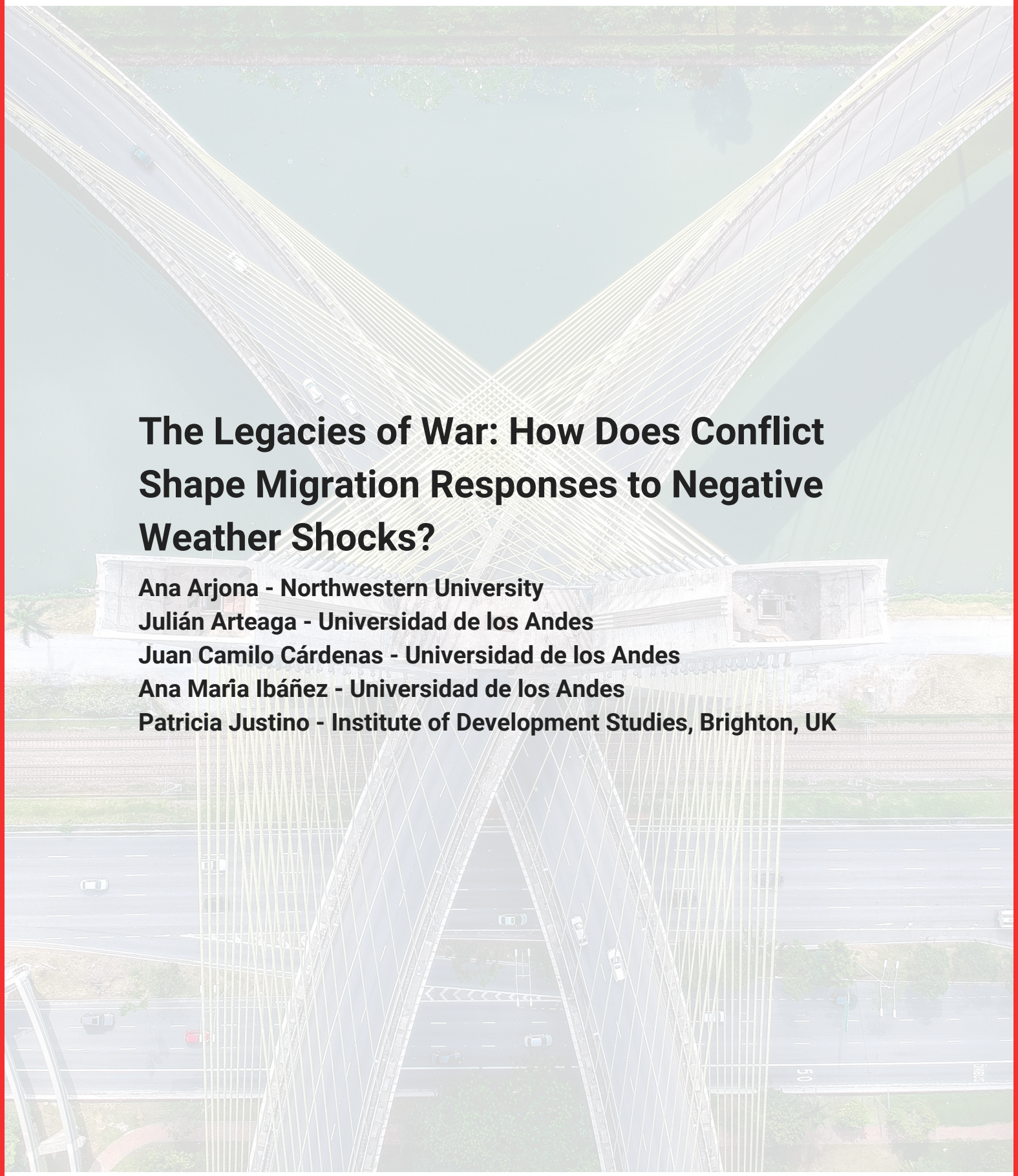

The Legacies of War: How Does Conflict Shape Migration Responses to Negative Weather Shocks?

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The Legacies of War: How Does Conflict Shape Migration Responses to Negative Weather Shocks? [*]

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Abstract

This paper explores the economic legacies of conflict through a particular transmitting mechanism: war-time institutions. The empirical strategy causally identifies households' migration responses to random weather shocks and estimates its heterogeneous impact by the extent of armed group interventions on the communities. Using a household panel in four conflict regions in Colombia, the estimation controls for time invariant unobservables. The study finds that war-time institutions have large and persistent economic impacts. In regions with strong interventions from non-state armed actors (NSAA), households are better able to cope with negative weather shocks compared to those living in regions with NSAA presence but with limited or no intervention. The former households resort less to survival migration, while using formal credits and participation in non-agricultural activities to offset the negative income shock. Strong interventions from NSAA seemingly reduce uncertainty and provide a predictable environment in which civilians can better operate, pushing these households to engage in more profitable activities and a higher income trajectory. Conflict exerts a negative economic impact on households, yet this negative impact is lower if NSAA provide clear and stable rules.

Keywords: armed conflict, institutions, migration, weather shocks, Colombia
JEL Code: D74, H56, O54, Q54, R23

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I. Introduction

The decreasing trend of armed conflicts after the end of the Cold War reverted recently. In 2014, 40 conflicts were active worldwide, representing an increase of 18 percent compared to 2013 and the highest figure since 1999. Thirty nine were internal conflicts. The number of battle related deaths was the highest for the entire post-Cold War period (Pettersson and Wallensteen 2015). In 2013, 471 million people lived in fragile and conflict affected countries and 78 percent of the world's poor lived in these countries (181 million people)[1].

Armed conflict can exert a heavy toll on economic and social development[2]. In the long-term countries may recover from the physical and human capital destruction if a threshold is not surpassed (Murdoch and Sandler 2002, Miguel and Roland 2011, Justino and Verwimp 2013). However, the legacies of conflict can be long lasting through the negative impacts of conflict on children while in utero or during early childhood (Ichino and Winter-Ebmer 2004, Camacho 2008, León 2012), changes in preferences and behavior (Voors, Nillesen et al. 2012, Moya 2013, Carter and Moya 2014, Bauer, Blattman et al. 2016), and institutional transformations (Tilly 1992, Kalyvas, Shapiro et al. 2008, Mampilly 2011, Gilligan, Pasquale et al. 2014, Arjona 2016, Justino and Stojetz 2018).

The purpose of this paper is to study the persistence of the economic legacies of internal conflict through one specific mechanism: rebelocracy. Rebelocracy is the broad intervention of non-state armed actors in civilian affairs which emanates from a social contract between civilians and combatants, allowing both groups to have clear expectations and a framework in which to operate (Arjona 2016). In maximizing control over a territory, NSAA control civilian affairs, provide security and public goods, adjudicate disputes, and regulate economic activities (Wood 2003, Wood 2010, Arjona 2014, Arjona 2016,

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[1] http://data.worldbank.org/data-catalog/world-development-indicators retrieved on the 25th of August. Poverty defined as less than US$1.90 a day.

[2] For detailed literature reviews see Blattman, C. and E. Miguel (2010). "Civil War." Journal of Economic Literature **48**(1): 3-57.

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, Bauer, M., et al. (2016). "Can war foster cooperation?" Journal of Economic Perspectives **30**(3): 249-274.

Sanchez-de-la-Sierra 2017). Although a large literature has studied the economic impacts of violence, this is the first paper to examine the economic legacies of war-time institutions. The impact of these interventions may persist long after NSAA leave the territory.

The paper uses a longitudinal household survey we designed and applied in four conflict areas in Colombia. We collected the baseline in 2010 and two follow-ups in 2013 and 2016. Besides the traditional household information, the survey contains information on direct exposure to violence and community characteristics. We complement the household survey with detailed data at the community level on the informal institutions established by NSAA based on the methodology developed by Arjona (2016). These datasets gather yearly information for each NSAA present in the community throughout the conflict on the imposition of rules to regulate economic, political, and social conduct in the community, the provision of public goods and security, as well as the social interaction between civilians and combatants. Based on this information, we build a 'rebelocracy' index measuring the scope of intervention by NSAA in the communities (Arjona 2016). We restrict our sample to only the communities with prolonged NSAA presence, and estimate the impact of rebelocracy at the intensive margin. In the communities of our sample, NSAA left on average eight years before we applied the survey, rendering this data unique to identify the persistence of the legacies of conflict.

We identify the causal impact of rebelocracy on the ability of households to cope with extreme weather shocks through migration. Migration can be an effective coping mechanism to substitute for income losses caused by negative economic shocks (Halliday 2006, Dillon, Mueller et al. 2011, Bohra-Misra, Oppenheimer et al. 2014, Kleemans 2014, Cattaneo and Peri 2016, Grögger and Zylberberg 2016, Jessoe, Manning et al. 2018). Rebelocracy may shape migration decisions by affecting long-term income trajectories, wealth accumulation and access to markets. Recent studies find violence places households in low income trajectories that persist for several decades (Bozzoli and Brück 2009, Verpoorten 2009, Acemoglu, Hassan et al. 2011, Singh 2012, Arias, Ibáñez et al. 2013, Serneels and Verpoorten 2015, Rockmore 2016), and pushes farmers to lower agricultural production or to reliance on subsistence agriculture to protect their households' welfare (Wood 2003, Brück 2004, Singh 2012, Arias, Ibáñez et al. 2013, Cassar, Grosjean et al.

2013, Serneels and Verpoorten 2015). However, a strong intervention from NSAA may also bring certainty about the rules of the game and predictability to the community, creating incentives for larger investments, wealth accumulation, and a stronger connection to markets. Higher income and wealth provides larger access to financial markets and other coping mechanisms, reducing the need to rely on survival migration (Rosenzweig and Stark 1998). We explore how wealth and greater access to markets shape the impact of NSAA's interventions on the decision to migrate.

Given the non-randomness of NSAA's interventions, our empirical strategy exploits the exogenous variation of two extreme weather shocks, *El Niño* and *La Niña*, to causally identify the impact of rebelocracy on migration responses in Colombia. Our identifying assumption requires that past levels of rebelocracy are not related to the current extreme weather events households faced between 2010 and 2016. NSAA left the communities of our sample eight years ago on average, thereby we can expect that past levels of rebel's interventions and current shock are not correlated. Nonetheless, if weather shocks are correlated across time, it is possible that current weather shocks and past levels of rebelocracy might be correlated. In order to rule out this possibility, we estimate a regression of rebelocracy on current weather shocks, including municipal fixed effects and a vector of controls, and do not a find a statistically significant relation. We also include household fixed effects to control for time invariant unobservables, such as risk and time preferences, which determine migration and are also shaped by the legacies of conflict (Voors, Nillesen et al. 2012, Moya 2013, Carter and Moya 2014, Bauer, Blattman et al. 2016).

Our results show that war-time institutions have large and persistent economic impacts. Households living in regions with stronger rebelocracy cope better with extreme weather events than those living in regions with weaker rebelocracy. Drought shocks reduce consumption, pushing households to survival migration. In communities with higher rebelocracy levels, households need to rely less on survival migration by resorting to financial markets, agricultural production and non-agricultural activities to offset the negative income shock. Wealth and a stronger connection to markets are the transmitting channel through which rebelocracy partially offsets the negative shock. Rebelocracy, by

providing clear rules in which to operate, reduces uncertainty and creates the incentives for households to increase investment and engage in risky and more profitable activities. Indeed, the results are driven by two dimensions of NSAA rule that may reduce uncertainty: provision of public goods, and adjudication of disputes.

