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Peer Effects and Recidivism: Wartime Connections and Criminality among Colombian Ex-Combatants

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To what extent do peers affect criminal behavior? In this article, I study peer effects among ex-combatants in Colombia. Following a theoretical framework that differentiates the impact of economic conditions from that of social networks, I rely on individual-level data on over 16,000 former paramilitaries in Colombia to study the relationship between illegal gold production and recidivism. I show that when the economic benefits of illegal sectors increase, ex-combatants favor criminal activities. More importantly, I show that an increase in wartime peers' criminality increases an ex-combatant's criminal activity. I complement these results with the analysis of an original survey about the social connections of ex-combatants and explore the potential effect of tackling wartime networks as a policy to reduce crime after conflicts.

INTRODUCTION

During transitions from war to peace, countries struggle to control rising levels of crime, with evidence coming from diverse settings, ranging from a crime wave following the Napoleonic Wars around 1815 to present-day gang violence after the end of El Salvador's civil war in 1992. The continuation of violence after the transition to peace is often related to the failure to reintegrate ex-combatants and can pose a challenge to political and economic development. Given the evidence of increases in criminality after conflicts and the threat of remobilization, the policy research accompanying peace transitions has increasingly focused on the reasons why former combatants may engage in criminal activities. In this article, I present evidence concerning the way local economic changes and wartime connections impact postconflict criminality among ex-combatants, expanding on the potential effects of peacetime policies in preventing crime and promoting reintegration.

While there is plenty of research on the continued violence after conflict, we still lack a clear understanding of the reasons why ex-combatants engage in criminal actions. Recent work has shown that, besides the classical motivations for engaging in delinquent activities, which include economic incentives and psychological factors (Collier 1994; Weinstein 2006), ex-combatants' contact with former fighters during the aftermath of conflict might be a crucial factor determining recidivism (Daly 2016; Themnér 2011). Such individuals are usually jobless, have mostly lost contact with their families and civilian acquaintances, and have only other fellow fighters with similar levels of criminal capital on whom to rely (Humphreys and Weinstein 2007). According to this interpretation, it is possible that a peer effect drives ex-combatants to criminal activity. However, limitations in data availability have prevented researchers from making progress in the identification of these peer effects, and, more importantly, the estimation of their relevance, compared to other factors, in explaining postconflict criminality.

To overcome these limitations, in this article, I use individual-level panel data of postconflict criminal records of over 16,000 former paramilitary combatants in Colombia from 2013 to 2016. I match this information with detailed records about individual wartime experience and connections. The structure of the data enables me to differentiate the effect of economic changes that vary over time on delinquent behavior and separate the effect from the criminal activity of peers. I rely on a theory about peer effects in criminal behavior and derive explanations of criminality of former combatants. I argue that individual and social constraints shape the incentives and opportunities for ex-combatants to participate in illegal behavior: individual constraints refer to the opportunity cost provided by the surrounding context, such as proximity to an illegal market, and social constraints refer to the social network of the ex-combatant. Because the severity of these constraints may be affected by criminal activities, I study plausibly random variations to the economic local conditions, combined with the presence of partially overlapping groups of peers in the wartime network across municipalities, to estimate the effect of economic shocks separately from that of the peers' activity.

The observable implications of the argument are straightforward: I find that when the economic returns to the illegal sector increase, former combatants favor criminal activities. In particular, a one-standard-deviation increase in the economic shock is associated with an increase of around 0.375 ex-combatants' captures. More importantly, consistent with other theoretical accounts of crime, I show that an increase in the

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criminal activity of peers is likely to impact an ex-combatant's criminal behavior. A one-standard-deviation increase in wartime connections' captures is associated with an increase of around 0.484 ex-combatant's captures. The intuition is that changes in the economic returns to illegal activities taking place in certain municipalities will affect both (a) the opportunity cost of individuals living in those municipalities (individual economic effect) and (b) those individuals connected to them through social ties who live in unaffected municipalities (social level effect). Note that (b) is true *only* if a peer effect exists. The only way that a change that takes place elsewhere can affect an individual is through their connection to a peer who lives in a municipality that is experiencing changes in economic returns to criminal activities.

I complement the main results in several ways. First, I present consistent results across similar versions of the wartime network, severity of the economic changes, and crime measures. Second, I run several additional placebo tests with different commodities, outcomes, networks, and econometric specifications. I pay special attention to the mobility and connectivity of the units of analysis. Third, to explore the mechanisms, I show that the results are driven by collective crimes that require the participation of several acquaintances. Additionally, I conduct a dyad analysis rather than a group-level analysis to include additional individual-level controls. Finally, to validate the measures used in the main analysis, I analyze an original survey of ex-combatants that highlights the relevance of wartime connections for former paramilitaries in Colombia.

The results presented in this article are directly relevant to policy debates concerning the most effective strategies for addressing the challenge of ex-combatant economic and social reintegration. To test the implications of the main finding, I analyze the potential effects of a policy that tackles the wartime connections related to crime and discuss the generalizability of the results.

This article makes two main contributions. First, I use detailed individual panel data on criminal records and wartime connections to demonstrate the existence of peer effects among ex-combatants. Recent studies find evidence of the relevance of social factors in explaining recidivism (Daly, Paler, and Samii 2020; Kaplan and Nussio 2018b); I deepen the analysis of these studies by exploiting exogenous economic variation and the presence of overlapping groups to carefully examine the relevance of peers and social networks. The article also contributes to the literature on peer effects in comparative political science. The identification of peer effects within social networks is challenging; recently, political scientists have exploited exogenous variation and the use of more-detailed network data and strategies to examine the relevance of peers' behavior (Christakis and Fowler 2013; Siegel 2009), especially in American politics (Fowler et al. 2011; Sinclair 2012). While many studies focus on the correlation between network characteristics and behavior, this article aims to contribute to and expand the discussion about how to identify the impact of peer behavior (Acemoglu, Garcia-Jimeno, and Robinson 2015; Alt et al. 2022; Kline and Tamer 2020; Quispe-Torreblanca and Stewart 2019).

The rest of the article proceeds as follows: in the following two sections, I explain the theoretical motivation and context of the article. In the next section, I present the relevant aspects of a model of peer effects from which I derive the hypotheses and then introduce the data and identification strategy. In the final three sections, I present the main results, discuss policy implications, and conclude with a discussion of limitations of the article and avenues for future research.

ECONOMIC CHANGES AND PEER EFFECTS

Mounting evidence suggests that there is a high level of violence and crime in most postconflict contexts (Call 2012; Kurtenbach and Rettberg 2018). Although many scholars have studied the problem of postconflict crime, there is little consensus about the motivations of former fighters for reverting to violent and illegal behavior (Berdal and Ucko 2009; Muggah 2008; Stedman 1997; Walter 1997). For example, different reasons, including individual economic considerations and social circumstances, could potentially converge to affect the likelihood of recidivism.

