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Collective Property Leads to Household Investments: Lessons from Land Titling in Afro-Colombian Communities¹

Ximena Peña ^(a), María Alejandra Vélez ^(b), Juan Camilo Cárdenas ^{(a)2},

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Abstract

In the developing world, collective land titling has become an important tool for recognizing the historical presence of ethnic communities and safeguarding their rights to occupy and manage their territories. However, little is known about the average impact of these titling processes on the well-being of these communities. In this paper we attempt to estimate the impact of collective land titling in territories inhabited by Afro-descendent communities in Colombia. Using an Analysis of Covariance (ANCOVA) estimation, we compare rural districts in titled areas with rural districts in untitled areas that are similar in all the relevant observable characteristics. We find that the collective titling process in the Chocó region has caused an increase in average household per capita income, larger investments in housing, higher attendance rates among children in primary education, and a decrease in housing overcrowding. Our results suggest that collective land titling creates a more secure natural resource base and a longer time horizon for households in collective territories, which leads to investment in their private physical and human capital.

Key Words: Afro-descendants; Collective property; Colombia; Ethnic community; Land titling

JEL Codes: Q15, Q24, R52, N36, N56

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La Propiedad Colectiva mejora las inversiones del hogar: Lecciones de la Titulación de Tierras a Comunidades Afro-Colombianas¹

**Ximena Peña ^(a), María Alejandra Vélez ^(b), Juan Camilo Cárdenas ^{(a)2},
Natalia Perdomo ^(c)**

Resumen

En el mundo en desarrollo, la titulación colectiva de la tierra se ha convertido en una herramienta importante para el reconocimiento de la presencia histórica de las comunidades étnicas y la salvaguardia de sus derechos a ocupar y administrar sus territorios. Sin embargo, poco se sabe sobre el impacto promedio de estos procesos de titulación sobre el bienestar de estas comunidades. En este trabajo se intenta estimar el impacto de la titulación colectiva de los territorios habitados por comunidades afrodescendientes de Colombia. Utilizando un análisis de la estimación de la covarianza (ANCOVA), comparamos veredas rurales en áreas tituladas con veredas rurales de las zonas no tituladas que son similares en todas las características observables relevantes. Encontramos que el proceso de titulación colectiva en la región del Chocó ha generado un aumento del ingreso per cápita promedio de los hogares, mayores inversiones en vivienda por habitante, índices de asistencia más altos en la enseñanza primaria entre los niños, y una disminución en el hacinamiento de la vivienda. Nuestros resultados sugieren que la titulación colectiva de la tierra crea una base más segura de los recursos naturales y un horizonte de tiempo más largo para las familias en los territorios colectivos, lo que conduce a la inversión privada en capital físico y humano.

Palabras claves: Afro-descendientes; Propiedad colectiva; Colombia; Comunidades étnicas; Titulaciones de tierras

Códigos JEL: Q15, Q24, R52, N36, N56

Introduction

The allocation of property rights has been at the core of debates surrounding the efficient use of resources for society and as a means for prosperity. When property rights over an asset are clearly defined its residual claimants can make long-term decisions, such as committing to maintain it over time and invest in linked factors of production. Often, the focus for poverty reduction programs rests on assigning individual (private) property rights so that those very individuals can claim the entire stream of benefits and assume the costs associated with the resources they manage (see, for example, the review by Lawry et al. 2016). In his landmark work *The Mystery of Capital* (2000), Hernando de Soto calls for nations to allow the poor to generate capital by assigning secure and clear property rights, thus allowing them to invest in their future. He goes further in suggesting that these property rights should also include the making of these assets fungible to allow owners to use them to create more value and stimulate the formation of businesses. Moreover, his strategy includes the need to make these assets divisible in order to facilitate such transactions. De Soto summarizes this in the following manner: “*By making assets fungible, by attaching owners to assets, assets to addresses, and ownership to enforcement, and by making information on the history of assets and owners easily accessible, formal property systems converted the citizens of the West into a network of individually identifiable and accountable business agents*” (De Soto, 2001: 58). Such a call for the strengthening of the system of property rights has, however, relied almost entirely on a system of individual private property.

At the opposite end of spectrum we find the case of no property, or open access to resources, which inspired the infamous article “The Tragedy of the Commons” by Hardin (1968), who rightly raises the dangers of an absence of property rights as a driver of the overexploitation of resources. This position has translated into skepticism among many who equate the collective ownership of resources with open access and collective property with a lack of property rights. In this vein, those who defend the importance of private property rights argue that assigning collective rights to a group and not to individuals would run against efficiency claims, because the individuals would not have any incentive to invest in maintaining the resource base because they could not capture all the proceeds from their private effort. Such an argument would also agree with the criticism against the assigning of rights that it does not allow owners to divide or sell the assets (inalienability and fungibility).

Others such as Elinor Ostrom (1990) argue based on ethnographic, theoretical, and laboratory work that collective access and ownership of resources could, under the right self-governed institutions, achieve efficiency levels that would sustain the stream of net benefits from such resources through collective action (Wade, 1988; Baland & Platteau, 1996; Taylor & Singleton, 1993; Agrawal, 1998; Sethi & Somanathan, 1996).

During the mid-1990s one of the most ambitious land reforms of recent decades took place in Colombia: recognizing collective rights over land to the Afro-descendent population that inhabits the Pacific coast of the country. Colombia was the first to assign collective lands to a non-indigenous ethnic minority group such as the black communities of the Pacific coast (Villa & Sanchez, 1998; Plant & Hvalkof 2001). Similar processes are now underway in Ecuador, Brazil, Honduras and Guatemala (Offen, 2003), but the scale of the Colombian collective titling program stands out as a major undertaking aimed at improving the livelihoods of slaves' descendants.

This titling process began after the writing of the 1991 Colombian Constitution and was formalized with the enactment of Law 70 in 1993. The first title was issued in 1996 and up to 2014 the Colombian government has titled around 5.3 million hectares to 168 Afro-Colombian groups in six regions of the country. As mentioned by Velez (2011), the specific goals that emerged from the constitutional mandate were designed to benefit the groups that had historically occupied these territories and preserve valuable ecosystems in what is considered a hotspot of biodiversity (Plant and Hvalkof, 2001; Offen, 2003; Ng'weno, 2001; World Bank, 2005; Sanchez & Roldan, 2002; Sanchez & Garcia, 2006).

This new property rights regime changed the political structure of the country's Pacific region, with the emergence of new local authorities who have since gained visibility and power (Velez, 2011). However, despite these changes in the land institutions, after two decades a lack of systematic evaluation is evident for the effects of this process on household well-being, community organizational processes, or natural resource management.

Although the political origins of collective titling were supported on the hypothesis that these communities could benefit through access to productive assets and the protection of their territorial, cultural and social rights, such a claim is open to empirical testing. Thus the impact of land titling on the well-being of its beneficiaries is ultimately an empirical question that needs to be addressed. Ours is the first evaluation that aims to understand the average impact of collective titling processes in the well-being of these communities. In fact, to our knowledge, no such study has been conducted for similar collective titling processes in the developing world.

In particular, this paper seeks to identify the impact of collective land titling, focusing on how such policy may change the basic conditions that might improve the capabilities of those households living in these communities. There are a number of outcomes that could be evaluated in our study, including, for instance, access to health or access to electricity, which clearly drive development and well-being for the rural poor. We have focused on income, education, and housing conditions. This latter group of indicators is more dependent on individual investment decisions by households whereas the former group is highly dependent on the provision of public goods by state agencies and the political dynamics of governors and mayors. There is not much that an empowered household or community can do to increase its access to electricity or health if the basic network infrastructure and facilities are not provided by the state. However, household and organized communities are more likely to generate income sources through private investments, or to invest in their home, or send their kids to school, once the property rights over their territory are better secured for the long run. Thus we assess whether or not, due to changes in the property rights of their territory, households living on collectively titled areas exhibit a more rapid increase in per-capita income, school attendance and housing investments.

Estimating the causal effects of titling on outcome variables is not easy due to the complex economic, political, cultural and social dimensions encompassed in the process and the endogeneity of the formation of the community organizations and their application process for the collective land title. There also exists a severe lack of information and an absence of baseline data, which makes difficult an adequate characterization of the socioeconomic situation of the relevant Afro-descendant communities and the resource availability in their territories. The identification of causal impacts is further complicated by several external factors that also affect the population under study: the presence of illegal armed actors, internal forced displacement, drug trafficking and institutional changes.