Conflict is more than just violence and chaos. NSAA have incentives to provide order and intervene in the communities to control the civil population (Kalyvas 2006, Arjona 2016). These positive effects do not imply that conflict generates economic benefits to households affected by weather-related shocks. What these results suggest is that, in spite of living in conflict-affected communities and presumably under violence and fear, forms of rebelocracy by NSAA may reduce the levels of uncertainty, and allow households to operate within predictable rules. These lower uncertainty levels provide better incentives for higher the investment levels and economic production in the communities with stronger rebelocracy, leading to better conditions today.

We perform several robustness tests. First, we rule out other competing hypothesis: the impact of rebelocracy on social networks. Rebelocracy may also affect the density and effectiveness of social networks, which plays an important role on migration decisions of financially-constrained households. We find this is not the case. Households from regions with stronger rebelocracy do not rely more on their social networks to avoid survival migration. Second, we examine whether other dimensions that may determine rebelocracy in the first place and also the current conditions in these regions might be driving the results: state presence before and after the arrival of NSAA. Our results are robust to including interactions between proxies for these two dimensions and the weather shocks. Third, in order to rule out that rebelocracy is capturing the impact of violence measured by previous studies, we include an interaction term between each weather shock and the total number of internally displaced persons while NSAA were in the community. The coefficient estimates are robust to this inclusion. Lastly, the results are also robust to different measurements of the weather shocks.

Our paper contributes to three strands of the economic and political science literature. A growing body of economic research estimates the negative economic impacts of conflict, where conflict is proxied by measures of violence. These papers find that

conflict leads to the destruction of assets, deterioration of human capital, weakening of institutions, and changes in economic behaviour, all of which resulting in lower income and consumption levels (Camacho 2008, Verpoorten 2009, Blattman and Miguel 2010, Akresh, Verwimp et al. 2011, Justino 2011, León 2012, Singh 2012, Justino and Verwimp 2013, Grosjean 2014, Serneels and Verpoorten 2015, Rockmore 2016). Recent papers have found more positive impacts of violence and forced recruitment on political participation, collective action, and pro-social behaviour, yet these effects vary depending on the dynamics of conflict and violence against civilians (Bellows and Miguel 2009, Blattman 2009, Voors, Nillesen et al. 2012, Cassar, Grosjean et al. 2013, Gilligan, Pasquale et al. 2014, Bauer, Blattman et al. 2016, Arjona, Bernal et al. 2017). The persistence of these impacts across time is not clear. Some papers find that the negative costs from the destruction brought by violence subsides with time (Murdoch and Sandler 2002, Miguel and Roland 2011). Others show that these effects may persist for decades through the impact on human capital accumulation, social structures, and preferences (Ichino and Winter-Ebmer 2004, Kondylis 2008, Kondylis 2010, Acemoglu, Hassan et al. 2011, Besley and Mueller 2012, León 2012, Grosjean 2014, Justino, Leone et al. 2014). We contribute to this literature by studying an additional channel largely ignored by the economic literature: the creation of war-time institutions and transformation of local institutions brought by the interventions of NSAA on the communities. Our findings show that the impacts of conflict go beyond violent shocks, which is the main proxy of conflict used in the papers mentioned above. We find that the interventions of NSAA on the communities had profound and lasting effects by transforming local institutions and shaping long-term households' income trajectories.

A growing body of work shows that non-state armed actors often take on governance functions in territories under their control (Wickham-Crowley 1987, Weinstein 2007, Mampilly 2011, Arjona, Kasfir et al. 2015, Arjona 2016). As part of their governance strategy, NSAA establish new institutions—understood as the rules that structure human interaction (North 1990)—to regulate the social, economic, and political activities of civilians, creating new forms of local social order (Arjona 2016). Even though several studies have recognized that NSAA often tax the population, regulate economic activities, organize labor, transfer property rights, and restrict access to state institutions (Wood 2003,

Korf 2004, Gutiérrez-Sanin and Giustozzi 2010, Wood 2010, Crost, Felter et al. 2014, Arjona 2016, Weintraub 2016, Sanchez-de-la-Sierra 2017), to our knowledge, no study has investigated the economic legacies of these phenomena in the post-conflict period. One noteworthy exception is Justino and Stojetz (2018) that studies the causal link between war time governance, participation in armed groups and future civic engagement of ex-combatants. Our paper provides the first attempt to trace these effects by focusing on the economic consequences of wartime social order on individuals' decision to migrate in order to cope with extreme weather shocks.

Lastly, our paper contributes to the nascent literature on migration as an ex-post strategy to mitigate the negative impacts of extreme weather shocks (Halliday 2006, Yang 2008, Dillon, Mueller et al. 2011, Gray and Mueller 2012, Bohra-Misra, Oppenheimer et al. 2014, Bryan, Chowdhury et al. 2014, Mueller, Gray et al. 2014, Cattaneo and Peri 2016, Grögger and Zylberberg 2016, Jessoe, Manning et al. 2018). Because people relocate in response to drops in income, ex-post migration movements tend to take place in nearby locations, for short period of times, and might not be an option for people with incomes close to subsistence levels (Yang 2008, Bryan, Chowdhury et al. 2014, Kleemans 2014, Cattaneo and Peri 2016). Our contribution to this literature is twofold. First, we study whole-household migration, which is more permanent and entails higher costs (Agesa and Kim 2001, Bohra-Misra, Oppenheimer et al. 2014), while most of the other papers concentrate on the individual migration of some household members. Second, we explore how the legacies of conflict and extreme weather events interact to shape migration responses.

The remainder of the paper proceeds as follows. Section two discusses the existing literature on the link between weather shocks and migration, and theorizes how the legacies of war-time institutions shape this link. Section three briefly describes the Colombian conflict, and the economic, social and political interventions NSAA undertook in the territory. In section four we describe the panel household survey we designed and collected, as well as the community level data to characterize the interventions of NSAA on the communities. We discuss the empirical strategy, the results and the robustness tests in section five. In section six, we conclude and discuss policy implications.

II. Migration, Weather Shocks and the Legacies of War-Time Institutions

Rural households resort to different strategies to cope with the negative impact on income after a weather shock. In substituting for the income loss, households may rely on private transfers, such as financial credit or selling of assets (Rosenzweig and Stark 1998, Kleemans 2014, Munshi and Rosenzweig 2016). These private resources and transfers depend on the initial wealth of the households and on their access to financial markets. If financially-constrained, households can resort to transfers from community members to mitigate the negative income shock. The insertion of each household into the communities' social networks and the effectiveness of these organizations determine the flow of transfers from community members in times of needs.

Migration is a coping strategy households use if access to financial markets is limited or the support from social networks is not sufficient (Kleemans 2014, Grögger and Zylberberg 2016). After a negative weather shock households may decide to send some household members to nearby towns to earn additional income or in a more radical decision may decide to migrate all together (Halliday 2006, Dillon, Mueller et al. 2011, Bohra-Misra, Oppenheimer et al. 2014, Kleemans 2014, Cattaneo and Peri 2016, Grögger and Zylberberg 2016, Jessoe, Manning et al. 2018).

Migration takes places if the gains from migrating are greater than the migration costs and the costs of losing the transfers from social networks (Rosenzweig and Stark 1998, Munshi and Rosenzweig 2016). The gains from migrating are the difference between the potential income in destination and the agricultural income in origin, which in the present period is affected negatively by the weather shock. After a negative weather shock, migration is oftentimes temporary, and to nearby locations given its lower migration costs (Kleemans 2014).

The relation between initial income and the likelihood of migration after a weather shock is non-linear. Households with the ability to mitigate the negative income shock using private transfers do not need to rely on a more costly strategy, such as migration, to cope with the shock. Conversely, households near subsistence levels or highly dependent on transfers from community members are also less likely to migrate (Munshi and

Rosenzweig 2016). Since migration outcomes are risky and require an upfront investment, people from households near subsistence levels may not be able to migrate to mitigate weather-related shocks (Yang 2008, Gray and Mueller 2012, Bryan, Chowdhury et al. 2014, Cattaneo and Peri 2016).

The legacies of conflict may shape the migration response to weather shocks by affecting wealth and access to markets. Strong levels of rebelocracy may reduce wealth among community members through the regulation of economic activities, the redistribution of assets not necessarily to the most productive households in the community (via patronage links), and the isolation of communities from markets, placing households in lower income trajectories (Bozzoli and Brück 2009, Verpoorten 2009, Acemoglu, Hassan et al. 2011, Singh 2012, Arias, Ibáñez et al. 2013, Serneels and Verpoorten 2015, Rockmore 2016). In fact, high rebelocracy levels may push households to subsistence agriculture or to cultivate particular crops, such as food crops for combatants, isolating farmers further from markets (Wood 2003, Brück 2004, Singh 2012, Arias, Ibáñez et al. 2013, Cassar, Grosjean et al. 2013, Serneels and Verpoorten 2015). A lower wealth and isolation from markets may reduce the income before the weather shock occurs and constrain their access to financial markets once it takes place. This may push households to survival migration as is one of the only options available to mitigate the drop in income.

However, a strong rebelocracy, in spite of being autocratic, may bring certainty by creating clear and stable rules in which community members operate (Arjona 2016). NSAA may provide protection and public goods, adjudicate disputes, and regulate economic activities (Wood 2003, Wood 2010, Arjona 2014, Arjona 2016, Sanchez-de-la-Sierra 2017). By providing these state-like functions that are essential for economic activity, NSAA create a stable environment for households seeking to maximize their current and future income. The certainty and stability brought by rebelocracies may push households to invest more, engage in risky but profitable activities, and increase thus their income and wealth (Arias, Ibáñez et al. 2013). This may also ensure that community members have access to agriculture markets and continue agriculture production, which is of great interest to NSAA because continued agriculture production will provide them with a steady source of revenue extraction (de la Sierra 2014). Higher wealth and a stronger access to markets,

including financial ones, reduce the vulnerability of households to weather shocks and thus the need to recur to survival migration when facing an extreme weather shock.

The final impact of rebelocracy on migration is unknown *a priori*. Households living in regions with strong rebelocracy might migrate less or more in response to the weather shocks. This is ultimately an empirical question which we explore in the following sections.

III. The Colombian Conflict and the Interventions of Non-State Armed Actors

Colombia has faced more than 50 years of conflict. After enduring a bloody conflict in the mid twentieth century, the Liberal and Conservative party brokered a peace deal in 1956 and signed a power sharing agreement. The end of the violent confrontations between both parties was not the end of violence in the country. Liberal guerrilla and self-defense groups remained in isolated rural regions of the country (Sánchez and Meertens 1983). Some of these groups created in 1964 the Revolutionary Armed Forces of Colombia (FARC for its Spanish acronym), a left-wing guerrilla group pushing for an agrarian reform, and better opportunities for the rural population. In 1963, the National Liberation Army (ELN for its Spanish acronym), a left-wing guerrilla group emerged.

