the case the low credibility marginal utility curve might not be the one marked $\mu'(\underline{h})$ but instead something like the dashed downward sloping curve marked $\tilde{\mu}'(\underline{h})$ in the upper panel of Figure A2. The soldier's equilibrium contribution level would then be $\tilde{c}(\underline{h})$ and the group's concomitant probability of winning would be $\tilde{\pi}$. In such a case the group would choose technical training even though its credibility ($\underline{h}$) was just as low as the NSAGs.

B List of laboratory sessions

Table A1: List of laboratory sessions

Who	Where	Date
Maoists	Kathmandu	10/6/12
Maoists	Kathmandu	3/20/13
Maoists	Kathmandu	3/23/13
Maoists	Dang	9/8/12
Maoists	Dang	9/8/12
Maoists	Jhapa Birtamod	3/30/13
Maoists	Jhapa Birtamod	3/31/13
Maoists	Jhapa Birtamod	3/31/13
Maoists	Jhapa Kerkha	4/1/13
Maoists	Jhapa Kerkha	4/1/13
Maoists	Gorkha	4/22/13
Maoists	Gorkha	4/23/13
Maoists	Gorkha	4/23/13
Maoists	Chitwan	7/25/2012
Maoists	Chitwan	7/25/2012
Maoists	Butwal	8/2/12
Maoists	Butwal	8/2/12
HQ guards	Abidjan	8/12/15
Marines	Marine base	8/12/15
FRCI infantry	Training center Bengerville	8/13/15
FRCI infantry	New Akoido camp Abidjan	9/1/15
FRCI infantry	Old Akoido camp Abidjan	9/1/15
Gbagbo militias	Yapougon	7/19/2015
Gbagbo militias	Yapougon	7/22/15
Gbagbo militias	Yapougon	7/23/15
Gbagbo militias	Yapougon	8/2/15
Gbagbo militias	Yapougon	8/2/15
Peshmerga	KDP party hall Makhmur	20/5/2016
Peshmerga	FOB Makhmur	20/5/2016
Peshmerga	KDP Training center	23/5/2016
Peshmerga	Training center	23/5/2016
Peshmerga	Training center	23/5/2016
Peshmerga	Training center	23/5/2016
Peshmerga	Training center	28/5/2016
Peshmerga	Training center	28/5/2016
Peshmerga	Training center	29/5/2016
Peshmerga	Training center	29/5/2016
Peshmerga	Training center	6/6/16
Peshmerga	Training center	6/6/16
Peshmerga	PUK party hall Erbil	27/7/2016
Peshmerga	KDP party hall Erbil	1/8/16
Peshmerga	Socialist party hall Erbil	9/8/16
Peshmerga	PUK party hall Erbil	16/8/2016
Peshmerga	KDP party hall Erbil	1/9/16

C Summary statistics for Maoist sample

Table A2 shows summary statistics for our PLA (NSAG) sample in Nepal. The age range is between 21 and 47. The data were collected in 2013, which implies that these individuals were between 5 and 30 at the very onset of the conflict in 1996 and between 9 and 35 at the time of major mobilization in 2001. Years of experience as a Maoist combatant ranges from 6 years to 17, where the latter is the maximum possible given the onset of the conflict in 1996. Education levels are indicated according to a 4-point scale of attainment: 1=less than junior secondary school, 2= junior secondary school, 3=high school, 4=university or more. The mean is about 2, and indeed this is modal category (41% of the sample). This is in contrast to father's education levels, which are predominately category 1 (82% of the sample). The sample varies in terms of caste and ethnic background, with the modal category being that of "Janajati," the colloquial designation for Nepal's indigenous peoples (Jha, 2003). It is an umbrella term for a variety of indigenous peoples some of which, in particular the Kham Magars of central Nepal, are closely associated with the Maoist movement (de Sales, 2003). Soldiers vary in their combat experience, as indicated by the variation in number of times wounded and whether they had soldiers under their command killed. A majority (67%) of those responding indicated having had soldiers killed, but the response rate was slightly lower for this question (about 84%) possibly out of consideration for the dead.

