

# Colonial Institutions and Long-Run Economic Performance in Colombia: Is there evidence of Persistence?<sup>1</sup>

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## Abstract

A recent body of literature has claimed that differences in long-run economic performance within the Americas stem from the different institutional structures established during colonial times. This research tries to find evidence of institutional persistence in Colombia using direct measures of colonial institutions, particularly the intensity of *encomiendas*, slavery and State presence. The paper deals with the possible endogeneity of colonial institutions developing an instrumental variables strategy based upon colonial institutional design. We find evidence of institutional persistence of *encomienda*, slavery and State capacity on a series of current socioeconomic outcomes.

**Keywords:** Institutions, institutional persistence, colonial history, long-run development.

**JEL Classification:** N26, N36, N46, O18.

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*...the economic, social and racial  
problems which were created by  
the conquest of the New World  
still exist. The Conquest, thus, is  
in the highest possible degree a  
Living past.*  
Sverker Arnoldsson

## **1. Introduction**

Recent contributions of economists interested in providing answers to the questions about economic performance in the long-run have focused on the role played by history, and more specifically, in the way societies have organized themselves, or have been organized by other societies in the past. Maybe the best example of how historical trajectories have had dramatic effects on long-run economic performance can be found in the histories of former colonies of European countries. While some of them were able to industrialize and democratize during the 19<sup>th</sup> century, others were able to achieve comparable levels of per capita income and wellbeing only until recently. Finally, some others still exhibit dramatic levels of poverty, with highly unequal societies in terms of the distribution of wealth and political power. In fact, many of the former European colonies have had long dictatorship periods and are characterized by governments captured by very small ruling elites (Coatsworth, 1999).

Different historical paths have meant different ways of organizing economic activity and political structures, which in turn have produced very different levels of prosperity and economic development across societies. The ways in which societies organize their institutions, understood broadly as "... the humanly constructed restrictions that shape human interaction" (North, 1990), are critical for determining private as well as collective incentives towards entrepreneurship or rent-seeking, cooperation or opportunism, etc., because they alter relative prices for all of these activities. Social scientists are looking for evidence that can relate long-run economic performance with past institutional design for two main reasons. In the first place, comparative work by historians has offered documental evidence that relates differences in institutions to differences in historical trajectories (Lockhart and Schwartz, 1983). In the second place, from an econometric standpoint the relation between current institutions and current economic outcomes is very difficult to assess directly due to evident endogeneity problems; finding evidence based on past institutions may solve totally or at least partially these issues.

It is hardly controversial that different institutional settings translate into different *current* economic outcomes, but asserting that past institutions have long-lasting effects on

current economic performance requires the presence of what the recent literature has called *institutional persistence*<sup>3</sup>. This concept refers to the possibility that the effects of past institutions may persist over long time spans even after those specific institutions have been changed or have evolved in some way. This paper tries to investigate the impact of colonial institutions on current socioeconomic performance in Colombia, and the possible persistence they may have had since colonial times. To understand institutional persistence and institutional change it is necessary to have in mind that institutions are the product of collective decisions in societies, frequently taken in the political arena.

When inefficient economic outcomes persist over time –as the low per capita income levels of Latin American or African countries– it must be the case that the political processes by which institutions are chosen and established are being subject to serious commitment problems –limiting the possibility of *Coase-type* bargains–, or take place under highly unequal distributions of power among the different groups in society. Moreover, given that some former European colonies –the so called neo-Europes– have been much more successful in the long run than others, it ought to be that for those countries, persistence of bad quality institutions was interrupted, or that past institutions differed considerably from those of unsuccessful countries. In case there is evidence of institutional persistence of this kind, future institutional and policy reform must take into account the historical specificities of each country and even of smaller political units if they are intended to prove successful for fighting against poverty and inequality. Frequently, institutional reform efforts in developing countries have failed in achieving their objectives possibly because of lack of attention to the particular historical backgrounds that have made each society’s institutions negative in specific ways for economic success.

### **1.1. Institutional Persistence and Economic Performance**

The literature has pointed out several mechanisms that make persistence of institutions plausible, and that in a greater or less extent can be traced back to the Colombian case. Following North (1997) and Acemoglu, Johnson and Robinson (2002), interest groups are a consequence of the economic and political opportunities provided by the existing institutional framework, so each institutional arrangement creates interest groups whose welfare depends on its maintenance. Once a group –a primary action group in the sense of Davis and North (1971)– has made complementary investments to a set of institutions, it will be willing to

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<sup>3</sup> Authors like Banerjee and Iyer (2002) prefer to call it *institutional overhang*, stressing the negative persistent effects of some institutional settings, particularly for the Indian case.

incur in some additional costs to maintain them (Acemoglu, 1995). For the groups that do not benefit directly from the institutional setting –or do not benefit at all–, institutional change is a public good since it is non excludable and non rival. No one will be willing to incur in the entire costs of changing institutions –which are frequently very high– and solving collective action problems may also be very costly. In contrast, when ruling elites are small, the private gains of a particular set of extractive institutions are higher, making elites more willing to maintain them, and collective action problems can be overcome more easily.

This may have been the case of Latin America, since the colonial State was administered by small white Spaniard elites, and post-independence States were captured by small *criollo* elites, which just replaced the colonial ones as historiography has highlighted (Lynch, 1987). The possibility of institutional persistence even after independence may also be due to the costliness of institutional change (Acemoglu and Verdier, 1998, and Acemoglu, Johnson and Robinson, 2002). If colonial institutions were already respectful of property rights, it would not pay for the republican elites trying to change them towards exploitative ones. In the same way, if colonial institutions were exploitative, elites would not find in their interest to change them, and would prefer to benefit from them by capturing the State.

Acemoglu and Robinson (2004) also suggest other mechanisms of institutional persistence through the modelling of land markets. In their model, the persistence of repressive institutions is the equilibrium result of a repeated game in which it may always be optimal for a group –the landowners– to repress workers in order to keep wages down and land prices high. Their model suggests that an unequal and repressive institutional setting might persist over time if a group in society is capable of using violence repeatedly to modify factors relative prices in their own benefit (Acemoglu and Robinson, 2004).

Other recent papers<sup>4</sup> have shed important lights regarding why development trajectories in the Americas ended up being so different, with rich and relatively egalitarian North American countries coexisting with poor and unequal Latin American ones. There has been agreement around the idea that institutional design depended heavily on the initial conditions found by European conquerors in different regions of the American continent.

According to this view, for which Engerman and Sokoloff's data “does not permit rigorous hypothesis testing”<sup>5</sup>, factor endowments were critical for determining the type of institutional design Europeans would adopt in different places, and in the long run, implied

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<sup>4</sup> See Engerman and Sokoloff (1997, 2000), Acemoglu, Johnson and Robinson (2001, 2002), Coatsworth (1978, 1993, 1999) and Haber (1997, 2002) among others.

<sup>5</sup> See Banerjee and Iyer (2002), p. 3.

what the literature has called a *reversal of fortune*<sup>6</sup>. Some places like the Caribbean or Brazil –well suited for plantation agriculture because of their climatic and environmental conditions, and risky for massive European migration because of their disease environment– brought about the conditions for the use of slave labor because of scale economies. Other places with originally high population densities –usually implying complex social structures and relatively wealthy pre-conquest societies– saw the development of coercive institutions where the colonial State, as well as European elites, monopolized labor, land and natural resources due to their superior technologies and better biological protection from contagious disease<sup>7</sup>. Hence, places with these factor endowments, though very prosperous during colonial times, produced highly unequal societies with very small, rich, and powerful elites together with huge masses of politically excluded and poor populations.

Different mechanisms of institutional persistence may have been responsible for the reproduction of these kinds of exploitative institutions even until present days, but on the other side, the same factor endowments-institutional design mechanism can explain the establishment of institutions conducive to economic growth. Temperate zones offered the possibility of mixed farming –grains agriculture along with livestock raising– based on small size land plots. These areas lacked densely populated indigenous societies that paid designing exploitative and redistributive institutions, and offered a more benign disease environment for massive European settlement. Colonial institutions set up in these places implied a much better distribution of wealth and political power, since Europeans were the majority of the population and hence, demanded institutions to protect their property rights, providing incentives for entrepreneurship, individual initiative and investment:

... a hemispheric perspective across the range of European colonies in the New World indicates that although there were many influences, the factor endowment and attitudes toward it reflected in policy had profound and enduring impacts on the structure of respective colonial economies and ultimately on their long-term paths of institutional and economic development. (Engerman and Sokoloff, 1997, p. 36)

Some papers have tried to prove Engerman and Sokoloff's hypothesis focusing on different channels of institutional design and persistence. La Porta *et al.* (1998) find that the colonizer's identity, through the different judiciary institutions they implanted, has an effect on current institutions across former colonies. Acemoglu, Johnson and Robinson (2002) also estimate the effect of colonial institutions on economic performance using settler mortality rates as an exogenous source of variation for colonial institutions in a sample of former

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<sup>6</sup> See for example Acemoglu, Johnson and Robinson (2002) or Pritchett (1999).

<sup>7</sup> For an account of European superiority and their capacity to conquer other societies during the 16th century see Diamond (1997).

colonies. They argue that colonial institutional design was closely related to the feasibility of settlement –measured by mortality rates– and that these institutions have persisted. The authors find strong evidence of institutional persistence and virtually no impact of geography on per capita income variability, once institutions have been accounted for.

## **1.2. Fundamental vs. Proximate Causes**

Institutions have been only one of the plausible fundamental causes of economic performance considered by social scientists. In very broad terms, geography and culture have been the other landmarks considered as possible fundamental causes of economic development or backwardness. For example Bloom and Sachs (1998) and Gallup, Mellinger and Sachs (1998) find a relation between climatic and soil conditions and economic outcomes for a group of countries, and for Colombia, Núñez and Sánchez (2000) study the impact of geographical variables on a constructed measure of municipal per capita GDP. Some other studies, for which empirical research has been very scarce, try to assess the impact of cultural differences on economic performance<sup>8</sup>. Barro and McLeary (2003), as well as Guiso, Sapienza and Zingales (2003) focus on religious differences, while Putnam (1993) studies differences in civic characteristics across Italy.

Geography is highly variable within Colombia. At the same time, cultural specificities may also be important given that ethnic groups –indians and afro-descendants with documented differences in their social organization– currently inhabit different regions of the country. Given the importance of geographical as well as cultural theories of development, this paper aims to test the relative importance –compared to institutions– of these hypotheses for the Colombian case.

For this reason the paper focuses on the impact of deep determinants rather than proximate causes –such as investment or public expenditure– on economic outcomes. The more traditional literature on economic growth has focused precisely on these so called proximate causes of development, looking at human and physical capital accumulation, saving rates, investment or technological adaptation, etc. Important contributions have been made, such as Mankiw, Romer and Weil (1992), Barro (1996) or Quah (1996), which prove the strong impacts of such variables on growth. However, even after taking into account any endogeneity concerns, they leave unanswered the most fundamental questions about why some societies decide to invest, innovate or accumulate more capital than others. This strategy

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<sup>8</sup> The difference between culture and institutions is frequently vague. For this paper's purpose, and following North (1981), culture can be interpreted as informal institutions, meaning any kind of implicit rules of social interaction, usually very specific to each society.

may allow an assessment of the capacity of some specific fundamental causes to explain current performance variability, avoiding the troubles implied by endogeneity issues when studying proximate causes.

### **1.3. The Within-Country Approach**

Factor endowments vary considerably across the Americas, but it is also well known that geographical conditions and natural resource endowments vary across Colombia<sup>9</sup>. In somewhat more than one million square kilometers there are coastal areas –both in the Caribbean and in the Pacific Ocean– savannas, mountain ranges –the Andes–, interandean valleys and tropical rainforests, with climates ranging from the extremely hot to the very cold, and some areas suitable for agriculture as well as others better suited for livestock raising or mining activities. This observation alone could be enough motivation for looking at Engerman and Sokoloff’s factor endowments-institutional persistence hypothesis for the Colombian case.

Even more, a closer look to Colombian colonial history also reveals important within-country variability in the kind of institutions set up by Europeans. In particular, labor institutions were organized differently according to environmental and pre-Hispanic demographic conditions, and colonial State presence varied considerably depending on the incentives faced by the Crown<sup>10</sup>. Central economic regions coexisted with frontier areas – actually, some of them were never reached by Europeans or by European descent until the 19<sup>th</sup> century–. Given that the former institutional theory of comparative development applies to a cross-country level, it is quite plausible that it may also work at a within-country one. But even more suggestive is the fact that current within-Colombia economic performance presents huge variation too. Per capita GDP of the richest department was more than nine fold that of the poorest in 2002<sup>11</sup>, and while there are prosperous urban areas where industry and services represent a large proportion of added value, others remain backward, with low life expectancy rates, high Unmet Basic Needs indexes and virtually no public goods provision. Table 1 compares per capita GDP and other current measures of welfare for Colombian departments<sup>12</sup>.

Within-country variability for testing institutional persistence has been exploited for other countries, though the literature is scarce. Mitchner and McLean (2003) study labor productivity variability within the United States and find that intensity of slavery during the

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<sup>9</sup> Actually this is true not only for Colombia but for many other Latin American countries. See Acemoglu, Bautista and Robinson (2005).

<sup>10</sup> Coatsworth (2004) studies economic organization during colonial times in Latin America.