By the end of the 80s, the conflict intensified. Both guerrilla groups expanded their presence to wealthier regions of Colombia to fund warring activities by extracting economic resources through kidnapping and extortions (González 2014). In addition, illicit coca production provided massive monetary resources for rebel groups to operate and expand their geographical outreach. Drug-dealers, some large landowners and peasant group created self-defence groups in several regions of the country to combat guerrilla groups. In 1997, most of these right-wing groups came together under an umbrella organization (AUC – United Self-Defence of Colombia). Violence against civilians peaked to unprecedented levels. Between 1985 and 2015, more than 166,000 people died due to conflict, 1,982 massacres were perpetrated by non-state armed actors, and 7.4 million

hectares were illegally seized (GMH 2013, Arteaga, Castro et al. 2017). Eight million people were officially recognized by the state as victims of conflict[3].

The balance of military power shifted after several years of large investments on the government's armed forces. The National Government expanded territorial control and stroke important military blows to FARC, killing some of its leaders and pushing them back to their historic territorial strongholds. In 2006 most paramilitary groups demobilized and in 2016 FARC signed a peace deal with the National Government that lead to their demobilization and transition to a political party. Currently, a peace negotiation between the government and ELN is underway. Violence subsides in some regions of the countries as some residual groups of the AUC and the FARC did not demobilize, and narco-trafficking remains strong.

During the 50 years of conflict, rebel and paramilitary groups intervened in the social, economic and political life of the communities they controlled (Arjona 2016). NSAA regulated private life, imposed social norms, restricted mobility, dictated political behavior and limited freedom of speech (Gutiérrez-Sanin and Barón 2005, GMH 2011, Acemoglu, Robinson et al. 2012, Ronderos 2014, Arjona 2016). Armed groups also transformed and captured local institutions to further their political agenda, collected information and controlled the population (Gáfaro, Ibáñez et al. 2014, Ronderos 2014, Arjona 2016). In communities with weak state presence, NSAA became oftentimes the *de facto* court adjudicating disputes and property rights over land (González 2014, Arjona 2016). The influence over economic life from NSAA was in some cases substantial. NSAA collected taxes, enforced environmental regulations, regulated salaries and working conditions, pushed for the cultivation of certain crops, including coca crops, and invested in public goods, among others (GMH 2010, Gutiérrez-Sanin and Giustozzi 2010, Ronderos 2014, Arjona 2016). The goal of these economic interventions was to increase territorial control, extract economic rents, and earn political legitimacy among the peasant population (Gutiérrez-Sanin and Giustozzi 2010, Arjona 2016).

[3] https://www.unidadvictimas.gov.co retrieved on the 30th of September, 2017.

IV. Data

We use a unique longitudinal household dataset - the Colombian Longitudinal Survey of Universidad de los Andes (ELCA for its Spanish acronym) - that tracks migrants before and after migration. The survey was purposively designed to understand the impacts of conflict on household economic conditions and behavior, but a decision was also made to track migratory movements across the waves. ELCA was conducted in 2010, 2013 and 2016 among 4,555 rural households. The 2010 sample covers four regions, 17 municipalities and 224 rural communities. We selected regions and municipalities within them to maximize variation in conflict intensity. Two regions had a high intensity of conflict,[4] and two experienced low intensity conflict[5]. Within each municipality, rural communities were chosen randomly. The sample is representative of these four regions.

In the follow-up surveys, we resurveyed households and, if they had split-off or migrated, we tracked the households' core group in their new households or host communities. The core group within each household comprises of the head, spouse and children below nine years of age in 2010 of the original household. The attrition rate for 2016 was 13.5 percent.

The household questionnaire contains information on household composition and characteristics of household members, employment, land tenure, asset ownership, agricultural production, consumption, and participation in organizations, among others. We designed a detailed module on incidence of traditional economic shocks and direct exposure to violence between the three waves of the survey. Each household location is geo-coded.

We applied also a community questionnaire in a focus group discussion setting to three community leaders. The purpose of the questionnaire was to collect information on public infrastructure, provision of state services, access to markets, land quality, and incidence of violent events at the community level. The questionnaire also contains a detailed module on presence of armed groups, the history of conflict during the last three years, and the behavior of armed groups.

[4] Middle-Atlantic and Central East.
[5] Cundi-Boyacense and Coffee region.

In order to gather detailed information of the social order NSAA imposed on the communities and the interventions they pursued, we collected qualitative and quantitative data at the community level based on the methodology developed by Arjona (2016). The information on the community questionnaire of the first wave allowed us to identify the communities with prolonged presence of non-state armed actors from 2000 till 2010. We contacted community leaders before starting the field-work to inquire whether NSAA had been present at least for six consecutive months during the time span of the conflict – 35 communities reported armed group presence. We visited all these communities and identified specific individuals with in-depth local knowledge to participate in key informant interviews, historic memory workshops, and quantitative surveys. The interviews elicited information on the imposition of rules to regulate economic, political, and social conduct in the community, the provision of public goods and security, as well as the social interaction between civilians and combatants. For each dimension, we collected yearly information for each armed group present on a range between two and five variables. We also collected information on the conditions before NSAA arrived to the community.

Based on this information, we build a rebelocracy index that measures the scope of economic, social and political interventions of NSAA in the communities. We sum the variables that compose each of the six dimensions by dyad of year and NSAA, and normalize them. We then sum all dimensions to build and normalize the yearly rebelocracy index by NSAA, and calculate the maximum overall value for each community. An index equal to zero means that interventions are restricted to security or taxation, while an index equal to one means full rebelocracy, implying an intervention of NSAA on all six dimensions (Arjona 2016). Our variables of interest are the maximum aggregate rebelocracy index at the community level, and three dimensions that might strongly influence economic activity by bringing certainty and clear rules to operate: provision of public goods, ruling of political conduct, which main component is adjudication of disputes, and regulation of economic activities.

Because presence of NSAA is highly correlated to community characteristics that also determine migration responses, we restrict the sample to the communities with NSAA presence. Our analysis thus concentrates on the intensive margin – the impact of

rebelocracy levels given NSAA presence – and not on the extensive margin – the impact of having lived under rebelocracy. The NSAA sample contains 35 rural communities and 617 households. In order to check for attrition bias, we estimate the probability of falling from the sample on household and community characteristics. Table A1 in the appendix shows attrition is not correlated to observable characteristics. In particular, the coefficient index for rebelocracy levels is not statistically significant.

Descriptive statistics for this data is presented in Table 1. NSAA were present in the community nine years on average with a maximum of 37 years. The average rebelocracy index is 0.18, suggesting a limited scope of interventions in the communities. Nonetheless we have a large variation across communities with a minimum of 0 and a maximum rebelocracy index of 0.53. The strongest dimensions are the provision of protection (0.441), the imposition of social norms (0.305) and ruling over political conduct (0.262). Indeed, in 82.8 percent of these communities NSAA punished rape or robbery, in half of them mobility was regulated, and in 46.8 percent freedom of speech was restricted. Regulation of economic activities, albeit weaker, was also important: in 35.7 percent of communities NSAA requested monetary contributions, and in near 23.2 percent they regulated economic activities, for example. In addition, in 21.8 percent NSAA adjudicated disputes and in 2.6 percent of the community they provided public goods.

[Table 1 goes about here]

We merge the ELCA data set to daily data on rainfall collected between 1980 and 2016 for 1,365 monitoring stations of the Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM). Using the geographical coordinates of each household, we merge each to the three closest weather stations[6]. This data allow us to calculate indexes of excessive rainfall and drought shocks.

Colombia faced two extreme weather events between 2010 and 2016. In July 2010, after we finished collecting the ELCA baseline, *La Niña* started and lasted till April 2011. *La Niña* caused rainfall well above historical averages and reached maximum historical levels in some regions. Several regions of the country suffered flooding, and landslides,

[6] The average distances to the closest, second closest and third closest stations are respectively 6.38 kilometers (km), 9.69 km and 12.87 km.

which affected nearly seven percent of the population (3.2 million)[7]. In order to estimate the index of excessive rainfall, we use the following procedure: (i) calculate the monthly historical averages and standard deviations per monitoring station; (ii) calculate the monthly number of days per monitoring station in which the rainfall was 1.5 standard deviations above the monthly historical averages during the three years before each wave[8]; and (iii) average the number of days for the three monitoring stations. The excessive rainfall index measures the average number of days with rainfall 1.5 standard deviations above the historical mean. We conduct robustness tests using 0.5 and one standard deviations above the historical means.

In May 2015, the second strongest *El Niño* since 1950 started in Colombia. The high temperatures lasted until May of 2016 and caused severe droughts as well as a significant reduction in river flows and reservoirs' water levels. Indeed, in some cases water levels reached the historical minimum levels[9]. The droughts severely affected agricultural production, reducing food supply and causing a sharp increase in food prices. Food inflation increased to 10.9 percent in 2015 from 4.7 percent in 2014[10]. We use the Standardized Precipitation Index (SPI) to measure the drought shock. We calculate the monthly SPI for each monitoring station, and define that a drought shock occurs in a monitoring station when the SPI is less than minus one. We define a household having had a month with a drought shock if at least two of the three monitoring stations had a SPI lower than minus one. The drought index for each household measures the number of months with a drought shock during the three years before each wave[11]. We test the robustness of the results modifying the drought shock: (i) using the SPI threshold of minus 1.5; and (ii) defining a drought when at least one weather station had a SPI below minus one.

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[7] http://www.cepal.org/publicaciones/xml/0/47330/OlainvernalColombia2010-2011.pdf retrieved on September 7th of 2017.

[8] The three periods are: (i) 2008-2010; (ii) 2011-2013; and (ii) 2014-2016.

[9] http://www.ideam.gov.co/web/tiempo-y-clima/clima/fenomenos-el-nino-y-la-nina retrieved on September 7th of 2017.

[10] http://www.banrep.gov.co/docum/Lectura_finanzas/pdf/informe-gerente-2017-abr.pdf retrieved on September 7th of 2017.

[11] The three periods are: (i) 2008-2010; (ii) 2011-2013; and (ii) 2014-2016.

V. Empirical strategy

The purpose of this paper is to identify the impact of rebelocracy on the migration responses to extreme weather shocks. We use panel data of three periods – 2010, 2013 and 2016 – to identify the causal impact of excessive rainfall and drought shocks on the probability of migration, and estimate the heterogeneous effect of these responses with respect to rebelocracy levels. The heterogeneous effect captures the legacies of NSAA interventions. We then explore whether wealth and access to markets is the potential mechanism through which rebelocracy levels affect the migration response.

The probability of migration of household *i* from community *j* located in municipality *k* in period *t* is defined by

$$y_{ijkt} = \beta_0 + \beta_1 \sigma^r_{ijkt} + \beta_2 R_{jk} * \sigma^r_{ijkt} + \beta_3 \sigma^d_{ijkt} + \beta_4 R_{jk} * \sigma^d_{ijkt} + \beta_5 X_{ijkt} + \gamma_i + \delta_k * \lambda_t + \varepsilon_{ijkt}$$

where y_{ijkt} are the migration outcomes. In order to account for distance of migration, we estimate the regressions for overall migration, migration to rural areas, and migration to urban areas. Survival migration is usually to nearby locations and for short periods of time (Kleemans 2014). Therefore, we expect that migration to rural areas captures survival migration. These dichotomous variables are equal to one when the household migrated between 2010 and 2013, or between 2013 and 2016. Twenty four percent of households migrated in 2013 and in 2016. The bulk of migration in both periods was to rural areas (19% in 2013 and 14% in 2016).