In order to causally estimate the effects of titling on a set of outcomes, we need to know the difference between the outcomes of titled communities and the outcomes of titled communities had they not received the title. However, land titles were not randomly assigned, there was no exogenous scaling of the process and, to this date, almost all community councils have been granted a title. Finding an adequate control group is therefore challenging. Titled communities may comprise a group of self-selected organizations in the Pacific region. Communities with and without collective titles may, for example, have had different levels of human or social capital before the titling, or different organizational structures; these factors may have influenced a community's decision to claim the title or take advantage of their income-generating capacity. More organized

communities might also be better prepared to undertake the process of acquiring their collective title, which in turn would enhance their capacity to access public support and funding to improve their living conditions.

To address these challenges we use Analysis of Covariance (ANCOVA) estimation and compare rural districts (e.g., smaller administrative divisions within municipalities) in titled areas (treatment group) with rural districts that were, at the time, in untitled areas but similar in all relevant observable characteristics (control group). Because the titling process has taken place over the last two decades, we take advantage of this expansion of the process over time when conducting our analysis.

To conduct our analysis, we construct a rural district panel dataset of collective title recipients and non-recipients. To enhance the comparability of treatment and control groups, we restrict our analysis to the Chocó region (representing 56.87% of the collective titled area in Colombia), where the black population represents the largest ethnic group and where rural districts share very similar traits, such as agricultural activities, levels of poverty incidence, exposure to violent shocks and geographic characteristics. We use information from the second and third waves of the Census of the Poor (SISBEN)³ in the Chocó region. The second wave was conducted between 2003 and 2008 and the third wave between 2009 and 2013. We take the former wave as our baseline and the latter as our post-treatment data. Our final sample contains 60% of titled rural districts and their lengths of exposure range from two to fifteen years. The comparison group consists of the remaining 40% of rural districts where no collective titling occurred at the baseline (the time of collection for the second wave of SISBEN) and which do not contain indigenous resguardos (reserves).

This identification strategy allows us to evaluate the causal effect of collective land titling on household income and private investment decisions, such as home improvements and children's educational attendance, by controlling for observable pre-treatment characteristics and unobservable factors that remain invariant or vary smoothly over time.

We show that collective titling has significant effects on household per-capita income, housing investment and the educational attendance of children between 5 and 15 years old. After controlling for pre-treatment observables and rural district fixed effects, we estimate that the increase in the average household per-capita income in titled villages is more than 10 times the

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³ SISBEN is a government multi-topic household survey used in the focalization of social programs that covers information on all major socioeconomic conditions and outcome variables.

change reported for the comparison group. In addition, we find an improvement in housing quality, indicating an investment in private assets despite the collective nature of land ownership. Results also indicate significant positive effects on overcrowding in the households. In addition, we find that the titling program improves investments in human capital. Although the significance of these estimates is sensitive to changes in the econometric specification, the rise in educational attendance rates for children between 5 and 10 was larger in titled villages. Thus it seems that access to collective land creates a more secure resource base and a longer time horizon for these households, which leads to them investing in their private physical and human capital.

Our results contribute to the discussion about the importance of land reforms targeted at identity-based groups, such as Afro-Colombian communities. More specifically, the results contradict the claim that without private ownership of the land there aren't any incentives to invest in productive assets at the household level. In fact, we report similar results to those discussed by Galiani and Schargrodsky (2010) as the benefits of individual titles, who also find a positive effect on housing investments from the titling of land. Further, they claim that these investments did not occur due to access to credit. Therefore, our results contribute to the ongoing debate on rural poverty reduction, land reforms and development, and suggest that these collective land titling programs in the developing world should be continued and improved.

The rest of the paper is organized as follows. In the following section we expand upon the literature surrounding debates about land property rights and explain why they continue to feed political contestation. We then describe the origins of Law 70, the context of the Pacific region and in particular the Chocó region, where a substantial share of collective titling cases and areas can be found. In the third section we explain our empirical strategy for the study of the possible causal effects of collective land titling, and include a detailed explanation of the data collected for analysis and our econometric estimations. The fourth section presents and discusses our results. The final section concludes.

2. Background

2.1 Land, rights and community-based development

The particular issue of institutional design and the incentives against and in favor of assigning property rights to a group instead of individuals continues to attract attention with important policy implications for land programs in the developing world (Demsetz, 1967; North & Thomas, 1973; Field, 1989; Ostrom, 1990; Brown, 2000; Agrawal & Ostrom, 2001).

In the economic literature, a lack of individual property rights is considered an obstacle to economic development. Private land titling alleviates poverty in light of a definition of property rights that allows the poor to transform wealth into capital via access to credit, allowing them to invest in productive projects (De Soto, 2000), and through investment in physical and human capital (Galiani & Schargrodsky, 2007). As for the case of rural land, arguments are based on getting the owner of the land to become the only residual claimant and therefore invest in activities that would make the land more productive. Beyond the efficiency argument lies the equity argument, which claims that unproductive land would move into the hands of more productive labor (landless farmers interested in investing), and that with the help of the state such market transactions of land would generate a more equitable and efficient allocation. Such was the recommendation made by the World Bank in the mid-1970s, which encouraged “*that communal tenure systems be abandoned in favor of freehold titles and the subdivision of the commons*” (Deininger & Binswanger, 1999: 248).

However, evidence regarding the virtues of the privatization of land for rural development is not robust (see Lawry et al. 2016). In a recent survey study, Vendryes (2014) collects the theoretical arguments in favor of privatization and existing evidence on the virtues and problems that land privatization has had over time. The results suggest that the expected effects of increased efficiency and equity outcomes are not as frequent as first thought. The author in fact argues that with failures in the institutional setting that surrounds land privatization such policies could do more harm than good. One of the arguments as to why the individualization of property might fail refers to externalities or spillovers flowing across individual holdings, especially those that are hard to measure and account for. When these externalities are sufficiently high, the benefits of a consolidation of the land through state or communal arrangements might internalize them and provide net benefits greater than the social costs that arise from the externalities of the individual property solution.

By the end of the twentieth century, the World Bank (Deininger & Binswanger, 1999) had recognized that communal arrangements could in fact be as efficient, improve tenure security, provide multiple functions, take advantage of economies of scale within the community, and even serve as a better path towards efficient land transactions.

The channels through which collective titling in Colombia may decrease poverty are not obvious. The community organizations created in the Pacific region do not receive municipal or national transfers and no systematic state (or external) program exists that aims at income generating projects. Members of the community have no legal individual property rights and

therefore cannot sell their share of the title. Furthermore, collective titles are inalienable and indefeasible, which, among other things, prevents the use of land as collateral, making access to credit more difficult. In this case, poverty reduction may result from other mechanisms detonated by collective titling. (i) Strengthening a sense of ownership over the territory may extend the time horizons in which households plan their individual investments in other complementary capital factors, such as natural, human, physical and social capital. (ii) The titling process requires that communities first formalize their organizational structure for them to be able to apply for the title. This process of recognition by the formal authorities and the rest of society strengthens the process of consolidation among their organizational structures and their role in the political landscape of the region, which may increase their access to productive and aid projects. (iii) More generally, strengthening the sense of belonging to a community implies a better use of the cultural values and general knowledge of the people that occupy collective territories. This includes making use of the existing social networks that provide informal social insurance in response to different natural and economic shocks. In fact, some argue that the presence of strong territorial identities in the region, reinforced by religious practices, consolidates the concept of territory-region as a complex pattern of social relationships and cultural constructions (Grueso *et al.* 1998; Escobar *et al.*, 2001). Therefore, the appropriation of the territory through the construction of a stronger set of social relations within the communities could also lead to improvements in the economic, physical and human capital indicators that we observe. Finally, iv) the possibility of taking advantage of economies of scale at the communal level, helping to reduce costs for productive activities thanks to the organizational structure, the social networks and the longer time horizon regarding security in property rights over the communal land.

Therefore, beyond political achievements through the recognition of their ancestral rights over the land, one could expect a possible set of positive impacts on the well-being of these households.

2.2 Law 70 and the Context of the Chocó Region

Afro-Colombian communities have been settled in the Pacific region – an area that runs from Panama to Ecuador, and west to the Andes – since the seventeenth century without any formal arrangements for property rights at the individual or community level. This region has been occupied historically by indigenous groups, as well as the majority of former slaves and their descendants once slavery was abolished in the country in 1851.

Until 1991, the Colombian government viewed the Pacific region as a massive forest reserve of unoccupied land, basically ignoring the historical presence of black and indigenous communities (Plant and Hvaalkof, 2001). In 1991, Article 55 of the new Colombian Constitution recognized the right of black rural communities to collective land titles in the territories of the Pacific region. This article was operationalized in 1993 with the implementation of Law 70, which implied the recognition of the black community as an ethnic group with the responsibility of setting up its own authority in its territory and with the right to exclude outsiders and exploit their natural resources (Velez, 2011). Black communities in the Pacific have all the rights identified by Schlager y Ostrom (1992): access, extraction, management, exclusion except for alienation. In fact, an important feature of the law is a prohibition against issuing further individual titles in the region in which black communities have a historical presence. These lands are now subject only to collective titling. Law 70 changed the political structure of the country's Pacific region, with the emergence of new local authorities who have gained visibility and power (Velez, 2011). In fact, a later decree (1320 of 1998) specifies the right of black communities to be petitioned or consulted by higher levels of government or any other organizations before the implementation of any decision or project that directly affects these ethnic communities.