<sup>11</sup> DANE National Accounts (2005), at [www.dane.gov.co](http://www.dane.gov.co).

<sup>12</sup> Colombia is politically organized as a centralized republic divided into 32 departments and the capital city, Bogotá.

19<sup>th</sup> century explains a high proportion of current productivity level variability between states, even when considering the possible endogeneity of slavery. They follow Acemoglu, Johnson and Robinson (2002), who argue that slaves were taken in higher proportions to those places where settlement was less attractive for Europeans because of higher mortality rates. Using soldier mortality as an instrument for slavery, Mitchner and McLean find a causal effect of this exploitative institution on current productivity.

Banerjee and Iyer (2002) also study the effect of colonial land tenure systems on current economic performance in India. They exploit the fact that some Indian regions faced different land tax structures in colonial times. While in some of them taxes were raised directly by British officials over individual cultivators, in others, local landlords had the right to tax peasants under a contract with the British crown. Finally, in some other regions villagers commonly owned land and raised taxes directly. Banerjee and Iyer find that differences in colonial land tax institutions are related to huge differences in current economic performance. These authors also deal with the possible endogeneity of land tenure institutions, modeling the land tax design process. They argue that decisions over different types of land tenure systems were grounded on changing ideologies based on the most recent economic doctrines. Given that the British conquest took several decades, conquest dates serve as an instrument for assessing the effect of land tenure systems over current economic outcomes such as agricultural investment, productivity and public goods provision. They find that landlord based land tenure systems have a strong negative effect over these outcome variables. These few studies provide appealing evidence that institutional persistence may be a strong force driving economic performance within very different countries.

The aim of this paper is to exploit within-Colombia variability in current outcomes as well as in colonial institutions, to test whether it is possible to find institutional persistence from colonial times up to the present through the channels Engerman and Sokoloff (1997, 2000) have stressed. Despite the plausibility of this kind of institutional persistence in the Colombian case, where factor endowments determined institutional design at the local level, the particular history of *Nueva Granada*<sup>13</sup> suggests that those channels may have been more complex than we should expect based on their theory.

Engerman and Sokoloff's account is probably too simple to describe the Colombian case. Indeed, in Colombia not only the appearance of exploitative institutions such as

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<sup>13</sup> Nueva Granada was the name given by Spaniards during colonial times to the Audience and later to the Viceroyalty of what is more or less currently Colombia. The territory of the Audience limited to the south with the Province of Quito and the Viceroyalty of Peru, and included current Panama and some western regions of current Venezuela.

*encomienda* or slavery depended upon factor endowments; at the same time, the presence of the colonial State –and hence the institutions accompanying it– was also closely related to factor endowments, and in particular, to the ease of fiscal income raising based on taxation of economic activities<sup>14</sup>. Along with the fact that State presence meant coercive redistribution and hierarchical political structures, it also provided some public goods such as roads or a judiciary –that could even look behind the interests of indigenous people as some historians have shown repeatedly<sup>15</sup>–, and could operate as part of a checks and balances mechanism limiting the opportunism of local elites and priests.

I give some explanations to these issues by studying the most important colonial institutions –according to historiography– for the economic and political organization of colonial *Nueva Granada*, along with the impact they have had on current economic performance indicators at a municipality level<sup>16</sup>. While historians have offered a huge amount of compelling evidence supporting institutional persistence, causality –from past institutions onto current outcomes– still remains to be proven or rejected.

Specifically, the questions that this paper tries to answer follow closely those in Acemoglu, Bautista and Robinson (2005), where the authors ask if there is statistical evidence that colonial institutions actually influence contemporary outcomes, and what mechanisms may be relating both. Studying a specific set of institutions allows a focus on very specific channels of institutional change, making easier the identification of mechanisms. Since colonial institutions are no longer operating, they are potentially very good candidates to be truly exogenous variables, so any evidence of a causal relationship may be interpreted as institutional persistence. After understanding in detail the colonial institutional design, this will enable me to construct an instrumental variables strategy for handling any possible endogeneity issues. As Acemoglu, Bautista and Robinson (2005) point out, having a variable from hundreds of years ago does not immediately avoid endogeneity concerns, since it may be correlated with hard to measure omitted variables. If causes persist, past variables may not be exogenous to current outcomes.<sup>17</sup>

A major advantage of this paper is the possibility of focusing on a within-country analysis, in which a set of important determinants of economic development frequently

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<sup>14</sup> The case of the Province of Popayán is very revealing. Even though gold mines were located in the Chocó region –one with resisting indigenous tribes and a difficult disease environment– the *caja real* as well as the mining businesses were administered from the city of Popayán, hundreds of kilometers away.

<sup>15</sup> Bonnett (2002) gives evidence on how the colonial judicial system in many cases looked behind the interests of indigenous populations in the face of Spanish abuse.

<sup>16</sup> The most immediate indicator of economic performance is per capita GDP but unfortunately, no measures of this variable exist at a municipality level.

<sup>17</sup> This point is also stressed by Banerjee and Iyer (2002).

included in cross-country studies remain constant across units of observation. This solves the problem of controlling for highly unobservable variation in country-specific factors that may influence colonial institutions and current economic outcomes at the same time. Characteristics such as language, culture or technology vary enormously across countries, and in many cases institutions are not clearly comparable between nations. In the Colombian case, some of these characteristics can confidently be considered homogeneous between regions, so this major caveat of cross-country studies is not an issue here.

Finally, an institutional persistence account would, if successful, be at the same time part of an answer to the questions about the huge disparities between levels of economic development between Colombian regions. The latter question has never been answered from an institutional perspective<sup>18</sup>. A direct measurement of the colonial legacy has never been done for Colombia, and many questions regarding economic disparities between regions have not been tackled yet. If any relationship arises between colonial institutions and current outcomes, the contribution of this paper would be bold from a theoretical standpoint, and surprising given the nature of the data and the time span separating us from colonial times.

#### **1.4. Overview**

In this paper I construct three direct measures of colonial institutions intensity at the municipality level: the number of tribute paying indians in *encomiendas* in 1560, the proportion of slaves in 1843 and the presence of the colonial State in 1794. I regress current economic outcomes of importance for human welfare on the colonial institutional measures, controlling for several other variables that may be important for determining economic performance. The measures of colonial institutional intensity were taken from original documents where data on tributary population, slavery and State presence were recorded in a detailed way at a disaggregated level.

In fact, the estimated effects are robust and significant for some of the outcome variables I consider. This is surprising given that *encomienda*, slavery and colonial administration no longer exist, and that the colonial institutions variables are inevitably subject to considerable measurement error. Each one of the institutions considered has an important effect over at least one of the current economic performance variables considered. Slavery appears to be strongly related with current land inequality, while State presence is robustly associated with better public goods provision measured by primary and secondary

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<sup>18</sup> Meisel (2001) and Nuñez and Sanchez (2000) study within-Colombian economic development, growth and convergence focusing mainly on geography and infrastructure, but center their analysis on the 20<sup>th</sup> century.

enrollment as well as by infant mortality rates. Interestingly, State presence appears to have no effect on land distribution. The presence of tributary indians or *encomiendas* is associated with worse land distribution, higher mortality rates and lower primary and secondary enrolment rates. A sensibility analysis is carried out to control for other important fundamental causes of long-run economic performance, such as geography and culture. An instrumental variables strategy is also implemented to tackle the possible endogeneity of the tributary indians and slavery variables due to omitted and unobservable factors which may be correlated with them and may be causing current economic outcomes. Based on historical evidence, this paper argues that altitude above sea level is an accurate exogenous source of variation for tributary indian population and *encomienda*, and that the presence of a gold mine at any moment during the colonial period is also a good predictor of the intensity of slavery, both being orthogonal to current economic performance. Instrumental variables results appear to be more significant than OLS in several cases. OLS coefficients for some regressions produce signs opposite to those expected by the theory, but the signs change under the IV strategy. This suggests that OLS estimates may be biased due to measurement error.

Section 2 of this paper studies the historical background of colonial institutions in *Nueva Granada*, trying to understand the process of institutional design. Section 3 describes the nature of the data in detail, section 4 explains the empirical methodology along with the instrumental variables strategy and section 5 presents the main results. Section 6 concludes, trying to grasp some of the potential mechanisms of institutional persistence suggested by the results.

## **2. Historical Background**

The arrival of Europeans to America in the late 15<sup>th</sup> and early 16<sup>th</sup> centuries can be considered a *critical juncture*, since it implied a dramatic, deep and sudden change in the social organization of pre-Hispanic societies and in the continent's landscape. In the social sciences it is frequently very difficult to find causal relationships between variables because of the evident endogeneity of social phenomena. Hence, from a scientific point of view, the conquest and colonization of the Americas can be seen as a truly exogenous shock and as such, can be studied as a natural experiment.

## 2.1. Colonial *Nueva Granada*

Spaniards arrived to present-day Colombia in the early 16<sup>th</sup> century, initially through the Caribbean coast. Historians have shown that early *conquistadores* did not have a clear interest for settlement on this region. They preferred to undertake indian capture campaigns to use them as slaves and carry out the so called *cabalgadas*, in which, with the use of horses, entire indigenous communities were devastated with the purpose of appropriating their food and precious objects (Luna, 1993). Cities founded along the Caribbean Coast answered to the need of military forts which could be used as advance posts for military expeditions, and as ports for provision from the Caribbean islands.

Only after some time a few urban centers started growing around the more complex indigenous communities, where the *encomienda* acquired some importance. The effect of military expansionist policies, combined with tropical climatic conditions favorable to epidemics, meant a dramatic demographic fall of indigenous people. Consequently, Spaniards started replacing the falling indigenous labor force with slave population from the African west coasts starting in the late 16<sup>th</sup> century. In this way, Cartagena became the most important slave trade port of South America and remained as such during all the 17<sup>th</sup> century. As a result, the Caribbean was characterized by a weak presence of *encomienda*, a strong presence of plantation and mining slavery, and a heavily concentrated presence of the Colonial State in a few important ports as Figures 1 to 4 suggest.

Some years after the Spanish settlement on the Caribbean Coast, *conquistadores* started exploring deeper south into the territory, following mainly the upstream course of the Magdalena River, attracted by the discovery of the Inca Empire in the 1520s. In this way, Spaniards made contact with Andean indigenous communities, and in particular, with the politically and socially complex *chibchas* who inhabited the eastern highlands, in current central Colombia. The much higher population densities found all along the Andes, together with a better disease environment because of lower temperatures, translated into Spanish urban settlements and a strong presence of *encomienda*, even after the demographic collapse of indigenous populations.

The first geographic guides give a fair idea of the reasons motivating the foundation of a city in a specific place... The cardinal criterion for choosing an ideal location was the availability, docility and abundance of indigenous labor force. If healthy climate and soil fertility were added, conditions would be ideal<sup>19</sup> (Palacios and Safford, 2002, p.76)

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<sup>19</sup> Translated by the author from the Spanish Edition.

Agriculture became the main economic activity, characterized by non-increasing returns native crops such as corn or potatoes and European cereals such as wheat. The absence of scale economies in agriculture, together with the absence of important mines, meant that Spaniards could only benefit from direct labor force exploitation. Control of indigenous labor force required surveillance, reorganization and relocations, for which stronger administrative and religious presence was required. In this sense, economic activity around agriculture based on coerced labor force was accompanied by larger urban centers and a stronger State presence. At the same time, the local State –many times captured by local *encomendero* elites– was directed towards the benefit of Spanish interests, and the Crown –given its fiscal needs– tried to limit *encomendero* and even church exploitation of indians. The conflict between local elites and State officials has been widely documented, and the correlation of forces varied with time.

Soon after conquest, the crown intended to subject *conquistadores* to its control. Nevertheless, for decades the action of its emissaries seemed to have been as important to spread disorder as to establish royal authority...Weakening official power, these conflicts helped perpetuate the charismatic authority of *conquistadores*. Many Spanish officials who tried to protect indigenous populations by applying legislation frequently became targets of attacks by other officials allied with *encomenderos*<sup>20</sup> (Palacios and Safford, 2002, p.84)

Other authors also argue that the colonial State tried to limit the church's actions, since priests were not only the recipients of part of indian tribute –mainly tithes<sup>21</sup>– but also had authority over indians through evangelization<sup>22</sup>. These traits persisted more or less unchanged along the three centuries of colonial administration.

Conquest and colonization of the southern regions of actual Colombia came from Peru since some of the participants of the Inca Empire's conquest were allowed to conquer north. The central and western ranges of the Andes were settled by these Spaniards, who followed the Cauca and Magdalena Rivers downstream. This colonization path established a third important region characterized by the presence of gold mines scattered throughout mountain slopes and rivers. Indigenous tribes in those areas differed considerably among each other in terms of their political and social organization. Indians of the highlands of the current departments of Nariño and Cauca –such as the Pastos or Quillacingas– had attained some relatively complex levels of social organization, while the valleys of the Cauca and Magdalena rivers were inhabited by nomadic and more egalitarian societies.

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<sup>20</sup> Translated by the author from the Spanish Edition.

<sup>21</sup> Tithes were a direct tax on agricultural produce, usually of 10% over aggregate production, which accrued to the church.

<sup>22</sup> See, for example, Bonnett (2002).