Economic Returns and Postconflict Crime

How variations in economic conditions impact civil conflict (Dube and Vargas 2013) and crime (Dix-Carneiro, Soares, and Ulyssea 2018) has been widely studied. The theoretical motivation for this effect can be traced back to classical economic studies of crime, according to which agents engage in criminal activities after performing a calculation of the cost and benefits that includes the opportunity costs of legal sector employment (Becker 1968; Dal Bó and Dal Bó 2011).[1] The effect of a commodity price shock will depend on many factors, including whether the commodity is legal or illegal, capital or labor intensive, or seasonal or not.[2] There is evidence that changes in the economic returns to the production and distribution of illegal commodities are associated with crime and violence (Dell 2015; Dube and Vargas 2013; Mejia and Restrepo 2013; Millán-Quijano 2020; Sviatschi 2022). When illegal profits change, rates of criminality also change, for example, because of variations in market

[1] For a review of crime and economic incentives, see Draca and Machin (2015) and Ferraz, Soares, and Vargas (2021). A recent meta-analysis of the literature on economic shocks and violence by Blair, Christensen, and Rudkin (2021) compares different possible mechanisms and the recent study by Rettberg et al. (2018) discusses the applications to Colombia.

[2] Economic variations could affect crime by changing local labor market conditions such as employment rates and earnings (Fougère, Kramarz, and Pouget 2009; Lin 2008). Other potential mechanisms include the rapacity effect of a change to capital intensive goods (like appropriation of oil revenues) and an increase in public good provision (Di Tella and Schargrodsky 2004).

shares or because the number of people involved in the illicit market varies.

Profits from illegal markets can fuel criminality in general and recidivism of ex-combatants in particular. To study variations in the ex-combatant's opportunity cost, I analyze municipal-level changes to illegal gold production. This commodity is at the core of the individual constraints that bind delinquent behavior, particularly in the developing context of Colombia, characterized by low state capacity and limited labor market opportunities. Especially relevant for our case study, the fact that the product is illegal gives former combatants a comparative advantage in this market. Ex-combatants possess knowledge of the functioning of illegal operations and the know-how required to make a profit from engaging in such activities (Ortiz-Riomalo and Rettberg 2018; Valencia and Riano 2017).

To simplify my argument, I hypothesize that ex-combatants' participation in criminal activities changes in response to changes in the economic returns to labor-intensive illegal commodities.

Peer Effects and Postconflict Crime

Several scholars in sociology and criminology underscore the effect of social networks in crime decisions (Papachristos 2014; Warr 2002). According to this explanation, individuals participate in criminal activities as a result of the interaction with other delinquents. This approach suggests that delinquents have friends who have participated in crimes and that social ties are a means by which an actor is influenced to commit a crime (Sarnecki 2001). In the same vein, following the seminal work of Glaeser, Sacerdote, and Scheinkman (1996), recent theoretical approaches in economics relate crime to social networks. Several papers find that, in fact, crime and delinquency are related to positions in social networks.[3]

These studies suggest that properties of peer associations should be taken into account in order to better understand the relationship of social pressure and delinquent behavior in the aftermath of conflict and to inform delinquency-reducing policies targeted at ex-combatants. The reason to focus on wartime peers is threefold. First, recent studies show that different aspects of the social connections of an ex-combatant are important in explaining recidivism (Daly, Paler, and Samii 2020; Kaplan and Nussio 2018b; Themnér 2011; 2015). Second, wartime bonds lay the foundation for one of the most important social networks of ex-combatants following demobilization and during reintegration. Militancy often requires that combatants break links with family and friends, which in most cases implies a complete separation of military and civil life that is not always easy to bridge after conflict (Themnér and Karlén 2020; Wood 2008). The bonds created during a conflict are an important source of information (Parkinson 2013; Staniland 2014) and many ex-combatants actually retain their identity long after a conflict has ended (Daly 2016). Third, the stigma against ex-combatants in postconflict societies (Kaplan and Nussio 2018a; McMullin 2013) may make them look to maintain contact and alliances with former peers. Consequently, although reintegration paths may differ, ex-combatants have in common at least one set of "weak ties": their former fellow combatants. These weak ties derive from bonds formed during wartime through socialization for long periods of time in small units while being exposed to constant threats.

Fellow ex-combatants remain an important source of information after a conflict has ended and units have demobilized. Even though these connections are not as "strong" as family and friends, they are relevant in one key domain. Granovetter (1977; 2018) famously shows that weak ties are superior to strong ties in terms of providing support in getting a job.[4] Moreover, Patacchini and Zenou (2008) show that weak ties are positively related with crime decisions. Criminals transmit valuable information about criminal opportunities to potential accomplices. In other words, networks of criminals amplify delinquent behavior. As information about criminal opportunities is transmitted through social networks, an increase in the level of activity of peers in turn drives an increase in individual participation in criminal activities.

To simplify the second part of my argument, I hypothesize that ex-combatants will be affected by the level of criminal activity of their wartime peers. In particular, I argue that the overall criminal activity of the wartime connections will directly affect the decision of an ex-combatant to participate in criminal activities.

CONTEXT

Civil conflict has affected every region of Colombia. Left-wing guerrillas, right-wing militias, and groups involved in drug trafficking have proliferated since the 1980s and the consequences of their actions still resonate across the country (Romero 2003). The paramilitary groups were created as a reaction by the landowning elite, drug barons, and the political class to the growth of rebel groups (López and Martínez 2010; Medina Gallego 1990) and were the main group responsible for war atrocities during a conflict that left over 220,000 dead and displaced more that 4.7 million, according to the Historical Memory Group (Comisión Nacional de Memoria Histórica) (CNMH 2013).

After negotiations with the government of Álvaro Uribe, the self-defense paramilitary organization Autodefensas Unidas de Colombia (AUC) collectively

[3] See, e.g., Ballester, Calvó-Armengol, and Zenou (2006), Patacchini and Zenou (2008), Mastrobuoni and Patacchini (2012), and Liu et al. (2020).

[4] According to this argument, neighborhood-based close networks are limited when it comes to providing information about possible jobs. Recently, Alt et al. (2022) empirically develop this argument to show how unemployment shocks can transmit via social connections. I conduct an analysis similar to that of Alt et al. (2022), who look at the effect of an economic shock on individuals not directly affected by it, in Supplementary Table A.5.

demobilized between 2006 and 2007.[5] The militia organizations that composed the AUC showed considerable divergence in their postconflict trajectories (Daly 2016). Almost half of the former factions remilitarized and some formed the backbone of criminal organizations that are still operating in the country (Daly 2016; Fundacion Ideas para la Paz 2017).

Although many factors could account for the overall dynamics of the reintegration and recidivism of an ex-combatant, this study seeks to identify the role of local economic conditions and peer effects. Because commodity price changes and wartime connections are important channels through which postconflict criminality responds to economic conditions and peer effects, I provide background information on these factors in the following subsections.

Illegal Commodities and Postconflict Crime in Colombia

Studies have shown the effect of commodity price changes on conflict and criminality in Colombia.[6] Following Rettberg, Cárdenas, and Ortiz-Riomalo (2019), gold did not play a major role during the conflict, compared to coca, coffee, and oil, but has become one of the main focuses of criminal activity since the post-paramilitary demobilization. In the words of the Colombian National Police chief, "Gold will have even more devastating effects than drug trafficking for the country" (cited in Rettberg, Leiteritz, and Nasi 2014).[7] There are multiple opportunities for illegal groups to take advantage of mining activity: they can appropriate the value generated along the chain of gold production and even regulate the value chain in the territories where they are present.[8] For these activities, agents with experience in routes, the use of weapons, and engaging in violence are particularly valuable. In addition, agents with knowledge of trusted people to carry out these activities across different regions are of paramount importance.[9] Moreover, there are numerous documented cases of arrests related to illegal mining that spread through various municipalities where organizations consisting in part of former paramilitary members were known to operate. Section E of the Supplementary Material reports on instances of illegal gold-mining activities taking place in different municipalities and describes multiple cases in which ex-combatants were involved as a proof of concept of the mechanisms of the argument in this article.