Overall, Law 70 and its corollary decrees specify the processes for allocating collective land, as well as some general rules regarding community organization, the functions of new local authorities, and decision procedures at the local and regional levels. According to the new legal framework, in order to apply for a collective title, each community has to first establish a community council (CC) as a political and territorial organization. Each community or group of families with a historical presence in the territory is autonomous with regard to how to organize a particular CC. In the department of Chocó, the focus of our study, CCs (Consejos Mayores) were mainly formed following the river or watershed-based organizations and rural settlements along the river⁴.

Behind this change in the property rights regime, which has translated into a massive decentralization process, lays a complex community-building process that was initiated almost a decade before Law 70 and supported by catholic missionaries, indigenous groups and social movements (e.g., Movimiento Cimarrón). According to the interviews conducted with community leaders, during the 1980s the black and indigenous populations that inhabited the Chocó lowlands witnessed an increasing trend of industrial logging and mining endorsed by the local environmental

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⁴ However, these CCs have a complex structure. Consejos Mayores are the formal authority but are formed by smaller communities (Consejos Menores) at the district level, and not all of them are represented in the formal community board. Also, there are some CCs that were formed at the rural district level.

authority⁵. Thus black communities, with the guidance of catholic missionaries⁶, made use of their river-based social networks to assemble meetings in order to construct local associations bound by the shared problems derived from the existing legislation and the public policies implemented in the region. Following prior indigenous claims to territorial rights⁷, these new organizations started to draw up and structure demands that sought to secure their access to natural resources and protect their traditional forms of production and social organization through a change in local governance rules.

An important antecedent to this process was the formation in Chocó of the Peasant Association of the Middle Atrato ACIA (Asociación Campesina Integral del Atrato) in 1987, which passed a petition aimed at persuading the national land authority (then INCORA) to stop the timber concessions supposedly granted to private companies in the Middle Atrato. They alleged that the area in dispute overlapped with the territories inhabited by black communities, and supported their request with maps⁸ delimiting the territories, purportedly just a forest reserve, where they had historical presence. With this petition they could not only stop the degradation of the forest, but also prove that the rural Pacific was not an unoccupied forest. As a consequence of these demands, the state committed to awarding them 800,000 hectares of land for collective management. Although this agreement was never complied, it set an important precedent for future collective land titling legislation (Pardo, 1997; Restrepo, 2011).

As this movement was strengthened, the black peasants of the Middle Atrato (ACIA) and lower San Juan among others forged an interethnic alliance with the indigenous organization OREWA⁹. Despite the absence of black representatives then, their demands were presented in the National Constituent Assembly by the indigenous delegates. Finally, their concerns found concrete expression in Article 55, mentioned above, and Law 70.

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⁵ In 1959, the national government sanctioned a law that declared the Pacific forest a national reserve forest and began to implement public policies to open up the frontier of the Pacific to commercial interests. These interventions led to the multiplication of extractive actions in Chocó (Ng'weno, 2001).

⁶ After 1970, the catholic missionaries in Chocó, deeply inspired by the Liberation theology movement and convinced that through community organization and collective action black peasants could overcome their extreme poverty, focused their work on helping to set up ecclesiastical grassroots groups and develop small productive projects. The church not only had the capacity to summon the peasants and unify them around common agendas, but also to gather the human and financial resources necessary to put into practice such initiatives. These small communal associations worked as the starting point upon which the black peasantry movement was built (Restrepo, 2011).

⁷ Since the 1960s, different indigenous communities have compelled the government to reestablish indigenous *resguardos*, which entailed collective titles over their lands for the former (Rappaport & Gow, 1997).

⁸ These maps were elaborated as part of the Forest Action Plan for Colombia project, sponsored mainly by the Netherlands government.

⁹ According to the interviews we conducted with community leaders, inspired by ACIA and OREWA other community organizations were organized during the 1980s in Chocó and later became Community Councils: ACADESAN, OCABA, ACABA, ASOCASAN, OPOCA.

In 1994, through a loan to the Ministry of Environment, the World Bank promoted the collective approach to property rights as a sustainable development strategy for the Pacific region. A direct result of this program was the collective titling of more than 2.3 million hectares (Sanchez & Roldan, 2002), including the first title issue to ACIA in 1996 (now organized as a community council and renamed COCOMACIA).

In summary, a political process that involved a national government commitment to honor the constitutional mandate, and a bottom-up social movement that had helped bring the issue of land and Afro-Colombian rights to the constitutional assembly, gave birth to a collective, rather than private land reform, without precedent in Colombia and the Latin American region. Now, the goals of securing these collective rights are up for empirical testing. The next section describes our empirical strategy, starting with the building of a dataset to estimate the causal impact of the collective land titling process on the private investment decisions of households.

3. EMPIRICAL MODEL

3.1. DATA

As mentioned before, territories where black communities held *de facto* property rights were only subject to collective titling, and therefore individual titles could not be issued. Thus collective titles were granted to the CCs as the new authority in the territory. However, we could not use the CCs as our level of analysis since this political unit, with its geographical boundaries, does not exist for the control group. Therefore, we use the rural district (*vereda*). This unit has historical roots with defined boundaries given that rural districts had been sub-municipal units at which the state targeted key policies, such as establishing schools and in some cases health posts, and whose households share some cultural traits and productive practices. By using these boundaries, we are able to identify a comparable unit of analysis across territories that were and were not titled. The formation of the community council did necessarily match the rural district, however. One community council might cover several rural districts or, on the contrary, black communities might have established more than one community council in one rural district.

To conduct our analysis, we constructed a rural district panel dataset of collective title recipients and non-recipients, created from three different sources of data. The main source is the Census of the Poor. This questionnaire includes a variety of modules that allow us to construct different indicators to assess the quality of life of the most vulnerable households in the country. We use information from the second and the third waves of SISBEN to measure the outcome

variables¹⁰. The second wave was conducted between 2003 and 2008 and covered 33,500 households in 960 rural districts in the Chocó department, where most of the collective titling has occurred. The third wave was conducted between 2009 and 2013¹¹ and included 33,077 surveyed households in 933 rural districts. We take the former wave as our baseline¹² and the latter as our post-treatment data¹³.

Based on the detailed information on household location from each wave of the census, we have merged two rural district datasets by aggregating household and individual data. The resulting datasets were merged using village name as the matching criterion¹⁴. To minimize the exclusion of rural districts, we have not restricted the subsample to the perfect matches but allow for some minimal spelling differences or phonetic distances using a record linkage method¹⁵. We are left with 458 rural districts in our sample, in which 25,000 households are settled¹⁶.

Since information on land ownership or collective land title allocation is not available in the census, we used the legal certificates that support title allocation to identify the rural districts (*veredas*) located within the areas assigned to each community council that was issued a title. We have also gathered information regarding the dates of the submission of the legal request for the land title and its further issuance. This data has been carefully merged with the panel of rural districts in order to define the treatment status¹⁷. Thus for the rural districts available in both waves of the census, we define treatment based on two criteria: i) the rural district appears in a land

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¹⁰ Given the history of extreme poverty and social exclusion in the department of Chocó, the Census of the Poor represents considerably well the Afro-descendant communities that inhabit the rural areas of the Pacific lowlands. In fact, according to the population census done by the National Bureau of Statistics (DANE), the second wave represents 67% of the population of Chocó and the third wave 62%.

¹¹ See Appendix 1 for a detailed description of the distribution of the years in which the census was collected.

¹² Note that our baseline was collected after the titling process had already began. By 2003, 80% of the eligible communities had received the collective land title and the average length of exposure of a community council to collective titling was 3.2 years. See Appendix 2 for a description of the evolution of the title granting process.

¹³ To avoid inaccurate reports, we only use households with at least one individual over 12 years of age, located within villages with at least four more households. See Appendix 3.

¹⁴ Before merging, village names were subject to a strict cleaning process. For instance, non-alphabetical or numerical characters were eliminated from the village name registered in the census database.

¹⁵ The accuracy of the merge was evaluated by checking with official sources, whenever possible, if the apparent discrepancies between two names were just typographical mistakes or represented two different villages.

¹⁶ Our analysis does not take into account the potential effect of migration between the two data collections. This is due to a lack of information concerning how long families have lived in the rural district.

