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Indigenous Income Disparity And Resguardo Land In Colombia

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Abstract

This article examines the association between the resguardo, a colonial land access system similar to the North American reserve and reservation systems, and income inequality among Indigenous people in Colombia. I regressed the variable income unmet basic needs gap (IUBNgap) between Indigenous people and non-minority people in Colombia on a set of regressors that included the mean of resguardo land size per family. I find that more resguardo land per family is associated with a larger IUBNgap, which is likely due to the fact that resguardos tend to be larger where lands are isolated and where most of the land suitable for economic production is owned by non-Indigenous landowners.

Keywords

Colombia, Indigenous Peoples, resguardo, land rights, income disparity, colonialism

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Indigenous Income Disparity and Resguardo Land in Colombia

During the first part of the 15th century, the Spanish Crown expropriated Indigenous lands in Colombia and granted them to the colonizers as part of the *encomienda*¹ system. By the beginning of the 17th century, the *encomienda* was banned, and the colonial government established limited segments of land called *resguardos* for Indigenous Peoples' exclusive use and dwelling. Indigenous people worked the *resguardos* lands to derive their own sustenance and to pay the Crown's tribute (Tirado Mejía, 1998; Kalmanovitz, 2003). Since the establishment of the Colombian republic, Indigenous people have struggled to defend their *resguardos* from non-Indigenous people's economic interests. It was not until 1991 that the Constitution recognized Indigenous land rights (Mora Vera, 2015).

In 2005, Colombian provinces with large Indigenous populations, such as La Guajira and Vichada, also had high rates of extreme poverty (47.1% in La Guajira and 46.0% in Vichada). This is almost 5 times the national rate of 10.6% (Programa de Naciones Unidas para el Desarrollo [PNUD], 2013). In order to better understand the factors that contribute to the persistent comparative poverty among Indigenous people in Colombia, this article investigates the impact of *resguardo* land rights and the factors that influence the economic productivity of the *resguardo* on the relative rate of poverty among Indigenous Peoples. In this article, land rights refer exclusively to the lands conferred to Indigenous Peoples through the *resguardos*. Productive lands, in this context, should be understood as lands whose legal ownership, soil quality, and location allow households to supply their basic material needs. Productive land should be accessible for harvesting or producing goods and services for sale at market or for Indigenous consumption.

This article aims to identify the extent to which *resguardo* land rights are associated with a perceived monetary income gap between Indigenous and non-minority populations in Colombia. Data collected as part of the 2005 Census are used to estimate the income gap. Specifically, the question, "Is your household income enough to cover basic expenditures?" (Departamento Administrativo de Estadística, 2005c). *Basic expenditures* are also referred to as *basic needs* in this article. Clearly, the Census question is subjective because it does not provide a common definition of basic expenditures.

The concept of basic needs and the way in which these needs are met may differ among Indigenous people and non-minority populations. Therefore, income needs are not directly comparable. For example, rent should not be a basic need in Indigenous *resguardos* because land is collectively owned, but it is a need for households outside of *resguardos*, the majority of which are non-Indigenous households. In some Indigenous communities, non-monetary activities, such as harvesting, hunting, bartering, and gathering, meet food and clothing needs. Consequently, these households would be able to meet their basic needs with less income compared to non-minority households. However, the data used in this study show that there is still an income gap between Indigenous and non-minority people (as measured by the percentage of households in which income is perceived to be inadequate to meet basic needs).

As discussed below, Indigenous people in Colombia supply their income and non-income resources from their lands. Therefore, Colombian policies should enhance the capacity of the *resguardo* to satisfy

¹ The *encomienda* was a grant by the Spanish Crown to a colonist. Through this system, the colonist could demand tribute and forced labor from an Indigenous chief and his people (Tirado Mejía, 1998).

the needs of Indigenous people and address factors that hamper this capability. As a colonial institution, the *resguardo* is similar to reserves and reservations, which are held by Indigenous communities around the world. Thus, the findings of this investigation convey relevant lessons for international Indigenous policy.

Literature Review

Resguardo, Land Access, and Income Needs

In the history of the Colombian Republic and its policies toward *resguardos*, there are three key periods. The first period starts with the independence wars when Indigenous ownership of the *resguardo* lands was recognized through the Decree of May 20, 1820. During the second period, in spite of national legislation in 1890 that reinstated protection for the *resguardos*, some *resguardo* lands were lost. Law 55/1905 allows *resguardo* lands to be legally sold. As well, many Indigenous people lost their lands during the 1930s and 1940s because the government contended that Indigenous landowners had lost their Indigenous identity. By this time, the Province of Cauca's law allowed for the division and privatization of *resguardos* (Garzón Zabala, 2017; Kalmanovitz, 2003; Tirado Mejía, 1998). This occurred in Cauca in spite of resistance from the Indigenous Nasa people, led by Manuel Quintin Lame. Quintin Lame's activism inspired the creation of the Regional Indigenous Council of Cauca (CRIC) and the Regional Indigenous Council of Tolima (CRIT), which are Indigenous organizations that defend Indigenous land and political rights in these provinces (Benavides Vanegas, 2012). The third period was influenced by Law 135/1961, which assigned marginal areas called *reservas* to Indigenous people. Later the *reservas* became *resguardos* (Garzón Zabala, 2017).

Currently, Indigenous lands are ruled by the Law 160/1994, which recognizes the right of Indigenous people to *resguardo* lands in order to preserve their culture, to exercise their traditional production practices, and to enhance their quality of life. Decree 1071/ 2015 allows for the expansion of *resguardo* lands to accommodate community economic and cultural development or for socio-ecological purposes. From 1966 to 2016, Colombia established 750 *resguardos* with an extension of 32.3 million hectares (Garzón Zabala, 2017). However, the CRIC has stated that the government failed to create a proper institutional framework that reflects the actual Colombian constitutional mandate regarding Indigenous territories and identity (Garzón Zabala, 2017).

According to Articles 63 and 329 of the 1991 Colombian Constitution, the *resguardo* is collectively owned land that is not subject to embargo or sale. Article 21 of Decree 2164/1995 defined the *resguardo* as a socio-political and legal institution constituted by one or more Indigenous communities that hold legal collective ownership of a territory. This ownership entitles them to enjoy the privileges of private ownership and to govern and organize their lives within the *resguardo* according to their autonomous normative system. The establishment of *resguardo* land requires the possession of a legally registered limited territory with one or more communities self-identifying as Indigenous and an internal organization ruled by their own norms (Arango Ochoa & Gutiérrez Sanchez, 2008).