Table A2: Summary statistics for PLA Soldier Sample

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	28.79	4.26	21	47	202
Years in PLA	9.84	1.95	6	17	204
Ed. level	2.12	0.89	1	4	204
Father's ed. level	1.28	0.70	1	4	203
Brahmin	0.16	0.37	0	1	202
Chhettri	0.19	0.40	0	1	202
Newar	0.01	0.12	0	1	202
Dalit	0.10	0.30	0	1	202
Janajati	0.53	0.50	0	1	202
No. times wounded	1.50	1.76	0	15	204
Any soldiers killed?	0.67	0.47	0	1	171
Rs. sent, pay-it-forward	47.79	29.50	0	100	204
Rs. sent, PG	38.53	28.73	0	100	204

Table A3 shows the distribution of highest ranks achieved in our the sample. Officers are over-represented because another project that we were conducting at the same time required subjects to be officers. Still a few non-commissioned officers were accidentally included in the sample. Our selection of officers reduces concerns about using a convenience sample: the number of officers in each of the cantonments we worked with was so small that we used every officer in each cantonment unless an officer was missing from the cantonment for idiosyncratic reasons. The bulk of our sample attained ranks between platoon commander to battalion vice-commander following the PLA rank system, corresponding, approximately, to 1st Lieutenant to just above Captain based on the US Army ranks system. The concentration of our sample at this middle tier is to be expected, given promotion for the many early entrants that appear in our sample.

Table A3: Ranks in PLA Soldier Sample

Code	Rank	US Army Equiv.	N	Sample %
15	Supreme Commander		0	0
14	Deputy Commander	General	0	0
13	Division Commander	Major General	0	0
12	Division Vice-Commander		1	0.49
11	Brigade Commander	Colonel	0	0
10	Brigade Vice-Commander		3	1.47
9	Battalion Commander	Lt. Colonel	14	6.86
8	Battalion Vice-Commander		25	12.25
7	Company Commander	Captain	46	22.55
6	Company Vice-Commander		51	25.00
5	Platoon Commander	1st Lieutenant	40	19.61
4	Platoon Vice-Commander		8	3.92
3	Section Commander	Sergeant	10	4.90
2	Section Vice-Commander		2	0.98
1	Front Guard Leader	Corporal	2	0.98
0	Member	Private	2	0.98

D Civilian placebo test

Table A4: Summary statistics for Civilian-Only Groups

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	31.75	9.89	18	50	120
Edu. level	2.17	1.02	1	4	120
Father's edu. level	1.33	0.72	1	4	120
Brahmin	0.19	0.40	0	1	120
Chhettri	0.61	0.49	0	1	120
Newar	0.04	0.20	0	1	120
Dalit	0.04	0.20	0	1	120
Janajati	0.12	0.32	0	1	120
Rs. sent, recip.	56.08	27.20	0	100	120
Rs. sent, PG	61.58	31.25	0	100	120

E Descriptive Statistics from Ivory Coast

E.1 Summary statistics

Tables A5 and A6 show summary statistics for our army/marines (SAG) and militia (NSAG) samples in Ivory Coast. The age ranges are 23-53 and 21-48, respectively. The data were collected in 2015-6, which implies that these individuals were between 10 and 41 at the very onset of the initial outbreak of the civil war in 2002. Years of experience as a combatant ranges from 1 years to 32 for members of the army/marines between 3 and 13 for members of the militia. The analysis drops members of the army/marines who had joined prior to 2002. Education levels are indicated according to a 5-point scale of attainment: 1=less than primary school, 2= primary school, 3=junior secondary school, 4=high school, 5=university or more. The mean is about 3 for the army/marines and closer to 2 for the militia. This difference is not surprising given that educational requirements for entry into the army or marines. The survey also asked whether respndents fathers were literate. The majority indicated that their fathers were, with the average among the militia (0.78) being higher than for the army/marines (0.60). Ethnic and religious backgrounds vary, with modal ethnic affiliation being Akan for both subsamples and modal religion being Christian, which again is unsurprising given that southern Christians formed the core of the Gbagbo-aligned political movements. The combatants vary in their combat experience, as indicated by the variation in the number of combatant engagements and number of times wounded. Both of these are higher for militia members.