The rainfall shock $\left(\sigma^r_{ijkt}\right)$ measures the number of days with rainfall levels 1.5 standard deviations above the historical levels during the three years previous to each survey. σ^d_{ijkt} is the drought shock and measures the number of months during the last three years in which at least two monitoring stations matched to the household had a SPI below minus one. In Table A2 of the appendix, we report the descriptive statistics for each shock. Between 2011 and 2013, when *La Niña* occurred, the average number of days of excessive rainfall was 191, with some households facing 266 days of excessive rainfalls. The average

number of months with drought between 2014 and 2016, the period of *El Niño*, is 4.6, with a maximum of 13 months.

R_{jk} represents the maximum rebelocracy levels at community j throughout the period that NSAA were present in the community. β_2 and β_4 are the coefficients of interest, and estimate the heterogeneous impact of the legacies of conflict on migration responses. Some of the conditions that favored the intervention of NSAA also influence the household's economic conditions, and their ability to respond to weather shocks. For example, NSAA may be able to regulate economic activities in communities with weak institutions, or NSAA may decide to strongly intervene in communities to impose social order and control the territory when it provides the opportunity for extracting valuable rents (Arjona 2016). In order to estimate a causal impact, we exploit two extreme and random weather events: *El Niño* and *La Niña.* We interact these two weather shocks with rebelocracy levels. Maps A1 and A2 illustrate the variation we are exploiting using the examples of four of the 35 communities. We are comparing the response of households across communities with similar rainfall or drought shocks but with different rebelocracy levels.

We estimate each regression using the aggregate rebelocracy index, and then separately for the provision of public goods, ruling over political conduct, which includes adjudication of disputes, and regulation of economic activities. By estimating separately the coefficients for these three dimensions, we are probing whether these exert the stronger influence on wealth accumulation and access to markets as we expect[12].

Our identifying assumption is valid if past rebelocracy levels are not correlated with these two weather shocks. By 2010, the baseline year of our survey, NSAA had left the community eight years ago on average (Table 1). Therefore, past rebelocracy levels are not related to current weather shocks. However, weather shocks can be serially correlated. For example, communities that endured a high impact of *La Niña* in 2010 and 2011 might periodically suffer periods of excessive rainfall. This may cause a correlation between past rebelocracy levels and current weather events. Table A3 reports the coefficient estimates

[12] Results for the six dimensions are available upon request.

for a community level regression of rebelocracy levels on rainfall levels between 2010 and 2013, drought levels between 2013 and 2016 and municipal fixed effects. The coefficient estimates for the two weather shocks are not statistically significant which rules out the possibility of a strong correlation between current weather shocks and past rebelocracy levels. In addition, household fixed effects controls for the historical weather conditions of the community. Table A4 compares the mean of socio-economic variables for communities with: (i) rebelocracy levels below the median; and (ii) equal or above the median. The differences are only statistically significant for incidents of violence at the community level and the highest education level achieved.

We control for household fixed effects (γ_i) that absorbs all time-invariant unoservables such as risk and time preferences. The household fixed effects also control for the victimization households faced while NSAA were present. Exposure to violence may have affected the wealth levels and access to markets, which is the mechanism we are exploring and is also strongly correlated to rebelocracy levels. In spite of this, we estimate additional robustness tests to rule out that we are capturing the effects of violence during conflict and not rebelocracy levels. In addition, we control for municipality fixed effects (δ_k) interacted by year (λ_t) to control for specific trends at the municipality level.

X_{ijkt} are household controls that include gender of the household head, household composition (number of household members between 0 and 5 years of age, 6 and 17 years of age, 18 and 65 years of age and above 65 years of age), and incidents of violence in the community during the year previous to the survey. We control also for the incidence of health, family, employment, production and asset shocks during the three previous year before the survey[13]. Since weather shocks are strongly correlated with these other shocks,

[13] Adverse shocks are defined according to whether households report having been affected during the three years prior to the survey by any of the following situations: *Health*: illness of any member obstructing their normal activities, accident of any member obstructing their normal activities. *Family*: death of the household head or spouse, death of other members of the household, abandonment by household head or spouse, abandonment by under age, divorce of spouses. *Employment*: household head or spouse lost its job, other family member lost its job. *Production*: bankruptcy or closing of family businesses, failure of crops or livestock loss. *Assets*: loss of dwelling or land plots, destruction of household goods through burglary or fires, loss of remittances.

we report the results with and without controls for these shocks. ε_{ijkt} is the error term. We cluster the standard errors at the original community levels, that is the community in which households resided in 2010.

Table 2 presents a first approximation to gauge whether rebelocracy shapes weather migration responses through wealth and access to markets. The table reports the coefficients estimates for the coefficients of rebelocracy levels, provision of public goods, ruling over political conduct and regulation of economic activities on several outcomes in 2010, which proxy initials conditions, after controlling for municipality fixed effects. Although these are simple correlations, the results are suggestive of the potential mechanisms driving the results discussed in section 2. Households from communities with stronger rebelocracy levels have higher wealth levels, measured with a principal component index of durable assets. In regions with stronger rebelocracy levels, famers have a lower yearly value of agricultural production and are more likely to sell all their agricultural production in the community, yet they are more connected to labor markets and thus more likely to earn non-agricultural income. The provision of public goods is correlated with higher wealth levels, a stronger connection to non-agricultural labor markets and a lower likelihood of selling all goods within the community. Ruling over political conduct and economic regulations are correlated with less favorable conditions for promoting the engagement of households in more profitable activities, and a stronger connection to markets. Regulation of economic activities is negatively associated with the yearly value of agricultural production while ruling over political conduct is positively correlated with a higher likelihood of selling all goods within the community. NSAA regulate economic activities to exert territorial control and not with the objective of maximizing economic surplus. This result is not surprising. In sum, households residing in communities with strong rebelocracy were wealthier in 2010, had more access to labor markets, had lower levels of agricultural production, and experienced lower access to agricultural markets. Higher wealth levels may allow households to access adequate mechanisms, such as formal financial markets, to cope with an extreme weather event and thus avoid survival migration. Better connection to labor markets and less dependency on agricultural production may deter survival migration by reducing the vulnerability of households to weather shocks.

[Table 2 goes about here]

We use the same empirical strategy as above to identify the mechanisms driving the impact of rebelocracy levels on the migration responses. The regression to explore the these mechanisms is defined by

$$Z_{ijkt} = \beta_0 + \beta_1 \sigma^r_{ijkt} + \beta_2 R_{jk} * \sigma^r_{ijkt} + \beta_3 \sigma^d_{ijkt} + \beta_4 R_{jk} * \sigma^d_{ijkt} + \beta_5 X_{ijkt} + \gamma_i + \delta_k * \lambda_t + \varepsilon_{ijkt}$$

where Z_{ijkt} are the outcomes proxying for wealth and access to markets for household *i* in community *j* at municipality *k* in period *t* (=2010,2013, 2016). These outcomes are whether the household had access to credits from a formal financial institution, the value of the formal credit, the log of the value of consumption of market goods, log of the value of consumption of goods produced in their land plot, and the log of the value of annual agricultural production.

3.2. Empirical results

We estimate for each outcome the overall impact of rebelocracy, and the separate impact for the provision of public goods, ruling over political conduct and regulation of economic activities. Before reporting the results for the probability of migration and the transmitting mechanisms, we identify the impact of the weather shocks on welfare levels, using the log of annual aggregate consumption and the log of monthly income, and the heterogeneous impact by rebelocracy levels.

Both weather shocks cause a negative impact on welfare levels. We report the results in Table 3. Columns 1 and 4 report the overall impact of the shock, Columns 2 and 5 add the heterogeneous impact of the shock with respect to rebelocracy levels, and Columns 3 and 6 add controls for other shocks. The coefficient estimates for total monthly are not precise yet the effects of both weather shocks are negative. Living in regions with past strong rebelocracy levels contributes to partially offset the negative impact of both shocks on income levels. The capacity to offset the negative income shock in high rebelocracy communities is driven mostly by the provision of public goods by NSAA and also by the regulation of economic activities, albeit more weakly.

The income shock does not translate fully into a reduction in consumption. Households are able to insure fully from the rainfall shock, while the drought shock causes a reduction in annual aggregate consumption. An increase of a one standard deviation on the drought shock decrease consumption by 12 percent. Households living in regions with high rebelocracy level are able to partially compensate for it. Moving from zero rebelocracy to one standard deviation reduces the impact of the shock by one percentage point. The effect of rebelocracy is driven by the regulation of economic activities. We explore in the sections below the migration response to these shocks, whether the migration response differs by rebelocracy levels, and the potential transmitting mechanisms.

[Table 3 goes about here]

The probability of migration

Excessive rainfall and drought causes migration. The impact is large: one additional standard deviation in the rainfall and drought shock increases the probability of migration by 0.16 and 0.21 percentage points respectively (Table 4). Rural migration increases after the rainfall and drought shocks, signalling potential survival migration which is oftentimes temporary, to nearby locations and thus with lower migration costs (Kleemans 2014). Rainfall shocks are also related to urban migration. Because we are studying more permanent forms of migration, whole-household migration, households are more likely to engage in permanent moves (Bohra-Misra, Oppenheimer et al. 2014) and may make a more radical decision by moving to a more distant place when facing a large shock.

Households living in regions with high rebelocracy levels are less prone to migrate in response to weather shocks. For example, moving from a rebelocracy index of zero to one standard deviation reduces the migration response in 0.02 percentage points for drought shocks. The negative impact is driven by lower rural migration from communities with high rebelocracy levels. A lower survival migration in response to weather shocks may suggest these households are less vulnerable and may have available several other strategies to mitigate the weather shocks. The lower migration after both shock in regions with strong rebelocracy levels is driven strongly by the provision of public goods and more weakly the ruling over political conduct.

The negative coefficient of the interaction between rebelocracy levels and weather shock may result from positive or negative legacies of the interventions of NSAA on the communities. If a strong rebelocracy increases wealth and access to markets, households will be better able to mitigate the impact of negative income shocks through transfers private sources such as access to financial markets or selling of assets. Therefore, households will rely less on migration as a coping mechanism. Nonetheless, negative legacies of conflict may also explain less migration from communities with strong rebelocracy levels. Stronger rebelocracy levels may reduce wealth and access to markets, placing in low income trajectories near subsistence levels. Due to constraints imposed by migration costs relocation to mitigate the shock is not a feasible response.

[Table 4 goes about here]

Two results suggest that the lower migration from communities with higher intervention from NSAA is caused by a positive effect of strong rebelocracy. First, results from Table 2 show a positive correlation between rebelocracy, on the one hand, and wealth levels and insertion into labour markets, on the other hand. Second, the reduction on migration is driven mostly by a lower migration to rural areas which is probably survival migration and not an investment migration in search of better income opportunities. Below we explore the potential mechanisms in order to better gauge whether less migration is the result of some positive legacies of the intervention of NSAA on the communities.