In Indigenous culture, there are spiritual dimensions that connect the people to the land. Nonetheless, Colombian capitalist modernization has diversified Indigenous attitudes toward land. Thus, for Indigenous people, land can function as a means of production and/or as a community asset with spiritual attributes (Ruiz Garcia, 2006). Land as a means of production is embedded in diverse

Indigenous systems of production, which depend on the natural landscape. In the Amazonian and Pacific forests, about 22.8% of Indigenous people engage in productive systems that generate little or no monetary income. They practice horticulture combined with hunting, fishing, and gathering wild resources. However, illicit cultivation and urbanization limit land availability, which obligates Indigenous people to participate in income-generation activities, most often as employees (Arango Ochoa & Gutiérrez Sanchez, 2008; De la Cruz, Bello, Acosta, Estrada Lugo, & Montoya, 2016). In other Colombian regions, there are Indigenous communities whose productive system includes the generation of monetary income. For example, the Andean forest Indigenous communities' principal income source is cocoa cultivation, which is complemented with subsistence agriculture and livestock. In regions greatly impacted by colonial expansionism, such as the Andean peasant economies,² the Caribbean region, and the inter-Andean valleys, communities generate income through minor industries (e.g., handcrafted goods, processed coffee, pearl quinoa, and dehydrated aromatic herbs), plantain cultivations, and salt mining (Arango Ochoa & Gutiérrez Sanchez, 2008).

The 1991 Colombian Constitutional recognition of Indigenous collective rights to resguardo lands is an achievement in the Indigenous struggle to recover ancestral territories and to maintain cultural identity (Arango Ochoa & Gutiérrez Sanchez, 2008; Benavides Vanegas, 2012; Garzón Zabala, 2017). However, the struggle is ongoing. For example, in the province of Cauca the Indigenous Nasa still conduct communal actions known as *minga*³ to liberate their ancestral territories from the sugar cane industry. Industrial cultivation limits the Nasa's agricultural prospects (Watts, 2017).

Indigenous Peoples in Colombia have also raised concerns about international agreements under the Food and Agriculture Organization of the United Nations Reducing Emissions from Deforestation and Forest Degradation "plus" conservation (REDD+). Their concern is that, given the unique ecosystems and biodiversity within Indigenous territories, REDD+ will lead to territorial appropriations, conservation activities, and resource extraction that deny Indigenous community rights (Ulloa, 2013).

There is a growing body of literature that examines different dimensions of poverty and inequality among Indigenous people in Colombia. Except for the year 2008, extreme poverty and poverty decreased in both rural and urban areas between 2005 and 2011. However, the poverty gap between the rural and urban populations persists. This gap disproportionately affects Indigenous groups because 78.62% of Indigenous people live in rural areas (PNUD, 2013). The Human Opportunity Index⁴ for the province of Guajira, including the Wayyuu Indigenous community, was calculated using 2005 data from the Departamento Administrativo de Estadística (DANE). The results showed that Indigenous people were disproportionately likely to have an inadequate standard of living and fewer social and economic opportunities (Cárdenas Estupiñán, 2011).

The relationship between poverty and health among Indigenous Peoples has also been investigated. High rates of malnutrition were found in two Embera Indigenous communities in Colombia, Tausig and Nusido, despite having different geographic locations and cultural features. Food insecurity,

² Peasant economies use intensive household labour and limited capital. Production is mainly for family sustenance with limited market production (Subgerencia de Tierras Rurales, 2013).

³ Minga for the Nasa people is a meeting to share happiness or to work (CRIC, 2017).

⁴ The Human Opportunity Index measures how equitably children aged 16 and under have access to essential services (World Bank, 2016).

independent of the community's particular nutrition habits, were found to be the primary cause of malnutrition (Rosique, Restrepo, Manjarrés, Gálvez, & Santa, 2010). In the Embera Katio Indigenous community (located in the province of Cordoba), the prevalence of malnutrition among children under the age of 7 is 63.3% (Restrepo, Restrepo, Beltrán, Rodríguez, & Ramírez, 2006).

Economic inequality between Indigenous people and the rest of the population across all regions of Colombia was examined through a Blinder-Oaxaca decomposition, which explains the difference in the means of an explicatory variable between two groups. The findings indicate that the lower average labour income among Indigenous people in Colombia is related to wage discrimination (Romero-Prieto, 2010).

At the beginning of the Spanish colonization, Indigenous people were enslaved. In 1517, the Spanish Crown approved the process to replace Indigenous slaves with African slaves in the Americas (Tirado Mejía, 1998). Despite the extensive literature on Colombian Indigenous poverty, inequality, and land rights, there are almost no empirical studies that address the topic within the context of Colombian colonial land tenure. One exception examines the influence of extractive colonial institutions, such as the enslavement of Indigenous Peoples, the African slave trade, and the Indigenous *encomienda*, on the 2005 Multidimensional Poverty Index (MPI).⁵ The authors found a correlation of 0.67 between the MPI and the provincial proportion of Indigenous and Afro-Colombian persons. All oppressive colonial systems such as slavery and *encomienda* were characterized by a lack of investment in human capital (Cepeda & Meisel, 2014).

Characterization of the Colombian Regions

Figure 1 displays the five geographical regions of Colombia. In Colombia, the regional contributions to gross domestic product (GDP) in 2011 indicate that the economies of the Amazon, Orinoquia, and Pacific are the less prosperous, with the Amazon ranked last (Centro de Investigación Económica y Social, 2013). Interestingly, Table 1 shows that these three regions make up about 65.4% of Colombian municipalities with *resguardo* lands. Figure 1 indicates that the Amazon and the Orinoquia regions have the lowest population density, while Table 2 shows that, in these regions, the average number of hectares of *resguardo* land per family (or simply *resguardo* land size) is the highest among the regions. Table 3 shows that, in 2005, the Amazonian and Orinoquia regions had municipalities with zero kilometers of constructed secondary roads.

The prosperity of the Caribbean and Andean regions contrasts with the other Colombian regions. With a regional contribution to the 2011 national GDP of 49.7%, the Andean region is the wealthiest in Colombia. This region also has the most populated provinces in the nation (Figure 1). The Andean region contains 26.2% of municipalities with *resguardo* land, which places this region second within the nation in terms of the presence of *resguardos* (Table 1). The Andean region has the second lowest average number of hectares of *resguardo* land, with the Caribbean region having the lowest (Table 2). The Andean region also has the highest average number of kilometers of secondary roads (Table 3). The Caribbean region is the second most prosperous Colombian region, based on regional contribution to the 2011 national GDP. The Caribbean region also has the second highest population density in the

⁵ The MPI encompasses five poverty dimensions: education, childhood and youth (e.g., mortality, undernourishment, school attendance, and school level), health, shelter (PNUD, 2013).

nation (Figure 1). However, the region's provinces have the lowest proportion of municipalities with resguardo land among the five Colombian regions (Table 1).