Spaniards had a hard time trying to defeat the more bellicose tribes, but after some time they were able to almost annihilate them. The resistance of some indigenous tribes is best exemplified by the Cunas and Emberas of the Chocó region. Only after 1680 were Spaniards able to settle in the area because of the violent resistance of these tribes. As a result institutional design in the western region of actual Colombia was highly variable. In some places, such as the southern Andean highlands, the *encomienda* was the basis of economic organization, while other regions soon developed mining activities based on slave population, as in actual northern Caldas or later, along the rivers of Chocó. The appearance of African slaves in mining activities followed the sharp decline of indian population, originally forced to work in the mines. Mining was also accompanied by village foundation, though these settlements frequently disappeared soon after mines were exhausted. Since mining activities were at the heart of economic interests of the Crown and the Spaniards, the agricultural activities based on indigenous labor were intended to supply mines with food and materials. Finally, other regions remained as frontiers for long periods, with a virtual absence of the Colonial State (See figures 1 to 4).

## 2.2. Colonial Labor Institutions

The previous section allowed us to grasp the general process of institutional design following the Spanish conquest of *Nueva Granada*, focusing on labor institutions and State presence. The present subsection studies each one of these colonial institutions in more detail pointing towards the instrumental variables strategy that will be used subsequently.

The *encomienda* consisted of a right to indigenous labor and tribute, granted by the crown to Spanish conquerors or other settlers. According to Coatsworth (2004) and Yaeger (1995), this institution provided a set of conflicting incentives to *encomenderos* as well as to indians and crown officials:

An *encomienda* was an organization in which a Spaniard received a restricted set of property rights over indian labor from the crown whereby the Spaniard (an *encomendero*) could extract tribute (payment of a portion of output) from the indians in the form of goods, metals, money, or direct labor services. In exchange, encomenderos provided the indians protection and instruction in the Catholic faith, promised to defend the area and paid a tax to the crown. (Yaeger, 1995, p. 843)

But the set of property rights was restricted in several ways, since the Spaniards didn't own the indians or the lands where they inhabited, and inheritance of the right was restricted. At the same time, indigenous populations were falling sharply, due mainly to inevitable epidemics, so *encomenderos* found attractive to overexploit indians –since the stock of labor

assigned to them would not last for a very long time—. Though the *encomienda* was costly for the crown as it meant less tribute, the huge costs implied by the direct control of indigenous populations made the partial privatization of labor a feasible and attractive strategy.

Under the *encomienda* regime Indigenous populations were highly restricted in terms of their mobility, and coercive practices were common to avoid shirking. They were excluded from political participation and from access to capital and credit markets, and the institutional setting was designed so as to drive wages to subsistence levels. The need of a surplus out from indian labor that could be redistributed towards the *encomendero*, the church, and the crown, meant that only tribes with the capability of producing these surpluses –given their pre-conquest social organization, sedentarism and ecological conditions of the lands they inhabited– were attractive to Spaniards. Hence, as mentioned before, the *encomienda* appeared mainly in regions inhabited by the politically and socially more developed indigenous tribes. Nomadic groups would be very costly to organize in *encomiendas*, and being much smaller in numbers, they were also much more vulnerable to European epidemics. In this case, it was less costly for Spaniards to replace physically indigenous populations with slave labor imported from Africa.

In the Colombian case, pre-Hispanic indigenous populations varied considerably in their level of political development. “...the anthropological framework explains the historical fact of Spanish settlement. Conquerors tried to establish where the indigenous social relations hierarchies could be replaced at low cost, and where there already existed a leading caste” (Colmenares, 1999, p. 31).<sup>23</sup>

The more highly organized indigenous groups were found in highlands such as the *Altiplano Cundiboyacense* or the *Pasto* and *Popayán* plateaus, while nomadic tribes inhabited the interandean valleys and the coasts. In fact, there is a very strong and positive relation between altitude and indigenous population densities. Service (1966) develops a taxonomy of pre-Hispanic indian tribes according to their degree of social complexity. In his classification, altitude plays a central role, since highland indians were able to produce agricultural surpluses. Indians inhabiting mountain slopes and inter-Andean valleys had less developed agricultural techniques. Finally, other highly mobile marginal tribes inhabiting the lowlands based their subsistence in hunting and gathering activities. Palacios and Safford (2002) agree with this view:

At least since the conquest times and, based on what is known, also during the pre-Columbian times, the highest human densities were found in the highlands that allowed escaping high

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<sup>23</sup> Translated by the author from the Spanish Edition.

temperature climates and tropical diseases, and offered favorable conditions for agriculture<sup>24</sup>. (Palacios and Safford, 2002, p. 16)

Slavery was another fundamental labor institution in Latin America and in *Nueva Granada*. Starting in the mid 16<sup>th</sup> century, Europeans forced the migration of millions of Africans to America –especially to the Caribbean and the Pacific Coast– in order to replace rapidly declining indigenous populations. According to Coatsworth (2004), the rise of African based slavery was critically related to several very particular conditions of some American regions. On one side, geography, climate and soil characteristics determined suitable areas for slave-based plantation agriculture and for mining activities, and by the other, colonial State policies determined the destination of slaves.

Europeans took slaves mainly to lowland tropical regions, which for the *Nueva Granada* case frequently coincided with gold mining areas. Although the literature has stressed a relation between plantation economies and slavery in the Americas (Coatsworth, 2004 and Engerman and Sokoloff, 1997), slavery in *Nueva Granada* followed more closely the distribution of gold mines. In fact, gold was the main export commodity during all the colonial period, and *Nueva Granada* was the biggest individual gold exporter to Spain (Sharp, 1976 and Colmenares, 1999). Nowadays, colonial mining regions such as the Chocó or the Cauca valley have the highest proportions of afro-descendent populations in the country. These regions were characterized by high levels of inequality, very powerful elites and, according to Coatsworth (2004), were among the last in Latin America to call into question the colonial institutional order.

### **2.3. The Colonial State**

The Spanish conquest of America was mainly a private enterprise. During the first years the Crown limited its intervention to the granting of conquest rights for private agents and to the establishment of legislation –for which enforcement could be very weak–. Financing the conquest was responsibility of *conquistadores* (Zavala, 1940 and Lockhart and Schwartz, 1983). Even the granting of the first *encomiendas* was undertaken by the leaders of the expeditions, and only after some time did the Spanish officials start to administer the *encomienda* grants directly. In the first stage, the Crown mediated the conflicting interests between *conquistadores*, and regulated the foundation of cities. With time, the settlement of Spaniards in urban centers, along with the need for a regulation of economic activities based

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<sup>24</sup> Translated by the author from the Spanish Edition.

on indian labor, created a demand for State presence. In this sense, State capacity appears to be highly correlated with indian population densities and urban Spanish settlements, which, as pointed out before, also appeared hand in hand. The coexistence of *encomienda* and State presence many times meant that *encomendero* elites managed to capture State organizations such as the *cabildos* –city councils–, using them to their own benefit, for example, to grant the best located or better quality lands for themselves. Calero (1997) stresses this point in the case of the city of Pasto:

Land appropriation was closely intertwined with the structures of political power. This power rested in the local *cabildo*, an institution established for the town's governance, but whose influence reached far beyond the town itself. Such matters as *encomienda* inheritance, assignment of town plots, formal validation of new residents (*vecinos*), celebration of feasts, appointment of town officials, and allotment of *estancia* land were all functions performed by the *cabildo*... During the first decades of European occupation, when *encomienda* holders and *estancieros* were buying their highest returns, the *cabildo* was a group mostly made up of *encomenderos* who constituted a powerful economic and political elite... Cabildo records for the years 1564-1569 indicate that out of thirty-nine land concessions, twenty-five went to individuals who held both *encomienda* trusts and *cabildo* membership. Eight others went to *cabildo* members who had no allocation of indians in *encomienda*, and only five grantees had no connection with either *encomiendas* or the town's government. These figures indicate beyond any doubt that land-grant allocation favored the early *encomendero* elite and their descendants, who already controlled decisions in the district of Pasto. (Calero, 1997, pp. 104-105)

The case of Pasto may well have repeated itself in varying degrees in other important colonial urban centers of *Nueva Granada*, depending on the relative power of local elites vis-à-vis the Spanish Crown officials. In fact, the case of Pasto could be considered an extreme case of Crown's weakness, since the southern region of *Nueva Granada* was for a long time a peripheral area. The search for evidence of institutional persistence tries, precisely, to uncover the possible continuation of these historical traits of land inequality and concentration of political power, that may have translated into differing paths of economic performance in the long-run.

### 3. The Data

To test the hypothesis that the extent of colonial institutions has an effect on current economic performance, I constructed direct measures of the intensity of those colonial institutions highlighted in the literature as the most important for social organization during the colonial period in *Nueva Granada*. I also gathered information on current socioeconomic outcomes of interest. Municipality level data was chosen since this is the smallest possible unit of observation –thus enlarging the sample size– and it allows capturing more variability,

given that even within each department differences in current economic performance are considerable (See Table 1).

There is a large amount of documentation about indigenous population during colonial times –including transcripts by historians from original documents–. For our purposes, the 1560 anonymous visit copied by Tovar (1988)<sup>25</sup> was selected as the main source of information on indigenous population because of its comprehensiveness and its early date<sup>26</sup>. Only after 1560 did Spaniards start gathering the scattered indian tribes in *pueblos de indios*, so the distribution of indians at this date can be confidently considered quite close to the geographic pattern of pre-conquest indian location (Herrera, 1999 and González, 1992).

The document reports the number of tributary indians assigned to each *encomienda*, specifying the province to which the *encomienda* corresponded. A very meticulous job was done to match each one of the 1560 *encomiendas* to current municipalities, based mainly on historical cartography and anthropological works on toponimics for all the country. More than 82% of the indian population reported in the visit was successfully matched<sup>27</sup>. Though these documents usually reported tributary indians only –males between 17 and 50 years of age who, by law, should pay tribute–, historians have found a 1 to 3 relation between tributary and total population (Meisel, 1980 and Tovar, 1970). Our dataset contains information for 21 current departments, mainly those located in the Andean region, and around the principal Caribbean Coast port cities (See Figure 1). A dummy variable taking the value of one for any municipality who had successfully been matched to one or more 1560 *encomiendas* was created, with the purpose of carrying out a robustness check on the basic results, given the possibility of measurement error in the number of tributary indians variable. It is important to highlight that if a municipality is coded as having no tributary indians, this does not necessarily imply that no indians lived in that place. It means that by 1560 no indians in that location had been assigned into *encomiendas*. A detailed description of the construction of this variable can be found in Appendix 1.

As the basic labor institution under which mining and plantation agriculture developed in *Nueva Granada* during colonial times, slavery data was also coded based on a national census done in 1843. By this time the country had already achieved its independence

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<sup>25</sup> López de Velasco's (1574) account of *Nueva Granada*'s population was based directly on this visit.

<sup>26</sup> A visit consisted of a census of Indian population for tributary purpose. The visitor traveled all around the area under scrutiny, counting Indians in every *encomienda*. The 1560 visit is the first one known for the *Nueva Granada*, and is the only one that covers almost all of the current Colombian territory. Many other visits took place during the 16<sup>th</sup> and 17<sup>th</sup> centuries, but the 1560 one is the most comprehensive and was done at an early date, so the relocation and demographic fall of indigenous populations are not important issues.

<sup>27</sup> Out of the 197,886 tributary Indians reported in the 1560 visit, it was not possible to assign the 35,576 indians of 353 *encomiendas* to any current municipality. It was not possible to find any reference of the names of these *encomiendas* that could let us locate them in any current municipality.

from Spain, and the “wombs law” had been approved<sup>28</sup>. As a consequence, slave population fell considerably compared to the late colonial period, but the falling rates can be confidently supposed to have been homogeneous across municipalities, so variability between them may have remained constant. In fact, the correlation of slave population at a province level between the 1778 and the 1843 censuses is of almost 80%<sup>29</sup>.

The slavery intensity measure consists on the proportion of slave population in each municipality. It was possible to build this measure since the 1843 census provides information on both total and slave population. For several municipalities it was necessary to match 1843 names to current municipality names too, due to the fact that from then onward new municipalities were founded, which were then small villages usually with changing names. Figure 2 shows a Slavery intensity map and Table 2 shows descriptive statistics for all of the colonial institutions measures at a departmental level. Though the average proportion of slaves is very small –0.8% for all the country–, it has an ample variation among the 23 departments for which slaves were reported.

The third institution of interest –the colonial State presence– was measured in alternative ways, based on Duran y Diaz (1794). His work –inscribed in the Bourbon administrative reforms aimed at achieving a greater control over the American colonies– gives a full account of State officials, salaries, the military, tariffs, taxes and fiscal revenue among others for all of the Viceroyalty of *Nueva Granada*. The document specifies the location of officials and State administrations. Of particular interest, Duran y Diaz (1794) has a complete record of every *estanco*, *alcabala*, and mail service office at a current municipality level –towns, villages or cities then–. An *estanco* was a State monopoly over the sale of a particular good, many times including also a monopsony by which the State regulated quantities and production rights. In particular, Duran y Díaz reports the presence of two different *estancos*; one for tobacco and playing cards and another one for *aguardiente* (a liquor) and gunpowder. An *alcabala* was a tax over sales –usually 2% over the sale price–, and mail service was also a State monopoly.