Illegal gold mining is a widespread activity in Colombia: based on the 2010 Mining Census, more than 62% of gold mines do not have a legal permit. The economic activity related to illegal gold mining is particularly vulnerable to predation; armed groups provide security along trafficking routes and in many cases exploit the mines. As such, illegal gold mining is an important source of revenue for organized criminal bands who control deposits and transit (Valencia and Riano 2017). Significantly, disputes over control of the illegal activity spread beyond the locations of the mines. The actors involved are often located along trafficking routes and have developed the criminal capacity for extortion in several locations.

Wartime Connections and Postconflict Crime among Colombian Ex-Combatants

A considerable number of ex-combatants in Colombia resumed criminal activities undertaken during the conflict after demobilization, many as a result of their ongoing contact with former commanders (Daly, Paler, and Samii 2020) and many as a result of weak family ties and the presence of illegal markets (Kaplan and Nussio 2018b).[10] Based on the number of arrests, around 15% of former paramilitary members participated in illegal activities in the years after demobilization, with their participation in crimes being spread across more than nine hundred municipalities across the country. Supplementary Figure A.1 shows the location and spread of arrests of ex-combatants in the country. Former paramilitary members participate more frequently in collective crimes.[11]

Three facts are worth mentioning about the collective nature of ex-combatant criminality. First, Figure 1 shows the frequency of arrest across types of crimes. The most common types of crimes are related to drug trafficking, organized crime, and possession of arms. Generally, these activities need the cooperation of several individuals to take place. Success in these activities depends on the collective participation of co-offenders (or knowing someone with connections and access to illegal markets). In fact, the National Police of Colombia uses the category of "gang-related" crime to refer to these crimes and to distinguish them from other "individual" crimes.

Second, we can approximate whether ex-combatants were arrested together. To that end, we can explore the

[5] Two points are worth mentioning: one, individual demobilizations continued until 2012, as not all units demobilized in 2007; and two, the process was criticized for inflating the number of demobilized combatants. Multiple accounts of former paramilitary leaders and former government officials argue that the actual number of paramilitary combatants was lower than the initial number of over 30,000 members. In the Data section, I discuss the implications of these two considerations.

[6] See several examples in Blair, Christensen, and Rudkin (2021).

[7] The same comparison was made by the Colombian Attorney General, according to Rubiano (2017).

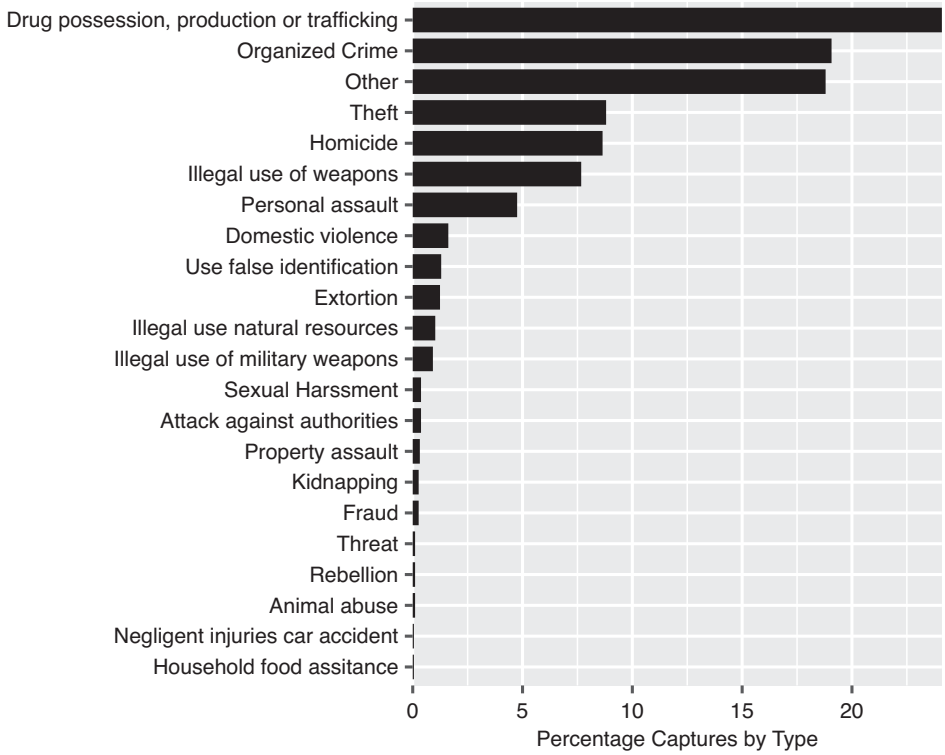
[8] Ortiz-Riomalo and Rettberg (2018, 44) provide evidence that nonstate armed agents have mediated in the development of the illegal gold mining industry, "especially in regions far from the main smelting and marketing centers. In this way, they gain access to the process of declaration, settlement and distribution of profits generated."

[9] Using evidence from different contexts, von Lampe and Johansen (2004) present a typology of how various types of crimes entail high levels of trust between partners.

[10] These studies analyze data on both guerrilla (FARC, ELN, EPL) and paramilitary (AUC) organizations.

[11] Table A.7 in Section E.2 of the Supplementary Material presents a comparison of national levels of crime with ex-combatants' levels and types of crimes.

FIGURE 1. Types of Crimes of Ex-Combatants, 2013–16



density of arrests across different periods to see whether there is evidence of overdispersion (Glaeser, Sacerdote, and Scheinkman 1996) or even bimodality (Gaviria 2000) in the crime distribution, meaning that several offenders must have acted together. If we see a multimodal geographical distribution, this reflects the fact that most places have few arrests (as expected) and a significant number of places have *many* arrests, which suggests that multiple participants were involved in criminal activities together. Supplementary Figure A.2 shows the densities of arrest rates across Colombian municipalities for different years and, following Gaviria (2000), it provides suggestive evidence of collective participation in crime.

Finally, as preparation for this article, I conducted a national survey of ex-combatants in Colombia to capture some patterns of their social connections. The idea was to capture the types of connections that are more relevant during conflict and how those relations vary after demobilization. I present the results broken down by each type of armed group, because the sample includes members who participated in a collective demobilization (Paramilitary) and those who demobilized individually (Guerrilla). The description of the survey strategy and results are provided in Section K of the Supplementary Material. Supplementary Figure A.9 shows that combatants spent more time with members of their same unit and their same rank than with commanders or combatants of other ranks and units. After demobilization, the connection with ex-combatants is stronger with peers in the same unit and of the same rank than with other ex-combatants but lower than with family and close friends.

Therefore, the increasing presence of both criminal bands and illegal markets and the participation of ex-combatants in both, combined with the recent peace process that disarmed thousands of former fighters, make the study of the implications of wartime legacies on recidivism and criminality in Colombia particularly relevant.