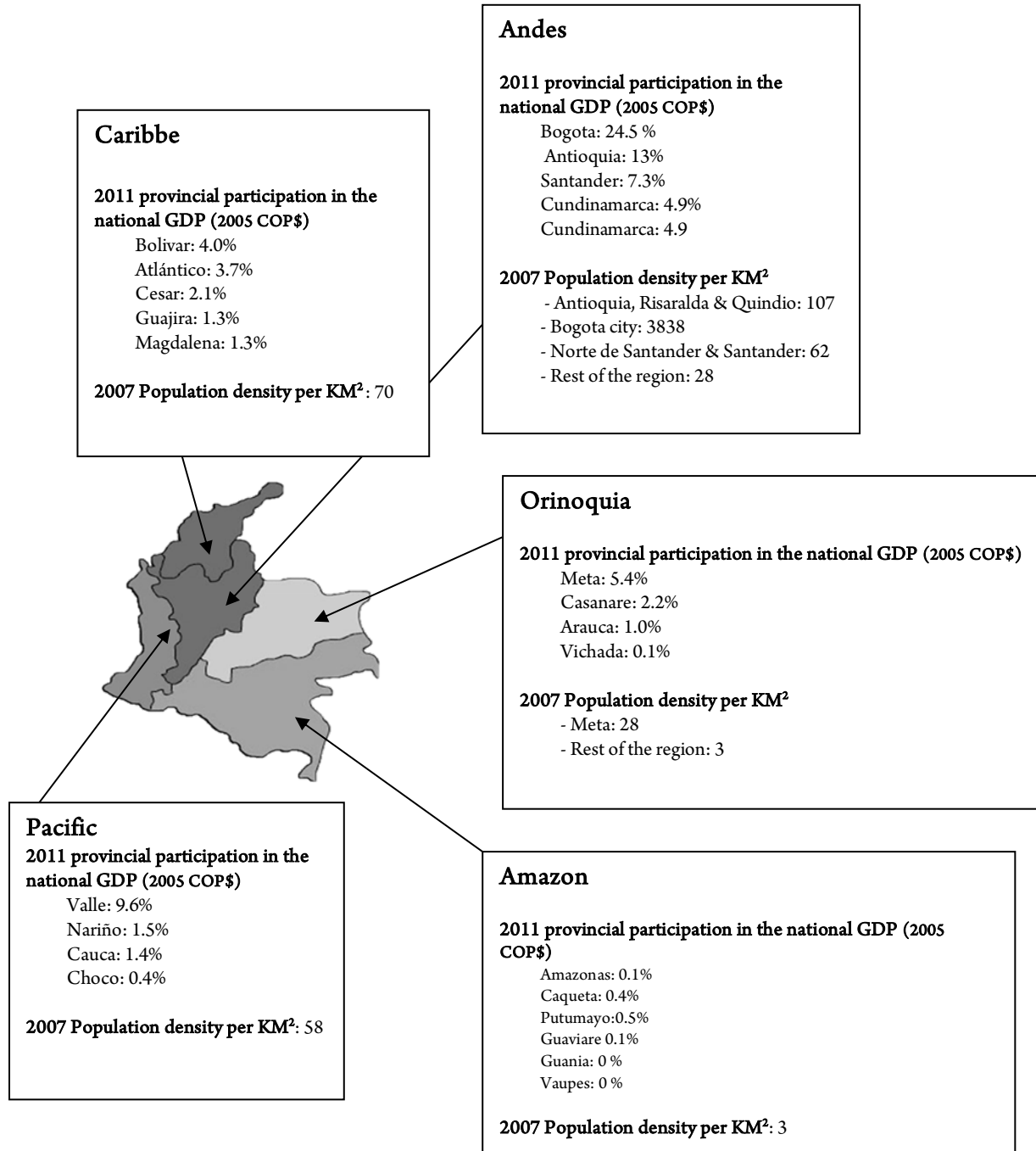


Figure 1. Regions of Colombia. GDP data source: Centro de Investigación Económica y Social (FEDESARROLLO, 2013) and Departamento Administrativo Nacional de Estadística (DANE, 2012). Population density data source: Rodriguez Albor (2011). Map source: author.

Table 1. Regional Distribution of Municipalities with Resguardos in Colombia

Region	Number of Municipalities with Resguardos	Percentage
Amazonian	30	17.8
Orinoquia	19	11.3
Pacific	61	36.3
Caribbean	14	8.3
Andean	44	26.2
Total	168	100

Note. Source: Author elaboration based on data from Instituto Colombiano de Desarrollo Rural (INCODER, 2011).

Table 2. Average Number of Hectares of Resguardo Land per Family

	Number of Municipalities with Resguardos	Mean	Standard Deviation	Min.	Max.
National	168	282.6	734.1	0.19	6,327.4
Amazonian	30	846.5	1,508.0	6.60	6,327.4
Orinoquia	19	500.2	547.3	55.10	2,176.4
Pacific	61	111.5	193.4	0.19	1,079
Caribbean	14	78.8	103.3	1.30	291.3
Andean	44	106.3	221.4	0.78	1,111.3

Note. Source: Author elaboration based on data from INCODER (2011).

Table 3. Average Number of Kilometers of Constructed Secondary Roads in Colombia

Variable	Number of Municipalities with Resguardos	Mean	Road KM per Regional KM ^{2a}	Min.	Max.
National	168	2,423.0	-	0	6,097
Amazonian	30	2,111.9	0.026	0	4,339
Orinoquia	19	1,564.8	0.031	0	3,948
Pacific	61	1,872.4	0.066	301	3,944
Caribbean	14	1,410.0	0.072	173	2,890
Andean	44	4,094.0	0.168	501	6,097

Note. Source: author elaboration based on 2004 data from Comisión Económica para América Latina (CEPAL, 2012).

^a Mean road km per regional km² was calculated as the sum of the average of road density per km² within each regional province with resguardo divided by the number of regional provinces with resguardo. Data on total provincial roads per km² area from Sociedad Geografica de Colombia (2011).

Historical and political factors shape today's Indigenous regional circumstances. In the Pacific region, isolation, rurality, climate conditions, and a bellicose Indigenous response to first contact with Europeans delayed Spanish colonization by about 200 years (Viloria de la Hoz, 2008). The largest percentage of the Indigenous population in Colombia inhabits the Pacific province of Cauca. Today, Cauca's Indigenous families cultivate eroded, steep, and reduced land lots. The CRIC has been partially successful in recovering Indigenous land: It reported that in 2005 the Cauca's resguardo extension was 544,901 hectares from which only 191,237 (35%) were productive (CRIC, 2007). The Pacific province of Choco holds 69% of the regional resguardo land (Instituto de Estudios Interculturales, 2016). Currently, the government has granted mineral exploitation titles on resguardo lands to non-Indigenous companies. Most of these companies conduct mineral exploitation in ways that do not respect the social and environmental norms of the Indigenous people who live on the land. Additionally, in the Low Atrato area, lumber companies make agreements with Indigenous people to cut lumber on resguardo lands and sell it to the company. Thus, the companies indirectly exploit the resguardo's forest resources while also reducing Indigenous traditional livelihoods (Villa, 2014).

Spanish colonizers contacted Indigenous people in the Orinoquia region in 1535. Orinoquia's provinces were isolated from the Andean region till mid-20th century due to deteriorated roads (Viloria de la Hoz, 2008). Adjacent to the Orinoquia region is the Amazon. Jesuit missionaries colonized the Amazonian region after the Spanish Crown banned new armed expeditions toward the Colombian east in 1573. During the quina and rubber booms in the 18th and 20th centuries, Indigenous people were enslaved and used as labourers, which reduced the Indigenous population. After 1950, new settlers arrived in the region as illicit crop cultivators or to escape violence. In 1959, the Colombian State designated most of the Amazonian region as protected areas (Indigenous resguardos and natural parks), limiting the new

waves of migrants into the region (Naciones Unidas and Comisión Económica para América Latina y el Caribe [NU & CEPAL], 2013). The Orinoquia and the Amazonian regions combined have 208 resguardos. The Amazonian resguardos represent 24% of Colombia's total resguardo land (Instituto Colombiano de Desarrollo Rural [INCODER], 2006; see also Territorio Indígena y Gobernanza, 2019).