¹⁷ Since each wave of the census was collected over a large time interval (about 5 years), we observe villages from the same community council at different times. As a result, there are differences in the treatment status within the same titled community council.

certificate¹⁸ and ii) is located within the areas assigned to a community council that received the collective title before or at time of the baseline data collection¹⁹. As shown in Table 1, titled rural districts represent 60% of the final sample and their lengths of exposure range from two to fifteen years. The comparison group consists of the remaining 40% of rural districts and includes only those that don't belong to any titled community council or to any indigenous resguardo²⁰.

(Table 1 here)

Finally, we associate the rural district panel with several municipal-level data. From National Government official sources, we have gathered detailed data on the armed conflict and forced displacement (Vice President's Office and Colombian Center for Historical Memory), ethnicity composition and population size (National Department of Statistics), gold-mining extraction (CODECHOCO in Jimeno et al. 1995), and other controls that are used in the different regressions²¹.

In order to allow for comparable data, we restrict our analysis to the rural population of the department of Chocó, which, according to the national institute of geography IGAC (by its acronym in Spanish), accounts for 60% of the collective land titled to black communities in the entire country. The homogeneity of Chocó, with respect to the Afro-descendant population and rural/urban balance, will allow us to refine our estimations. Other departments in the Pacific region, such as Valle, Cauca, Nariño or Antioquia, where fewer cases of collective land titling have emerged, pose a greater risk of bias in our estimations due to their proximity to large non-black settlements and larger urban centers that are not susceptible to collective land tilting²². Furthermore, restricting our sample to a common geographic area may reduce the possible biases derived from unobserved differences that vary smoothly across proximate communities but increase with geographic distance. Also, titled rural districts and comparisons from the same department may be more likely to experience similar changes that occur at a regional level. For instance, the

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¹⁸ When more than one title has been granted to different community councils in the same rural district, it is not possible to determine accurately the community council to which the rural district belongs. We matched the rural district to the community council with the largest area.

¹⁹ Notice however, that for our final treated sample all but 13 rural districts were titled before 2003. The remaining 13 rural districts were titled between the second and third waves of the census.

²⁰ According to Incoder, 116 resguardos equivalent to 1'271.570 hectares are present in Chocó (data obtained from http://www.territorioindigenaygobernanza.com/col_07.html). These communities cannot form a control group because their land is already collectively titled and their inhabitants belong to different ethnic groups.

²¹ See Appendix 4.

²² According to the 2005 national population census, in Chocó around 60% of the population that inhabits rural areas recognizes itself as Afro-descendant, while in the rest of the Pacific region less than 40% of the rural population does.

implementation of public policies aimed at overcoming poverty and designed or endorsed by the governor's office.

3.1. RESEARCH DESIGN: Testing for the causal impact of titling

The impacts of collective titling on income, well-being and private investment decisions are estimated according to six outcome variables. The first indicator is the average household per-capita income in the rural district²³. Measures of housing quality include the percentage of households in the rural district that are deprived of finished floors²⁴, the percentage of households living in dwellings with low-quality walls, and the percentage of households living under conditions of critical overcrowding. Finally, to measure educational impacts we use the school attendance rates of children between 5 and 10 years old and between 11 and 16 years old in the rural district.

To address these challenges we use Analysis of Covariance (ANCOVA) estimation and compare rural districts in titled areas (treatment group) with rural districts in untitled areas that are similar in all the relevant observable characteristics (control group). ANCOVA has been shown to improve in power when compared with using the more common difference-in-difference specification, since it reduces the variance of the treatment estimator by conditioning a variable correlated with the outcome of interest (McKenzie, 2012).

We estimate the following model for rural district i , in municipality j , observed in the period $t=0,1$:

$$Y_{ij1} = \alpha_i + \beta D_{ij} + \gamma Y_{ij0} + \delta X_{ij0} + (t_1 - t_0) + \varepsilon_{ij1} \quad (1)$$

where Y_{ij1} is the outcome variable post-treatment, α_i are the rural district level fixed effects, D_{ij} a dummy variable that denotes the treatment status, Y_{ij0} is the pre-treatment outcome variables, X_{ij0} is a set of rural district and municipal pre-treatment characteristics ($t=0$), $(t_1 - t_0)$ is

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²³ Since the Census of the Poor is the government social spending targeting tool, some individuals may choose to underreport their income deliberately since it might increase their chances of qualifying for social programs. However, the Census of the Poor was not a criterion for assigning collective titles to black communities, or for prioritizing the areas where these titles were to be granted. Therefore, there is no reason to believe that income miss reporting is correlated to treatment status. We do not exclude from our analysis households based on their reported monthly income in order to minimize measurement errors, though its measuring variable is very likely to be underreported. It is also likely that these households do not earn a monetary income, but harvest and barter surpluses. About 20% of the households from the initial sample report zero income.

²⁴ Floors are considered unfinished when they are made of dirt or sand. Walls are considered low-quality if they are made of guadua or another vegetable, zinc, cloth, cardboard, waste materials, or if no exterior walls exist.

the number of years between the second and the third wave of the census and ε_{ij1} is the random error in the post-treatment period.

A limitation of this research design is that it does not correct bias due to time-variant unobservables. If areas of comparison are not similar to the treated ones in terms of unobserved characteristics, then, after differentiating for fixed effects, changes in the outcomes may still be a function of that heterogeneity. Even though our first cross-section doesn't precede the collective titling process, by having two time periods we are able to correct bias due to time-invariant characteristics.

We include in our estimations a set of variables, X_{ij0} , that may simultaneously condition the probability of a community gaining its collective land title and the subsequent changes in outcomes. We control for the percentage of adults in the rural district that attained at least primary education in 1995 as a proxy of the human capital of the community members leading the process of council formation and the titling request. Higher educational levels may be a determinant for a community in the structure and push for title claims upon the authorities, as well as of the completion of the bureaucratic process required to apply for the land title. We also control for the ethnic composition and size of the rural population in the municipality since Law 70 is explicitly targeted at Afro-descendants and rural areas and therefore caught on faster in communities with a higher presence of this ethnic group.

In addition, to adjust for the effects that armed conflict may have had on the titling process, we control for past history of conflict in the municipality by using measures of violent shocks that occurred during the late 1980s and mid-1990s. We define violent shocks as those directly related to the political conflict, such as selective assassinations, massacres, attacks against civilian populations, kidnappings, terrorist attacks, and non-combatant casualties due to cross-fire between contesting armed groups. We also include forced displacement rates in the estimations. Armed conflict may have affected collective land titling mainly because violence has been strategically used against civilians to exert territorial control. Through violent actions and land seizure, non-state armed actors may secure access to valuable natural resources, appropriate strategic areas and routes, conduct illegal activities, among others. In such a context, landownership may become a victimization factor. In addition, violent shocks has also been purposively directed to debilitate social networks, associative organizations and shatter new social initiatives as a means to gain control over a population, especially in communities where social organizations are more fragile. Since collective titling requires the building of new social institutions based on existing leaderships, communities, and especially their leaders, may have been targeted by armed groups in order to

alienate the emergence of new local authorities that could resist their attempts to strengthen territorial control. Thus by threatening community initiatives to build new forms of self-government, armed actors may have discouraged them from requesting collective land titles²⁵.

Drawing from Jimeno, Sotomayor and Valderrama (1995)²⁶, we also include a dichotomous variable that measures whether rural districts are located within municipalities where formal wood extraction or industrial mining permits were granted during the 1980s. This variable not only captures the level of extraction of natural resources prior to the onset of the land titling process, but it is foremost a proxy of the existence of outsiders pressuring to extract valuable resources. As mentioned before, behind this change in the property rights regime lays a complex community building process that is closely linked to black communities' struggles to gain control over their territory and its resources. Before the collective titling process, there weren't any institutional limitations on access to the natural resources available in territories inhabited by black communities. Such a structure of incentives led to the increasing overexploitation of these resources at the hands of foreign private companies²⁷. The resulting environmental degradation in these areas, where outsider pressure was higher, endangered the long-term sustainability of the productive use of the natural resources. Communities faced by increasing environmental damage may be more

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²⁵ As a consequence of the intrusion of armed actors in the Pacific region, black communities have suffered a substantial loss of territorial control. The conflict shocks that hit black communities inhabiting the old municipality of Riosucio help to highlight the destructive effects that armed conflict may have on social organization. By the end of 1996, paramilitary forces had erupted in the rural areas of the old municipality of Riosucio. Using massacres, selective assassinations and public executions, among others, paramilitary forces carried out a systematic killing of civilians, especially community leaders, stigmatized as supporters of left-wing guerrilla groups. Such an escalation of violent actions caused the massive displacement of entire communities. The forced displacement of the rural households inhabiting the Curvaradó, Jiguamiandó and Cararica river basins are emblematic cases of the massive exodus of the black population in the Pacific region. As a result of such tremendous waves of violence, the social organizations that led the titling process in the region were shattered. Some of the displaced communities could only start the legal struggle to secure their territorial rights once they were back in their hometowns. Others applied for the land titles when they were displaced, but only received an answer years after they had already returned (Wouters, 2001) (Restrepo, 2011).