EMPIRICAL STRATEGY

The identification of peer effects within social networks is challenging for several reasons. There are two main problems, as explained in Figures 2 and 3. First, the investigation of the effect of an ex-combatant *i*'s criminal behavior on the criminal behavior of an ex-combatant *j* to whom *i* is connected may be affected by a "reflection problem" (Manski 1993). This refers to the possibility that a correlation in the criminal behavior of two ex-combatants, *i* and *j*, is because either *i*'s criminal effort is affecting *j*'s criminal effort or vice versa. A second problem is that of "common shocks." Specifically, unobserved common shocks might affect the behavior of ex-combatants who are connected and might be the underlying reason for the observed correlation in their behavior. It is possible to incorrectly attribute a change in *i*'s behavior to *k*'s behavior, when

FIGURE 2. Reflection Problem

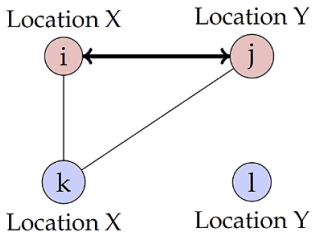
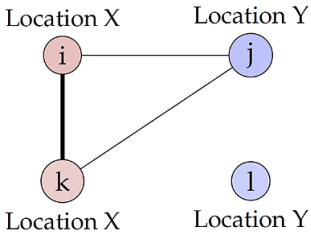


FIGURE 3. Common Shock



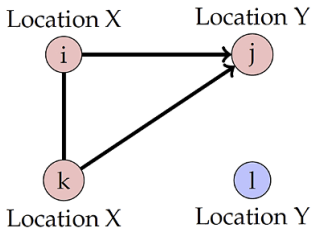
in fact both are being affected by the same shock in location X.

For the identification of peer effects, ideally we would find a treatment that randomly affects a unit in the group (locally/specifically) and then estimate how the unit's behavior (outcome) would affect the outcomes of other units in the network. This means that for the economic change to be local, it would be ideal for the change in economic returns to be at the individual level. In our approach, the treatment could be similar for several group members in similar municipalities (units j and l in Y in Figures 2–4). However, because they may belong to different networks, the treatment will enable us to see how their behavior, and not another factor, can affect the outcome of other network members.

I address the main empirical challenges related to identification of peer effects by taking advantage of the panel structure of the data and the presence of overlapping wartime groups across municipalities to calculate the effect of the economic shock on one municipality as it transmits to connected peers in other municipalities, including group (wartime), time (year), and location (municipality) fixed effects. The idea behind the strategy is that it estimates how the effect on some units of analysis, for example, i and k, transmits to other units of analysis, j (but not to l), through their connection in the wartime network. Put differently, I estimate to what extent an economic shock that does not necessarily affect the municipality of an ex-combatant may still have an effect on his criminal record through his wartime connections.

To further explain the identification strategy, I rely on popular models that have been developed to describe the relationship between social networks

FIGURE 4. Peer Effect



and crime. In what follows, I present a simplified version of one such model, based on a synthesis by Calvó-Armengol, Patacchini, and Zenou (2009), Ballester, Calvó-Armengol, and Zenou (2006), and Calvó-Armengol and Zenou (2004).[12] The model departs from the idea that the decision to put effort into criminal activities is affected by local economic conditions (e.g., presence of legal and illegal markets) and by social networks (e.g., criminal activity of peers and social connections involved in crime). Therefore, the model not only reflects the main elements discussed in this article but also enables the empirical separation of the effect of economic conditions from peer effects.

Networks and Crime

There are many variants to models of crime and social interactions, all of which are similar to the specification that is considered in this section. Individuals are connected to each other through a social network represented by an adjacency matrix g, where $g_{ij} = 1$ if i and j are linked to each other and $g_{ij} = 0$ otherwise.[13] In Figure 4, agents i, j, and k belong to the same wartime network, while l belongs to another network.

In each period t, individuals indexed by i who are members of group g choose a level of criminal effort $y_{it} \geq 0$ and obtain an utility $u_{it}(\mathbf{y})$ that depends on the group's criminal profile $\mathbf{y} = (y_1, y_2, ..., y_n)$ in the following way:

$$u_{it}(\mathbf{y}) = \underbrace{a_{it}y_{it} - \frac{1}{2}y_{it}^2}_{\text{Benefits–Cost}} + \underbrace{\beta\left(\sum_{j \neq i} g_{ij}^w y_{it} y_{jt}\right)}_{\text{Social Component}}.$$

The first two elements represent the benefits and costs of criminal effort y_{it}, where $a_{it} > 0$ denotes differences in the individual's economic benefits from criminal activity and the cost of engaging in crime is given by $\frac{1}{2}y_{it}^2$, which increases with own effort.

[12] The general version of this kind of model, network games with quadratic payoffs, is explained in the textbook by Jackson (2010, 290–2). For a review of applications of this model to crime, see Lindquist and Zenou (2019).

[13] By definition, $g_{ij} = 0$ means that individual i is not connected to j and therefore does not have an influence on j. We can let $g_{ii} = 0$ and use an undirected network such that if $g_{ij} = 1$, then $g_{ji} = 1$.

The social component is included in the utility function by adding $\sum_{j \neq i} g_{ij}^{w} y_{it} y_{jt}$. The social component reflects the influence that the action or outcome (e.g., criminal activity) of other members of group g has on the utility of i. The social influence of i on j is captured by g_{ij}^{w}. The overall effect of the weighted sum of bilateral influences is captured by β. The idea behind this social component is that individuals derive more utility from committing a crime when their connections commit more crimes, which means that crime decisions are *complements*. Therefore, the parameter that we would like to estimate in the empirical section is β, which reflects the effect of the criminal records of the group, holding the other variables fixed.

In equilibrium, each individual maximizes their own utility by choosing a level of criminal effort. The first-order condition for each individual i is

$$y_{it} = a_{it} + \beta \sum_{j \neq i} g_{ij}^{w} y_{jt}. \tag{1}$$

Thus, the level of crime that an individual will show in equilibrium is determined by their own economic characteristics, a_{it}, and by the individual i's weighted sum of their group's criminal efforts, $\sum_{j \neq i} g_{ij}^{w} y_{jt}$. Therefore, the first-order condition can also be divided into individual-level and social-level elements. On the one hand, suppose that the personal cost–benefit element, a_{it}, is subject to variation in measured and unmeasured factors:

$$a_{it} = x_{it}\eta + \alpha_g + \tau_t + \epsilon_{igt},$$

where x_{it} are the observed variables that explain variation in the individual cost–benefit ratio, α_g and τ_t denote the full set of group and year effects, and ϵ_{igt} represents the unobserved heterogeneity. On the other hand, in the second element of the best response, the social component, suppose that the scaled weights g_{ij}^{w} follow

$$g_{ij}^{w} = \begin{cases} 0, & \text{if } g_{ij} = 0, \\ \dfrac{1}{\sum_{j \neq i} g_{ij}}, & \text{if } g_{ij} = 1. \end{cases}$$

Thus, $\sum_{j \neq i} g_{ij}^{w} y_{jt}$ in the best response is the average of the criminal record of the agents who influence individual i in g. This parametrization, known as the *linear-in-means*, determines that the criminal effort of i depends linearly on the mean of the criminal records of the other members of the group, $E[y_{it}]$. As a consequence, what we can study is the effect of the "average level of criminality of the group." For example, an individual with one connection who commits two crimes is affected to the same degree as an individual with two connections who each commit two crimes.