Unlike in other regions, when Spanish colonizers arrived in the Andean region, they found the Chibcha and the Caribbean Indigenous Peoples were, in their view, the most culturally, politically, and linguistically “advanced” compared to Indigenous Peoples in other regions (Lopez Garcia, 1995). The Spanish Crown kept the structure of the prosperous Indigenous urban settlements intact. The forthcoming Colombian state continued to invest in the region (Salazar Mejía, 2010). This is the origin of Andean prosperity and population density. Currently, Andean Indigenous communities are a minority population that is not isolated from urban centres. A larger percentage of the regional Indigenous population inhabits the Andean provinces of Tolima and Caldas (Salazar Mejía, 2010). Tolima's Indigenous people compete desperately for territory with non-Indigenous economic agents (SWISSAID Colombia, 2012). Caldas' Indigenous socio-economic system faces disruption due to macro-projects, such as mining, lumber, and road construction, that overlap with their territories (Consejo Regional Indígena de Caldas, 2011).

In the Caribbean region, Law 55 of 1905 legalized the resguardo expropriation in Bolivar Grande and in the south of Barranquilla. Beginning in the 20th century, the provincial government decreed that Indigenous identity would be revoked upon marriage to a non-Indigenous person and that resguardo land be made available for occupation by non-Indigenous people (Solano & Flores, 2011). This explains the region's low resguardo representation (see Table 1).

Methodology

Dependent and Potential Explanatory Variables

To estimate the association between land rights through the resguardo and income unmet basic needs (IUBN) between Indigenous and non-Indigenous people across Colombian municipalities, this investigation uses a series of ordinary least squares (OLS) regression models. The dependent variable is the log of the income unmet basic needs gap between Indigenous and non-minority people in Colombia (IUBN_{gap}) at the municipal level. This variable was created by subtracting the percentage of non-minority households that reported their income was not enough to meet their basic expenses from the percentage of Indigenous households with the same perception in Colombian municipalities with resguardos. Non-minority people were selected instead of the remainder of the Colombian population because the Colombian population includes other minority ethnic groups who also face socio-economic disparity when compared to non-minority people (DANE, 2005a). Thus, the key sociodemographic characteristics associated with the dependent variable are ethnicity and income need.

The IUBN is a household variable that originated from the 2005 Colombian Census question, “Is your household income enough to cover basic expenses?” As explained above, this variable is clearly a subjective measure of poverty as it asks for the individual's perception of basic needs (expenses), which could be different within specific cultures that distinguish Indigenous people and non-minority people. However, any subjectivity bias, relative to more objective measures, would be that non-minority

Colombian household perception tends to be more influenced by the dominant capitalist system than Indigenous households. Although this subjectivity exists, the data from this study shows a mean gap of 8.67%.

To assess the association between land rights through *resguardos* and the IUBNgap, *resguardo* land size per family in hectares is included as an explanatory variable. *Resguardo* land tenure was selected among other existing forms of land rights because most of the Indigenous population resides in *resguardos* (88.9% of the total population; Arango Ochoa & Gutiérrez Sanchez, 2004). Other Colombian Indigenous land tenure forms, such as *reservas*, *comunidades*, or *parcialidades*, became *resguardos* in 1991 (Decreto 2001, 1988; Riascos de la Pena, 2008; Ruiz García, 2006).

The literature identifies limited access to quality land and Indigenous land expropriation as some of the principal reasons for Indigenous poverty in Colombia (González Posso, 2011). Hence, all else being equal, a larger *resguardo* land size is expected to decrease the IUBNgap. However, it is relevant to investigate other factors that may influence the impact of these lands on the dependent variable. To this end, the *resguardo* land size variable is partitioned based on the presence of protected areas (natural parks and natural reserves) overlapping *resguardos*, the municipality level of road infrastructure, and the distribution of productive land (as measured by a Gini coefficient⁶) at the municipality level.

In Colombia, there are several *resguardo* lands that overlap protected areas (Cisneros & McBreen, 2010). When assessing the effect of municipal protected areas overlapping *resguardo* lands, it is expected that if the presence of this area reduces the Indigenous benefit from *resguardo* land rights then the *resguardo* land size effect would differ between those municipalities where protected land areas overlap *resguardos* and those where they do not.

Secondary roads are important for connecting Indigenous *resguardos* with urban economic markets and social services. However, these roads could also increase the IUBNgap if they bring competition for land from non-Indigenous people, or by disrupting traditional Indigenous sustenance activities. To investigate how road infrastructure influences the effect of *resguardo* land size on the IUBNgap, the provincial average number of kilometers of secondary roads were used to estimate the density of secondary road networks. The *resguardo* land size variable is partitioned to indicate municipalities with high, medium, and low secondary road network densities.⁷ As a robustness check, the equation was run using various cut-offs for the road network densities to ensure that the results were not purely an artifact of the chosen cut-offs.

To determine whether land quality (marginal versus productive) affects the *resguardo* land size variable, the Gini coefficient for the distribution of productive non-*resguardo* land was used as a proxy. This variable serves as a proxy for the potential marginality of *resguardo* land because the historical record suggests that past predation of the *resguardos* occurred where the land was potentially productive and near urban centres. The beneficiaries of that predation were large landowners (Garzón Zabala, 2017).

⁶ The land Gini coefficient measures landholding inequality. The coefficient can be a minimum of 0, meaning complete equality, or a maximum of 1, meaning complete inequality.

⁷ The provincial secondary road infrastructure density categories are: (a) high network (more than 0.125 km of road per provincial km²), (b) medium network (between 0.075 and 0.125 km of road per provincial km²), and (c) low network (less than 0.075 km of road per provincial km²).

Therefore, a high Gini coefficient for productive non-resguardo land indicates the predominance of large landowners, which leaves only marginal lands for the Indigenous population. The productive land Gini coefficient was categorized in low, medium, and high categories.⁸

The resguardo land size variable was then partitioned to indicate municipalities with high, medium, and low levels of land inequality (based on the Gini coefficient measures). For robustness, various category cut-offs were tried to ensure that the results were not dependent on the precise choice of cut-offs. It is expected that the resguardo land size variable will be a weaker indicator of any positive outcome of land rights for municipalities with high Gini coefficients because the resguardo lands are likely to be marginal. The resguardo land size in municipalities with low Gini coefficients is more likely to be negatively related to the IUBNgap because such lands may be sufficiently productive to impact Indigenous incomes.