Table A5: Ivory Coast Army and Marines (SAG) Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	34.63	7.77	23	53	60
Abidjan born	0.25	0.44	0	1	60
Literate father	0.60	0.49	0	1	60
Education scale	2.88	1.50	0	5	60
Akan	0.35	0.48	0	1	60
Krou	0.23	0.43	0	1	60
Malinke	0.10	0.30	0	1	60
Mande	0.07	0.25	0	1	60
Voltaic	0.12	0.32	0	1	60
Christian	0.73	0.45	0	1	60
Muslim	0.23	0.43	0	1	60
Female	0.03	0.18	0	1	60
Years in mvt.	11.82	8.77	1	32	60
Rank in Increasing Order	3.55	2.17	1	11	60
No. of combat engagements	0.77	1.49	0	9	60
Times wounded	0.05	0.22	0	1	60
CFAs sent, pay-it-fwd.	364.17	137.50	0	500	60
CFAs sent, PG	375.83	153.63	0	500	60

Table A6: Ivory Coast Militia (NSAG) Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	29.66	4.98	21	48	50
Abidjan born	0.04	0.20	0	1	50
Literate father	0.78	0.42	0	1	50
Education scale	2.26	1.51	0	5	50
Akan	0.40	0.49	0	1	50
Krou	0.18	0.39	0	1	50
Malinke	0.04	0.20	0	1	50
Mande	0.14	0.35	0	1	50
Voltaic	0.12	0.33	0	1	50
Christian	0.78	0.42	0	1	50
Muslim	0.16	0.37	0	1	50
Female	0	0	0	0	50
Years in mvt.	6.18	2.90	3	13	50
Rank in Increasing Order	2.14	1.26	1	6	50
No. of combat engagements	2.84	2.28	0	12	50
Times wounded	0.42	0.73	0	3	50
CFAs sent, pay-it-fwd.	362.00	146.93	0	500	50
CFAs sent, PG	399.00	116.71	100	500	50

E.2 Covariate differences

Table A7 examines mean differences for covariates across the army/marine (SAG) and militia (NSAG) subsamples from the Ivory Coast. The tables shows ordinary-least-squares regression estimates of the variable listed in the column headers on a dichotomous variable equal to one if the subject was in the militia and zero otherwise. The constant is the mean for army/SAG subjects, and the coefficient on "Militia" shows the difference in means across the two groups. The regression analysis in the main text includes results that control for all of these covariates.

Table A7: Covariate balance for SAG and NSAG (militia) subjects in Ivory Coast

	(1) Age	(2) Abidj. born	(3) Lit. father	(4) Educ. scale	(5) Akan	(6) Krou	(7) Malinke	(8) Mande	(9) Voltaic	(10) Christian	(11) Muslim	(12) Female
Militia	-4.97***	-0.21***	0.18**	-0.61**	0.05	-0.05	-0.06	0.07	0.00	0.05	-0.07	-0.03
	(1.23)	(0.06)	(0.09)	(0.29)	(0.09)	(0.08)	(0.05)	(0.06)	(0.06)	(0.08)	(0.08)	(0.02)
Constant	34.63	0.25	0.60	2.87	0.35	0.23	0.10	0.07	0.12	0.73	0.23	0.03
	(1.00)	(0.06)	(0.06)	(0.20)	(0.06)	(0.06)	(0.04)	(0.03)	(0.04)	(0.06)	(0.06)	(0.02)
N	110	110	110	110	110	110	110	110	110	110	110	110
R^2	0.12	0.08	0.04	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.02

Robust standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

E.3 Wartime experiences

Table shows how measures of wartime experiences differed for army/marine (SAG) versus militia (NSAG) subjects. Because these outcomes are endogenous to SAG versus NSAG status, these variables provide hints on possible mechanisms to explain the differences that we estimate for SAGs versus NSAGs in the analysis that appears in the main text.