Potential mechanisms

Table 5 explores outcomes related to wealth and access to markets as potential transmitting mechanisms. In order to identify whether the wealth mechanism is operating, we estimate the impact of weather shocks on the access of households to formal credits, the amount of the formal credit, the log of the value of consumption goods produced in the plot, the consumption of market goods, and the log of the value of annual agricultural production. Table A5 in the appendix presents the descriptive statistics for all these variables. Relying on formal credits to cope with the weather shocks was not a strategy used by the average household. In fact, the likelihood of having a formal credit is lower after facing both weather shocks. Nonetheless, the likelihood of having a formal credit and

the amount of the credit is higher for households living in communities with strong rebelocracy levels. However, the coefficient estimates are imprecise and lose significance when we control for other shocks, which are strongly correlated with the weather shocks. A wider access to financial markets is indicative of higher wealth. The effect is driven by the the ruling over political conduct. By adjudicating disputes in the community, this dimension may reduce the uncertainty of investing in risky activities which produce profits in the long-term. Interestingly, the provision of public goods has a negative effect on access to formal credits.

The drought shock reduces agricultural production and the value of consumption good bought through markets. One additional standard deviation of the drought shock reduces agricultural production by 37 percent and 12 percent the value of consumption of market goods. High rebelocracy levels mitigate this negative impact. Indeed, these households are able to compensate four percentage points of the fall in agricultural production. In spite of the fall in agricultural production, the lower reduction in the consumption of market goods signals these households may have alternative sources of income. Most of the effect of the intervention of NSAA comes from the provision of public goods. Taken together, this positive impact of provision of public goods suggests that the lower migration from communities with strong rebelocracy is the result of better economic conditions and not of more vulnerability to weather shocks.

[Table 5 goes about here]

Our results suggest a strong intervention of NSAA on economic, social and political dimensions might have provided clear and stable rules in which community members are able to operate and conduct their daily lives, as well as providing valuable public goods. The predictability of these interventions, and shared expectations between NSAA and civilians about behavior might encourage civilians to invest more, produce more and accumulate more wealth. These legacies tend to persist after NSAA leave the territory. Households are then still better able to cope with a negative income shock by relying on financial markets and non-agricultural labor markets to guarantee their consumption.

A word of caution is, however, in order. Our results compare communities living in conflict regions across different levels of interventions from NSAA and suggest that some of the negative impacts of conflict are reduced when armed groups impose rules and regulations in the communities. In these contexts, households are better able to make choices and behave in predictable ways, which is not possible in situations where violence and anarchy dominate over rebel order. Nonetheless, it is important not to forget that these are still communities affected by violent conflict, where rules are imposed under the threat of violence.

Robustness checks

Our results could be driven by strong social networks in communities with high rebelocracy levels and not by higher wealth and access to markets. The intervention of NSAA on local communities may affect the density and effectiveness of social networks, yet the effect of rebelocracy on social networks is a-priori unknown. A strong intervention of NSAA on the community's social issues may reduce trust, induce households to retrieve from public life, and weaken local institutions. However, new organizations may emerge, the effectiveness of social networks may improve and pro-social preferences may be strengthen (Arjona, Bernal et al. 2017). Indeed, evidence shows the impact of violence and forced recruitment on social networks can be positive or negative and ultimately depends on the dynamics of war and initial conditions (Bellows and Miguel 2009, Blattman 2009, Wood 2010, Voors, Nillesen et al. 2012, Cassar, Grosjean et al. 2013, Gáfaro, Ibáñez et al. 2014, Bauer, Blattman et al. 2016, Arjona, Bernal et al. 2017). Strong social networks in communities with limited access to financial markets reduce the incentives to migrate as households risk losing their support (Munshi and Rosenzweig 2016).

We explore in Table 6 whether social network is a potential transmitting mechanism. We proxy for the effectiveness of social networks using as outcomes whether the household received transfers from family and friends, and the log of the value of consumption from transfers. Households seem to rely little on social networks to cope with the negative weather shock. The impact of both shocks on the two outcomes is most of the time not statistically significant. The coefficient estimate for the interaction terms is not robust to the different specifications. In addition, when we estimate the correlation between

rebelocracy levels and participation in organization in 2010, the coefficient estimates are not statistically significant. In spite of not finding suggestive evidence of a social network mechanism, we cannot strongly rule out this possibility. Since weather shocks are covariate, the possibility of relying on social networks to cope with these events is usually limited.

[Table 6 goes about here]

We perform additional robustness tests to rule out the fact that the rebelocracy index may be picking up the effect of other unobserved variables. We use household fixed effects to control for time invariant unobservables and municipal trends to capture other time variant unobservables. However, rebelocracy may be correlated with other variables, such as violence during the presence of NSAA and state presence. In order to rule out this possibility, we estimate several new regressions. In Table A6, we report the coefficient estimates for all these robustness tests[14].

First, we include interactions between both weather shocks and variables capturing state presence before or after NSAA left the communities. Lack of state presence may explain in the first place the presence of NSAA and their strong interventions in the communities. The first variable measures state presence before NSAA arrived to the community We collected information on state presence in the community the year before the first NSAA arrived for six state dimensions: police presence, health centre, phone services, paved road, military presence and court presence. We measure state presence summing these six dimensions. The coefficient estimates for the drought shock are robust to this inclusion while the coefficient estimates for the rain shock loses significance but the sign and magnitude does not change. The second variable measures whether the state strengthened its presence after NSAA left the community. We use the changes in investment at the municipal level three years before and three years after the NSAA left the community. Since this variable is measured at the municipal level, we have less precision than the previous variable. The results are again robust for the drought shock but we lose significance for the rain shock with the sign and magnitude unchanged. The third variable

[14] We report the results only for the probability of migration for sake of space. However, the results for the other outcomes are also robust. Results are available upon request.

measures state presence at the community level in 2010 summing whether the community had child day care, nutrition programs, primary and secondary schools, and a functioning health center. The coefficient estimates are robust to this variable.

Second, rebelocracy could be simply picking the effects of the violence exerted by the NSAA in the community. In order to proxy for violence against civilians, we calculated the total number of IDPs in the municipality during the years that the NSAA were present in the community. We interact this variable with both weather shocks. Similarly with the previous controls for state presence, the coefficient estimates for the drought shocks are robust to including this new control whereas the coefficient estimates for the rain shocks lose significance but the sign and magnitudes remain unchanged.

Lastly, we estimate the regressions using different definitions for both weather shocks. For rainfall shocks, we estimate all outcomes using 0.5 and one standard deviations above the historical means. We also estimate all the outcomes with two additional definitions of the drought shock. (i) using the SPI threshold of minus 1.5; and (ii) defining a drought when at least one weather station had a SPI below minus one. Results reported in Table A6 are robust to alternative definitions of weather shocks.

V. Conclusion

This paper studies the economic legacies of conflict and identifies war-time institutions as an important transmitting channel. We collect detailed information at the community level on the economic, social and political interventions of NSAA, and construct a rebelocracy index which measures the extent of these interventions in all aspects of the social, political and economic life of each community. The empirical strategy exploits the exposure of households to random weather shocks to identify the heterogeneous migration responses across rebelocracy levels, and uses panel household data to control for time invariant unobservables that are also shaped by the legacies of conflict such as time and risk preferences. After identifying the migration responses, we explore whether wealth and access to markets are the potential transmitting mechanisms.

The findings show that households living in communities with strong levels of rebelocracy in the past are better able to cope with the negative income shock caused by

extreme weather events. This negative income shock pushes households to rely mostly on survival migration and transfers from family and friends as a mitigation strategy. In communities with high rebelocracy levels, households migrate less, use formal credits to compensate for the negative income shock, and have more access to non-agricultural activities to substitute for the drop in agricultural income. Higher wealth and access to non-agricultural activities helps these households to better cope with the negative income shock. We interpret these results as suggestive of the fact that rebelocracy may offer clear and stable rules in which households can operate and make decisions, where disputes are adjudicated and valuable public goods are provided (Arjona, 2016). These interventions by NSAA may reduce uncertainty, provide a predictable environment, and thus create incentives for engaging in more profitable economic activities. It is, however, important to note that the marginal better conditions of these households do not necessarily translate into an overall positive economic impact of the conflict. The paper studies households living in conflict regions, and compares their conditions across different levels of interventions of NSAA. Our results show that living with clear rules under conflict is better than living amid violence and chaos.

These results have three important implications. First, the results illustrate the complexity of conflict zones, beyond the typical portrays of areas of violence, destruction and anarchy. In Colombia, as in many other conflict-affected contexts, non-state armed actors rule and govern communities as part of their endeavors to control the territory. The consequences of these interventions may mitigate marginally the negative economic impacts of conflict on these communities and may persist over time. Second, internal conflict is often perceived as 'development in reverse'. The findings in this paper indicate that in reality conflicts are areas of institutional building, where institutions are created and transformed (Justino 2013), affecting the economic conditions of communities well after NSAA leave the territory. Third, because these NSAA interventions are autocratic and arbitrary, these marginally economic conditions come at cost. Using the same data, we find in another paper that enduring the authoritarian rule of armed groups has mixed effects on civilians' preferences for the rule of law. In spite of not endorsing extra-legal measures in order to combat crime, people in communities who receive more support from NSAA are more likely to disregard the rule of law (Arjona, Cárdenas et al. 2016).

Additional research to understand the economic legacies of economic, social and political interventions NSAA impose of the communities is important. Our paper concentrates on a particular context and with a data set that is representative of four regions in Colombia. In order to gauge the external validity of our results, new research in other countries is required. Also, future research needs to understand the distributive implication of these interventions. NSAA create new elites, adjudicate property rights, force opponent households to relocate and impose taxes on particular groups, among others. Since we concentrate on the households that stay in the conflict regions, we are missing an important component of the economic impact of these interventions: the consequences for households that were forced to migrate by NSAA.

The results of this paper have important policy implications for post-conflict periods. Most post-conflict interventions concentrate on reconstruction and oftentimes ignore the institutional transformations of the communities, and its ensuing economic impacts. Any policy or program needs to take advantage of the positive institutional and economic transformations, and redress any negative redistributive impact of these transformations. A more nuanced understanding on the impacts of conflict may contribute to the design of better post-conflict policies.