Income gaps between groups can also be explained by factors such as degree of municipal development (municipal economic concentration) in different economic sectors and other socio-demographic variables such as unemployment and human capital (Leichenko, 2003). To capture the effect of human capital on the IUBNgap, the following additional variables were included in the model: the non-education gap (the percentage of non-minority people with no formal education subtracted from the percentage of Indigenous population with no formal education); the university education level gap (the percentage of non-minority population with university education subtracted from the percentage of Indigenous population with university education); and the percentage of Indigenous people with incomplete education because of financial constraints.⁹ It is expected that the no formal education gap and the percentage of Indigenous people with incomplete studies because of financial constraints will have a positive relationship with the IUBNgap while the university education level gap has a negative relationship with the IUBNgap. Empirical literature has found a statistical relationship between increasing labour opportunities for minorities and declining income inequality (Dixon & Maré, 2007; Lewin-Epstein & Semyonov, 1992). To measure this relationship, the percentage of Indigenous people who are formally employed, and the percentage of Indigenous job seekers, with and without working experience were added to the model.

Several studies on industrialization and rurality conclude that income inequality stems from increasing industrialization and declining agriculture. This is because industrialization increases the service-based economy, which reduces the number of skilled, well-paid blue-collar jobs available (Parrado & Kandel, 2010; Tickamyer & Duncan, 1990). Thus, industrial activity, commercial activity, and service sector activity, as a percentage of total economic activity, are also potential explanatory variables. To measure the impact of rurality on the IUBNgap, the percentage of municipal area covered by forest was included as an explanatory variable. It is expected that higher urbanization levels, as indicated by industrial and service sector activity, will increase the IUBNgap. Although commercial activity is associated with

⁸ The Gini coefficient categories for productive land are: (1) high (more than 0.65), (2) medium (between 0.50 and 0.65), and (3) low (less than 0.50).

⁹ When the variable *incomplete education because of financial reasons* was entered into the model as the gap between the Indigenous and non-Indigenous population, the ovtest decreased from 0.2 to 0.05, indicating misspecification in the model. However, when the variable was coded as the percentage of Indigenous people with incomplete education because of financial constraints, the ovtest significantly improved. For this reason, all regression models use the variable *incomplete education for financial reasons* calculated as the percentage of Indigenous people with incomplete education.

increasing urbanization, the academic literature shows that commerce in rural areas decreases income inequality (De Janvry, Murgai, & Sadoulet, 1999; Mduma & Wobst, 2005). It is expected that the increasing commercial activity will decrease the IUBNgap. Likewise, it is expected that municipalities with proportionally more forested areas (rurality) will have a smaller IUBNgap.

Violence from Colombia's political conflict has been identified as a cause of marginalization and economic inequality against Indigenous people (Alta Consejería Presidencial para la Mujer, 2012; Guevara Corral, 2003; Rodriguez, Orduz, Boada, Rubiano, & Arias, 2010). Therefore, data on murders, displacement, and kidnapping of Indigenous and non-Indigenous people with a municipality were introduced as explanatory variables.

Speaking Indigenous languages and/or Spanish are also explanatory variables. According to the theory of institutions, the formal and informal constraints that define a group institutional framework originate from mental models and are embedded in language. Those constraints are passed from generation to generation through language (North, 1994). To assess the effect of language preservation (and, in turn, cultural preservation) on the IUBNgap, this research uses the percentage of the Indigenous population in a municipality that are Spanish or Indigenous language monolingual and the percentage that is Indigenous-Spanish language bilingual. If Indigenous language speakers benefit from greater access to cultural and economic institutions through full community participation, the language retention variables should reduce IUBNgap, while the variable Spanish monolingual should increase the gap.

Regression Analysis

The initial regression model to assess the effect of the resguardo land size (R_{PF}) on the IUBNgap (across the Colombian municipalities with Indigenous resguardos) includes measures of covariates (X) that the literature suggests should have an effect on the IUBNgap, as described. This model also includes five dummy variables representing each of the Colombian regions (REG) to control for regional effects.¹⁰

$$\text{Log IUBNgap} = \beta R_{PF} + \delta X + \theta REG + \varepsilon$$

The Akaike and Bayesian information criterion were used to determine the explanatory variables relevant to the Colombian experience. Using a general-to-specific approach, variables were dropped from the general equation if their absence improved the information criteria. Once a parsimonious model was established, tests for misspecification (ovtest) and heteroscedasticity (Breusch-Pagan/Cook-Weisberg) were used to determine the credibility of the final equation to estimate the main influences on the IUBNgap. Robust models were run to reduce the outliers influence.

This model was then extended in the following ways to ask more nuanced versions of the original question:

- To determine whether the effect of resguardo land size on the dependent variable varies according to the Colombian regions. This model includes five variables that examine the interaction between the resguardo land size and each one of the five regional dummy variables.

¹⁰ To include the five regional dummy variables the intercept of the model was dropped.

- To determine whether the effect of the resguardo land size on the dependent variable was influenced by the density of provincial secondary road infrastructure. Instead of one resguardo land size variable, this model includes three variables originated from partitioning the resguardo land size in municipalities with high, medium, and low road density networks, respectively. For each group, the variables take the value zero when the municipalities did not fulfill the road density criteria.
- To determine whether the effect of the resguardo land size on the IUBNgap was influenced by the existence of protected areas overlapping the resguardo land. Instead of one resguardo land size variable, this model includes two variables created by partitioning the resguardo land size in two municipalities with and without protected areas, respectively. For each group, the variables take the value zero when the municipalities did not fulfill the protected area criteria.
- To control for the influence of ownership concentration of agriculture-grade land on the effect of the resguardo land size on the IUBNgap. Instead of one resguardo land size variable, this model includes three variables created by partitioning the resguardo land size in municipalities recording high, medium, and low Gini values, respectively. For each group, these variables take the value zero when the municipalities did not meet the respective Gini value criteria.

Data

Data on resguardo land size in the year 2005 are from INCODER (2011). The Gini coefficient data are from Instituto Geografico Agustin Codazzi et al. (2012). Data on kilometers of secondary road constructed are from CEPAL (2012). Data about protected areas overlapping resguardo lands are from Parques Naturales de Colombia (2015). The rest of the data, including that on IUBN, are from the 2005 Colombia Census (DANE, 2005a, 2005b).

Table 4 shows the descriptive statistics of the variables used in the OLS regression analysis. In 2005, there were 168 Colombian municipalities with Indigenous resguardos (whose size could be determined), which allowed for 168 observations in the dataset.

The mean of the IUBNgap is 8.67%, indicating that on average the percentage of Colombian Indigenous households with income unmet basic needs was 8.67 points higher than those of non-minority households. The IUBNgap standard deviation is 14.3%, indicating a high dispersion. This is because there are municipalities in which the gap is negative, which means that the IUBN for non-minority people is higher than for Indigenous people. There are also municipalities in which the IUBNgap is 68.9, indicating that the income unmet basic needs for Indigenous people are very high compared to non-minorities.

The most important explanatory variable for answering the question posed in this research is the resguardo land size. The resguardo land size shows a large dispersion with a standard deviation of 734.2 hectares (against a mean of 283) and ranging from 0.2 to 6,327 hectares per family.

Data in Table 4 shows that, on average, 39.2% of the Indigenous population is Spanish monolingual. The largest proportion (51.6%) is Indigenous language and Spanish bilingual while the smallest proportion (4.8%) is Indigenous language monolingual Indigenous people.