Table A8: Differences in wartime experiences for SAG and NSAG (militia) subjects in Ivory Coast

	(1) Years in mvt.	(2) Rank in Increasing Order	(3) No. of combat engagements	(4) Times wounded
Militia	-5.64***	-1.47***	2.67***	0.41***
	(1.20)	(0.33)	(0.38)	(0.11)
Constant	11.82	3.55	0.77	0.05
	(1.13)	(0.28)	(0.19)	(0.03)
Observations	110	110	110	110
R^2	0.15	0.14	0.33	0.13

Robust standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

F Descriptive Statistics from Kurdistan

F.1 Summary statistics

Tables A9, A10 and A11 show summary statistics for our Peshmerga sample from Kurdistan in Iraq. naturally the mean age, as expected, for the pre-2003 joiners is higher, 51.42, while for those who joined after 2003 but before 2014 is 25.83 and the mean for post 2013 joiners is 24.71. Education levels are indicated according to a 5-point scale of attainment: 1=less than primary school, 2= primary school, 3=junior secondary school, 4=high school, 5=university or more. The education level mean for post 2013 joiners is 3.24 which is higher than the other two groups. Unsurprisingly 65% of post 2013 joiners had literate fathers as opposed to the other groups with 46%. We have not included religion and ethnicity because, except for one Peshmerga who reported being Shia, the rest were Sunnis. All our subjects were Kurds. More than 60% of our subjects in all three groups reported that their fathers had served as a Peshmerga. The pre-joiners whose father served in the Iraqi National Army was 12% as opposed to 25% in the other two groups. Times wounded and friends killed in combat are the actual reported numbers and unsurprisingly the pre-2003 joiners report a much higher number than the other two groups, indicative of this particular group's exposure to combat. Game average is the residuals from the regression of the average of the two games (two payments) regressed on a dummy variable of whether subjects received 5000 dinars or 2500 dinars max for each game. Since the first five sessions only received a maximum of 2500 dinars for each game, we took this approach.

Table A9: Peshmerga pre-2003 joiners Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	51.42	10.56	31	80	78
Erbil born	0.32	0.47	0	1	78
Education scale	2.64	1.5	0	5	78
Literate father	0.46	0.5	0	1	78
Years served	31.53	9.44	13	52	78
Rank in Increasing order	8.4	3.1	1	13	78
Father served in Peshmerga	0.62	0.49	0	1	78
Father served in Iraqi Army	0.12	0.32	0	1	78
Times wounded	1	1.33	0	7	78
Friends killed in combat	25.83	27.47	0	150	78
Dinars sent, pay-it-fwd	3560.9	1434.83	0	5000	78
Dinars sent, PG	3743.59	1401.51	0	5000	78
Game average (resid)	719.93	1185.85	-3128.47	1871.53	78