Following Kline and Tamer (2020), the elements that affect an individual's equilibrium best response in Equation 1 can be represented in its corresponding empirical equation:

$$y_{it} = x_{it}\eta + E_{gt}[y_{it}]\beta + \alpha_g + \tau_t + \epsilon_{igt}. \tag{2}$$

Because the outcomes, y_{it}, are simultaneously determined in Equation 2, the previous equation cannot simply be estimated in a regression. The aim of the following sections is to capture the effect of local economic conditions, η, separately from the effect of the peers' criminal activity, β. To that end, the following sections describe the structure of the data I use as a proxy for the variables in the model and the identification strategy.

Data

Data for this project come from three different sources. The first dataset—gold mining data—provides the tools to create the treatment variable. I interact the time-series variation in the international price of gold with information on illegal gold production at the municipality level. The second dataset—conflict experience—provides individual-level information, which serves as the basis for the construction of the network of wartime connections. The third dataset—criminality—provides individual-year-level information of captures of ex-combatants after demobilization.

Gold Mining Data

The geographic variation in illegal gold productions is drawn from the mining census published by the Colombian Ministry of Mines and Energy in 2010. The census contains records of the number of illegally mined gold deposits in each municipality prior to 2009. Municipalities are the lowest level of disaggregation in the census. Furthermore, because the geographical measure of gold production is defined before the period of analysis of this article and the expansion of Colombia's illegal gold mining industry, the records do not reflect potentially endogenous production efforts correlated with the main outcomes over the period of analysis. The census was carried out in more than six hundred municipalities that reflect the places that, due to geographical characteristics, the government identified as potential producers (see Supplementary Figure A.6). The census counts the number of mines without permits in each municipality and the variable changes from 0 to 254, with the activity concentrated in the Caribbean and Andean regions. Information about other municipal-level characteristics comes from the National Department of Statistics (DANE), the municipal panel from the Centro de Estudios sobre Desarollo Economico (CEDE) of the Universidad de los Andes, and data collected by Acemoglu, Garcia-Jimeno, and Robinson (2015) and Dube and Vargas (2013).

The other identifying source of variation comes from changes in the international price of gold from 2013 to 2016. The data on the international price of gold and other commodities were obtained from the World Bank Global Economic Monitor Commodities Database. Importantly, Colombia is not an international price maker in the gold market, so variations in the

price of gold experienced during the period studied can be arguably considered exogenous to local production (Dube and Vargas 2013).

Conflict Experience

I use two different sources to create the wartime network measure. The first is a census of ex-combatants conducted by the Colombian Agency of Reintegration (Agencia Colombiana para la Reincorporación y la Normalización, ARN) as part of the reintegration process. The survey contains information concerning the population of paramilitary members who initially demobilized. It also includes information about the subunit inside the larger structure of the paramilitary organization to which each ex-combatant belonged during the conflict, which enables me to identify which individual belonged to which subunit. The list of units is shown in Supplementary Figure A.3. The paramilitary organization AUC had 41 subunits at the time of demobilization.

Second, to capture the rank of each ex-combatant during the conflict, I use information from a survey conducted by ARN and the International Organization for Migration about conflict experience. The survey includes questions about the rank inside the organization of 16,761 paramilitary ex-combatants. The ranks mentioned in the survey vary from commander to foot soldier. The survey, known as Base Line (Línea Base), was implemented for several months beginning in 2007 and is one of the most comprehensive datasets about ex-combatant experience. Supplementary Figure A.3 also shows the recognized subunits, the ranks/positions identified by the agency, and the number of members in each wartime group.

Using both sources of information, I construct the links between all the individuals in my sample. Two individuals are considered to be linked if they were of the same rank and served in the same subunit for at least 1 year during the conflict. This way of capturing wartime connections is based on interviews and ex-combatants' recollections about the most important connections during the conflict.

The representation of the network resembles the "military squads network" in basic network classifications (Christakis and Fowler 2009), in which the group is described as having a transitive relationship in which all those involved know each other. I provide additional justification for this selection with qualitative and survey evidence in Section K of the Supplementary Material and consider variations of the wartime connection definition in the empirical analysis. The section contains a complete description of the original survey with ex-combatants about wartime connections.

There are a total of 559 groups/networks in the sample. The average group has approximately 30 members. The smallest group is comprised of 1 individual and the largest has 1,110 individuals. The median group has a size of 4 and there are only 12 groups with more than three hundred people.

Additionally, it is important to highlight that ex-combatants are spread all over the country. In other words, ex-combatants have several wartime peers living outside their own municipality. The empirical analysis includes different versions of the network definition, including only subunit membership and time spent together during the conflict.

Criminality

In order to examine whether ex-combatants exposed to changes in returns to illegal activities are more likely to engage in crime, I use confidential and anonymized information from the National Police of Colombia on the universe of ex-combatants captured in the period of 2013 to 2016. I use an indicator of whether an ex-combatant was captured for a crime during the period of study along with the type, location, and date of the last crime this person committed. There are two categories of captures reported in the data: captures as a result of an investigation (labeled *Capture* in the analysis) and captures in flagrante (labeled *Red-handed capture* in the analysis). Supplementary Figure A.1 displays the distribution of crimes among ex-combatants across Colombia and Figure 1 shows the types of crimes for which ex-combatants were arrested according to the articles of Colombia's penal code.

I do not rely on perceptions, opinions, or self-reported participation in criminal activities, and instead use a behavioral indicator. This is the best available information, because it is used to measure individual-level criminal behavior—it is used in all other studies about postconflict criminality. However, there are some concerns that are worth discussing. One is that captures reflect law enforcement capacity and the results may reflect the contagion of "law enforcement capacity" instead of contagion of crime. To minimize this concern, the main analysis focuses on in flagrante captures, because these captures are less dependent on police investigation and may be carried out by citizens.[14] I discuss other possible concerns associated with this measurement in light of the results in a separate section in the Supplementary Material.

I provide a list of all the variables used in the article and identify their source in the replication materials (Vásquez-Cortés 2024). When data are restricted, I explain how other researchers can request it.

Identification

Recall that the identification problem arises from the presence of y_{it} on both sides of Equation 2. Following Manski (1993, 534) and provided that $\beta \neq 1$, we can define the social equilibrium by considering the expectation on both sides of Equation 2:

$$E_{gt}[y_{it}] = E_{gt}[x_{it}]\frac{\eta}{1-\beta} + \frac{\alpha_g}{1-\beta} + \frac{\tau_t}{1-\beta}. \quad (3)$$

[14] Article 32 of the Political Constitution of Colombia establishes that an offender who is caught in flagrante delicto, i.e., while committing a crime, can be apprehended either by the authorities or by a private citizen.

Suppose that this equilibrium holds for the observed data in each period t. Then, substituting Equation 3 back into the individual-level model in Equation 2, we have

$$y_{it} = E_{gt}[x_{it}]\theta + x_{it}\eta + \alpha_g^* + \tau_t^* + \epsilon_{igt}, \tag{4}$$

where $\theta = \beta\eta/(1-\beta)$. The first element of Equation 4 estimates the mean of the economic change for members of the group, the second element estimates the variation in the economic returns for each individual, and α_g^* and τ_t^* are the rescaled group and time effects, respectively.