The mean percentage of people unable to finish their studies due to insufficient funds is 30.4% and 31.1% for Indigenous and non-minority populations, respectively. However, while there are municipalities where 100% of Indigenous people lack sufficient funds to study, the maximum that this figure reaches for non-minority people is 62.5%. There is significant variance across regions in Colombia with respect to the formal education disparity between Indigenous people and the rest of the population. For example, the gap for university education fluctuates between -32.73% and 8.1%. This indicates that when the gap favours Indigenous university educational attainment (i.e., the gap is positive) the gap is lower. On the contrary, when the gap favours non-Indigenous people (i.e., the gap is negative) the gap is larger. The same is true for the non-education gap (-25.6% and 75.3%, respectively). When the gap favors Indigenous people (i.e., the gap is negative) it is about 3 times less than when the gap favours the non-minority population.

Table 4. Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Income Unmet Basic Need Gap (IUBNgap)*	8.672321	14.31478	-39.15	68.31
Resguardo Land Variables				
Resguardo land size per family—national	282.6	734.1	0.19	6,327.4
Resguardo land size per family—Amazonia	151.2	707.6	0	6,327.4
Resguardo land size per family—Andes	27.8	121.7	0	1,111.3
Resguardo land size per family—Caribe	6.5	36.2	0	291.6
Resguardo land size per family—Orinoquia	56.5	239.8	0	2176.3
Resguardo land size per family—Pacific	56.6	239.8	0	1,079.0
Resguardo with Land Protected Area (LPA)	123.3	501.1	0	4,614.6
Resguardo with LPA —Amazonia	67.7	461.3	0	4,614.6
Resguardo with LPA—Andes	12.7	60.3	0	475
Resguardo with LPA—Caribe	3.71	28.9	0	291.6
Resguardo with LPA—Orinoquia	27.6	197	0	2,176.4
Resguardo with LPA—Pacific	11.7	68.4	0	550

Table 4. Descriptive Statistics (continued)

Variable	Mean	Std. Dev.	Min.	Max.
Language Variables				
Percentage of Indigenous people Spanish & Indigenous language bilingual	51.64	27.71	0	100
Percentage of Indigenous people Spanish language monolingual	39.21	30.66	0	100
Percentage of Indigenous people Indigenous language monolingual	4.81	9.8	0	58.37
Municipal forest area	8.8	36	0	447.2
Municipal commercial development	43.5	22.3	0	100
No formal education gap ^a	16.9	18.4	-25.6	75.3
University education gap ^a	-3.6	4.2	-32.73	8.1
Indigenous incomplete education for financial reasons	30.4	19.6	0	100
Non-minority incomplete education for financial reasons	31.1	12.15	0	62.5
Provincial secondary roads	2,423	2,112.4	0	6,097

Note. Source: Author elaboration based on data from DANE (2005b), Parques Naturales Nacionales de Colombia (2015), INCODER (2011). *N*= 168 municipalities.

^a Gaps are calculated by subtracting the percentage of non-minority households from the percentage of the Indigenous households for the variable.

Results

Resguardo Land Size per Family

The regression model in Table 5 shows that the resguardo land size is significant in explaining the IUBNgap. However, it indicates that increasing resguardo land per family *increases* the IUBNgap. This result is contrary to the expected outcome. As noted above, the largest resguardos were allocated to Indigenous people in regions with low road networks such as Amazonia and Orinoquia. Also, large parts of these regions are designated as protected areas (Cisneros & McBreen, 2010). Therefore, it makes sense to investigate whether the coefficient for the size of resguardo land is:

- Significantly different across regions
- Affected by the lack of road networks
- Affected by the presence of protected areas (natural reserves).

The results of this investigation are analyzed in the following subsections.

Regression model in Table 5 also shows that the effect of municipal commercial development is significant and negatively impacts the IUBNgap, which is supported by literature that indicates commercial activity decreases rural income inequality (De Janvry et al., 1999; Mduma & Wobst, 2005). The percentage of the municipal area covered in forest (a rurality proxy) has a negative effect on the IUBNgap, which is consistent with previous research that found increasing urbanization increases income inequality (Parrado & Kandel, 2010; Tickamyer & Duncan, 1990). Urbanization adds to the IUBNgap because it reduces available land for Indigenous traditional economic activities while requiring monetary income to buy goods. This happens to Amazonian Indigenous people as the expanding urban frontier transforms them into minorities competing with non-Indigenous people for their resguardo land and its natural resources. As a result, Amazonia's Indigenous people have changed their traditional productive strategies (NU & CEPAL, 2013). An example of these strategies can be found in the Indigenous Council of Tarapacá, where families trade some cultivated products in local markets. This trade revalues their traditional knowledge and represents an adaptation to the socioeconomic changes that require income and the consumption of industrialized goods (De la Cruz et al., 2016).

The model in Table 5 indicates that the variable no formal education gap is significant and increases the IUBNgap. The university education gap is significant and decreases the IUBNgap. These results are in line with theory. Also, the regional dummies for the Pacific and Orinoquia regions are positive and significant. This indicates that municipalities in those regions have particular attributes that increase the IUBNgap. The related language variables appear not significant in explaining the IUBNgap.

With the exception of the language variables, the other variables tested in the model in Table 5, which are derived from scholarly literature, were not significant. The information criteria indicated that these non-significant variables were not a good fit for the model. These variables include violence, employment or labour status,¹¹ the municipal industrial development, and the municipal service development.

Regional Differentials on the Effect of the Resguardo Land Size

The model in Table 6 investigates if the resguardo land size effect is regionally specific. The results show that the resguardo land size coefficient is significant and positive for the Amazonia and Pacific regions, with coefficients of 0.038 and 0.141, respectively. This indicates that an additional hectare of resguardo land in these regions increases the IUBNgap. However, the coefficient is not significant for any of the other three regions.

¹¹ The 2005 Colombian Census questionnaire included questions on economic activity designed to identify labour force participation. Among people without paid work during the reference period, those who were looking for a job were considered to be in the labour market and those who were not looking for a job were out of the labour market (DANE, 2005a, 2005c). This concept of economic activity is not completely applicable to Indigenous communities that do not assign monetary value to work. For example, Indigenous women are usually in charge of the horticulture production while rearing children. In the census, these women could appear to be non-employed persons doing domestic activities (Renshaw & Wray, 2004). Thus, the differences in the concept of economic activity for Indigenous and non-Indigenous population may be the reason why labour variables did not appear significant in explaining the IUBNgap. However, this presumption requires more research.