Table A10: Peshmerga post-2003 and pre-2013 joiners Summary statistics

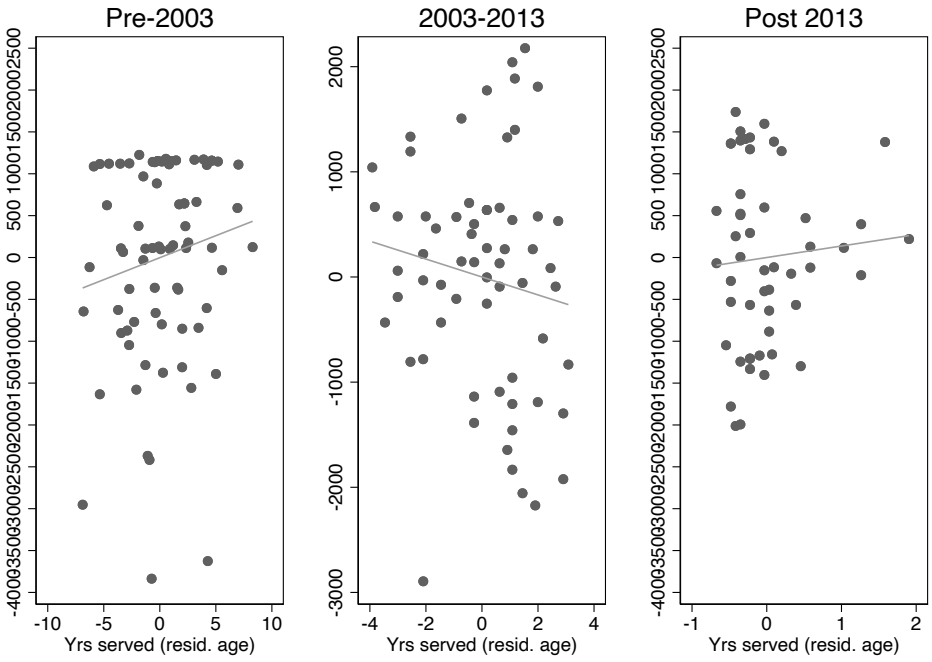
Variable	Mean	Std. Dev.	Min.	Max.	N
Age	25.83	4.54	17	38	63
Erbil born	0.22	0.42	0	1	63
Education scale	2.84	1.74	0	5	63
Literate father	0.46	0.5	0	1	63
Years served	6.38	2.77	3	11	63
Rank in Increasing order	3.75	2	1	7	63
Father served in Peshmerga	0.68	0.47	0	1	63
Father served in Iraqi Army	0.25	0.44	0	1	63
Times wounded	0.21	0.57	0	3	63
Friends killed in combat	5.42	8.19	0	30	62
Dinars sent, pay-it-fwd	2134.92	1521.24	0	5000	63
Dinars sent, PG	2583.33	1675.85	250	5000	63
Game average (resid)	-327.77	1263.78	-2878.47	1871.53	63

Table A11: Peshmerga post-2013 joiners Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	24.71	3.91	18	34	51
Erbil born	0.11	0.32	0	1	63
Education scale	3.24	1.81	0	5	51
Literate father	0.65	0.48	0	1	51
Years served	0.33	0.62	0	2	51
Rank in Increasing order	1.12	0.62	1	5	51
Father served in Peshmerga	0.73	0.45	0	1	51
Father served in Iraqi Army	0.25	0.44	0	1	51
Times wounded	0	0	0	0	51
Friends killed in combat	0.43	1.19	0	5	51
Dinars sent, pay-it-fwd	1944.44	1270.35	500	5000	63
Dinars sent, PG	1904.76	1120.22	0	5000	63
Game average (resid)	-563.58	999.33	-2628.47	1121.53	63

F.2 Peshmerga graph, removing Pre-2003 outlier

Figure A3: Lab contribution and years served in Peshmerga for various cohorts



F.3 Covariate differences

Table A12, A13 and A14 examines mean differences for covariates across our three different groups of Peshmerga subjects. The tables shows ordinary-least-squares regression estimates of the variable listed in the column headers on a dichotomous variable equal to one if the subject was in one of the three groups and zero otherwise. The constant is the mean of subjects not belonging to that group. The coefficient on each of the three groups shows the difference in means across any two groups. The regression analysis in the main text includes results that control for all of these covariates. Columns (1) to (6) are six variables related to pre-joining characteristics where as columns (7) to (10) show how four measures of wartime experiences differ among these three groups. Because these outcomes are endogenous to each type of group a Peshmerga belongs to, these variables provide hints on possible mechanisms to explain the differences that we estimate for different time frames in our analyses. Table A15 shows the distribution of ranks achieved in our Peshmerga sample. 50% of our sample are below the rank of officers, normally those who always take up front line combat roles.