If we can (1) identify coefficients on $E_{gt}[x_{igt}]$ and x_{igt} and (2) partial out the group and time effects, then we can back out β, which is the social interaction parameter of interest:

$$\hat{\beta} = \frac{\hat{\theta}}{\hat{\theta} + \hat{\eta}}. \tag{5}$$

The conditions that are sufficient to identify β are the following: first, to identify coefficients on $E_{gt}[x_{it}]$ and x_{it}, we need that $E_{gt}[x_{it}]$ and x_{it} not be confounded with respect to ϵ_{igt}. We also need that $E_{gt}[x_{igt}]$ and x_{igt} not be perfectly collinear. We obtain this with the variation in x_{igt}, which is equivalent to the effect of each shock *within* the groups indexed by g.

In other words, β will capture the effect on criminality of the criminal activity of peers who were affected by the exogenous economic variation by transforming the coefficients of the individual- and group-level estimations.

The treatment variable for the individual-level effect, x_{igt}, is the price of the commodity interacted with the intensity of its production in the municipality of residence of i in year t. In the case of gold, the shock is the interaction of the international price of gold with the number of illegal gold mines in the municipality. The outcome of interest, y_{it}, measures the number of red-handed captures of individual i in year t:

$$y_{it} = \underbrace{E_{gt}\left[\left(Price_t \times Intensity_{ig}\right)\right]\theta}_{\text{MeanGroupSchok}_{gt}} + \underbrace{\left(Price_t \times Intensity_{ig}\right)\eta}_{\text{PriceShock}_{it}} + \alpha_g^* + \tau_t^* + \epsilon_{igt} \tag{6}$$

To partial out the group and time effects, I take advantage of the panel data and include group (α_g^*) and time (τ_t^*) fixed effects. For reasons of robustness with fixed effects models, I use ordinary least squares to estimate the parameters and then the delta method for inference on $\hat{\beta}$. That is, to estimate the peer effects, β, I compute the estimates and standard errors for the composite parameters estimated in the main specification in Equation 6. I cluster standard errors at the group level and provide additional results with individual and municipality clustered standard errors.

In addition to estimating the parameters of the model, I conduct several robustness checks to address potential concerns. First, in all estimations, I include municipality fixed effects. By including these fixed effects, I control for invariant differences between gold- and non-gold-producing municipalities. Second, I include time trends to control for changes in aggregate time trends across years. Third, I include region time trends and municipality-specific time trends for a set of baseline characteristics.[15] These interactions are included to control for potential differential changes across types of municipalities. More importantly, the municipal-level variables related to mobility and connectivity (distance to Bogotá and paved primary roads) enable me to control for any potential biases coming from differential trends in districts that have greater economic needs or are potentially more connected. Finally, I include a set of individual-level characteristics (age, gender, and race).

RESULTS

In this section, I present the main results. First, I provide evidence that ex-combatant criminal records are significantly affected not only by their local economic conditions but also by their wartime peers' average criminal activity. I complement these main results in two ways. First, I consider the effect for different levels of the strength of the wartime connection. I look at the size and precision of the peer effects for connections that range in duration from 1 to 5 years during the conflict. Second, I examine the elements driving the peer effects by showing results for collective and individual crimes separately. I show that peer effects are mostly driven by the effect on collective crimes.

Economic and Peer Effects

Panel A of Table 1 shows the estimation of the parameters in Equation 6 and Panel B shows the estimation of the peer effects following the transformation in Equation 5. The shocks have been standardized across all estimations. All columns include group, time, and municipality fixed effects. Results show that higher economic returns for illegal activities are positively associated with an increase in criminality. The coefficient on the individual economic changes in column 1, reflecting variation in local economic returns to illegal markets, shows that a one-standard-deviation increase in the treatment is associated with an increase between 0.372 and 0.394 red-handed captures, depending on the specification. The main results are consistent with the theoretical expectations and other studies about commodity prices shocks and crime.

[15] Colombia is divided into five regions. I include municipality-specific baseline time trends for poverty index, total population, distance to local market, kilometers of paved primary roads, and distance to Bogotá.

TABLE 1. Effect of Gold-Price Shock and Effect of Peers Criminality—Red-Handed Captures

	Red-handed captures				
	(1)	(2)	(3)	(4)	(5)
Panel A: Economic shock and average shock for the group					
Economic shock	0.393***	0.394***	0.372***	0.379***	0.380***
	(0.0881)	(0.0882)	(0.0885)	(0.0932)	(0.0932)
Average shock	0.256**	0.256**	0.275**	0.289**	0.286**
	(0.104)	(0.104)	(0.107)	(0.114)	(0.114)
Panel B: Criminal peer effects					
Peer effect	0.394***	0.394***	0.425***	0.433***	0.430***
	(0.125)	(0.125)	(0.127)	(0.134)	(0.135)
Mean of outcome	0.0242	0.0242	0.0244	0.0243	0.0244
SD of outcome	0.1697	0.1697	0.1703	0.1704	0.1704
Observations	36,746	36,746	36,340	34,868	34,865
Municipality, year, and group FE	✓	✓	✓	✓	✓
Time trends		✓	✓	✓	✓
Region × Year			✓	✓	✓
Municipality characteristics TT				✓	✓
Individual covariates					✓

Note: The dependent variable includes only red-handed arrests for the 2013–16 period. Panel A shows the result of estimating Equation 6, where the first row represents the effect of the shock for individual *i* and the second row represents the average shock for the group *g*. The economic shock is defined as the interaction of the natural logarithm of the international price of gold and illegal gold production, in standard deviations. Panel B shows the estimation in Equation 5, representing the effect of wartime peers' arrests on *i*'s criminality. Standard errors in parentheses clustered at the group-wartime level. Municipality characteristics include pretreatment levels of poverty, population, distance to Bogotá, and kilometer of paved primary roads. Individual controls include age, gender (female), and race (Indigenous and Afro). *** = significant at the 1% level, ** = significant at the 5% level, and * = significant at the 10% level. Complete model results included in Table A.23 in the Supplementary Material.

The most important result is the robust, positive, and significant effect of peers' criminal activity on the likelihood that an ex-combatant will be captured. Column 1 of Panel B shows the coefficient associated with the peer effects from the theoretical model. There is a significant effect of wartime peers' criminality on individual criminal activity. A one-standard-deviation increase in the average criminal activity of an ex-combatant's group increases the ex-combatant's criminal record between 0.394 and 0.433 red-handed captures, depending on the specification. This estimate captures the effect of an increase in the average criminality of the wartime group as a result of economic changes in the groups' municipalities. Given that the peer effect reflects the impact of the actions of group members, the size of the impact depends both on each individuals' group characteristics (i.e., exposure to the shock at the group level) as well as to what is going in that individuals municipality (i.e., the individual shock). Thus, the effect will change for individuals depending on where they reside, and their group characteristics.[16]

The results in Table 1 are consistent across different specifications and robustness checks as explained in the Identification section. The magnitude of the coefficients barely changes compared to the baseline estimation. Economic changes and peer effects remain similar when I include time trends, region- and municipality-specific time trends, and individual covariates. Column 3 includes the interaction of region and year; column 4 includes the interaction of municipality characteristics with year, which accounts for potential biases stemming from differential trends in places that may have been more affected by violence; and column 5 includes individual covariates. Complete model results for all results in the article can be found in the Supplementary Material as part of the replication materials.