Table 5. Effect of Resguardo Land on Income Unmet Basic Needs Gap (IUNBgap)

Explanatory Variables	Log of IUNBgap ^c
Resguardo land size per family	0.03** (2.41)
Spanish language monolingual	0.002 (0.35)
Indigenous language monolingual	-0.007 (-0.52)
Spanish–Indigenous language bilingual	0.0007 (0.09)
Municipal planted forest area	-0.42*** (-4.11)
Commercial concentration of production	-0.01** (-2.15)
No formal education gap	0.015** (2.48)
University education gap	-0.073*** (-2.83)
Incomplete education for financial reasons (% Indigenous population)	0.011 (1.97)
Dummy Andean region ^a	1.231 (1.87)
Dummy Caribe region ^a	0.821 (1.09)
Dummy Amazon region ^a	0.97 (165)
Dummy Orinoquia region ^a	1.9*** (2.92)
Dummy Pacific region ^a	1.325** (2.04)
Ovtest ^b $F(3, 152)$	1.55
Prob > F	0.20
Number of Observations	168

Note. Ordinary least squares (OLS) regression.

^aIn order to include all dummy regional variables, the intercept was dropped, which eliminates the need to omit a region as the reference category.

^bOvtest was estimated dropping the dummy variable for the Orinoquia region and including the intercept.

^cUnstandardized regression coefficients with standard errors in parentheses.

** $p < 0.05$, *** $p < 0.01$

Table 6. Regional Resguardo Land Per Family Effect on the Income Unmet Basic Needs Gap (IUNBgap)

Explanatory Variables	Log of IUNBgap ^b
Spanish language monolingual	0.003 (0.40)
Indigenous language monolingual	-0.007 (-0.49)
Spanish–Indigenous language bilingual	0.0002 (0.02)
Municipal planted forest area	-0.44*** (-4.44)
Municipal commercial development	-0.009 (-1.91)
No formal education gap	0.017** (2.83)
University education gap	-0.06** (-2.48)
Incomplete education for financial reasons (% Indigenous population)	0.011 (1.97)
Resguardo land size per family— Andean region	-0.0403 (-0.42)
Resguardo land size per family— Orinoquia region	-0.064 (-1.02)
Resguardo land size per family—Pacifica region	0.141*** (3.04)
Resguardo land size per family—Caribbean region	0.20 (0.61)
Resguardo land size per family— Amazon region	0.038*** (4.26)
Dummy Andean region	1.22 (1.75)
Dummy Orinoquia region	2.304*** (3.26)
Dummy Pacific region	1.154 (1.67)
Dummy Caribe region	0.614 (0.76)
Dummy Amazonian region	0.873 (1.43)
Ovtest ^a $F(3, 152)$	1.42
Prob > F	0.24
Number of Observations	168

Note. Ordinary least squares (OLS) regression.

^a Ovtest was estimated dropping the dummy variable for the Orinoquia region and including the intercept.

^b Unstandardized regression coefficients with standard errors in parentheses.

** $p < 0.05$, *** $p < 0.01$

Provincial Secondary Road Density and Resguardo

The model in Table 7 tests the hypothesis that road infrastructure influences the effect of the size of resguardo land on IUBNgap. The resguardo land size for municipalities with low road networks (less than 0.075 km of road per km²) is significant and positive, indicating that, where there are low-density road networks, the size of resguardo land is associated with a higher IUBNgap. Medium- and high-density road networks were not significantly associated with the resguardo land size effect.

Protected Areas and Resguardo Land Size

The model in Table 8 investigates the effect of resguardo land with protected areas on the IUBNgap. The results indicate that the resguardo land size variable is positive and strongly significant for municipalities without protected areas but not significant for municipalities with protected areas. One possible reason for this counter-intuitive result is that resguardos are largest when the land is not a protected area and is of low quality, which makes it less likely to meet the material needs of Indigenous households. The following model investigates whether the effect of the size of resguardo land on the dependent variable is related to the best quality land being taken by non-Indigenous owners.

Productive Land Gini Coefficient and Resguardo Land Size per Family

The model in Table 9 tests the hypothesis that the concentration of productive land ownership influences the effect of the size of resguardo land on the IUBNgap. The results indicate that the effect of the resguardo land size for municipalities with a Gini coefficient for productive land beyond 0.64 is positive and significant. This supports the hypothesis that larger resguardo land sizes are assigned to Indigenous people where a larger proportion of the land is productively marginal. This finding supports the contention that most of the productive land has been taken by non-Indigenous people in these regions.

Discussion

The results of this research indicate that larger resguardo land sizes increase the IUBNgap in the Amazonian and Pacific regions (see Table 5). This relationship is particular to municipalities with a low density of secondary roads without protected areas and with unequal distribution of productive non-resguardo land. One potential explanation for this pattern is that larger resguardo lands are assigned to Indigenous people in Colombia in inaccessible areas, where the particular land features leave it free from non-Indigenous landowner competition. Given the spiritual and cultural value of land, Indigenous people may still benefit from marginal lands, but require additional high-quality agricultural land to supply their basic material needs. The data analysis presented in this article support a land-specific conditions hypothesis, although these results are not sufficient to explicitly prove this relationship.

Table 7. Provincial Secondary Road Infrastructure Density and Size of Resguardo Land per Family Effect on the Income Unmet Basic Needs Gap (IUNBgap)

Explanatory Variables	Log of IUNBgap ^b
Spanish language monolingual	0.003 (0.43)
Indigenous language monolingual	-0.005 (-0.36)
Spanish–Indigenous language bilingual	0.0008 (0.10)
Municipal planted forest area	-0.45*** (-4.47)
Municipal commercial development	-0.01** (-2.44)
No formal education gap	0.015*** (2.58)
University education gap	-0.073*** (-2.75)
Incomplete education for financial reasons (% Indigenous population)	0.011 (1.95)
Resguardo land size per family—low road network density	0.033** (2.6)
Resguardo land size per family— medium road network density	-0.041 (-0.44)
Resguardo land size per family— high road network density	0.249 (0.77)
Dummy Amazonian region	0.971 (1.64)
Dummy Andean region	1.296** (1.92)
Dummy Pacific region	1.324** (2.01)
Dummy Orinoquia region	1.95*** (2.94)
Dummy Caribe region	0.76 (0.98)
Ovtest ^a $F(3, 152)$	1.7
Prob > F	0.17
Number of Observations	168

Note. Ordinary least squares (OLS) regression.

^a Ovtest was estimated dropping the dummy variable for the Orinoquia region and including the intercept.

^b Unstandardized regression coefficients with standard errors in parentheses.

** $p < 0.05$, *** $p < 0.01$

Table 8. Protected Area within Resguardo Land Effect on the Income Unmet Basic Needs Gap (IUNBgap)

Explanatory Variables	Log of IUNBgap ^a
Spanish language monolingual	0.002 (0.36)
Indigenous language monolingual	-0.006 (-0.44)
Spanish–Indigenous language bilingual	0.0006 (0.08)
Municipal planted forest area	-0.419*** (-4.10)
Municipal commercial development	-0.009** (-2.04)
No formal education gap	0.015** (2.45)
University education gap	-0.08*** (-2.78)
Incomplete education for financial reasons (% Indigenous population)	0.011 (1.8)
Provincial secondary roads	-0.01** (-2.5)
Resguardo land size per family—no protected areas	0.04*** (4.33)
Resguardo land size per family—protected areas	0.018 (0.86)
Dummy Caribe region	0.78 (1.00)
Dummy Andean region	1.214 (1.82)
Dummy Pacific region	1.31** (1.98)
Dummy Orinoquia region	1.887*** (2.88)
Dummy Amazonian region	0.97 (1.64)
Ovtest $F(3, 149)$	1.76
Prob > F	0.16
Number of Observations	168

Note. Ordinary least squares (OLS) regression.