Based on these four alternative measures of State presence, I built an index taking values from 0 to 4 depending on the number of 1794 institutions in each current municipality. If a given municipality has a tobacco *estanco*, an *aguardiente estanco*, mail service and an

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<sup>28</sup> The 1821 *Ley de Vientres* was approved by the Cúcuta Congress as a first step towards total slave manumission. It intended to be a transition mechanism to avoid a direct conflict with slave owners. From that date onward all the children of slave women would be free after becoming 18.

<sup>29</sup> The 1778 census reports population aggregated at a provincial level. For this reason it could not be used as a source for econometric estimations.

*alcabala*, it is coded with a 4<sup>30</sup>. Although at first glance it appears that these colonial State institutions may have been a burden for private enterprise, they also suggest a bigger supply of public goods at the local level. Moreover, given the previous discussion about potential conflict between local elites and the Crown, it is possible that this measure of State presence captures the capability of the State for limiting political power inequality. This index will be my preferred measure of State presence intensity, though the number of Crown employees and each one of the institutions were used independently as alternative measures. Crown employees are a direct and intuitive way of measuring the presence of the State, but they were heavily concentrated in the most important urban centers, reducing variability. From a total of 5,810 officials registered by Duran y Díaz, 3,844 were in Cartagena –a first order military center on the Caribbean– and 715 were in Bogotá –the Viceroyalty capital–.

Geographical variables were also included in the analysis, in particular latitude, longitude, mean annual rainfall and altitude above sea level. The density of first, second, and third level rivers in each municipality was also included (extension of rivers in meters divided by municipality surface area in square kilometers). Since transport costs have been pointed out by historians as important determinants of economic performance during colonial times, I also coded a dummy variable for municipalities whose urban area is a port over the Magdalena River, the main communication artery during colonial times. Distance from each municipality to the capital city of its department was also coded to control for the possible effects of a nearby political center or an important market.

Finally I also included the earliest foundation date of each municipality based on Bernard and Zambrano (1993). This variable seems to be important since during the second half of the 18<sup>th</sup> century and the second half of the 19<sup>th</sup> century a process of town foundations took place. The former was product of the *resguardos* dissolution policy by which indian reservoirs were auctioned and turned into *parroquias* –towns of *mestizos* and poor whites– and the latter because of the colonization of peripheral areas for coffee cultivation (Bonnett, 2002 and LeGrand, 1986). Institutions and unobservable characteristics of these municipalities may differ from older ones, and historians have suggested they may have better than average income and wealth distributions and better economic performance.

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<sup>30</sup> The construction of this index implies the plausible assumption of a linear relationship between the level of State presence and the outcome variables of interest. It also assumes that the individual effect of any of the State institutions is quantitatively the same.

#### 4. Empirical Strategy

The empirical strategy aims to relate a set of current outcome variables at the municipality level with different measures of colonial institutions intensity. That this strategy may be promising is suggested by Figures 5, 6 and 7, which plot the average departmental intensity of slavery, *encomienda*, and State presence against current GDP per capita. They show a negative relationship for slavery, and a positive relation for State presence, at least at the departmental level. For *encomienda*, the linear fit is positive but only due to Boyacá and Cundinamarca which are clearly outliers. These two departments were inhabited by large indigenous populations during colonial times, which made them the political center of *Nueva Granada*. Unfortunately there is no measure of per capita GDP at the municipality level, so with Occam's razor in mind, some of the socioeconomic outcomes more clearly related to welfare and development are used. Specifically, this research looks at land distribution measured by the Gini Coefficient and calculated by Offstein, Caballero and Hillón (2003), primary and secondary gross enrolment rates, infant mortality rates of children less than 1 year and the Unmet Basic Needs Index (NBI), a frequently used measure of structural poverty. Table 3 shows descriptive statistics of these variables at the departmental level.

##### 4.1. Methodology

Accordingly, I will estimate the following linear regression by Ordinary Least Squares:

$$y_i = \beta_0 + \beta_1 Encomienda_i + \beta_2 Slavery_i + \beta_3 ColonialState_i + \beta_4 \mathbf{X}_i + \varepsilon_i \quad (1)$$

where  $y_i$  is the outcome variable of interest,  $Encomienda_i$  is one of the possible measures of *encomienda* intensity in 1560,  $Slavery_i$  is the proportion of slaves on total population in 1843,  $ColonialState_i$  is one of the possible measures of State presence in 1794,  $\mathbf{X}_i$  is a vector with geographic and other control variables, and  $i$  indexes municipalities.  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  are the coefficients of interest.  $\varepsilon_i$  is the error term, assumed to have zero mean. The initial identification assumption on this specification is that the institutions intensity variables are uncorrelated with the error term, that is, that any omitted variables in the regression are not correlated with *encomienda*, slavery or State Presence. If this assumption were true, OLS would consistently estimate the effect of colonial institutions on the variability of current socioeconomic performance between municipalities. Although this assumption is very strong given our previous discussion about colonial institutional design, it is worth estimating the model as a benchmark. The exogeneity of *encomienda* may be a very strong assumption,

while it may be more reasonable for slavery, given that it was closely related to gold mines, whose distribution, given by nature, can confidently be considered random. However, these assumptions will be relaxed later. Regarding colonial State presence, the exogeneity assumption also looks very strong, but for lack of an appropriate IV strategy, I will maintain it along the whole document taking care of not making a strong interpretation of results on it.

To deal with the possibility of omitted variables causing endogeneity –and hence inconsistency of the OLS estimation– an instrumental variables strategy will be implemented. Since it is very difficult to control appropriately for every possible element that may be causing current economic performance, if one or some of these omitted variables appears to be correlated with my measures of colonial institutions, the standard OLS assumption of no correlation between the explanatory variables and the error term will be violated, producing inconsistent estimates for all the coefficients in regression (1). It is possible that *encomienda* intensity may be correlated with variables such as land quality, since pre-Hispanic indigenous tribes could have been settled on better soils, or because Spaniards gathered them in places with a particular set of characteristics. In any case, it is clear that indigenous population distribution was not random in 1560. In the case of slavery, as pointed out above, gold mines, as innate characteristics of geography, may be considered random, and thus the distribution of the majority of slaves. Nevertheless, slaves were also taken to urban centers for domestic work and were used as labor force in cotton and sugarcane plantations (Colmenares, 1999). To be sure that the impact of slavery is not biased under OLS estimation, I will also instrument this variable using a dichotomous measure of gold mine presence. Regarding State presence, it is also clear that colonial State distribution was not at all random. Unfortunately, dealing with the possible endogeneity of this institution may require an entirely different paper, so here the colonial state presence will only be used as a control variable and I will not press hard on results about it.

Tackling the endogeneity problem requires a close look at the previous discussion about institutional design during the colonial period, since I need an exogenous source of variation –the instrument– correlated with each one of the possibly endogenous variables but not correlated with the error term of the structural equation (1). Theoretically, this means that the instruments, though able to explain the behavior of *encomienda* and slavery distribution, should not be structural determinants of socioeconomic performance today.

By 1560 Spaniards were only starting to gather indians into *pueblos de indios*, but *encomiendas* had been granted over indigenous populations scattered around the territory. As

explained earlier, the distribution of pre-Hispanic indian population was strongly associated with altitude above sea level. Microverticality<sup>31</sup> and disease environment conditions may explain this pattern. Since there is no reason to suppose that altitude above sea level by itself may directly cause current socioeconomic outcomes once geography has been accounted for, this variable will be the instrument for tributary indian population in 1560. Figure 8 plots the number of tributary indians against altitude above sea level (along with a linear fit). The relationship is positive suggesting the appropriateness of altitude as an instrument.

Slave populations were taken forcibly during the three centuries of colonial regime, mainly towards gold mining regions. Since gold mines can be considered randomly distributed and were almost completely depleted during the 16<sup>th</sup>-18<sup>th</sup> centuries, the more natural instrument for slavery is the presence of gold mines. A dummy variable was coded following Colmenares (1999) (who in turn is based on West, 1952), taking a value of 1 for any actual municipality with a gold mine at any time during the colonial period. Figure 9 plots the slave proportion in 1843 against the dichotomous gold mines variable; the relation is also positive. Table 4 provides descriptive statistics of the outcome variables of interest by quartiles of the instruments distributions.

Hence I estimate by two-stages least squares the following model:

First Stage:

$$Encomienda_i = \gamma_0 + \gamma_1 Altitude_i + \gamma_2 \mathbf{X}_i + v_i \quad (2)$$

$$Slavery_i = \varphi_0 + \varphi_1 GoldMines_i + \varphi_2 \mathbf{X}_i + v_i \quad (3)$$

where the dependent variables are defined as above,  $Altitude_i$  is the altitude above sea level of the municipality urban center (in meters),  $GoldMines_i$  is the Dummy Variable for presence of gold mines during colonial times, and  $v_i$  and  $v_i$  are error terms assumed to have zero mean.

Second Stage:

$$y_i = \beta_0 + \beta_1 \hat{Encomienda}_i + \beta_2 \hat{Slavery}_i + \beta_3 ColonialState_i + \beta_4 \mathbf{X}_i + \varepsilon_i \quad (4)$$

where variables are defined as for equation (1), and  $\hat{Encomienda}_i$  and  $\hat{Slavery}_i$  are the fitted predicted values in the first stage regressions (2) and (3).

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<sup>31</sup> Salomon (1991 and 1978) studies the patterns of indian distribution in the Northern Andes –Modern Ecuador and Colombia– which he called *microverticality*. It consists in a settlement pattern of indigenous tribes along the mountain slopes in which settlement altitude was chosen optimally as to maximize the number of climatic strata that families in a community could reach, diversifying their production and consumption possibilities. This was made possible by the geographic and climatic characteristics of the Northern Andes, where climate changes rapidly according to altitude, making it relatively easy to reach different climatic settings at short distances.

## 5. General Results

### 5.1. OLS regressions

Tables 5 to 9 present the OLS regressions. In Table 5, regressions for land Gini are presented<sup>32</sup>. Column 1 shows the linear relationship between Gini and two institutions variables: the number of tributary indians and the slave proportion. Both independent variables are very significant and positive, meaning that higher intensity of colonial institutions is associated with higher inequality. The second column introduces the colonial State presence measure, which appears significant and positive, while the signs and significance of the *encomienda* and slavery measures remain unchanged. The following columns check the robustness of the results introducing other control variables. Column 3 includes foundation dates and column 4 geographical controls and the measure of current influence of indigenous culture. In column 5 foundation date is replaced by the distance to the department capital city. Columns 6 through 8 use alternative measures of colonial institutions intensity –the number of Crown officials, a dummy variable for *encomienda* and the number of *encomiendas* in each municipality, respectively–.

The introduction of foundation date (see columns 3, 4, 6-9) –which is always very significant and reduces land inequality– makes State presence insignificant. This suggests that younger municipalities tend to have a better land distribution, possibly because of frontier colonization. Since these municipalities surely had less colonial State presence, this confirms the importance of including foundation date in the structural equation; State presence could have been capturing the omitted effect of younger municipalities. The introduction of current Indigenous influence and geography (see columns 4-9) do not change the results on the colonial institutions coefficients either, nor the inclusion of distance to the capital city or the unobservable region-specific effects (see column 9)<sup>33</sup>.

The results for the rest of outcome variables are less clear-cut. Tables 6 and 7 present the regressions for Primary and Secondary enrollment rates. Tributary indians reduce primary enrolment but raise secondary enrolment, while slavery is associated with higher primary and is not significant for secondary. On the other hand, State capacity is robustly associated with higher enrollment rates. Foundation date (see columns 3, 4, 6-9) is always significant for both

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<sup>32</sup> The Gini coefficient is a commonly used measure of inequality. In the case of land distribution, it is constructed by calculating the proportion of land that each cumulative percentile of the population actually owns, against an equi-distribution –where each percentile should own exactly a share equal to its relative size in the whole population–.

<sup>33</sup> Easten Andean Region is the omitted category.

outcome variables, but while it raises primary enrollment, it reduces secondary enrollment. Neither of the control variables changes drastically the results for the coefficients of interest.

Results for infant mortality rates are shown in Table 8. Tributary indians are associated with higher mortality rates while State presence reduces them. Slavery is never significant for this outcome variable. The coefficients on foundation date show that younger municipalities, *ceteris paribus*, present better results for infant mortality. The robustness of the tributary indians variable only weakens when regional dummies are included (see column 9). Finally, regarding the results for the Unmet Basic Needs Index (see Table 9), tributary indians and State capacity both reduce poverty significantly, while the coefficient on the proportion of slaves is not statistically different from zero. This awkward result for the *encomienda* intensity measure appears together with a positive relation between Foundation date and poverty. As Table 8 shows, younger municipalities tend to have higher poverty levels.

To sum up, *encomienda* tends to raise inequality and mortality, and reduce primary enrollment rates as expected, and strangely, is associated with higher secondary enrollment rates and lower poverty levels. Slavery raises land inequality too, but appears to have no significant relationship with educational coverage, mortality or poverty. It is interesting to observe that State presence is never significant for Gini but usually significant and with the expected sign for the rest of the regressions –it reduces poverty and mortality and raises primary and secondary enrollment–. Neither distance to the capital city nor current indigenous population change the results. The alternative measures of colonial institutions (columns 6, 7 and 8 in the OLS tables) usually produce coefficients with the same signs as the preferred measures, though somewhat less significant. The regressions including controls are able to explain around 15% of the variability on current outcomes (see R-squares). Although the results for Gini support Engerman and Sokoloff’s hypothesis, the results for the other socioeconomic outcomes suggest that endogeneity issues and possibly measurement error problems on the explanatory variables may be blurring the relationships.