Table A12: Pre-treatment balance (cols. 1-6) and post-treatment outcomes (cols. 7-10) for Pre-2003 Peshmerga joiners

	(1) Age	(2) Erb. born	(3) Edu.scale	(4) Lit.fath.	(5) Pesh.fath.	(6) Irq.Arm.fath.	(7) Yrs.serv.	(8) Rank	(9) Times wounded	(10) Friends killed
Pre-2003	26.10***	0.15**	-0.38	-0.08	-0.09	-0.14**	27.85***	5.83***	0.89***	22.67***
	(1.26)	(0.06)	(0.24)	(0.07)	(0.07)	(0.05)	(1.12)	(0.40)	(0.16)	(3.17)
Constant	25.32***	0.17***	3.02***	0.54***	0.70***	0.25***	3.68***	2.57***	0.11***	3.17***
	(0.40)	(0.03)	(0.17)	(0.05)	(0.04)	(0.04)	(0.34)	(0.19)	(0.04)	(0.62)
Observations	192	204	192	192	192	192	192	192	192	191
R^2	0.75	0.03	0.01	0.01	0.01	0.03	0.81	0.57	0.19	0.27

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A13: Pre-treatment balance (cols. 1-6) and post-treatment outcomes (cols. 7-10) for 2004-14 Peshmerga joiners

	(1) Age	(2) Erb. born	(3) Edu.scale	(4) Lit.fath.	(5) Pesh.fath.	(6) Irq.Arm.fath.	(7) Yrs.serv.	(8) Rank	(9) Times wounded	(10) Friends killed
Post 2003	-15.04***	-0.00	-0.03	-0.07	0.02	0.08	-12.81***	-1.77***	-0.40***	-10.37***
& pre-2014	(1.49)	(0.06)	(0.26)	(0.08)	(0.07)	(0.06)	(1.54)	(0.46)	(0.12)	(2.41)
Constant	40.86***	0.23***	2.88***	0.53***	0.66***	0.17***	19.19***	5.52***	0.60***	15.79***
	(1.38)	(0.04)	(0.15)	(0.04)	(0.04)	(0.03)	(1.50)	(0.38)	(0.10)	(2.18)
Observations	192	204	192	192	192	192	192	192	192	191
R^2	0.23	0.00	0.00	0.00	0.00	0.01	0.16	0.05	0.03	0.05

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A14: Pre-treatment balance (cols. 1-6) and post-treatment outcomes (cols. 7-10) for post-2013 Peshmerga joiners

	(1) Age	(2) Erb. born	(3) Edu.scale	(4) Lit.fath.	(5) Pesh.fath.	(6) Irq.Arm.fath.	(7) Yrs.serv.	(8) Rank	(9) Times wounded	(10) Friends killed
Post 2013	-15.28***	-0.17***	0.50*	0.19**	0.08	0.08	-19.96***	-5.20***	-0.65***	-16.36***
	(1.40)	(0.05)	(0.29)	(0.08)	(0.07)	(0.07)	(1.23)	(0.31)	(0.10)	(1.99)
Constant	39.99***	0.28***	2.73***	0.46***	0.65***	0.18***	20.29***	6.32***	0.65***	16.79***
	(1.29)	(0.04)	(0.14)	(0.04)	(0.04)	(0.03)	(1.22)	(0.30)	(0.10)	(1.99)
Observations	192	204	192	192	192	192	192	192	192	191
R^2	0.21	0.03	0.02	0.03	0.01	0.01	0.34	0.37	0.08	0.12

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A15: Ranks in Peshmerga Sample

Code	Rank	US Army Equiv.	N	Sample %
13	Lt. General	Lt. General	1	0.52
12	Major General	Major General	13	6.77
11	Brigadier	Brigadier	8	4.17
10	Colonel	Colonel	19	9.90
9	Lt. Colonel	Lt. Colonel	0	0
8	Major	Major	8	4.17
7	Captain	Captain	14	7.29
6	1st Lieutenant	1st Lieutenant	15	7.81
5	Lieutenant	Lieutenant	18	9.38
4	Warrant Officer	Warrant Officer	4	2.08
3	Corporal first class	Sergeant	25	13.02
2	Lance Corporal	Lance Corporal	1	0.52
1	Private	Private	66	34.38

G Ethical considerations

Informed and voluntary consent of research participants and others directly engaged by the research process, including continuing consent if needed Participation in the research was completely voluntary. Before subjects participated in the this research a local facilitator read a consent statement to them. This was read in their native language: Nepali in Nepal, French in the Ivory Coast and Kurdish or Arabic Kurdistan depending on the subject's native language. We asked subjects to give their consent verbally. We did not want them to sign the consent form to further insure them of their anonymity. We used a standard consent form recommended by the IRB at our home institution. We vetted the consent form with local experts in each locale to ensure that our subjects understood it.