²⁶ Jimeno et al. (1995, Appendix 1- 4) portray in detail the main economic activities in Chocó during the late 1980s. This description encompasses not only a deep characterization of the techniques implemented and of the actors involved in wood extraction and industrial mining activities, but also includes the geographical distribution of the extractive spots based on the administrative registers provided by CODECHOCÓ. According to their records, these activities were concentrated in the territories that, before the changes occurred on Chocó's administrative divisions, formed the old municipalities of Riosucio, Quibdó, Bojayá, Baudó, Nóvita, Istmina, Sipí, Condoto and Tadó.

²⁷ By 1980, wood logging in Chocó had greatly intensified. In the Low Atrato, for example, the surface covered with *catal* trees, the most common species in the region, decreased by 75% in 15 years (Andrade, 1993). Such massive exploitation was carried out by two major extractive private industries that held control over large-scale wood extraction in Chocó (Meza, 2006; Leal & Restrepo, 2003). Open access to the woodlands was secured by the legal permits that the regional environmental authority had given to private companies. Those permits, valid for no less than 10 years, allow them to exploit the Atrato, San Juan and Baudó riversides (Jimeno et. al, 1995.).

willing to engage in processes of collective land titling in order to gain control over the land they occupy.

Since this identification strategy corrects endogeneity caused by unobserved differences in time-invariant characteristics, controlling for rural district fixed effects allows us to account for characteristics such as land quality, rural district's size, availability of certain natural resources, distance to the nearest large market, distance to urban centers, to the state capital, to the nearest sea shore, and distance to the nearest river route, among others.

3.1. DESCRIPTIVE STATISTICS

In this section we examine in detail the distribution of titled and untitled rural districts by different sets of observable characteristics. Table 2 presents a comparison of baseline characteristics between treated and control rural districts using standardized t-tests. The results reveal a number of differences that are statistically significant. Regarding human capital accumulation before the onset of collective titling, we don't find any significant differences between the treatment and control groups. The percentage of the population over 18 in 1995 that attained at least primary education is about 20% for both groups. Rural districts inside titled communities are located within larger municipalities. We also compare, based on information from the population census of 2005, the percentage of the population in the municipality reported to be Afro-descendant. Rural districts belong to municipalities with a larger share of Afro-descendants.

In addition, using a measure of the presence of authorized large-scale wood extraction or industrial mining during the late 1980s, we find that over 60% of the rural districts in titled areas were located in municipalities where such activities were authorized by the environmental authorities, while only 44% of untitled rural districts were. This suggests that the exploitation of natural resources was higher during the late 1980s in the districts that ended up being titled. This in fact follows the discourse of the leaders of the Afro-Colombian movement who saw in these extractive enterprises a threat to their communities and therefore found a motivation for the process of organization and collective land claims.

To measure household exposure to violent shocks we have included a dummy variable equal to one if the rural district is located within a municipality that faced violent shocks between 1985 and 1995. According to the descriptive statistics, titled communities and untitled communities differed significantly in direct exposure to violent shocks before the titling process began. While 37.3% of titled rural districts belong to a municipality where at least one violent shock was

registered during the aforementioned period, 63.1% of the rural districts outside collective titles are located within such municipalities. A larger share of untitled rural districts than titled ones are located in municipalities that were more frequently hit by all sorts of violent shock. The most regular shock was that of kidnappings, but we observe larger differences between titled and untitled rural districts in relation to selective assassinations and direct attacks against civilians.

The large and significant differences that we observe in pre-treatment characteristics, and especially in violent shocks and the presence of private companies extracting valuable resources, raises some concerns regarding heterogeneity in the initial conditions that may affect the outcome trends. Therefore, we include all of the covariates in our regression analysis later on.

(Table 2 here)

We also report descriptive statistics of the outcome variables by titling status in Table 3.

Regarding housing conditions, we observe significant differences between titled and untitled rural districts. The descriptive statistics show that the percentage of households living in dwellings with dirt floors in titled areas fell by 2.2 percentage points, from 10.1% to 7.9%. We don't report significant changes in this dimension for the comparison group. As a result, at the end of the period under analysis, the incidence of households deprived of finished floors is lower in the titled areas than in untitled ones by 6 percentage points. Regarding the proportion of households living with low-quality walls, uneven progress is seen between titled and untitled rural districts. The former reduce in proportion of household with walls made of non-durable materials by 8.1 percentage points, while untitled rural districts do so by 5.0 percentage points. In addition, reported changes in critical overcrowding differ significantly between titled and untitled communities. The reduction made by title recipients doubles that achieved by the rural districts outside collective titles.

We don't find any significant differences in the distribution of school attendance at the standard significance level. The percentage of children attending school between 5 and 10 years old increased at similar rates in rural districts both inside and outside collective titles. And while in titled rural districts a larger percentage of children between 11 and 16 years of age attend formal education, school attendance seems to increase at the same pace in communities both inside and outside collective titles. Note that we do not include access to early childhood services (less than 5 years) because the institutional offer for early childhood and pre-school services is not common on the Pacific coast. Also, and perhaps more importantly, the provision of early child care continues to rely on the extended family. Titled rural districts show lower levels of household per-capita income

at the beginning of the period under analysis. However, this gap was reversed. Rural districts outside collective titles experienced a significant decrease in household per-capita income, which fell by a 30% between the third and the second wave of the census. On the contrary, we report a slightly significant increase in this income measure in titled districts.

Although levels of poverty in the rural areas of Chocó remain very high, titled rural districts have significantly improved their living conditions in all of the dimensions under study.

(Table 3 here)

3.2 ECONOMETRIC RESULTS: COLLECTIVE TITLING IMPACTS

In order to assess the sensitivity of the results, we estimate two different specifications. The first basic model (Model 1) includes only the rural district fixed effects and the number of years between the second and the third wave of the census. The standard model (Model 2) extends Model 1 by adding all the pre-treatment covariates presented in Table 3.

Findings on the causal effects of collective land titling on income, housing investments and school attendance using ANCOVA are presented in Table 4²⁸. Let us first discuss the results on the household per-capita income. According to the results of both models, we find that title recipients have increased their monthly household per-capita income more than non-recipients, and that these impact estimates are highly statistically significant. The amount of this difference (COP\$14.900 in Model 2) is close to the national minimum day wage (COP\$17.166 in 2010). Everything was deflated using 2008 as the baseline year.

In columns (2) and (3), we compare differences in school outcomes. While the first model estimates indicate that there are no significant effects, once we control for observable covariates, Model 2 suggests that collective land titling has a positive and significant effect on the school attendance rate of children between 5 and 10 years old. Rural districts inside collective titles show a larger attendance rate among young children in formal education than in the untitled rural districts. For Model 2, the impact estimate is that of 6.51 percentage points. Similar results are found when testing for differences in the school attendance of children between 11 and 16 years of age. Model 1 indicates that collective titling doesn't affect the rate of school attendance. However, once we adjust for observable differences in pre-existing conditions (Model 2), we find that collective titling has increased the percentage of older children attending school by 2.1 percentage points.

We summarize the effects of collective titling on housing investments in columns (4), (5) and (6). Our findings suggest that land titling reduces the proportion of households with low-quality

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²⁸ See Appendix 6 for all econometric estimates of covariates not reported in Table 4.

walls in both models. The evidence in column (4) suggests that for titled districts there is a statistically significant decrease of 2.1 percentage points in the proportion of households with low-quality walls in Model 2. The fifth column presents the effect of land titling on quality floors. The percentage of households living in dwellings with dirt or sand floors is lower in titled rural districts compared to untitled ones. This difference is estimated at 2.7 percentage points in Model 2. Finally, we test whether or not critical overcrowding decreases due to collective land titling. Our estimates, column (6), show that titled rural districts have improved in this dimension, either because the number of household members has decreased or because there was an increase in the number of divisions of the home, in both cases decreasing overcrowding in the household. The percentage of households living under conditions of critical overcrowding in titled rural districts is lower than in untitled districts by 1.4 percentage points, according to Model 2. We conclude that collective titling has improved the quality of the housing and living conditions in the black rural communities of the Chocó department. These conclusions are robust to the heterogeneous effects explored below²⁹.