## **5.2. IV regressions**

Tables 10 to 14 present the basic results using Two Stages Least Squares, each one for one outcome variable as well. The bottom panels show the first stage relationships between the instruments –altitude and gold mines dummy– and tributary indians and slave proportion respectively (the potentially endogenous variables). Altitude is always highly significant and

with the sign suggested by the scatter plot in Figure 8, and the gold mines dummy variable is also positively and significantly associated with more slave intensity as Figure 9 shows.

Results for land Gini regressions are shown in Table 10. Both *encomienda* intensity and slavery maintain their strong association with higher land inequality. The alternative measures of *encomienda* –columns 7 and 8– produce not so significant coefficients: the *encomienda* dummy is significant at the 9% level and the number of *encomiendas* is not significant at all. This suggests that IV solves measurement errors in the number of tributary indians variable, so that the predicted number of indians is a clearly superior measure of *encomienda* intensity. As it happened with OLS, the State Presence index is not significant for Gini, but interestingly, the alternative measure of State presence, namely crown officials (see column 6), is highly significant and has a positive effect on inequality. This result is driven by the outliers in any case. As pointed out before, some few colonial cities concentrated the majority of crown officials. When regression in column 6 is run excluding outliers, the coefficient on Crown officials loses all of its significance while *encomienda* and slavery remain unchanged (results not reported).

It is also worth noting that foundation date loses its significance compared to OLS results, while distance to the capital city remains highly significant. It appears that after solving the endogeneity concerns, younger municipalities do not differentiate significantly in terms of their land distribution from older ones. This result is counterintuitive based on Colombian historiography on frontier expansion, but is appealing considering that departments with young municipalities such as Caldas, Risaralda or Quindío present very high levels of land inequality as Table 3 confirms. Current proportion of indians is not significant either, and the introduction of regional dummies (see column 9) produce interesting results too: tributary indians is no longer significant for Gini, but slavery remains significant at the 10% level.

For primary gross enrollment rates, as Table 11 shows, the negative impact of *encomienda* remains significant, even when using the alternative measures (columns 7 and 8). Under OLS slavery produced a striking positive sign (see Table 6), but under IV its coefficient loses its significance when geographical variables are added, so its impact cannot be statistically distinguished from zero. The Duran y Díaz measures of State presence also lose their significance, as well as the variable describing foundation dates.

The IV regressions produce very interesting results for secondary enrollment (see Table 12). While OLS coefficients for tributary indians had a strange positive sign, when

dealing with the endogeneity of this institution the sign becomes robustly negative as expected. The significance of tributary indians vanishes when controlling for regional effects, though regressions suggest a strong negative impact of *encomienda* on current educational attainment levels. Slavery is never significant for this outcome, and the State presence variable always has a very significant and positive effect. This suggests –not forgetting the caveats of the possible endogeneity of this institution– some persistence of State presence in Colombia; places with more colonial State may be providing more public goods today. Foundation dates remain significant and with a negative sign.

Results for infant mortality (see Table 13) are qualitatively very similar to those for secondary enrolment rates, since *encomienda* raises mortality and State presence reduces it significantly, even after controlling for geography. Controlling for regional dummies makes tributary indians no longer significant, suggesting that the pervasive effect of such institution may have operated at a regional level more than at a municipality level, or possibly that some omitted regional variables are partially correlated with the *encomienda* measure. Again, slavery and current proportion of indians are never significant as it happened in OLS regressions. As in the case of land inequality, foundation date loses its significance under IV, so it is no longer possible to affirm that younger municipalities achieve better mortality rates.

The most striking result appears with the relation between *encomienda* and poverty, measured through the Unmet Basic Needs Index (see Table 14). Its strange negative sign – meaning less unmet needs– remains unchanged as well as its significance. For slavery, results remain insignificant as in OLS except when controlling for regional effects (see column 9), but its sign becomes always positive as expected. This is an outstanding result, since it is clear that slavery was concentrated in specific regions, so controlling for this fact may be important to uncover the effect of this institution. Moreover, State presence reduces poverty significantly. It is worth noting that the alternative measure of State presence is not significant, but again, this result is driven by outliers. Foundation date is not significant while distance to the capital city, as expected, raises poverty. Finally, the coefficients for current indian population give some support for some kind of cultural hypothesis since they are significant and positive, but could also be capturing the institutional persistence effect of *encomienda* if the location of indigenous population has not changed considerably for the last centuries.

The IV regressions reveal a series of outstanding results suggesting the persistence of colonial institutions in Colombia. They are interesting because not all of the institutions

considered in this paper affect every one of the current socioeconomic performance measures chosen. Moreover, finding any evidence of institutional persistence at all is surprising given the nature of the data constructed and used. The IV coefficients are always larger in size than the OLS coefficients, and some of the signs that appeared as contrary to the hypothesis in OLS regressions change in the IV specification, which suggests that measurement error was probably biasing the OLS results.

It is also interesting that *encomienda* appears to be the particular institution with more persistence. Even though its coefficients are usually small in magnitude, the significance and net effect is high against every current outcome, and signs –except for poverty– indicate that it has had a pervasive effect on local socioeconomic performance. For example, for the case of Primary enrollment, based on column 4's specification, the coefficient is -0.00091. The mean of tributary indians is 150.42, so this implies that a 100% increase in the number of tributary indians leads to a  $150.42 \times 1.0 \times 0.00091 = 0.137$  reduction in the primary enrolment rate. Since the mean of primary enrollment is 1.267 and its standard deviation is 0.348, this effect is equivalent to a 10% reduction in the primary enrollment mean or, equivalently, to 39.3% of the standard deviation.

Slavery persistence appears to be an important determinant of land inequality, raising it considerably, and of poverty after controlling for regional effects. This result is particularly supportive for institutional persistence since, as noted earlier, slave-economy based regions have been identified by historians as the more unequal during colonial times. The quantitative effect of slavery on inequality can also be assessed. Based on column 4 in Table 10, the coefficient for slavery is 4.864. The mean of the proportion of slaves is 0.081, so this implies that a 100% increase in the variable leads to a  $0.081 \times 1.0 \times 4.864 = 0.394$  increase in the land Gini coefficient. Since the mean of land Gini is 0.684 and its standard deviation is 0.102, this effect is equivalent to a 57.6% increase in the variable's mean or, equivalently, to 3.8 times the standard deviation.

The opposite occurs with State Presence; it does not affect inequality but raises primary and secondary enrollment and reduces mortality and poverty. If in fact the colonial State presence has persisted to the present, this may be suggesting that the State has never been successful at redistributing land at the municipality level, but has been successful for providing local public goods. Finally, results for foundation date are interesting because they do not support the common knowledge idea about better socioeconomic performance of younger municipalities. Results also suggest a series of caveats that should be investigated in

more depth elsewhere. The results for slavery on socioeconomic outcomes are not clear, though a strong pervasive effect of such an exploitative institution was expected. Results for poverty are also unclear, something strange considering that the Unmet Basic Needs index is a structural measure of wellbeing.

## 6. Concluding Remarks

This paper aimed to make a contribution in the understanding of economic performance differences within Colombia, based on the possibility that institutions have persisted somehow in time. Results suggest that colonial institutions, designed depending on a series of local and regional characteristics more than four hundred years ago, have determined to some extent different paths of economic development in the very long-run. Unfortunately, the results do not talk at all about the mechanisms that have caused and permitted persistence, hence the most interesting research agenda for the future would be to find evidence that uncovers different mechanisms operating. Why didn't the pervasive effect of exploitative institutions such as *encomienda* and slavery wipe out once *Nueva Granada* achieved its independence in the early 19<sup>th</sup> century? Even more, how did the State manage to persist at the local level after the Spanish regime was overthrown by the *criollos*? Further research should also take seriously the possibility that colonial State presence may be endogenous.

Thanks to the fact that very specific institutions were considered in this work to evaluate their impact on economic performance, it is possible to highlight some plausible mechanisms of institutional persistence that may have been operating in Colombia. In the first place, political and economic inequality may be powerful channels favoring the *status quo*. Historians have emphasized how *encomenderos* were able to concentrate lands around the settlements of indians granted to them, and as a consequence, that *hacienda* was a product of this combination of strong local elites and strict control over labor force (Mörner, 1973). On the other hand, Slavery was associated with plantation agriculture, where it was used intensively as the way of organizing labor. Absenteeism of landowners –widely documented for Colombia during the colonial times as well as during the 19<sup>th</sup> century– may have meant a weaker demand for public goods in rural areas since landowners usually lived in the cities (Banerjee and Iyer, 2003).

The social structure of colonial Hispanic America was based on a racial criterion, by which non-whites were virtually excluded from the possibility of political participation. The excluding character of colonial politics may well have persisted after independence, with

*criollo* elites maintaining the monopoly of power and, as a consequence, its privileges. The successful capture of the local State may have translated into less provision of public goods such as education, health and equality before the law. On the other hand, it may be worth investigating the relationship between colonial institutions and violence in Colombia, since political and economic exclusion –which are colonial traits– have been stressed as main causes of conflict in the country.

The general results of this paper suggest that the ways in which the Colombian society was organized according to some colonial institutions may constitute a heavy burden on economic performance and human welfare up to the present. At the same time, results suggest that the State presence at the local level may be a strong force limiting the concentration of economic and political power in the hands of elites –*encomenderos* and slave owners during colonial times, regional *caciques* today–. Institutional persistence may not only be a burden because of pervasive institutions in the past, but, if institutions are appropriate, a powerful mechanism for economic development.

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## Tables.

Table No.1

### Comparative Economic Performance of Colombian Departments in 2002

Departments	GDP per capita 2002 (US dollars)	Infant mortality rate per 1,000 live births	Population below poverty line %	Urban Population %	Literacy rate of above 15 year-olds %	Net enrolment ratio in primary education %	Net enrolment ratio in secondary education %	Life Quality Index (0-100)	
Casanare	6,430	43.5	33.9	N/A	47.0	N/A	86.2	63.2	58.1
Bogota	2,687	31.1	22.5	43.5	99.8	98.0	84.3	104.3	87.71
San Andres	2,499	24.1	17.9	N/A	72.1	N/A	65.2	83.9	N/A
Santander	2,450	26.4	19.3	49.6	70.4	91.9	78.9	75.5	73.13
Valle	2,171	22.1	16.4	46.4	86.0	95.4	74.8	77.3	79.53
Antioquia	2,162	24.8	18.2	54.9	72.9	94.8	88.9	89.2	75.67
Meta	2,117	45.3	35.4	43.8	65.3	91.6	89.1	75.4	72.05
Cundinamarca	2,108	33.1	24.4	48.5	57.1	93.3	86.6	83.4	69.67
Arauca	2,028	61.2	48.3	N/A	53.8	N/A	81.3	62.8	59.8
La Guajira	1,838	45.6	35.7	50.9	68.6	84.3	89.0	73.7	70.13
Atlantico	1,668	25.7	19.2	55.1	84.7	94.5	71.5	81.2	80.4
Caldas	1,609	27.9	21.0	51.1	64.7	92.7	76.6	74.5	72.16
Tolima	1,609	29.9	22.8	56.0	63.0	88.9	89.3	74.4	68.61
Huila	1,585	37.6	28.7	57.4	61.7	91.8	97.7	76.3	68.71
Boyaca	1,501	38.7	29.2	63.7	44.6	90.1	74.7	71.9	58.81
Bolivar	1,487	49.9	38.4	57.9	49.5	89.5	75.4	58.1	63.32
Guaviare	1,478	48.6	38.1	N/A	25.1	N/A	60.4	33.1	64.1
Cesar	1,452	49.9	39.3	54.6	63.6	85.2	74.4	67.3	69.11
Risaralda	1,385	35.4	26.7	52.3	75.7	94.6	81.9	80.0	77.12
Cordoba	1,347	41.9	32.2	68.9	49.4	83.2	100.8	84.5	58.3
Quindio	1,299	35.0	26.6	49.6	84.7	89.2	79.2	81.3	76.05
Vaupes	1,282	48.6	38.1	N/A	21.0	N/A	72.5	55.5	N/A
Norte de Santander	1,131	30.5	22.9	58.8	74.5	90.1	73.9	68.3	74.16
Cauca	1,049	64.2	50.7	67.7	38.0	90.8	90.4	55.8	61.55
Caqueta	1,031	70.9	56.6	54.8	47.5	91.0	86.2	50.8	68.18
Magdalena	991	39.6	30.5	60.6	51.8	88.1	68.9	52.6	64.88
Amazonas	934	48.6	38.1	N/A	38.7	N/A	57.9	58.5	71.7
Vichada	930	61.2	48.3	N/A	16.2	N/A	62.3	33.3	N/A
Nariño	885	59.8	47.0	70.6	44.6	90.0	81.0	54.9	60.61
Putumayo	831	48.6	38.1	N/A	32.6	N/A	74.1	47.0	68.9
Sucre	774	31.7	23.8	61.1	69.0	84.6	87.4	74.4	62.7
Choco	728	98.8	81.3	75.3	42.1	81.4	99.4	66.9	55.29
Guainia	710	61.2	48.3	N/A	16.5	N/A	57.3	46.3	55.5
<b>Colombia</b>	<b>1,642</b>	<b>30.1</b>	<b>22.5</b>	<b>53.8</b>	<b>71.8</b>	<b>92.0</b>	<b>82.3</b>	<b>78.8</b>	<b>73.3</b>

Source: DANE (2004) and Colombian Health Ministry (2002).