^aUnstandardized regression coefficients with standard errors in parentheses.

** $p < 0.05$, *** $p < 0.01$

Table 9. Productive Land Gini and Resguardo Land Size per Family Effect on the Income Unmet Basic Needs Gap (IUBNgap)

Explanatory Variables	Log of IUBNgap ^a
Spanish language monolingual	0.002 (0.34)
Indigenous language monolingual	-0.007 (-0.52)
Spanish–Indigenous language bilingual	0.0006 (0.08)
Municipal planted forest area	-0.42*** (-4.07)
Municipal commercial development	-0.01** (-2.14)
No formal education gap	0.0147** (2.46)
University education gap	-0.07*** (-2.78)
Incomplete education for financial reasons (% Indigenous population)	0.011 (1.96)
Resguardo land size per family—low Gini coefficient for productive land	0.03 (1.59)
Resguardo land size per family—medium Gini coefficient for productive land	0.031 (1.43)
Resguardo land size per family—high Gini coefficient for productive land	0.035** (2.57)
Dummy Caribbean region	0.823 (1.09)
Dummy Andean region	1.23 (1.85)
Dummy Pacific region	1.324** (2.03)
Dummy Amazon region	0.972 (1.65)
Dummy Orinoquia region	1.901*** (2.89)
Ovtest $F(3, 149)$	1.61
Prob > F	0.19
Number of Observations	168

Note. Ordinary least squares (OLS) regression.

^a Unstandardized regression coefficients with standard errors in parentheses.

** $p < 0.05$, *** $p < 0.01$

Table 10. Regional Secondary Road Network Density

Region	Percentage of Municipalities with Low Density	Secondary Road Network Density		
		Mean	Minimum Density	Maximum Density
Pacific	70.4	0.033	0.006	0.068
Caribe	64.3	0.028	0.008	0.068
Amazon	100	0.036	0	0.052
Orinoquia	89.5	0.015	0	0.036
Andes	27.3	0.024	0.02	0.044

Note. Source: author elaboration based on 2004 secondary road data from CEPAL (2012) and data on provincial territorial extension from Sociedad Geografica de Colombia (2011).

The Pacific region is characterized by difficult climatic and topographic conditions, and inadequate infrastructure (Viloria de la Hoz, 2008). These factors have historically limited public investment in the region. Table 10 shows that 70.4% of Pacific municipalities are located in provinces with a low-density secondary road network. As a result of the lack of access to the region, the government has less control over the illegal exploitation of the Choco resguardos by private mineral and lumber companies (Villa, 2014). This exploitation depletes resources from resguardo land, which reduces the ability of Indigenous households to produce traditional market and non-market items to meet their needs. Some Indigenous people are employed by these companies, but this employment is temporary because the companies will leave once the resource is depleted. The final result is ecological damage and impoverished communities. Future research should further examine the hypothesis that larger resguardo land sizes increase the IUBNgap in the Pacific region because these lands are likely to have larger natural and mineral resources that are subject to illegal private industry exploitation.

Although the CRIC (2007) has succeeded in partially recovering Cauca's Indigenous ancestral territories, there is still a high regional concentration of non-Indigenous productive land ownership. Table 11 indicates that 78.7% of the Pacific municipalities have a productive land Gini coefficient larger than 0.65. The Pacific region is home to the Colombian municipalities with the highest productive land Gini coefficient (0.97). That is why many Indigenous families in Cauca work small, steep land lots that barely supply their basic needs (CRIC, 2007).

The Amazon is the most isolated Colombian region. Table 10 shows that all Amazonian provinces have municipalities with low secondary road network densities, which for some municipalities is 0 km of road per km². This situation is illustrated by the province of Vaupes with 0 km of constructed secondary road in 2004 (CEPAL, 2012). In 2005, Indigenous people made up 58.8% of the total population of Vaupes (DANE, 2005a). In this province, the municipality of Mitu registered 1,635 hectares of resguardo land in 2005 (INCODER, 2011), which is more than twice the mean number of hectares of resguardo land for all Colombian regions (see Table 2). Therefore, in the Amazonian region where isolation is a regional attribute, larger resguardo lands are allocated to Indigenous people.

Table 11 indicates that, among all Colombian regions, the Amazon has the smallest number of municipalities in the high productive land Gini coefficient category (33.3% of its municipalities). This is likely due to the government's policy to protect the region's biodiversity from economic development (Meisel Roca, Bonilla Mejía, & Sánchez Jabba, 2013). Out of 38 million hectares of Amazonian protected land, 25 million hectares are Indigenous resguardos (65%; NU & CEPAL, 2013). The fact that most of these resguardos are protected liberates Indigenous territories from the negative pressure exercised by mining and lumber companies, but it also limits its use to supply material needs for Indigenous people. Indigenous communities in Colombia have expressed their dissatisfaction with the government imposition of protected areas in their resguardos as the government establishes a special management regime that limits their productive systems and conflicts with traditional Indigenous ecological knowledge (Correa, 2010; Cortes Villa & Palacios, 2018). Further research is needed to examine whether larger resguardo land sizes increases the IUBNgap in the Amazon due to a lack of regional infrastructure and land suitable, from a legal and natural perspective, for productive activities that meet Indigenous IUBN.

Table 11. Concentration of Privately Owned Highly Productive Land by Region

Region	Percentage of Municipalities	Productive Land Gini Coefficient		
		Mean	Minimum value	Maximum value
Pacific	78.7	0.78	0.66	0.97
Caribe	50.0	0.69	0.65	0.76
Amazon	33.3	0.72	0.67	0.77
Orinoquia	47.4	0.73	0.65	0.88
Andes	37.0	0.77	0.65	0.86

Note. Source: author based on 2005 data from Instituto Geográfico Agustín Codazzi, Centro de Estudios de Desarrollo Económico UNIADES, & Universidad de Antioquia (2012).

Research Limitations

The data did not allow for the creation of an indicator of income inequality that would differentiate household basic needs by the culture between and among Indigenous and non-minority populations in Colombia. Data limitations also did not allow for the inclusion of additional variables that could affect the IUBNgap, such as illicit cultivation and Indigenous political activism.

Policy Implications

Policies that allocate land rights to Indigenous people are not enough to eliminate income inequality. In Colombia and around the world, there is a need for policies that allocate and protect Indigenous lands in ways that offer Indigenous Peoples the same opportunities available to the rest of society. Consequently, policy makers should reduce the isolation experienced by many Indigenous people living on their lands. Additional land rights protections are needed, particularly for Indigenous people living on high quality and non-isolated land, which is more likely to be targeted by outside companies for resource extraction

activities. These policies require enforcement mechanisms to mitigate these threats from non-Indigenous economic interests such as mineral and lumber companies. This is a common threat to Indigenous lands that has been reported in Latin America, Canada, and Australia (United Nations, 2009).

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