(Table 4 here)

During the period of land titling a surge in coca production and mining activities occurred in the Pacific region. One could argue that this might have generated an increase in disposable income for the households and improvements in housing. However, there aren't any a priori conjectures about the net impact of these activities if comparing treated villages with the controls.

On the other hand, parallel to the scaling of the collective land titling process, the internal conflict escalated in the Pacific Region and direct attacks against the civil population were intensified. These aggressions, that forced the population to migrate, were part of a deliberate strategy designed to subdue communities, seize lands and spread territorial control, among others. The violence unleashed was not randomly targeted. Since land and territorial control were factors in dispute, black communities claiming collective property rights might have been harassed more violently in order to force them to migrate. Forced displacement causes a significant reduction in quality of life for the affected households. Hence imbalances from violent shocks in titled and untitled areas would lead us to underestimate the impact of collective land titling, by mistakenly attributing it to the welfare losses caused by forced displacement.

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²⁹ For the titled rural districts we also explored the effect of exposure of the title on our outcome variables. That is, how long the village has been under collective title when the Census of the Poor was collected. Overall, we did not find any effect for title exposure using different measures (e.g. number of years with the title and dummy variables for group clustered by number of years). Regression of these models upon request.

Therefore as a robustness test we have conducted heterogeneous effects, controlling for cross effects with a high versus low presence of mining, coca production activities and forced displacement levels. We created a dummy variable with 1s for villages with high coca production if their cultivated area was always higher than the state's average, and 0 otherwise during the period between 2003 and 2013. In the case of mining, villages with gold extraction generally higher than the state average received a value of 1, and 0 otherwise during 2003-2013³⁰. Finally, we divide the rural districts into those within municipalities where the proportion of the population expelled was higher than the state average, and those municipalities where the proportion of the population expelled was lower than the state average. As shown in Appendix 5, the interaction between the treatment and the three mentioned parallel phenomena does not show a significant effect in explaining our outcome variables, except for the case of overcrowding in the household. The net effect of our treatment (collective titling) remains robust for most of the estimations and does not change our conclusion that titling increases income and private investments in housing and human capital, particularly for small children.

4. Final discussion

The impact of collective land titling on the well-being of Afro-Colombian communities on the Pacific coast had not previously been systematically evaluated, largely due to a lack of data and the multiple complexities surrounding the manner in which the land reform policy was implemented. We have constructed a panel dataset from multiple sources and over different periods of time and this has allowed, for the first time, for the testing of the causal impacts of this policy on the well-being of Afro-Colombian communities. Our estimates indicate that there has been an increase in income, school attendance and home investments. The material investment in their private capital, their home, is particularly interesting if one considers that land titling does not imply an increase in private wealth, nor the possibility of using land as collateral for traditional credits, as it has been argued as one of the virtues of private titling (De Soto, 2000). However, a recent survey work (Lawry et al. 2016) shows that not even the issuing of private individual titles increases access to credit.

In the case of communal titling, the securing of communal property rights over the land brings more stable access to the territory, which would facilitate a longer time horizon for the

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³⁰ Data for coca crops obtained from UNODC and mining data from the Ministry of Energy and Mines.

household and therefore secure future benefits from investing in the present improvement of their home. Our results suggest that collective titling, against the simplistic approach that collective ownership is the ownership of no one, has a positive effect in terms of inducing households to invest in their human and physical capital to improve their income and their well-being through a more secure legal territorial environment for their village. We should note that our test implies a comparison between collective property against no property and we cannot say much about its effects against private titling. However, our results are consistent with Galiani and Schargrodsky (2010), who evaluate private titling for the poor.

Our quantitative approach was complemented with a series of interviews that we conducted with leaders and representatives of community councils in the Chocó region. Their perceptions support our models and conclusions. Leaders from Community Councils state that one of the motivations for self-organization and access to collective titling was the pressure of external actors interested in exploiting natural resources, mainly timber³¹. Many of the leaders still feel that the state has failed them, and although access to health and education services is improving it is still precarious. From their perspective, the most important effect of collective titling has been the protection of their territory and the strengthening of their sense of belonging³². By creating a legal environment that secures the territory of the community its members lengthen their time horizon and thus increase the net present value of investments in their children, their house and their stability in occupying their collective territory. Such a legal context signals to external threats, for example, violent actors or extractive industries focused on short-term gains from timber or mining, that the community is there for the long run.

The increase in income can be associated with multiple factors related to titling. Most likely, the securing of communal property rights would bring the members of the community to invest in cash crops and some extractive activities that increase cash revenues³³. Qualitative data has also identified the creation of new community enterprises that could explain the increase in per-

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³¹ As one of the leaders said: “The collective titling started due the problem we had here, we had a territory but as that territory was not entitled it was called *baldio*, so logging companies, including Triplex Pizano, companies from El Darien, began to arrive through El Bajo Atrato, to exploit the natural resources we had, such as wood, all (our) resources. Then we started to worry because we said that if here in Chocó the government has abandoned so much that they even don’t even acknowledge us, so (others) come to exploit the resources we have, then how are we going to live?”

³² “I think Law 70 and the collective titling have for us been important in defending the territory, to achieve the integration of communities and to increase their sense of belonging.”

³³ “...after one’s land is titled, one can say: I am going to plant many hectares, I going to produce, because you know what you have. Before we did not know what we had, we worked and everything, but we did not know what we had, we used *linderos* (informal boundaries) and everything but in this way we did not know what was ours.”

capita income. However, according to the testimonies, this has mainly been due to specific entrepreneurial skills and support from international cooperation.

One of the promises of collective titling was access to formal markets, such as timber and mining. This is still precarious. Few communities have access to formal permits to exploit timber and only four community councils in the whole region have legal access to mining concessions.

An argument against collective land titling in Colombia is that these communities cannot use the land as collateral for accessing credit given that collective land in Colombia cannot be fractioned or privatized, and that the law forbids any transferring of rights to private individuals. In this regard, the financial sector could enhance access to credit to the titled communities through the design of new mechanisms. Even though collectively territories cannot be used as collateral, formal timber and mining permits could be used as such. This would generate an additional incentive among titled communities to secure these formal permits.

The role of the state and the possible complementarities between the state and community efforts also deserves attention. Collective titling was a first step in a long struggle to improve communities' well-being and it has been fruitful to an extent, as documented here – mainly through household and education investments, and cash income increases. However, systematic improvements to reduce the gap between the Chocó region and the rest of the country are still expected, as this region remains in the lowest percentile across most of the social and economic distributions used in the country.

Future research needs to explore other outcomes most likely affected by the titling of these territories. In particular, forest cover and other environmental outcomes need to be studied, given the original conservation goals of Law 70. Other key processes are also very difficult to measure. These include subjective well-being, the strengthening of ethnic identities, and the emergence of powerful leaderships that otherwise would not have taken root.

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Table 1. Treatment status and length of exposure

	Length of exposure – Years between issuance date and data collection date												
	0	2	4	5	6	7	8	9	10	11	12	13	14
Rural districts outside collective titles	100%												
Rural districts inside collective titles		1%	7%	1%	2%	19%	77%	18%	3%	2%	16%	1%	4%
Total	179	2	12	1	4	34	138	32	6	4	29	2	8

Source: Authors' calculations based on the second and third waves of the Census of the Poor.

Table 2. Descriptive statistics of control variables across treatment status

	Rural districts within titled areas	Rural districts outside titled areas	Diff
% adults in the rural district that attained at least primary education in 1995 (a)	19.33	20.95	-1.62
Rural population size of municipalities in 1995 (b)	17,702	13,662	4.039**
% of rural Afro-descendants in the municipality (b)	60.8	45.6	15.1***
% RD in municipalities where logging and industrial mining was authorized in the late 1980s (c)	51.3	26.8	24.4***
Forced displacement: expelled population from the municipality between 1985 and 1995 (rate per 10,000 inhabitants) (d)	419.4	501.8	-82.3*
Forced displacement: received population between 1985 and 1995 (rate per 10,000 inhabitants) (d)	294.8	223.6	71.2
% RD in municipalities that received at least one violent shock between 1985 and 1995 (e)	37.3	63.1	-25.9***
Violent shock: Selective assassinations (e)	21.1	45.8	-21.1***
Violent shock: Massacres (e)	9.0	17.9	-8.9***
Violent shock: Civilian casualties due to crossfire (e)	0.4	11.2	-10.8***
Violent shock: Direct attacks to civilian population (e)	9.3	25.7	-16.4***
Violent shock: Kidnappings (e)	33.0	34.1	-1.1
Observations	279	179	

Source: (a) Census of the Poor, (b) National Department of Statistics, (c) CODECHOCO in Jimeno *et al.* (1995), (d) Vice President's Office, (e) Colombian Center for Historical Memory.