Robustness

I address some potential concerns regarding the main identification strategy. First, I replicate the analysis with all types of captures, not only red-handed (Supplementary Table A.2). Second, I exclude from the analysis groups with more than 500, 250, and 100 members (Supplementary Table A.4). Third, I consider different measures of the treatment and sample, focusing on municipalities with low to no illegal

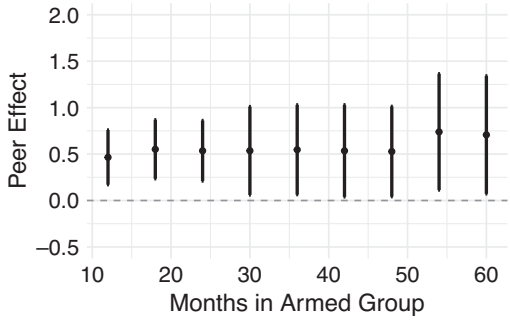
[16] For example, for an individual who belonged to the group of foot soldiers of the Bloque Venecedores de Auraca, a group of about 340 members residing in several different municipalities, the change in the mean group shock between 2015 and 2016 amounts to an increase in criminality from 62 to 66 percentage points (pp) (depending on the specification) with respect to the mean criminality. On the other hand, the effect for an individual who was a foot soldiers in the Bloque Catatumbo, the change in the mean shock during the same period, amounts to an increase in criminality between 16 and 17 pp.

gold production (Supplementary Table A.5). All results are consistent with the idea that local economic conditions and peers' activity affect recidivism after conflict.

I perform additional tests that are included in the Supplementary Material as part of the replication materials: I replicate the main analysis, clustering standard errors at the individual rather than the group level (Supplementary Table A.8), I consider the effect of a change in the production levels of other legal commodities such as oil (Supplementary Table A.11), I perform a falsification test with the leads of the treatment (Supplementary Table A.12), and I look at the impact of the gold shock on ex-combatants' noncriminal activities (Supplementary Table A.18).

In sum, a clear pattern emerges in which illegal markets and peers' activity play important roles in recidivism.

FIGURE 5. Peer Effect of Strong Ties: Time Together in Conflict



Note: Estimation of peer effects following Equation 6 and Equation 5, considering groups in which all members were in the same armed unit between 1 and 5 years. Complete model results included in Table A.42 in the Supplementary Material.

Strong and Weak Wartime Ties

The results should vary if we consider a definition of wartime network that affects the strength of the connection between peers. To address this possibility, I consider variations in the effects for arguably stronger and weaker links. The stronger ties refer to the time ex-combatants spent all together during the conflict: people who spent a long period of time together during the war may show differential peer effects than if they had spent a short period of time together. Figure 5 shows the peer effects for different wartime connections in which all members of the wartime network spent the same time together. The results show that when all members of the newly defined group spent more time together, the peer effect increases. The estimated peer effect coefficient for 1 year together in conflict is about 35% smaller than the one estimated for 4 and 5 years. These results are consistent with the central intuition. Nevertheless, the results are to be taken with some caution: time spent together is self-reported in months (which explains the concentration of observations every 6 months in the data). Additionally, the argument is that the collective experience of conflict essentially determines the bonds of war. Therefore, the strength of the relationship should only slightly change the effects we find. Importantly, more time spent together during the conflict could also imply that ex-combatants switched units and rose in rank during the war. While mobility was low, we should expect that more time in conflict was related with more time spent with peers.[17]

We can also consider a definition of the network that incorporates weaker ties. In Supplementary Figure A.5, I show that the peer effects are consistent if we define a weaker wartime connection in which two people belong to the same network because they belong to the same unit—regardless of rank. While the peer effects coefficient is positive, its magnitude shrinks compared to the other results with stronger ties (see Supplementary Figure A.4).

Overall, although the results found by using different definitions of the wartime network show some slight change, the magnitude and relevance of the coefficients confirm the intuition behind each network: stronger ties are associated with a larger peer effect and weaker ties with a smaller peer effect. The effect that the criminal activity of an ex-combatant has on the criminal records of his wartime connections increases as the time spent in the same unit and rank during the war increases.

Collective and Individual Crimes

In this section, I study the effect of economic changes and peers' activity, separating the types of crimes for which ex-combatants were captured. Table 2 shows the estimations of economic returns in Panel A and the peer effects in Panel B for *collective* crimes. In constructing this classification, I follow Khanna et al. (2023), who rely on the Colombian National Police's categorization of gang-related crimes. The list with the classification is in Table A.14 in the Supplementary Material in the replication materials. Collective crimes include homicide, extortion, and organized crime/conspiracy, among others. Individual crimes include simple assault, sexual harassment, and use of false identification, among others.

The results show an increase in criminality as a result of the economic changes for collective crimes. Column 1 shows that a one-standard-deviation increase in the average criminality of the group is associated with around 0.3777 more collective crimes. Columns 2–5 replicate the additional specifications to address some of the potential concerns regarding the main identification strategy. The results are consistent across all of these tests.

[17] Additional information from an original survey administered by the author in Section K of the Supplementary Material shows that ex-combatants spent more time with other fighters in their unit and of the same rank than with any other combatant during the war.

TABLE 2. Economic Shock and Peer Effects—Collective Crimes Only

	Red-handed captures for collective crimes				
	(1)	(2)	(3)	(4)	(5)
Panel A: Economic shock and average shock for the group					
Economic shock	0.343***	0.344***	0.315***	0.279***	0.279***
	(0.0777)	(0.0777)	(0.0740)	(0.0776)	(0.0776)
Average shock	0.167*	0.168*	0.188**	0.210**	0.208**
	(0.0867)	(0.0869)	(0.0894)	(0.0974)	(0.0971)
Panel B: Criminal peer effects					
Peer effect	0.328**	0.328**	0.374***	0.429***	0.427***
	(0.139)	(0.139)	(0.140)	(0.155)	(0.155)
Mean of outcome	0.0173	0.0242	0.0244	0.0243	0.0244
SD of outcome	0.1458	0.1697	0.1703	0.1704	0.1704
Observations	36,746	36,746	36,340	34,868	34,865
Municipality, year, and group FE	✓	✓	✓	✓	✓
Time trends		✓	✓	✓	✓
Region × Year			✓	✓	✓
Municipality characteristics TT				✓	✓
Individual covariates					✓

Note: The dependent variable includes only red-handed arrests for collective crimes in the 2013–16 period. Panel A shows the result of estimating Equation 6, where the first row represents the effect of the shock for individual *i* and the second row represents the average shock for the group *g*. The economic shock is defined as the interaction of the natural logarithm of the international price of gold and illegal gold production in standard deviations. Panel B shows the estimation of Equation 5, representing the effect of wartime peers' arrests on *i*'*s* criminality. Standard errors in parentheses clustered at the group-wartime level. Municipality characteristics include pretreatment levels of poverty, population, distance to Bogotá, and kilometer of paved primary roads. Individual controls include age, gender (female), and race (Indigenous and Afro). *** = significant at the 1% level, ** = significant at the 5% level, and * = significant at the 10% level. Complete model results included in Table A.24 in the Supplementary Material.