Table No. 2

### Measures of Colonial Institutional Intensity for Colombian Departments

Department	Number of Municipalities	Means			
		Tributary Indian Population in 1560	Slave Proportion in 1843 %	Index of State Presence in 1794	Number of Crown Employees in 1794
Antioquia	125	0.08	0.0070	0.480	0.54
Arauca	7	0	0.0014	0.286	0.00
Atlántico	23	55.87	0.0086	0.739	0.30
Bolivar	44	24.88	0.0108	0.659	89.09
Boyacá	123	359.57	0.0003	0.496	0.67
Caldas	27	74.18	0.0092	0.296	0.41
Caquetá	16	0	0.0000	0.125	0.00
Casanare	19	49.68	0.0003	0.684	0.63
Cauca	41	168.02	0.0357	0.439	7.00
Cesar	25	0	0.0176	0.440	0.96
Chocó	28	1.14	0.0241	0.607	0.79
Córdoba	28	14.75	0.0088	0.571	0.18
Cundinamarca	118	348.33	0.0022	0.593	7.25
Guajira	15	0	0.0096	0.667	1.33
Huila	37	140.46	0.0041	0.730	0.51
Magdalena	30	0	0.0084	0.633	2.17
Meta	29	55.62	0.0000	0.069	0.03
Nariño	64	286.21	0.0122	0.219	0.31
Norte de Santander	40	291.27	0.0041	0.525	0.70
Putumayo	13	307.69	0.0002	0.077	0.00
Quindío	12	35	0.0000	0.000	0.00
Risaralda	14	208.21	0.0057	0.143	0.07
Santander	87	153.18	0.0025	0.655	0.92
Sucre	25	34.96	0.0063	0.520	0.44
Tolima	47	62.89	0.0023	1.170	4.30
Valle	42	72.33	0.0408	0.905	1.62
<b>Colombia</b>	<b>1079</b>	<b>150.42</b>	<b>0.0081</b>	<b>0.540</b>	<b>5.38</b>

Source: Duran y Díaz (1794), Tovar (1988) and Secretaría del Interior (1843).

Table No. 3  
Measures of the Dependent Variables for Colombian Departments

Department	Descriptive Statistics of the Dependent Variables				
	Land Gini (2002)	Primary Gross Enrolment Rate (average 92-02)	Secondary Gross Enrolment Rate (average 92-02)	Infant Mortality Rate (children less than 1) (average 00-02)	Unmet Basic Needs Index (1993)
Antioquia	N/A	1.26	0.58	28.63	48.46
Arauca	N/A	(0.27)	(0.25)	(16.25)	(18.68)
Atlántico	0.58	1.28	0.55	15.81	57.66
Bolívar	(0.14)	(0.35)	(0.29)	(3.60)	(10.13)
Boyacá	0.62	1.06	0.73	32.10	47.29
Caldas	(0.12)	(0.17)	(0.25)	(14.05)	(14.09)
Casare	0.66	1.33	0.58	48.52	74.82
Cauca	(0.09)	(0.29)	(0.19)	(42.92)	(14.12)
Cesar	0.66	1.08	0.56	163.97	47.94
Chocó	(0.10)	(0.28)	(0.24)	(235.98)	(14.04)
Córdoba	0.75	1.09	0.57	25.80	36.46
Cundinamarca	(0.08)	(0.22)	(0.16)	(12.34)	(11.21)
Guajira	0.45	1.42	0.39	56.62	63.37
Huila	(0.07)	(0.31)	(0.19)	(27.74)	(13.61)
Magdalena	0.66	1.39	0.61	47.35	57.48
Meta	(0.18)	(0.47)	(0.29)	(73.43)	(14.52)
Nariño	0.75	1.37	0.48	45.43	66.54
Norte de Santander	(0.09)	(0.30)	(0.23)	(24.97)	(17.46)
Putumayo	0.63	1.20	0.50	28.60	63.67
Quindío	(0.05)	(0.28)	(0.17)	(14.95)	(8.55)
Risaralda	0.66	1.68	0.55	116.06	80.21
Santander	(0.12)	(0.41)	(0.32)	(95.82)	(15.46)
Sucre	0.68	1.79	0.74	35.75	74.22
Tolima	(0.04)	(0.38)	(0.19)	(14.46)	(10.46)
Valle	0.69	1.26	0.73	193.03	40.82
Colombia	(0.09)	(0.32)	(0.29)	(262.08)	(12.95)
	0.61	1.68	0.88	47.99	63.74
	(0.08)	(0.52)	(0.38)	(45.17)	(18.64)
	0.71	1.40	0.57	30.79	48.80
	(0.06)	(0.19)	(0.23)	(31.03)	(8.75)
	0.65	1.36	0.58	46.06	69.93
	(0.10)	(0.36)	(0.19)	(39.62)	(10.64)
	0.65	1.42	0.51	34.89	54.48
	(0.12)	(0.37)	(0.29)	(35.28)	(20.68)
	0.70	1.13	0.40	45.06	66.56
	(0.08)	(0.49)	(0.26)	(69.07)	(17.09)
	0.66	1.15	0.43	55.88	55.27
	(0.11)	(0.22)	(0.19)	(57.74)	(15.32)
	0.74	1.55	0.57	28.51	78.55
	(0.06)	(0.47)	(0.31)	(15.87)	(17.48)
	0.73	1.13	0.66	28.64	29.75
	(0.06)	(0.10)	(0.10)	(7.42)	(5.00)
	0.70	1.21	0.54	27.67	35.79
	(0.07)	(0.20)	(0.17)	(21.61)	(11.38)
	0.68	1.13	0.47	49.30	48.40
	(0.08)	(0.25)	(0.23)	(115.14)	(14.32)
	0.73	1.46	0.65	53.39	73.48
	(0.07)	(0.32)	(0.18)	(105.67)	(11.94)
	0.72	1.40	0.67	25.64	46.70
	(0.07)	(0.31)	(0.24)	(9.26)	(13.52)
	0.79	1.25	0.69	29.75	31.53
	(0.07)	(0.22)	(0.20)	(14.40)	(5.41)
Colombia	0.68	1.27	0.58	69.03	53.43
	(0.10)	(0.35)	(0.26)	(136.15)	(19.12)

Standard Errors in parenthesis.

Source: Caballero, Hillón and Offstein (2003), DNP (2004) and DANE (2004).

Table No. 4  
Measures of the Dependent Variables by quartiles of Altitude and Distance to Gold Mines

Dependent Variable	Descriptive Statistics of the Dependent Variables							
	By Quartiles of Altitude above Sea Level				By Quartiles of Distance to Gold Mines			
	First Quartile	Second Quartile	Third Quartile	Fourth Quartile	First Quartile	Second Quartile	Third Quartile	Fourth Quartile
Land Gini (2002)	0.66	0.71	0.68	0.69	0.72	0.69	0.68	0.66
	(0.11)	(0.10)	(0.10)	(0.09)	(0.10)	(0.09)	(0.11)	(0.10)
Primary Gross Enrolment Rate (average 92-02)	1.41	1.30	1.20	1.15	1.28	1.25	1.24	1.29
	(0.40)	(0.30)	(0.29)	(0.33)	(0.33)	(0.32)	(0.36)	(0.37)
Secondary Gross Enrolment Rate (average 92-02)	0.61	0.58	0.54	0.57	0.54	0.56	0.58	0.62
	(0.26)	(0.26)	(0.23)	(0.29)	(0.24)	(0.25)	(0.28)	(0.26)
Infant Mortality Rate (children less than 1) (average 00-02)	51.11	50.94	71.93	108.81	38.51	64.51	95.28	78.65
	(79.48)	(111.06)	(137.80)	(194.86)	(36.74)	(148.56)	(175.91)	(136.03)
Unmet Basic Needs Index (1993)	66.02	51.00	47.51	49.22	52.83	50.70	51.87	58.30
	(16.50)	(17.62)	(17.60)	(18.88)	(19.48)	(19.40)	(19.13)	(17.63)

Source: Caballero, Hillón and Offstein (2003), Bernanrd and Zambrano (1993), Colmenares (1999), DNP (2004) and DANE (2004).

## Ordinary Least Squares Regressions

Table No. 5

Land Gini

Ordinary Least Squares

	Dependent Variable: Physical Land Gini								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	0.000046 (0.000008)	0.000045 (0.000008)	0.000029 (0.000008)	0.000024 (0.000008)	0.000033 (0.000009)	0.000024 (0.000008)			0.000024 (0.000008)
<i>Encomienda Dummy</i>							0.023289 (0.006989)		
<i>Number of Encomiendas</i>								0.00350 0.00158	
<b>Proportion of Slaves</b>	0.775 (0.11)	0.720 (0.11)	0.638 (0.11)	0.539 (0.11)	0.658 (0.11)	0.531 (0.11)	0.538 (0.11)	0.528 (0.11)	0.465834 (0.111936)
<b>Duran y Díaz Index</b>		0.0070 (0.0037)	-0.0035 (0.0042)	-0.0007 (0.0041)	0.0069 (0.0035)		-0.0011 (0.0041)	-0.0019 (0.0041)	-0.004662 (0.0040)
<b>Number of Crown Officials</b>						0.000049 (0.000004)			
<b>Foundation Date</b>			-0.00013 (0.00003)	-0.00011 (0.00003)		-0.00011 (0.00003)	-0.00011 (0.00003)	-0.00013 (0.00003)	-0.000123 (0.00003)
<b>Distance to Department Capital</b>					-0.00019 (0.00004)				
<b>Current Proportion of Indian Pop.</b>				0.00020 (0.00044)	0.00042 (0.00042)	0.00022 (0.00044)	0.00017 (0.00045)	0.00023 (0.00045)	-0.000058 (0.00045)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes
<b>R-squared</b>	0.06	0.07	0.08	0.12	0.14	0.13	0.13	0.12	0.19
<b>No. of Observations</b>	927	927	887	883	899	883	883	883	883

Robust Standard Errors in Parenthesis

Constant not reported

Table No. 6

Primary Gross Enrolment Rate

Ordinary Least Squares

	Dependent Variable: Gross Primary Enrollment Rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	-0.000108 (0.000025)	-0.000110 (0.000026)	-0.000083 (0.000023)	-0.000062 (0.000019)	-0.000079 (0.000021)	-0.000060 (0.000021)			-0.000053 (0.000019)
<i>Encomienda Dummy</i>							-0.028970 (0.022430)		
<i>Number of Encomiendas</i>								0.000093 (0.004425)	
<b>Proportion of Slaves</b>	1.429 (0.36)	1.378 (0.37)	1.582 (0.38)	0.782 (0.41)	0.623 (0.40)	0.972 (0.40)	0.833 (0.41)	0.849 (0.41)	1.163318 (0.457901)
<b>Duran y Díaz Index</b>		0.0059 (0.0113)	0.0286 (0.0133)	0.0347 (0.0129)	0.0157 (0.0113)		0.0342 (0.0130)	0.0345 (0.0130)	0.032994 (0.012975)
<b>Number of Crown Officials</b>						-0.000048 (0.000020)			
<b>Foundation Date</b>			0.00033 (0.00011)	0.00028 (0.00011)		0.00018 (0.00010)	0.00030 (0.00011)	0.00033 (0.00011)	0.000228 (0.000112)
<b>Distance to Department Capital</b>					0.00015 (0.00013)				
<b>Current Proportion of Indian Pop.</b>				0.00592 (0.00147)	0.00584 (0.00148)	0.00563 (0.00148)	0.00582 (0.00148)	0.00575 (0.00147)	0.006156 (0.001611)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes
<b>R-squared</b>	0.03	0.03	0.04	0.10	0.09	0.10	0.10	0.10	0.14
<b>No. of Observations</b>	1,030	1,030	1,014	1,013	1,029	1,013	1,013	1,013	1,013

Robust Standard Errors in Parenthesis

Constant not reported

Table No. 7  
Secondary Gross Enrolment Rate  
Ordinary Least Squares

	Dependent Variable: Gross Secondary Enrollment Rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	0.000056 (0.000019)	0.000042 (0.000021)	0.000026 (0.000021)	0.000038 (0.000024)	0.000037 (0.000023)	0.000037 (0.000024)			0.000046 (0.000023)
<i>Encomienda Dummy</i>							0.047762 (0.018939)		
<i>Number of Encomiendas</i>								0.010433 (0.004320)	
<b>Proportion of Slaves</b>	0.659 (0.34)	0.189 (0.34)	0.070 (0.33)	0.242 (0.33)	0.354 (0.32)	0.431 (0.32)	0.225 (0.32)	0.225 (0.32)	0.503476 (0.353862)
<b>Duran y Díaz Index</b>		0.0538 (0.0088)	0.0395 (0.0107)	0.0361 (0.0106)	0.0410 (0.0084)		0.0368 (0.0104)	0.0346 (0.0106)	0.033467 (0.010519)
<b>Number of Crown Officials</b>						0.000044 (0.000016)			
<b>Foundation Date</b>			-0.00020 (0.00008)	-0.00013 (0.00008)		-0.00023 (0.00007)	-0.00011 (0.00008)	-0.00013 (0.00008)	-0.000155 (0.000080)
<b>Distance to Department Capital</b>					-0.00071 (0.00008)				
<b>Current Proportion of Indian Pop.</b>				-0.00142 (0.00096)	-0.00119 (0.00099)	-0.00170 (0.00097)	-0.00144 (0.00101)	-0.00128 (0.00101)	-0.000996 (0.001013)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes
<b>R-squared</b>	0.01	0.04	0.05	0.07	0.14	0.06	0.08	0.08	0.09
<b>No. of Observations</b>	1,032	1,032	1,016	1,015	1,031	1,015	1,015	1,015	1,015