Test for mean differences *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3. Descriptive statistics of Afro-descendant living conditions

	Rural districts within titled areas			Rural districts outside titled areas			
	Second Wave	Third Wave	Diff.	Second Wave	Third Wave	Diff.	Diff-in Diff
Housing							
% HH with dirt or sand floors	10.1	7.9	-2.2***	13.9	13.7	-0.1	-2.1*
% HH with low-quality walls	10.2	2.1	-8.1***	10.2	5.2	-5.0***	-3.1**
% HH living under critical overcrowding	16.3	9.5	-6.8***	12.8	9	-3.8***	-3.0**
Education							
% children between 5 and 10 years attending school	62.9	69.1	6.8***	62.1	66.1	4.1*	2.7
% children between 11 and 16 years attending school	73.4	79.1	5.7***	71	74.8	3.8**	1.9
Wealth							
Average household per-capita income (2008 constant prices)	53,248	56,522	3,274*	59,875	42,209	-17.67***	20.949***

Source: Census of the Poor Second wave (2003-2008), Third Wave (2009-2012)

Test for mean differences *** p<0.01, ** p<0.05,

* p<0.1

Table 4. ANCOVA Results

	(1) Household Per-capita Income		(2) School attendance rate – Children between 5 and 10 years old		(3) School attendance rate – Children between 11 and 16 years old	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	16174*** -3437	14900*** -3643	3.139 -2.114	6.512*** -2.488	3.336* -1.935	2.080* -1.223
Baseline variable	0.277*** (0.0519)	0.199*** -0.0592	0.129** (0.0506)	0.135*** (0.0519)	0.418*** (0.0533)	0.361*** (0.0572)
Constant	20942** -9246	39730*** -11226	61.58*** -5.138	56.21*** -5.985	52.10*** -5.796	50.68*** -6.008
Observations	458	458	446	446	442	442
R-squared	0.091	0.213	0.024	0.076	0.188	0.227
	(4) % HH with low-quality walls		(5) % HH with dirt or sand floors		(6) % HH living under critical overcrowding	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	-3.090*** -0.758	-2.011*** -0.688	-3.185*** -1.086	-2.664** -1.178	-4.362*** -1.186	-1.385* -0.736
Baseline variable	0.179*** (0.0447)	0.160*** (0.0463)	0.715*** (0.0520)	0.523*** (0.0879)	0.223*** (0.0475)	0.173*** (0.0453)
Constant	2.840* -1.671	4.671** -2.052	6.009** -2.757	4.019 -2.861	18.95*** -2.822	20.53*** -3.554
Observations	458	458	458	458	458	458
R-squared	0.158	0.208	0.7	0.73	0.126	0.23

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

Appendix 1. Rural districts according to dates of data collection

Appendix 2. Evolution of collective land titling in rural Chocó

Source: INCODER – Colombian Institute for rural development

Appendix 3. Sample Selection

	Individuals		Households		Rural districts	
	SISBEN II	SISBEN III	SISBEN II	SISBEN III	SISBEN II	SISBEN III
Rural districts in the department of Chocó	149,475	127,561	33,485	33,071	961	933
... inhabited by a mainly Afro-Colombian population	144,650	127,038	32,844	32,714	930	930
... with households consisting of at least one member aged 12 or older	143,091	126,328	31,896	32,569	926	925
... without duplicated records in the database		121,439		31,327		809
... formed by no less the five households	142,313	120,502	31,690	31,033	773	673
and surveyed in both waves of the Census	113,747	94,220	25,288	25,173	474	474

Appendix 4. Sources of information

Variable	Source	Years	Description
Dependent Variable (Treatment status)			
Rural districts under collective titles and untitled	Second and third wave of the Census of the Poor: SISBEN II and SISBEN III. National Planning Department (DNP)	SISBEN II: 2003-2005 SISBEN III: 2009-2012	To identify the rural districts in the Chocó department, we use the names of the rural districts as they were recorded in the module of identification and location of the Census of the Poor. From the titling resolutions issued by the INCODER, we extract the set of rural districts that were listed as part of the area titled to each Community Council.
	Titling resolutions. Land titling government agency (INCODER)	1996-2011	We merged these two datasets and inferred whether the rural districts covered by the census were located within or outside a collective land title. Thus for the rural districts available in both waves of the Census, we define treatment based on two criteria: i) the rural district appears in a land certificate, and ii) is located within a community council that received the land title before or at the time the data collection of the second wave of the Census.
Outcome variables			
Growth in the average per-capita income for the households within a rural district		2003-2005	From the monthly household per-capita income, we estimate the rural district average in Colombian pesos (COP). We then calculate the difference between the observed periods.
Change in the percentage of children between 5 and 10 years old attending a formal education institution		2009-2012	For each wave, we calculate the percentage of children (5-10 years- old) attending an education institution as the number of children enrolled in formal education over the total number of children (5-10 years old) in the rural district. Then, we calculate the difference between the observed periods.
Change in the percentage of children between 11 and 15 years old attending a formal education institution	Second and third wave of the Census of the Poor: SISBEN II and SISBEN III. National Planning Department (DNP)		For each wave, we calculate the percentage of children (11-15 years old) attending formal education as the number of children enrolled in formal education over the total number of children (11-15 years old) in the rural district. We then calculate the difference between the observed periods.
Change in the percentage of households with low-quality exterior walls			For each wave, we calculate the percentage of households with low-quality walls as the number of households living in dwellings with walls made of untreated wood, guadua, zinc, cloth, etc., over the total number of households in the rural district. We then calculate the difference between the observed periods.

Variable	Source	Years	Description
Change in the percentage of households with unfinished floors			For each wave, we calculate the percentage of households with unfinished floors as the number of households living in dwellings with dirt or sand floors over the total number of households in the rural district. We then calculate the difference between the observed periods.
Change in the percentage of households living in overcrowded conditions			For each wave, we calculate the percentage of households living in overcrowded conditions as number of households with more than three members sleeping per room (excluding kitchen, bathroom and garage) over the total number of households in the rural district. We then calculate the difference between the observed periods.
Independent variables			
% adults in the rural district that attained at least primary education in 1995	Second wave of the Census of the Poor: SISBEN II. National Planning Department (DNP)	2003-2005	From the educational level reported in the second wave of the Census, we estimate the percentage of population that in 1996 was over 18 years old had at least completed primary education. We use this variable as a proxy of the educational level of adults before treatment.
Rural population size of municipalities in 1995	Population estimates and projections. National Bureau of Statistics (DANE)	1995	Size of population living in rural areas in 1995 according to the population estimates and projections of the National Statistics Department
% of rural Afro-descendants in the municipality (b)	General Census 2005. National Bureau of Statistics (DANE)	2005	Percentage of people in the rural areas of the municipality that were self-reported as Afro-descendent in the 2005 General Census.
Municipality where logging and industrial mining was authorized at the late 1980s	Autonomous regional environmental authority in the Chocó department (CODECHOCO) in Jimeno et al. (1995)	1986-1992	Dummy variable that equals 1 if the regional environmental authority had authorizations for mining and logging licenses during the late 1980s, and equals 0 otherwise.
Internally displaced population expelled from the municipality between 1985 and 1995 (rate per 10,000 inhabitants)	Office of the presidential human rights counselor: Colombian Human Rights Observatory.	1985-1995	Population expelled by force from the municipality between 1985 and 1995 over the average municipal population (rate per 10,000 inhabitants)
Internally displaced population received in the municipality between 1985 and 1995 (rate per 10,000 inhabitants)			Internally displaced population that arrived to the municipality between 1985 and 1995 over the average municipal population (rate per 10,000 inhabitants)
Municipality that received at least one violent shock between 1985-1995	National Center for Historical Memory report <i>"Basta Ya! Colombia: Memorias de guerra y dignidad"</i>	1985-1995	Dummy variable that equals 1 if the municipality experienced at least one violent shock between 1985 and 1995 (selective assassination, massacres, civilian casualties due to crossfire, direct attacks on civilians and kidnappings)