Deceptive or covert research should be avoided No deception was involved in this study. Nonetheless, we held a discussion and debriefing with subjects after the games were finished in order to explain the rationale for the research, to assess subjects' perceptions of the activities, and also to address subjects' questions.

Harm (traumatization, social, economic or physical) should be avoided, minimized when avoidance is not possible, and research suspended if excessive We did not anticipate any risks of harm beyond those encountered in everyday life and indeed none occurred. Nonetheless, we made provisions to suspend the research and refer subjects to counselors had they experienced any emotional distress in the research, but this never occurred.

The confidentiality of participant identities, or, in some settings, the higher standard of anonymity At no point in the data gathering process were subjects' names recorded or even asked. We identified subjects only with a code that we randomly assigned at the start of the session. Knowing their identity was unnecessary for this research.

Compromising the integrity of broad political processes either at the time of the research process or on publication without the consent of those directly engaged by the research process should be avoided The research had no impact on broader political processes beyond what any survey of a few hundred respondents in each locale would have done. The text of our survey neither encouraged nor discouraged our subjects to take any actions in the lab or in the real world.

Review by relevant ethics boards to approve the research protocol, confirm exempt status, or confirm that the research is Not Human Subjects Research (NHSR) (Note that this also includes local review when required by host community or host country.

The research in each of the three venues underwent a thorough review by the ethics board at our home institution. None of the host countries require ethics board review but as part of our review at our home institution we had to obtain affidavits that stated our work complied with norms and laws in the countries where we worked.

Awareness of relevant laws and regulations governing research and related activities. As mentioned above we consulted with local experts, facilitators and government officials to ensure that our work did not violate any laws or norms in the countries in which we worked.

Any other ethical challenges or perceived ethical challenges related to research with human participants, how you addressed them, and whether how you addressed them might have adversely affected participants. This research did not pose any other ethical challenges. It did however employ survey and survey experimental techniques. Here are our answers to the extra questions pertaining to that form of research:

whether participants were paid and the extent to which payments were fair in both local and global contexts; We conducted lab-in-the-field measurement activities. Subjects earned money for participating in these activities depending on their actions and those of the other subjects in the lab. These payments were fair both locally and globally and were judged to be so by our IRB and local experts.

whether the participant pool was diverse, and in what ways Our research required a very specific participant pool: ex-combatants in Nepal and the Ivory Coast and some current members of the military in the Ivory Coast and Iraqi Kurdistan. Within that pool all potential subjects we met were invited to participate and we did not place any restrictions on who could participate other than their age (we required them to be over 18). The subject pool is quite diverse in terms of age composition and gender. In one case, the Ivory Coast, there simply were very few women in the sample frame.

whether the participant pool included or was comprised mainly of members of groups we should consider vulnerable or marginalized and if so, how you addressed that None of the groups we studied are vulnerable or marginalized. The ex-combatants in our study were all participating in legal ex-combatant reintegration programs. As such they were all covered by programs and statutes that granted them legal status. They possessed legal autonomy and were free to engage in this research voluntarily without pressure of any sort either to participate or refrain from participation.

whether the research differentially benefited or harmed particular groups. None of the participants in our study were harmed differentially or otherwise. Participants earned differential monetary amounts from their activities in the lab only insofar as their actions in the lab determined. All participants had equal opportunities to earn the same amounts of money from these activities and we made sure that our subjects were well aware of the rules of the games they were playing and how those would translate into monetary payoffs.