Taken together, these results show that the criminality of wartime connections had a major impact on an ex-combatant's probability of being captured. The results are concentrated among collective crimes, which are the types of crimes that are most likely to be susceptible to changes in prices and illegal returns and, more importantly, to changes in the criminal activity of peers.

I subject the main estimates to additional tests. I briefly summarize these tests here and provide greater detail on each of them in the Supplementary Material and replication materials.

Measurement. An extensive discussion is devoted to measurement error in Supplementary Section G. I expand on the earlier discussion of the benefits and limitations of using capture as a proxy for crime.

Ex-Combatant Mobility. In Supplementary Section H, I show that the results are robust when I examine individuals who moved to a different municipality (Supplementary Table A.6). The results rule out the possibility that the effects are driven by local enforcement in gold-producing areas.

Dyad Analysis. In Supplementary Section I, I conduct a dyad analysis, in which instead of considering the group-to-individual (g–i) effect, I rearrange the data to estimate the individual-to-individual (i–j) effect (see results in Supplementary Table A.7).

Original Survey. Supplementary Section K presents the results of the analysis of an original survey with ex-combatants in Colombia to explain better the relevance of social networks (Supplementary Figure A.9) and wartime peers in recidivism and reintegration processes (Supplementary Figure A.10).

The following additional results are included in the Supplementary Material as part of the replication materials:

Placebo Network. I show that changes in gold price are not associated with variation in captures for a *placebo* network of ex-combatants (see Supplementary Table A.9). That is, I show that it is not the case that a variation in the price of gold is associated with more captures for all other ex-combatants in all other municipalities, but only for those previously connected.

Economic Integration and Spatial Correlation. Given that some municipalities in Colombia are highly economically and socially integrated, it is essential to perform additional tests that consider mobility between municipalities, labor markets, and the spatial correlation of the economic shock (see Soifer 2019 for a broader discussion). Therefore, I show consistent results (Supplementary Table A.13) correcting for spatial correlation following Conley (1999), and I include specifications with additional variables directly related to mobility and labor market conditions (Supplementary Table A.19).

Nature of Collective Crimes. Additionally, Supplementary Table A.15 shows that all captures, not only red-handed, increase as a result of the economic shock. In this case, peer effects are also positive and comparable with other results, but are not significant. To

complement this result, as a placebo test, Supplementary Table A.16 presents data showing that the economic shock does not have a significant effect on captures related only to individual crimes.

Noneconomic Crimes. I present an additional discussion about the economic and collective nature of some crimes such as arms possession and homicide (Supplementary Table A.17) and other noneconomic crimes (Supplementary Table A.18).

Centrality and Other Individual Measures. I present a descriptive correlation of illegal gold production and crime (Supplementary Table A.20), the relationship between crime and other individual-level variables including the ARN reintegration index (Supplementary Figure A.11), education (Supplementary Figure A.12), and centrality measures (Supplementary Table A.21).

Historic Gold Production. To discuss the implications of the illegality of the commodity studied in the article, I show that there are no significant peer effects when we consider places where historically more gold, not only illegal, has been produced (Supplementary Table A.22).

DISCUSSION

The previous section showed that postconflict crime is influenced by changes in local economic conditions and peer effects. These results have implications regarding peace-transition activities.

It is important to underscore the relevance of the armed group's recruiting strategy and the demobilization process. On the one hand, several studies have shown that material incentives were indispensable for the paramilitaries (Francisco 2008; Nussio and Ugarriza 2013). This element is vital to our argument because we focus on the impact of economic shocks. On the other hand, the collective demobilization of paramilitaries makes it possible to argue that ex-combatants may maintain links with former combatants after demobilization. The findings pin to demobilizations that occur collectively and not to those of people who abandon their military structures because they are no longer part of that criminal network. Deserters generally do not respond to wartime commanders or peers after demobilization. In fact, the behavior of FARC deserters is different in many respects (Oppenheim et al. 2015).

We can consider alternatives to reduce reliance on war networks in the aftermath of conflict. The first step is to estimate the effect of reducing dependency on criminal networks. What would be the effect, for example, of a policy that addresses war networks? To answer these questions, in Section J of the Supplementary Material, I perform a counterfactual analysis of the predicted values of captures when we reduce wartime connections. As expected, red-handed captures decrease as we reduce network dependency, regardless of economic changes.

However, what does it mean to mitigate criminal connections? The second step concerns strategies to reduce reliance on networks in wartime. Recent evidence on social contact interventions (Lowe 2021; Mousa 2020; Scacco and Warren 2018) appears to suggest a promising avenue for this type of policy, through which participants can reduce their prejudices toward out-groups and, what is more important in this case, create new connections. Reducing criminal networks in the counterfactual experiment can also be interpreted as expanding noncriminal networks.

However, this analysis should not be taken as suggesting that all types of combatant connections should be broken. The expectation with such an intervention is that ex-combatants keep their friendships and political and social wartime networks unchanged. An individual can have different networks for different purposes; the results of the experiment point to economic connections, specifically new ones outside the former military structure, as potentially being able to promote reintegration.

CONCLUSIONS

This article studies the social logic of recidivism among former members of illegal armed groups. I argue that the networks that combatants develop during conflict facilitate delinquent behavior after demobilization. Given the time spent in military life, ex-combatants may rely on wartime connections in relation to many different activities. These connections are not necessarily the primary ties that they hold as civilians, being mostly weak ties, but these ties do help them to find out about economic, job, and crime opportunities. Therefore, ex-combatants are likely to be affected by the behavior of these connections.

I show that changes in the economic returns to criminal activity increase the participation of not only the ex-combatants directly affected by the local economic changes but also that of their peers during conflict. Contrary to previous studies of Colombian ex-combatants, I consider the local and external conditions that could affect the decision of ex-combatants to participate in crime. In doing so, I study only one group, the paramilitary members, and how their reintegration process was interconnected with the illegal gold-mining industry.

This study highlights the relevance of weak ties for criminal behavior in general and for ex-combatants in particular. However, it is important to note that networks can also play a positive role in the reintegration process. Support networks and political networks, for example, could potentially facilitate reincorporation into civilian life. The fact that some wartime networks, as shown in this article, affect recidivism suggests that the composition, type, and strength of networks should be carefully addressed in postconflict initiatives.

Future research could explore the mechanisms that explain why wartime connections are related to participation in criminal activities. Potential explanations include peer pressure, social status, and responsibility diffusion. All these channels could be studied with a survey that captures the relevance of these factors and further evidence on the effects of wartime connections after peace agreements.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/S0003055424000212.

DATA AVAILABILITY STATEMENT

Limitations on data availability are discussed in the text and Supplementary Material. Research documentation and available data that support the findings of this study are openly available at the American Political Science Review Dataverse: https://doi.org/10.7910/DVN/LXYVSA.

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CONFLICT OF INTEREST

The author declares no ethical issues of conflicts of interest in this research.

ETHICAL STANDARDS

The author declares the human subjects research in this article was reviewed and approved by New York University and certificate numbers are provided in the Supplementary Material. The author affirms that this article adheres to the principles concerning research with human participants laid out in APSA's Principles and Guidance on Human Subject Researc (2020).

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