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Table 1. NSAA interventions in 35 ELCA communities

	Obs	Mean	Std. Dev	Min	Max
Rebelocracy	35	0,18	0,13	0	0,53
Imposition of social norms	35	0,30	0,42	0	1,00
Rules over private conduct	35	0,09	0,17	0	0,67
Provision of public goods	35	0,04	0,11	0	0,33
Provision of protection	34	0,44	0,34	0	1,00
Regulation of economic activities	35	0,15	0,15	0	0,40
Rule over political conduct	35	0,26	0,32	0	1,00
(Year since first NSAA arrived - Year since last NSAA left)	35	11,80	10,25	1	38
Years with NSAA presence	35	11,26	9,92	1	38
Years with no presence in 2010	35	8,26	7,50	0	29
Initial presence year	35	1991	8,38	1975	2005
Final Presence year	35	2002	7,71	1981	2012

Source: authors' calculations based on NSAA data and IDEAM

Table 2. Household initial conditions in 2010 – OLS regressions

	Rebelocracy	Economic Regulations	Public goods	Political Conduct	Number of observations	R-squared
Wealth index	1.241*				618	0.267
	(0.715)					
		-0.273	1.057	0.299	618	0.267
		(0.610)	(0.778)	(0.309)		
Total annual agricultural production (Log million $COP)	-1.423***				449	0.140
	(0.476)					
		-0.712*	-0.174	-0.0705	449	0.131
		(0.405)	(0.563)	(0.213)		
=1 if sells at least one product	-0.228				449	0.066
	(0.203)					
		-0.111	-0.939***	0.0687	449	0.098
		(0.169)	(0.234)	(0.0887)		
=1 if all product sold in the community	0.938***				449	0.241
	(0.220)					
		0.0849	-0.757***	0.298***	449	0.239
		(0.186)	(0.259)	(0.0979)		
Household head had a monthly salary job last 12 months	0.318*				618	0.073
	(0.192)					
		-0.0613	0.820***	0.0225	618	0.096
		(0.162)	(0.207)	(0.0821)		

* p<0.10, ** p<0.05, ***p<0.01. All regressions

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table 3. Welfare effects: Log of total monthly income and log of aggregate consumption (OLS reggresions)

	Total monthly reported income (Log Million $COP2016)			Aggregate consumption (log Million $COP2016)		
Number of days > 1.5 SD	-0.000711	-0.000944	-0.00120	-0.000375	-0.000387	-0.00122
	(0.000723)	(0.000779)	(0.00113)	(0.000617)	(0.000699)	(0.00102)
Number of days > 1.5 SD* Rebelocracy		0.00141	0.00452*		-1.57e-05	0.00571***
		(0.00150)	(0.00252)		(0.00138)	(0.00153)
Number of months < -1 SPI	-0.000794	-0.0103	-0.00730	-0.0165**	-0.0143	-0.0369**
	(0.00823)	(0.0143)	(0.0144)	(0.00792)	(0.0157)	(0.0151)
Number of months < -1 SPI*Rebelocracy		0.0309	0.0908**		-0.00796	0.0892*
		(0.0301)	(0.0399)		(0.0353)	(0.0454)
Number of observations	1,681	1,681	1,095	1,681	1,681	1,095
R-squared	0.377	0.378	0.334	0.287	0.287	0.263
Number of days > 1.5 SD	-0.00132	-0.000898	-0.000669	-0.00623	-0.000422	-0.000243
	(0.00131)	(0.000733)	(0.00117)	(0.00648)	(0.000636)	(0.000928)
Number of days > 1.5 SD* Public goods		0.0129***	0.0154***		0.00260	0.00512
		(0.00143)	(0.00313)		(0.00564)	(0.00612)
Number of months < -1 SPI	0.0105	-0.00202	0.00634	-0.145	-0.0171**	-0.0226*
	(0.0218)	(0.00788)	(0.0120)	(0.114)	(0.00755)	(0.0117)
Number of months < -1 SPI*Public goods		0.192***	0.227***		0.0550	0.0825
		(0.0141)	(0.0325)		(0.0863)	(0.0965)
Number of observations	1,681	1,681	1,095	1,681	1,681	1,095
R-squared	0.169	0.383	0.340	0.269	0.288	0.259
Number of days > 1.5 SD	-0.00132	-0.000894	-0.00173	-0.00623	-0.000683	-0.00166
	(0.00131)	(0.000830)	(0.00127)	(0.00648)	(0.000772)	(0.00118)
Number of days > 1.5 SD*Economic regulations		0.00115	0.00563**		0.00164	0.00620**
		(0.00154)	(0.00239)		(0.00168)	(0.00255)
Number of months < -1 SPI	0,0105	-0.0115	-0.00976	-0.145	-0.0248**	-0.0405***
	(0.0218)	(0.0119)	(0.0127)	(0.114)	(0.0112)	(0.0125)
Number of months < -1 SPI*Economic regulations		0.0458*	0.106***		0.0305	0.104**
		(0.0236)	(0.0335)		(0.0285)	(0.0422)
Number of observations	1,681	1,681	1,095	1,681	1,681	1,095
R-squared	0.169	0.380	0.338	0.269	0.288	0.264
Number of days > 1.5 SD	-0.00132	-0.000742	-0.000342	-0.00623	-0.000294	-8.25e-05
	(0.00131)	(0.000731)	(0.00109)	(0.00648)	(0.000638)	(0.000868)
Number of days > 1.5 SD*Political conduct		0.000675	0.000600		0.000216	0.00137
		(0.000545)	(0.000693)		(0.000646)	(0.000894)
Number of months < -1 SPI	0.0105	-0.00199	0.00949	-0.145	-0.00863	-0.0177
	(0.0218)	(0.0117)	(0.0129)	(0.114)	(0.0123)	(0.0130)
Number of months < -1 SPI*Political conduct		1.73e-05	-0.00306		-0.0197	-0.0193
		(0.0100)	(0.0136)		(0.0148)	(0.0219)
Number of observations	1,681	1,681	1,095	1,681	1,681	1,095
R-squared	0.169	0.378	0.328	0.269	0.289	0.264
Household Shock Controls	No	No	Yes	No	No	Yes
Mean		0,432			2,271	
Standard Deviation		(0,284)			(0,476)	

* p<0.10, ** p<0.05, ***p<0.01. Clustered standard errors at the community level. All regressions include number of different types of covariate violence shocks at the original community in the past three years, gender of household head, number of members below 5 years of age, number of members between 6 and 17, number of members between 18 and 65, and number of members older than 65. Municipality*year fixed effects included.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table 4. The decision to migrate: overall, urban and rural migration (linear probability model)

=1 if household migrates	Overall migration		Urban migration		Rural migration	
Number of days > 1.5 SD	0.00406*	0.00429**	0.000303	0.000424	0.00390*	0.00382**
	(0.00209)	(0.00190)	(0.00113)	(0.00110)	(0.00193)	(0.00177)
Number of days > 1.5 SD* Rebelocracy	-0.00386*	-0.00325*	7.49e-05	0.000503	-0.00428**	-0.00396**
	(0.00209)	(0.00176)	(0.000896)	(0.000873)	(0.00191)	(0.00185)
Number of months < -1 SPI	0.0664***	0.0627***	0.0271*	0.0273**	0.0541***	0.0504***
	(0.0184)	(0.0159)	(0.0140)	(0.0129)	(0.0198)	(0.0175)
Number of months < -1 SPI*Rebelocracy	-0.156**	-0.131**	-0.0546*	-0.0401	-0.115**	-0.0932*
	(0.0596)	(0.0494)	(0.0306)	(0.0321)	(0.0559)	(0.0497)
Number of observations	1,095	1,095	871	871	965	965
R-squared	0.340	0.385	0.523	0.536	0.212	0.257
Number of days > 1.5 SD	0.00377**	0.00404**	0.000348	0,000509	0.00355**	0.00350**
	(0.00184)	(0.00172)	(0.00120)	(0.00117)	(0.00158)	(0.00147)
Number of days > 1.5 SD* Public goods	-0.0203***	-0.0171***	-0.000504	0.000910	-0.0213***	-0.0194***
	(0.00522)	(0.00471)	(0.00250)	(0.00234)	(0.00487)	(0.00454)
Number of months < -1 SPI	0.0393***	0.0400***	0.0166	0.0193*	0.0356**	0.0359***
	(0.0137)	(0.0119)	(0.0123)	(0.0111)	(0.0133)	(0.0116)
Number of months < -1 SPI*Public goods	-0.261***	-0.222***	-0.0140	0.00878	-0.260***	-0.236***
	(0.0747)	(0.0683)	(0.0290)	(0.0266)	(0.0692)	(0.0651)
Number of observations	1,095	1,095	871	871	965	965
R-squared	0.339	0.385	0.518	0.533	0.221	0.266
Number of days > 1.5 SD	0.00301*	0.00324*	0.000475	0.000521	0.00267	0.00258*
	(0.00174)	(0.00161)	(0.00124)	(0.00123)	(0.00164)	(0.00151)
Number of days > 1.5 SD*Economic regulations	0.00230	0.00253	0.000106	0.000542	0.00267	0.00288
	(0.00313)	(0.00293)	(0.00130)	(0.00120)	(0.00316)	(0.00299)
Number of months < -1 SPI	0.0487**	0.0458***	0.0192	0.0197*	0.0391**	0.0369**
	(0.0191)	(0.0168)	(0.0122)	(0.0106)	(0.0191)	(0.0167)
Number of months < -1 SPI*Economic regulations	-0.1000*	-0.0738	-0.0250	-0.00859	-0.0736	-0.0537
	(0.0567)	(0.0514)	(0.0292)	(0.0286)	(0.0518)	(0.0481)
Number of observations	1,095	1,095	871	871	965	965
R-squared	0.356	0.396	0.520	0.534	0.234	0.272
Number of days > 1.5 SD	0.00379*	0.00400**	0.000390	0.000566	0.00345*	0.00334*
	(0.00211)	(0.00191)	(0.00121)	(0.00117)	(0.00187)	(0.00168)
Number of days > 1.5 SD*Political conduct	-0.00159*	-0.00131*	-0.000210	-8.44e-05	-0.00154*	-0.00139*
	(0.000858)	(0.000726)	(0.000410)	(0.000363)	(0.000789)	(0.000753)
Number of months < -1 SPI	0.0473***	0.0454***	0.0192	0.0206*	0.0411***	0.0394***
	(0.0127)	(0.0117)	(0.0117)	(0.0106)	(0.0130)	(0.0120)
Number of months < -1 SPI*Political conduct	-0.0568**	-0.0405*	-0.0160	-0.00740	-0.0472*	-0.0348
	(0.0275)	(0.0232)	(0.0121)	(0.0137)	(0.0262)	(0.0230)
Number of observations	1,095	1,095	871	871	965	965
R-squared	0.336	0.381	0.519	0.534	0.212	0.255
Household Shock Controls	No	Yes	No	Yes	No	Yes
Mean	0,239		0,073		0,167	
Standard Deviation	(0,427)		(0,260)		(0,373)	

* p<0.10, ** p<0.05, ***p<0.01. Clustered standard errors at the community level. All regressions include number of different types of covariate violence shocks at the original community in the past three years, gender of household head, number of members below 5 years of age, number of members between 6 and 17, number of members between 18 and 65, and number of members older than 65. Municipality*year fixed effects included.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table 5. Access to formal credits and agricultural production: OLS regressions