Appendix 5: Heterogeneous Coca Effects

	(1) Household per-capita Income		(2) School attendance rate – Children between 5 and 10 years old		(3) School attendance rate – Children between 11 and 16 years old	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	13718*** (3816)	12182*** (4172)	3.453 (2.566)	6.417** (2.879)	2.186 (2.385)	2.572 (2.424)
Municipalities with a larger area under coca cultivation	-18515*** (5782)	-3835 (7446)	-0.844 (3.896)	0.996 (4.500)	0.540 (3.387)	5.606 (4.335)
Interaction	14343* (7772)	9822 (8422)	-0.488 (4.645)	0.302 (4.905)	2.752 (4.015)	-1.691 (4.492)
Constant	30136*** (9873)	38685*** (11615)	62.50*** (5.487)	55.68*** (6.076)	50.14*** (6.287)	48.39*** (6.281)
Observations	458	458	446	446	442	442
R-squared	0.107	0.217	0.024	0.076	0.191	0.233
	(4) % HH with low-quality walls		(5) % HH with dirt or sand floors		(6) % HH living under critical overcrowding	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	-3.756*** (0.931)	-2.535*** (0.852)	-2.026* (1.222)	-1.535 (1.378)	-1.878 (1.344)	0.227 (1.385)
Municipalities with a larger area under coca cultivation	-3.422*** (1.089)	-0.495 (1.432)	3.542 (2.757)	3.513 (2.555)	1.231 (2.392)	0.328 (2.411)
Interaction	3.250*** (1.229)	1.866 (1.413)	-4.736 (2.885)	-4.160 (2.658)	-7.219*** (2.760)	-5.841** (2.689)
Constant	4.335** (1.882)	4.310** (2.154)	5.320* (2.772)	3.893 (2.939)	20.29*** (2.942)	21.52*** (3.573)
Observations	458	458	458	458	458	458
R-squared	0.170	0.213	0.702	0.732	0.157	0.252

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

Heterogeneous Mining Effects

	(1) Household per-capita Income		(2) School attendance rate – Children between 5 and 10 years old		(3) School attendance rate – Children between 11 and 16 years old	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	18748*** (4060)	16821*** (4411)	0.679 (2.446)	4.984* (2.815)	1.490 (2.287)	0.391 (2.586)
Municipalities with large-scale gold-mining activities	1.701 (3.447)	2.379 (3.917)	-3.312*** (1.136)	-1.694 (1.156)	1.701 (3.447)	2.379 (3.917)
Interaction	3.809 (4.083)	5.699 (4.132)	2.889** (1.254)	2.029 (1.235)	3.809 (4.083)	5.699 (4.132)
Constant	20942** (9246)	39730*** (11226)	3.347* (1.710)	4.803** (2.061)	53.06*** (5.886)	53.87*** (6.313)
Observations	458	458	458	458	442	442
R-squared	0.091	0.213	0.169	0.211	0.198	0.241
	(4) % HH with low-quality walls		(5) % HH with dirt or sand floors		(6) % HH living under critical overcrowding	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	-3.482*** (0.918)	-2.566*** (0.886)	-4.060*** (1.418)	-3.913** (1.578)	-5.687*** (1.426)	-2.945* (1.560)
Municipalities with large-scale gold-mining activities	-3.312*** (1.136)	-1.694 (1.156)	-4.467*** (1.268)	-3.862*** (1.480)	-9.676*** (1.698)	-6.108*** (2.023)
Interaction	2.889** (1.254)	2.029 (1.235)	4.731*** (1.684)	4.615 (4.779)	8.905*** (2.166)	5.875*** (2.161)
Constant	3.347* (1.710)	4.803** (2.061)	7.019** (2.908)	4.436 (2.913)	20.85*** (2.860)	20.65*** (3.582)
Observations	458	458	458	458	458	458
R-squared	0.169	0.211	0.703	0.732	0.158	0.240

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

Heterogeneous Forced Displacement Effects

	(1) Household per-capita Income		(2) School attendance rate – Children between 5 and 10 years old		(3) School attendance rate – Children between 11 and 16 years old	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	15,877*** (3,680)	15,435*** (4,065)	4.673** (2.330)	7.212** (2.839)	4.497** (2.086)	3.389 (2.361)
Municipalities that faced the expulsion of a larger portion of their population	12,558 (9,713)	-19,569** (8,532)	-4.858 (4.315)	-4.399 (5.231)	5.742 (4.359)	8.741** (4.434)
Interaction	-5,065 (11,376)	-8,131 (8,532)	-4.534 (5.178)	-5.731 (5.560)	-8.253 (5.086)	-7.197 (4.489)
Constant	21,922** (9,190)	32,335*** (11,298)	58.57*** (5.264)	53.31*** (6.076)	51.09*** (5.757)	50.92*** (6.064)
Observations	458	458	446	446	442	442
R-squared	0.099	0.239	0.044	0.087	0.192	0.232
	(4) % HH with low-quality walls		(5) % HH with dirt or sand floors		(6) % HH living under critical overcrowding	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Treatment	-3.242*** (0.847)	-2.089*** (0.789)	-4.424*** (1.263)	-3.724*** (1.265)	-5.004*** (1.310)	-1.827 (1.379)
Municipalities that faced the expulsion of a larger portion of their population	-0.686 (1.598)	-0.144 (1.366)	-0.573 (2.833)	-3.160 (2.650)	-4.294* (2.590)	1.992 (2.627)
Interaction	1.025 (1.687)	0.484 (1.557)	5.543 (3.827)	6.535 (4.348)	5.023 (3.104)	3.381 (2.813)
Constant	3.006* (1.719)	4.761** (2.109)	7.968*** (3.012)	5.161* (3.061)	19.72*** (2.879)	21.79*** (3.460)
Observations	458	458	458	458	458	458
R-squared	0.158	0.208	0.706	0.734	0.131	0.239

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

Appendix 6: Econometric Estimates

	Household per- capita Income	School attendance rate – Children between 5 and 10 years old	School attendance rate – Children between 11 and 16 years old
Treatment status	14900*** (3643)	6.512*** (2.488)	2.080* (1.009)
Years between the waves of the Census	-1368 (1477)	-0.00261 (0.734)	-1.008 (0.791)
Rural population size of municipalities in 1995	0.415*** (0.107)	-0.000166*** (5.91e-05)	-5.10e-05 (5.98e-05)
% of rural Afro-descendants in the municipality	-169.6** (76.64)	0.0357 (0.0530)	0.0770* (0.0413)
% adults in the rural district that attained at least primary education in 1995	280.8** (129.1)	-0.0616 (0.110)	0.256*** (0.0843)
Forced displacement: received population between 1985 and 1995 (rate per 10.000 inhabitants)	22.92*** (5.043)	-0.00428 (0.00364)	0.000510 (0.00373)
Forced displacement: expelled population from the municipality between 1985 and 1995 (rate per 10.000 inhabitants)	-13.95*** (4.367)	0.00389 (0.00306)	-0.00175 (0.00317)
% RD in municipalities that received at least one violent shock between 1985 and 1995	-406.0 (4273)	6.371*** (2.430)	-1.997 (2.201)
% RD in municipalities where logging and industrial mining was authorized in the late 1980s	-7423* (4055)	-3.642 (2.239)	-3.526* (1.967)
Baseline household per-capita income	0.199*** (0.0592)		
Baseline school attendance rate – Children between 5 and 10 years old		0.135*** (0.0519)	
Baseline school attendance rate – Children between 11 and 16 years old			0.361***
Constant	39730*** (11226)	56.21*** (5.985)	50.68*** (6.008)
Observations	458	446	442
R-squared	0.213	0.076	0.227

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

	% HH with low-quality walls	% HH with dirt or sand floors	% HH living under critical overcrowding
Treatment status	-2.011*** (0.688)	-2.664** (1.178)	-1.385* (0.736)
Years between the waves of the Census	-0.0282 (0.287)	-0.326 (0.379)	-0.404 (0.389)
Rural population size of municipalities in 1995	-3.52e-05*** (1.09e-05)	4.72e-06 (2.11e-05)	-7.66e-05*** (2.30e-05)
% of rural Afro-descendants in the municipality	-0.0331** (0.0130)	0.0110 (0.0183)	-0.00586 (0.0247)
% adults in the rural district that attained at least primary education in 1995	0.00191 (0.0215)	0.0107 (0.0481)	-0.188*** (0.0351)
Forced displacement: received population between 1985 and 1995 (rate per 10,000 inhabitants)	0.00288*** (0.000974)	-0.00528* (0.00298)	-0.00433* (0.00224)
Forced displacement: expelled population from the municipality between 1985 and 1995 (rate per 10,000 inhabitants)	-0.00227*** (0.000839)	0.00844*** (0.00316)	0.00415** (0.00191)
% RD in municipalities that received at least one violent shock between 1985 and 1995	2.717*** (0.835)	1.037 (0.894)	4.197*** (1.300)
% RD in municipalities where logging and industrial mining was authorized at the late 1980s	-0.546 (0.683)	-0.492 (1.078)	-2.213* (1.182)
Baseline % HH with low-quality walls	0.160*** (0.0463)		
Baseline % HH with dirt or sand floors		0.523*** (0.0879)	
% HH living under critical overcrowding			0.173***
Constant	4.671** (2.052)	4.019 (2.861)	20.53*** (3.554)
Observations	458	458	458
R-squared	0.208	0.730	0.230

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