	=1 if household had formal credit		Amount formal credit (Log Million $COP2016)		Value of consumption goods produced in plot (Log Million $COP2016)		Value of consumption of market goods (Log Million $COP2016)		Value of annual agricultural production (Log Million $COP2016)	
Number of days > 1.5 SD	-0.00181*	-0.00158	-0.00279	-0.00222	-0.000380	0.00105	-0.000477	-0.00101	-0.00280	-0.00293
	(0.00101)	(0.00136)	(0.00168)	(0.00243)	(0.00100)	(0.00181)	(0.000766)	(0.00109)	(0.00447)	(0.00444)
Number of days > 1.5 SD* Rebelocracy	0.00752***	0.00223	0.0128***	0.00633	0.00300*	0.000912	-0.00150	0.00137	0.0157**	0.0156**
	(0.00198)	(0.00434)	(0.00420)	(0.00883)	(0.00155)	(0.00324)	(0.00137)	(0.00187)	(0.00736)	(0.00718)
Number of months < -1 SPI	-0.0278*	-0.00101	-0.0315	-0.00123	-0.0217	-0.0321	-0.0107	-0.0264	-0.110***	-0.108***
	(0.0163)	(0.0162)	(0.0219)	(0.0259)	(0.0161)	(0.0199)	(0.0172)	(0.0172)	(0.0373)	(0.0354)
Number of months < -1 SPI*Rebelocracy	0.0665	-0.0918	0.133**	-0.0698	0.0895**	0.0800	-0.0162	0.0262	0.359***	0.347***
	(0.0425)	(0.0610)	(0.0521)	(0.0984)	(0.0371)	(0.0615)	(0.0386)	(0.0464)	(0.124)	(0.124)
Number of observations	1,681	1,095	1,681	1,095	1,681	1,095	1,681	1,095	949	949
R-squared	0.153	0.156	0.156	0.148	0.234	0.210	0.271	0.266	0.124	0.129
Number of days > 1.5 SD	-0.000289	-0.000991	-0.000368	-0.000742	-7.68e-05	0.00108	-0.000774	-0.000784	-0.000491	-0.000639
	(0.000866)	(0.00112)	(0.00143)	(0.00192)	(0.000933)	(0.00172)	(0.000665)	(0.000951)	(0.00387)	(0.00389)
Number of days > 1.5 SD* Public goods	-0.00665	-0.00892***	-0.00295	-0.0140***	0.0101**	0.00740	0.000479	0.00195	0.0384***	0.0366***
	(0.00410)	(0.00290)	(0.00764)	(0.00496)	(0.00418)	(0.00578)	(0.00544)	(0.00617)	(0.00967)	(0.0104)
Number of months < -1 SPI	-0.00400	-0.0190*	0.0136	-0.0166	0.00420	-0.0181	-0.0167*	-0.0223*	-0.0494	-0.0496
	(0.0146)	(0.0106)	(0.0206)	(0.0195)	(0.0116)	(0.0139)	(0.00847)	(0.0124)	(0.0314)	(0.0314)
Number of months < -1 SPI*Public goods	-0.0957*	-0.126***	-0.0342	-0.171***	0.156***	0.131*	0.0302	0.0395	0.539***	0.511***
	(0.0544)	(0.0348)	(0.106)	(0.0554)	(0.0487)	(0.0714)	(0.0846)	(0.0961)	(0.112)	(0.115)
Number of observations	1,681	1,095	1,681	1,095	1,681	1,095	1,681	1,095	949	949
R-squared	0.146	0.149	0.148	0.145	0.231	0.209	0.271	0.266	0.120	0.125
Number of days > 1.5 SD	-0.000861	-6.40e-05	-0.000882	0.00163	0.000595	0.00181	0.000595	-0.00197*	0.000296	0.000145
	(0.00112)	(0.00133)	(0.00167)	(0.00209)	(0.000733)	(0.00140)	(0.000733)	(0.00108)	(0.00447)	(0.00445)
Number of days > 1.5 SD*Economic regulations	0.00265	-0.00448	0.00281	-0.0108*	-0.00193	-0.00318	-0.00193	0.00514**	-0.000156	-0.000456
	(0.00314)	(0.00364)	(0.00495)	(0.00638)	(0.00270)	(0.00375)	(0.00270)	(0.00230)	(0.00823)	(0.00823)
Number of months < -1 SPI	-0.0210	-0.00516	-0.00857	0.0171	-0.00901	-0.0206	-0.00901	-0.0352***	-0.0507	-0.0498*
	(0.0169)	(0.0168)	(0.0238)	(0.0282)	(0.0129)	(0.0166)	(0.0129)	(0.0129)	(0.0318)	(0.0293)
Number of months < -1 SPI*Economic regulations	0.0644	-0.0877	0.0912	-0.200**	0.0828*	0.0519	0.0828*	0.0696*	0.0737	0.0607
	(0.0501)	(0.0532)	(0.0727)	(0.0928)	(0.0414)	(0.0580)	(0.0414)	(0.0375)	(0.140)	(0.142)
Number of observations	1,681	1,095	1,681	1,095	1,681	1,095	1,681	1,095	949	949
R-squared	0.147	0.151	0.149	0.149	0.240	0.220	0.240	0.269	0.113	0.118
Number of days > 1.5 SD	-0.000754	-0.00131	-0.00102	-0.00136	-7.98e-05	0.00123	-0.000636	-0.000479	-0.000263	-0.000389
	(0.000848)	(0.000975)	(0.00139)	(0.00176)	(0.000869)	(0.00171)	(0.000708)	(0.000919)	(0.00406)	(0.00400)
Number of days > 1.5 SD*Political conduct	0.00274***	0.00118	0.00439**	0.00205	0.00114	0.000241	-0.000342	-0.000206	0.00466	0.00460
	(0.000909)	(0.00153)	(0.00176)	(0.00314)	(0.000794)	(0.00130)	(0.000634)	(0.000820)	(0.00282)	(0.00273)
Number of months < -1 SPI	-0.0311**	-0.0213**	-0.0307**	-0.0225	-0.00560	-0.0163	-0.00640	-0.0149	-0.0517	-0.0512
	(0.0118)	(0.0104)	(0.0150)	(0.0176)	(0.0128)	(0.0142)	(0.0133)	(0.0141)	(0.0366)	(0.0350)
Number of months < -1 SPI*Political conduct	0.0520***	0.00628	0.0870***	0.0260	0.0213	-0.000687	-0.0219	-0.0369*	0.0545	0.0469
	(0.0132)	(0.0244)	(0.0175)	(0.0419)	(0.0153)	(0.0223)	(0.0164)	(0.0207)	(0.0691)	(0.0641)
Number of observations	1,681	1,095	1.087**	1,095	1,681	1,095	1,681	1,095	949	949
R-squared	0.154	0.149	(0.404)	0.145	0.231	0.206	0.272	0.270	0.115	0.120
Household Shock Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean	0,348		0,539		0,440		2,171		1,058	
Standard Deviation	(0,477)		(0,891)		(0,401)		(0,498)		(0,973)	

* p<0.10, ** p<0.05, ***p<0.01. Clustered standard errors at the community level. All regressions include number of different types of covariate violence shocks at the original community in the past three years, gender of household head, number of members below 5 years of age, number of members between 6 and 17, number of members between 18 and 65, and number of members older than 65. Municipality*year fixed effects included.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table 6. Social network mechanism: consumption from transfers and transfers received from family and friends (OLS regressions)

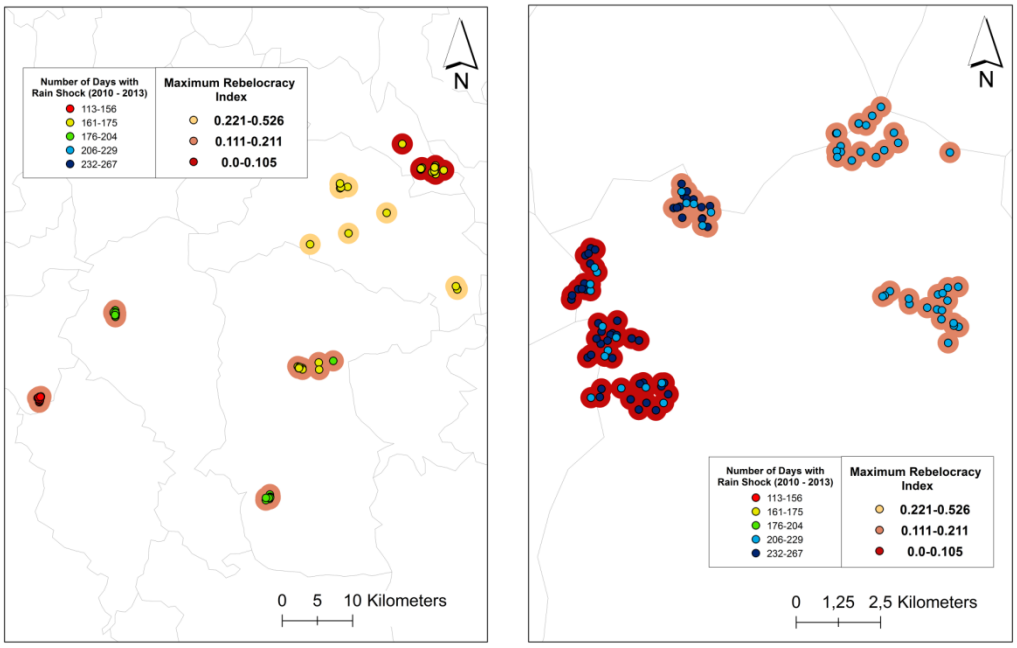
	Consumption from transfers (Log Million $COP2016)		Transfers received from family & friends (Log Million $COP2016)	
Number of days > 1.5 SD	-0.000750	-0.00175**	0.000284	-0.000157
	(0.000763)	(0.000856)	(0.000376)	(0.000801)
Number of days > 1.5 SD* Rebelocracy	0.00281*	0.0106***	-0.000417	0.00629***
	(0.00142)	(0.00176)	(0.00173)	(0.00181)
Number of months < -1 SPI	-0.00757	-0.0219	0.00902	0.00145
	(0.0169)	(0.0159)	(0.0136)	(0.0160)
Number of months < -1 SPI*Rebelocracy	-0.0212	0.118***	-0.0390	0.0329
	(0.0348)	(0.0410)	(0.0277)	(0.0383)
Number of observations	1,681	1,095	1,681	1,095
R-squared	0.135	0.125	0.175	0.160
Mean	0,159		0,107	
Standard Deviation	(0,266)		(0,301)	

* p<0.10, ** p<0.05, ***p<0.01. Clustered standard errors at the community level. All regressions include number of different types of covariate violence shocks at the original community in the past three years, gender of household head, number of members below 5 years of age, number of members between 6 and 17, number of members between 18 and 65, and number of

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

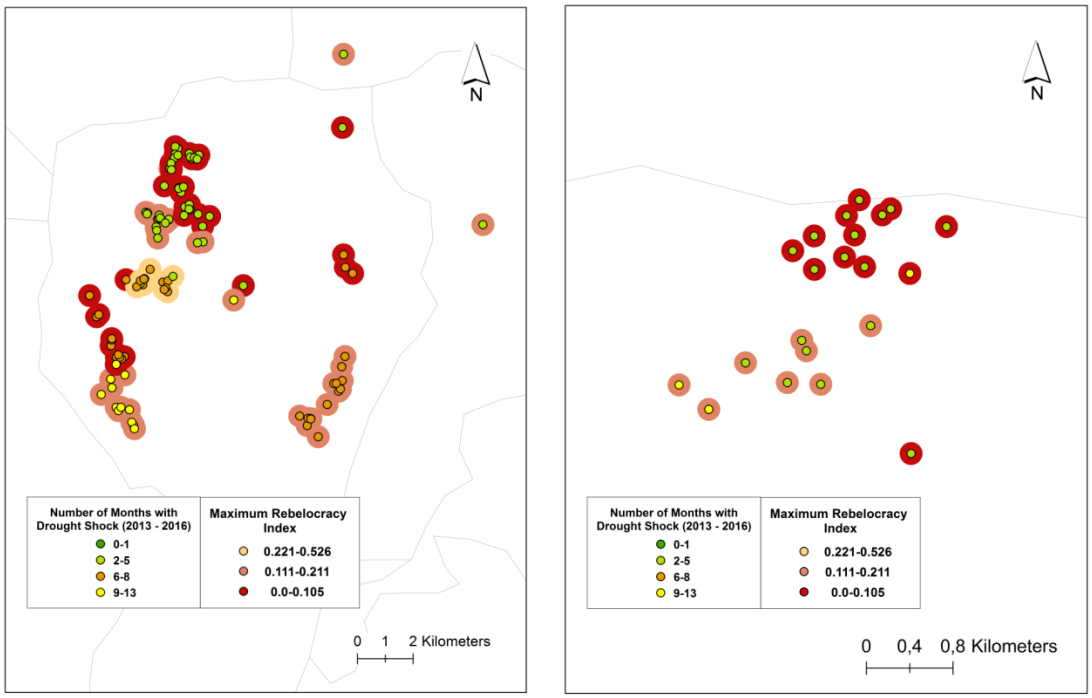
Appendix

Map A1. Rainfall shocks and rebelocracy levels



Each point on the map represents an individual household. Gray lines show municipality boundaries. A group of clustered households with equal levels of rebelocracy (represented as the larger circle in the background), conform a rural community. Source: Authors' calculations based on ELCA (2010,2013 and 2016), NSAA data and IDEAM.

Map A2. Drought shocks and rebelocracy levels



Each point on the map represents an individual household. Gray lines show municipality boundaries. A group of clustered households with equal levels of rebelocracy (represented as the larger circle in the background), conform a rural community. Source: Authors' calculations based on ELCA (2010,2013 and 2016), NSAA data and IDEAM.

Table A1. Probability of Falling from the Sample. 2010 Characteristics

	= 1 if household falls from sample			
Max Rebelocracy	-0.183**	-0.0985	-0.0881	-0.255
	(0.0920)	(0.0844)	(0.102)	(0.163)
Household Highest Schooling Grade		0.00227	0.00153	0.00184
		(0.00336)	(0.00346)	(0.00350)
Household Head Woman		0.0294	0.0247	0.0229
		(0.0279)	(0.0292)	(0.0297)
Household Members 0-5		-0.00111	-0.00318	-0.000341
		(0.0128)	(0.0134)	(0.0137)
Household Members 6-17		-0.00439	-0.00561	-0.00567
		(0.00728)	(0.00781)	(0.00787)
Household Members 18-65		-0.00779	-0.00812	-0.00984
		(0.0103)	(0.0107)	(0.0109)
Household Members 65+		0.0263	0.0275	0.0221
		(0.0184)	(0.0187)	(0.0191)
Wealth Index		0.000985	-0.000259	-0.000177
		(0.00529)	(0.00589)	(0.00613)
Land Plot Size		-5.05e-05	0.000364	0.000865
		(0.00264)	(0.00279)	(0.00285)
Number of Households in Community			9.05e-05	0.000165
			(0.000196)	(0.000253)
Time to Municipality Urban Center (Hours)			-0.00322	0.0202
			(0.0233)	(0.0317)
Lack of Water			-0.0149	-0.0248
			(0.0268)	(0.0428)
Number of Institutions Present in Community			-0.00609	0.00841
			(0.00681)	(0.0123)
Altitude (mts)			1.15e-05	-4.45e-05
			(1.69e-05)	(8.96e-05)
Distance to Main Road (km)			0.000815	-0.000186
			(0.00135)	(0.00416)
Distance to River (km)			-0.000648	0.000859
			(0.00133)	(0.00513)
Distance to State Capital (km)			8.06e-05	-0.00564
			(0.000388)	(0.00442)
Constant	0.132***	0.0926**	0.100*	0.190
	(0.0199)	(0.0395)	(0.0594)	(0.182)
Observations	718	698	672	672
R-squared	0.006	0.012	0.019	0.031
Municipality Fixed Effects	No	No	No	Yes

* p<0.10, ** p<0.05, ***p<0.01. Standard errors in parentheses.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table A2. Descriptive statistics: climate shocks

	Observations	Mean	Std. Dev	Min	Max
2008-2010					
Days with rain shock	618	208,64	39,71	120,00	279,67
Months with drought shock	618	1,49	1,95	0,00	6,00
2011-2013					
Days with rain shock	617	191,12	38,59	112,33	266,33
Months with drought shock	618	1,21	1,64	0,00	6,00
2014-2016					
Days with rain shock	612	112,86	38,46	43,83	186,67
Months with drought shock	618	4,59	3,43	0,00	13,00
Pooled					
Days with rain shock	1.847	171,05	56,95	43,83	279,67
Months with drought shock	1.854	2,43	2,90	0,00	13,00

Source: authors' calculations based on ELCA (2010, 2013 and 2016), and IDEAM

Table A3. Community maximum rebelocracy levels and climate shocks

	Maximum rebelocracy		
Rain Shock	-0.000168	-0.000805	0.000935
	(0.000408)	(0.00143)	(0.00239)
Drought Shock	0.0207**	0.0309	-0.0267
	(0.00970)	(0.0310)	(0.0668)
Number of Households in Community			0.000363
			(0.000508)
Time to Municipality Urban Center (Hours)			-0.00825
			(0.0701)
Lack of Water			0.00344
			(0.0861)
Number of Institutions Present in Community			0.00356
			(0.0237)
Altitude (mts)			-5.98e-05
			(0.000189)
Distance to Main Road (km)			-0.0104
			(0.00899)
Distance to River (km)			-0.000623
			(0.0101)
Distance to State Capital (km)			-0.00986
			(0.00792)
Constant	0.181*	0.139	0.510
	(0.0985)	(0.301)	(0.485)
Observations	35	35	33
R-squared	0.138	0.477	0.757
Municipality FE	No	Yes	Yes

* p<0.10, ** p<0.05, ***p<0.01. Standard errors in parentheses.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table A4. Sample balance: household characteristics for those living in regions with rebelocracy levels below and above the median

	Rebelocracy > = median		Rebelocracy < median		
	N	Mean	N	Mean	
Covariate violence shocks	317	0,066	269	0,182	***
		(0,249)		(0,387)	
Highest Schooling Grade	318	4,843	300	5,483	***
		(3,049)		(2,946)	
Household Head Woman	318	0,132	300	0,163	
		(0,339)		(0,370)	
Household Head Age	318	46,387	300	45,293	
		(12,446)		(11,847)	
Household Members 0-5	318	0,645	300	0,563	
		(0,819)		(0,726)	
Household Members 6-17	318	1,481	300	1,350	
		(1,466)		(1,334)	
Household Members 18-65	318	2,462	300	2,363	
		(0,981)		(0,984)	
Household Members 65+	318	0,267	300	0,297	
		(0,509)		(0,574)	

* p<0.10, ** p<0.05, ***p<0.01. Standard deviation in parentheses.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table A5. Descriptive statistics, outcomes

	Observations	2010	2013	2016
Aggregate Consumption (Million 2016 $COP)	618	8,50	9,82	11,24
		(4,59)	(5,41)	(6,19)
Consumption Produced (Million 2016 $COP)	618	0,52	0,79	0,79
		(0,64)	(0,85)	(0,93)
Consumption Bought (Million 2016 $COP)	618	7,81	8,77	10,19
		(4,44)	(5,16)	(6,01)
Consumption Transfers (Million 2016 $COP)	618	0,15	0,26	0,27
		(0,41)	(0,60)	(0,52)
Total reported monthly income (Million 2016 $COP)	618	0,49	0,56	0,82
		(1,17)	(0,42)	(0,74)
Transfer value received from family (Million 2016 $COP)	618	0,09	0,25	0,25
		(0,39)	(0,84)	(1,02)
Household has formal credit (%)	618	0,26	0,36	0,42
		(0,44)	(0,48)	(0,49)
Formal credit amount (Million 2016 $COP)	618	1,34	2,34	2,51
		(3,45)	(5,70)	(6,62)

* p<0.10, ** p<0.05, ***p<0.01. Standard deviation in parentheses.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM

Table A6. Robustness tests. Coefficient estimates for overall probability (Linear probability model)

	Obs.	R^2	Rain shock	Rain shock*Rebelocracy	Drought shock	Drought shock*Rebelocracy
Baseline	1,095	0.340	0.00406*	-0.00386*	0.0664***	-0.156**
			(0.00209)	(0.00209)	(0.0184)	(0.0596)
Controls for state presence at 2010 levels	1,050	0.361	0.00395*	-0.00860**	0.0524	-0.232***
			(0.00232)	(0.00366)	(0.0331)	(0.0677)
Controls for variation in state presence after NSAA groups left	853	0.335	0.00490**	-0.00573	0.0600**	-0.213*
			(0.00185)	(0.00767)	(0.0222)	(0.110)
Controls for state presence one year before NSAA groups arrived	1,095	0.346	0.00515**	-0.00266	0.0876***	-0.149***
			(0.00217)	(0.00188)	(0.0200)	(0.0510)
Controls for number of displaced persons reported on years with NSAA presence	1,095	0.341	0.00354	-0.00249	0.0606***	-0.130**
			(0.00225)	(0.00271)	(0.0186)	(0.0567)
Rain shock = (Days > 1S.D.)	1,091	0.329	0.00361*	-0.00341*	0.0689***	-0.157**
			(0.00200)	(0.00192)	(0.0190)	(0.0598)
Rain shock = (Days > 0.5 S.D.)	1,095	0.337	0.00293	-0.00313	0.0661***	-0.155**
			(0.00180)	(0.00197)	(0.0186)	(0.0611)
Drought shock = (SPI<-1.5)	1,095	0.328	0.00303	-0.00119	0.0615**	-0.263***
			(0.00208)	(0.00266)	(0.0258)	(0.0915)
Drought shock = At least 1 hh with SPI<-1.0	1,095	0.336	0.00499**	-0.00815***	0.0391***	-0.107***
			(0.00185)	(0.00283)	(0.00974)	(0.0323)

* p<0.10, ** p<0.05, ***p<0.01. Each row reports the coefficient of an individual OLS regression. Clustered standard errors at the community level. All regressions include number of different types of covariate violence shocks at the original community in the past three years, gender of household head, number of members below 5 years of age, number of members between 6 and 17, number of members between 18 and 65, and number of members older than 65. Municipality*year fixed effects included. Controls for state presence at 2010 levels include provision of child daycare and nourishment programs, primary and secondary schools, and functioning health posts. Variation in state presence after armed groups left is measured as the change in average total investment by the municipality three years before and three years after groups left. State presence levels one year before armed groups arrived include provision of health posts, telephone land lines, paved roads, and police stations at the community level, and army presence and judicial courts at the municipality level.

Source: authors' calculations based on ELCA (2010, 2013 and 2016), NSAA data and IDEAM