Robust Standard Errors in Parenthesis  
Constant not reported

Table No. 8  
Infant Mortality Rate  
Ordinary Least Squares

	Dependent Variable: Infant Mortality Rate (Children less than 1)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	0.023653 (0.016632)	0.028885 (0.016281)	0.017280 (0.016319)	0.005995 (0.016515)	0.015722 (0.016066)	0.005714 (0.017653)			-0.009051 (0.017092)
<i>Encomienda Dummy</i>							15.378000 (10.8523)		
<i>Number of Encomiendas</i>								0.069961 (2.175508)	
<b>Proportion of Slaves</b>	-205.690 (136.86)	-49.362 (140.56)	-138.751 (148.51)	160.410 (156.77)	267.381 (154.62)	3.382 (152.16)	162.327 (154.67)	153.582 (154.05)	163.341 (148.560)
<b>Duran y Díaz Index</b>		-17.9937 (4.3050)	-28.9550 (5.3232)	-29.7454 (5.4319)	-20.3359 (4.6817)		-29.5611 (5.4199)	-29.7225 (5.3460)	-24.6427 (5.1979)
<b>Number of Crown Officials</b>						-0.013523 (0.011922)			
<b>Foundation Date</b>			-0.15388 (0.03712)	-0.14087 (0.03691)		-0.04953 (0.03241)	-0.13025 (0.03553)	-0.14550 (0.0348)	-0.087669 (0.0339)
<b>Distance to Department Capital</b>					0.00316 (0.03430)				
<b>Current Proportion of Indian Pop.</b>				-0.08156 (0.25089)	0.09550 (0.24998)	0.17063 (0.24434)	-0.10342 (0.24736)	-0.06430 (0.24700)	0.216046 (0.214277)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes
<b>R-squared</b>	0.01	0.02	0.03	0.07	0.06	0.05	0.08	0.07	0.14
<b>No. of Observations</b>	1,000	1,000	983	982	999	982	982	982	982

Robust Standard Errors in Parenthesis  
Constant not reported

Table No. 9  
Unmet Basic Needs Index  
Ordinary Least Squares

Dependent Variable: Unmet Basic Needs Index									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tributary Indian Population	-0.008903 (0.001427)	-0.007775 (0.001430)	-0.006032 (0.001254)	-0.003336 (0.001115)	-0.003292 (0.001030)	-0.003162 (0.001156)			-0.004144 (0.001237)
Encomienda Dummy							-3.765764 (1.193064)		
Number of Encomiendas								-0.565066 (0.256057)	
Proportion of Slaves	2.880 (27.60)	38.776 (26.82)	48.802 (26.32)	-1.933 (24.48)	-13.923 (23.45)	-12.417 (24.98)	-0.319 (23.88)	0.470 (24.00)	-26.4661 (23.71)
Duran y Díaz Index		-4.0015 (0.6391)	-2.5318 (0.7424)	-2.0708 (0.6644)	-2.6562 (0.5381)		-2.1211 (0.6612)	-1.9915 (0.6703)	-1.62073 (0.62)
Number of Crown Officials							-0.007244 (0.001199)		
Foundation Date			0.01588 (0.00531)	0.01301 (0.00475)		0.01883 (0.00424)	0.01196 (0.00476)	0.01432 (0.00470)	0.01163 (0.00462)
Distance to Department Capital					0.06631 (0.00522)				
Current Proportion of Indian Pop.				0.67899 (0.05374)	0.65963 (0.05206)	0.69325 (0.05293)	0.67951 (0.05482)	0.66814 (0.05603)	0.57946 (0.05454)
Geography	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Regions Dummies	No	Yes							
R-squared	0.03	0.06	0.07	0.24	0.33	0.23	0.24	0.24	0.37
No. of Observations	1,079	1,079	1,033	1,027	1,044	1,027	1,027	1,027	1,027

Robust Standard Errors in Parenthesis  
Constant not reported

## Instrumental Variables Regressions

Table No. 10  
Land Gini

Instrumental Variables  
Panel A: Second Stage

Dependent Variable: Physical Land Gini									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tributary Indian Population	0.000163 (0.000038)	0.000158 (0.000036)	0.000161 (0.000046)	0.000141 (0.000076)	0.000114 (0.000047)	0.000161 (0.000078)			0.0000631 (0.000071)
Encomienda Dummy							0.1226 (0.072)		
Number of Encomiendas								0.0826 (0.0583)	
Proportion of Slaves	2.855 (0.952)	3.128 (1.158)	3.048 (1.116)	4.864 (2.942)	4.874 (2.645)	4.176 (2.171)	5.661 (3.642)	2.885 (2.382)	2.773979 (1.6531)
Duran y Díaz Index		-0.0154 (0.0107)	-0.0117 (0.0082)	-0.0203 (0.0168)	-0.0286 (0.0225)		-0.0271 (0.0211)	-0.0269 (0.0184)	-0.015539 (0.0095)
Number of Crown Officials						0.000038 (0.000008)			
Foundation Date			0.000055 (0.000070)	0.00012 (0.0002)		0.00017 (0.0002)	0.00015 (0.0002)	0.00015 (0.0002)	-2.12E-05 (0.0001)
Distance to Department Capital					-0.00017 (0.0001)				
Current Proportion of Indian Pop.				0.00060 (0.0006)	0.00044 (0.0006)	0.00066 (0.0006)	0.00056 (0.0007)	0.00086 (0.0008)	0.0005672 (0.0007)
Geography	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Regions Dummies	No	No	No	No	No	No	No	No	Yes

Panel B: First Stage

Dependent Variable: Tributary Indian Population in 1560									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altitude Above Sea Level	0.156070 (0.0123)	0.163545 (0.0123)	0.143898 (0.0126)	0.119596 (0.0157)	0.139384 (0.0154)	0.120371 (0.0152)	0.000155 (0.00002)	0.000141 (0.0001)	0.122101 (0.0186)
R-squared	0.15	0.17	0.21	0.22	0.19	0.22	0.19	0.10	0.23

Dependent Variable: Proportion of Slaves in 1843									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dummy for Gold Mines	0.019308 (0.0031)	0.017174 (0.0030)	0.017330 (0.0030)	0.008036 (0.0032)	0.009130 (0.0032)	0.009392 (0.0032)	0.008036 (0.0032)	0.008036 (0.0032)	0.007552 (0.0031)
R-squared	0.07	0.11	0.12	0.19	0.17	0.18	0.19	0.19	0.25
No. of Observations	889	889	873	872	888	872	872	872	872

Robust Standard Errors in Parenthesis  
Constant not reported

Table No. 11  
 Primary Gross Enrolment Rate  
 Instrumental Variables

Panel A: Second Stage									
	Dependent Variable: Gross Primary Enrollment Rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tributary Indian Population	-0.000641 (0.000127)	-0.000640 (0.000125)	-0.000654 (0.000156)	-0.000909 (0.000242)	-0.000850 (0.000183)	-0.000903 (0.000246)			-0.0004966 (0.000213)
Encomienda Dummy							-0.8749 (0.227)		
Number of Encomiendas								-0.3699 (0.2163)	
Proportion of Slaves	4.748 (2.355)	4.557 (2.844)	4.533 (2.970)	6.434 (5.096)	6.724 (4.663)	6.544 (4.241)	6.781 (5.062)	27.915 (11.874)	7.305211 (4.8447)
Duran y Díaz Index		0.0093 (0.0328)	0.0017 (0.0306)	0.0008 (0.0454)	0.0072 (0.0492)			-0.0104 (0.0341)	-0.0593 (0.0890)
Number of Crown Officials						0.000154 (0.000303)			
Foundation Date			-0.000111 (0.000216)	-0.00018 (0.0003)		-0.00016 (0.0004)	-0.00032 (0.0004)	0.00035 (0.0006)	0.0001375 (0.0003)
Distance to Department Capital					-0.00006 (0.0002)				
Current Proportion of Indian Pop.				0.00890 (0.0028)	0.00913 (0.0027)	0.00892 (0.0028)	0.00857 (0.0022)	0.00706 (0.0033)	0.009271 (0.0022)
Geography	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Regions Dummies	No	No	No	No	No	No	No	No	Yes

Panel B: First Stage									
	Dependent Variable: Tributary Indian Population in 1560								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altitude Above Sea Level	0.146468 (0.0135)	0.153172 (0.0134)	0.135228 (0.0137)	0.096163 (0.0160)	0.110492 (0.0157)	0.093964 (0.0156)	0.000099 (0.00002)	0.000067 (0.0001)	0.1147 (0.0189)
R-squared	0.10	0.12	0.16	0.18	0.15	0.19	0.20	0.12	0.19

	Dependent Variable: Proportion of Slaves in 1843								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dummy for Gold Mines	0.032086 (0.0040)	0.028070 (0.0039)	0.027224 (0.0039)	0.018568 (0.0040)	0.021177 (0.0040)	0.020585 (0.0040)	0.018568 (0.0040)	0.018568 (0.0040)	0.016081 (0.0039)
R-squared	0.08	0.12	0.14	0.20	0.18	0.18	0.20	0.20	0.26
No. of Observations	1,030	1,030	1,014	1,013	1,029	1,013	1,013	1,013	1,013

Robust Standard Errors in Parenthesis  
 Constant not reported

Table No. 12  
 Secondary Gross Enrolment Rate  
 Instrumental Variables

Panel A: Second Stage									
	Dependent Variable: Gross Secondary Enrollment Rate								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tributary Indian Population	-0.000137 (0.000072)	-0.000128 (0.000070)	-0.000243 (0.000089)	-0.000232 (0.000125)	-0.000181 (0.000099)	-0.000267 (0.000130)			-0.0001663 (0.000120)
Encomienda Dummy							-0.2228 (0.119)		
Number of Encomiendas								-0.0950 (0.0654)	
Proportion of Slaves	-0.410 (1.164)	-2.052 (1.470)	-2.390 (1.584)	-0.227 (2.073)	1.785 (1.935)	0.874 (1.833)	-0.137 (2.172)	5.289 (3.968)	-0.0785901 (2.2022)
Duran y Díaz Index		0.0796 (0.0157)	0.0497 (0.0159)	0.0378 (0.0177)	0.0409 (0.0196)		0.0350 (0.0164)	0.0222 (0.0252)	0.0377472 (0.0168)
Number of Crown Officials						0.000122 (0.000114)			
Foundation Date			-0.000485 (0.000129)	-0.00035 (0.0002)		-0.00044 (0.0002)	-0.00039 (0.0002)	-0.00022 (0.0002)	-0.0003132 (0.0001)
Distance to Department Capital					-0.00077 (0.0001)				
Current Proportion of Indian Pop.				-0.00068 (0.0015)	-0.00027 (0.0014)	-0.00073 (0.0016)	-0.00076 (0.0012)	-0.00115 (0.0014)	-0.0004849 (0.0015)
Geography	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Regions Dummies	No	No	No	No	No	No	No	No	Yes

Panel B: First Stage									
	Dependent Variable: Tributary Indian Population in 1560								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Altitude Above Sea Level	0.146410 (0.0134)	0.152975 (0.0133)	0.135234 (0.0136)	0.096104 (0.0159)	0.110274 (0.0157)	0.093903 (0.0155)	0.000099 (0.00002)	0.000067 (0.0001)	0.1144 (0.0188)
R-squared	0.10	0.12	0.16	0.18	0.15	0.19	0.20	0.12	0.19

	Dependent Variable: Proportion of Slaves in 1843								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dummy for Gold Mines	0.032119 (0.0040)	0.028083 (0.0039)	0.027247 (0.0039)	0.018607 (0.0040)	0.021196 (0.0040)	0.020659 (0.0040)	0.018607 (0.0040)	0.018607 (0.0040)	0.016135 (0.0039)
R-squared	0.08	0.12	0.14	0.20	0.18	0.18	0.20	0.20	0.26
No. of Observations	1,032	1,032	1,016	1,015	1,031	1,015	1,015	1,015	1,015

Robust Standard Errors in Parenthesis  
 Constant not reported

Table No. 13  
 Infant Mortality Rate  
 Instrumental Variables

Panel A: Second Stage									
Dependent Variable: Infant Mortality Rate (Children less than 1)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	0.151737 (0.04116)	0.150124 (0.03968)	0.138670 (0.04476)	0.145395 (0.06308)	0.158017 (0.05271)	0.171841 (0.06817)			0.0362262 (0.05904)
<b>Encomienda Dummy</b>							136.0856 (55.728)		
<b>Number of Encomiendas</b>								57.6571 (36.1096)	
<b>Proportion of Slaves</b>	-857.584 (484.129)	-391.508 (518.239)	-422.745 (523.957)	42.090 (828.175)	0.127 (787.556)	-799.395 (778.100)	-33.125 (763.030)	-3,239.110 (2179.462)	461.159 (718.292)
<b>Duran y Díaz Index</b>		-22.1288 (8.1892)	-25.8352 (7.6809)	-28.9921 (9.0744)	-26.0060 (10.3005)		-26.9088 (7.1193)	-20.0004 (14.9960)	-26.576 (6.813)
<b>Number of Crown Officials</b>						-0.054257 (0.067514)			
<b>Foundation Date</b>			-0.055632 (0.051922)	-0.03882 (0.0697)		0.03065 (0.0801)	-0.01824 (0.0742)	-0.12548 (0.0968)	-0.0484187 (0.0567)
<b>Distance to Department Capital</b>					0.03962 (0.0361)				
<b>Current Proportion of Indian Pop.</b>				-0.50191 (0.4878)	-0.48858 (0.5217)	-0.43718 (0.5580)	-0.43159 (0.3548)	-0.18493 (0.4964)	0.1534728 (0.3811)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes

Panel B: First Stage									
Dependent Variable: Tributary Indian Population in 1560									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Altitude Above Sea Level</b>	0.144709 (0.0137)	0.151185 (0.0136)	0.134696 (0.0139)	0.095751 (0.0163)	0.109642 (0.0160)	0.093165 (0.0159)	0.000101 (0.00002)	0.000069 (0.0001)	0.1151 (0.0194)
<b>R-squared</b>	0.10	0.12	0.15	0.18	0.15	0.18	0.20	0.12	0.19

Dependent Variable: Proportion of Slaves in 1843									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Dummy for Gold Mines</b>	0.034064 (0.0041)	0.029709 (0.0041)	0.028919 (0.0041)	0.020016 (0.0042)	0.022587 (0.0042)	0.022338 (0.0042)	0.020016 (0.0042)	0.020016 (0.0042)	0.017916 (0.0040)
<b>R-squared</b>	0.09	0.13	0.14	0.20	0.18	0.19	0.20	0.20	0.27
<b>No. of Observations</b>	1,000	1,000	983	982	999	982	982	982	982

Robust Standard Errors in Parenthesis  
 Constant not reported

Table No. 14  
 Unmet Basic Needs Index  
 Instrumental Variables

Panel A: Second Stage									
Dependent Variable: Unmet Basic Needs									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Tributary Indian Population</b>	-0.047834 (0.007557)	-0.048137 (0.007766)	-0.050012 (0.010117)	-0.056013 (0.014519)	-0.049753 (0.009550)	-0.050759 (0.013448)			-0.0202402 (0.011708)
<b>Encomienda Dummy</b>							-52.9104 (12.686)		
<b>Number of Encomiendas</b>								-22.5103 (12.8201)	
<b>Proportion of Slaves</b>	264.772 (150.952)	351.521 (197.531)	343.839 (207.621)	427.976 (324.256)	313.139 (254.196)	302.122 (235.532)	451.032 (309.884)	1,698.724 (715.051)	482.193 (281.877)
<b>Duran y Díaz Index</b>		-3.9813 (2.2945)	-4.9417 (2.2135)	-4.5910 (2.8580)	-2.8782 (2.7620)		-5.2765 (2.1161)	-8.1447 (5.5507)	-4.142 (1.799)
<b>Number of Crown Officials</b>						0.004170 (0.015582)			
<b>Foundation Date</b>			-0.015842 (0.013385)	-0.01242 (0.0197)		0.00036 (0.0200)	-0.02034 (0.0203)	0.02097 (0.0368)	0.017726 (0.0161)
<b>Distance to Department Capital</b>					0.05309 (0.0078)				
<b>Current Proportion of Indian Pop.</b>				0.86967 (0.1409)	0.85235 (0.1254)	0.87649 (0.1260)	0.85070 (0.0976)	0.76590 (0.1779)	0.7706084 (0.0878)
<b>Geography</b>	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Regions Dummies</b>	No	No	No	No	No	No	No	No	Yes

Panel B: First Stage									
Dependent Variable: Tributary Indian Population in 1560									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Altitude Above Sea Level</b>	0.144170 (0.0132)	0.150472 (0.0131)	0.132249 (0.0135)	0.095411 (0.0158)	0.110014 (0.0155)	0.092865 (0.0154)	0.000100 (0.00002)	0.000074 (0.0001)	0.1121 (0.0187)
<b>R-squared</b>	0.10	0.12	0.15	0.17	0.15	0.18	0.20	0.12	0.18

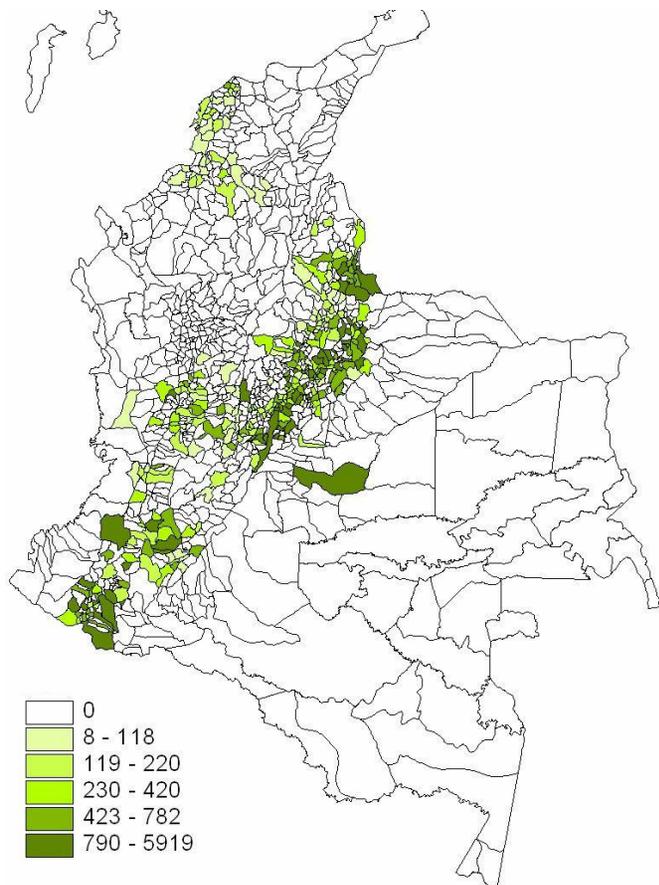
  

Dependent Variable: Proportion of Slaves in 1843									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Dummy for Gold Mines</b>	0.032380 (0.0039)	0.028072 (0.0039)	0.027224 (0.0039)	0.018914 (0.0039)	0.021429 (0.0039)	0.021113 (0.0039)	0.018914 (0.0039)	0.018914 (0.0039)	0.016748 (0.0038)
<b>R-squared</b>	0.08	0.13	0.14	0.20	0.18	0.18	0.20	0.20	0.26
<b>No. of Observations</b>	1,047	1,047	1,030	1,027	1,044	1,027	1,027	1,027	1,027

Robust Standard Errors in Parenthesis  
 Constant not reported

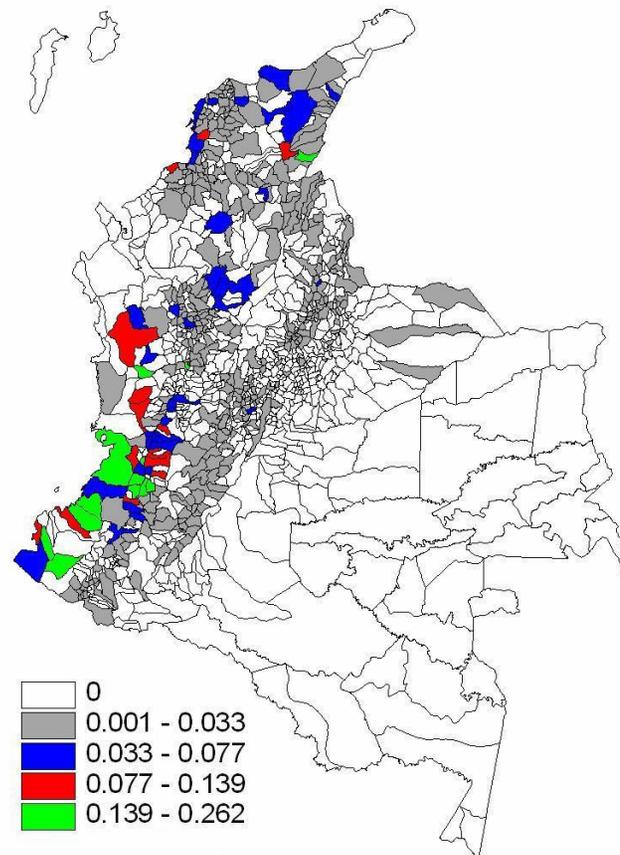
**Figures.**  
**The Cartography of Colonial Institutions**

Figure No. 1  
 Number of Tributary Indians in 1560



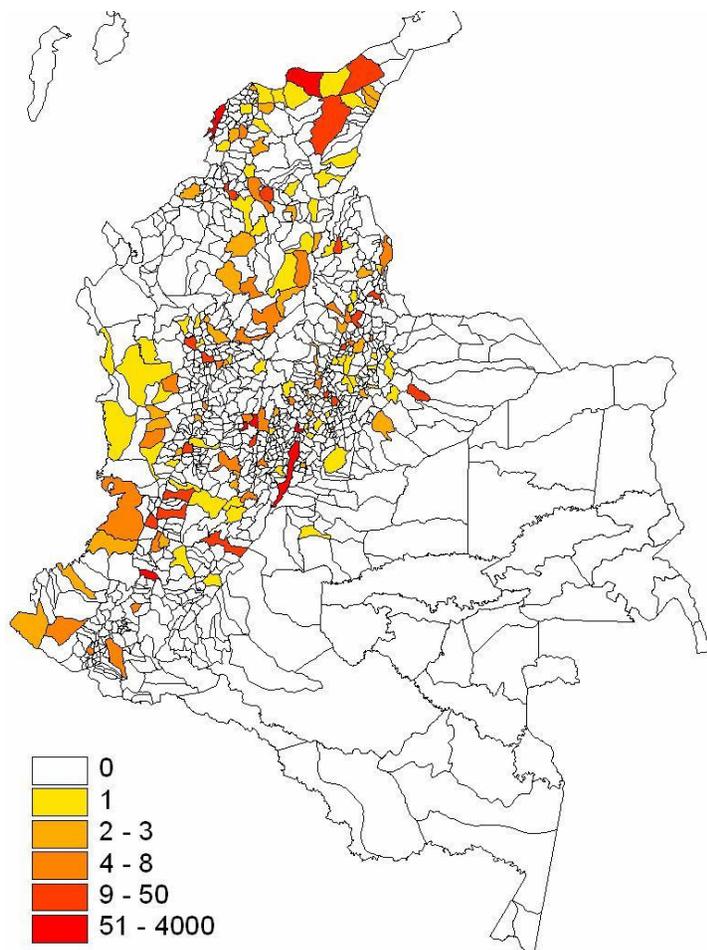
Source: Tovar, Hermes (1988)

Figure No. 2  
 Slaves as a Proportion of Municipality Population in 1843



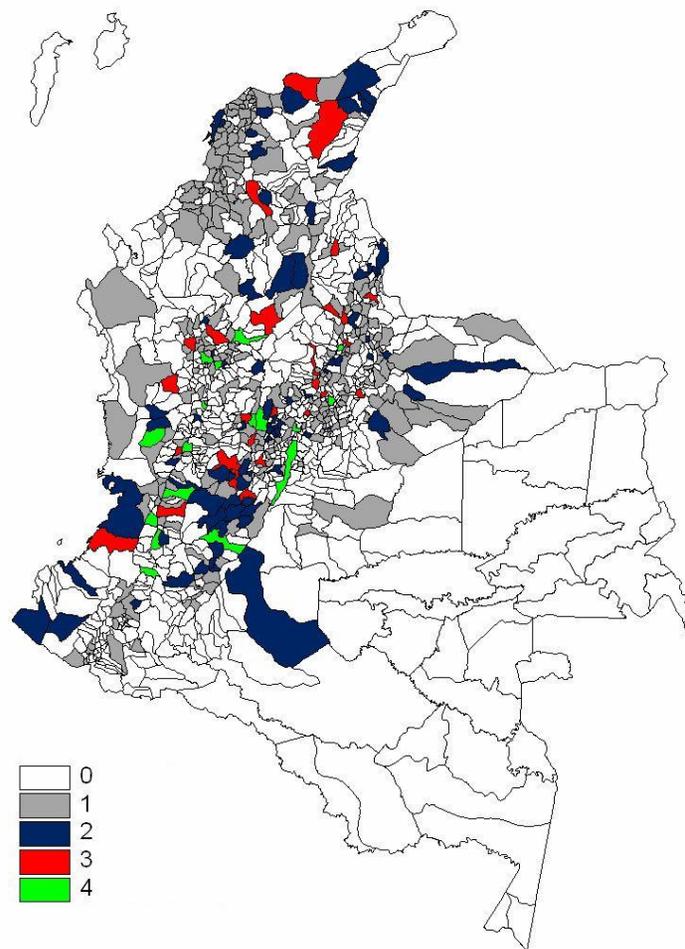
Source: Secretaría del Interior (1843).

Figure No. 3  
Number of Crown Employees in 1794



Source: Duran y Díaz (1794)

Figure No. 4  
Index of Colonial State Presence for 1794 (*Estancos, Alcabalas and Mail Services*)

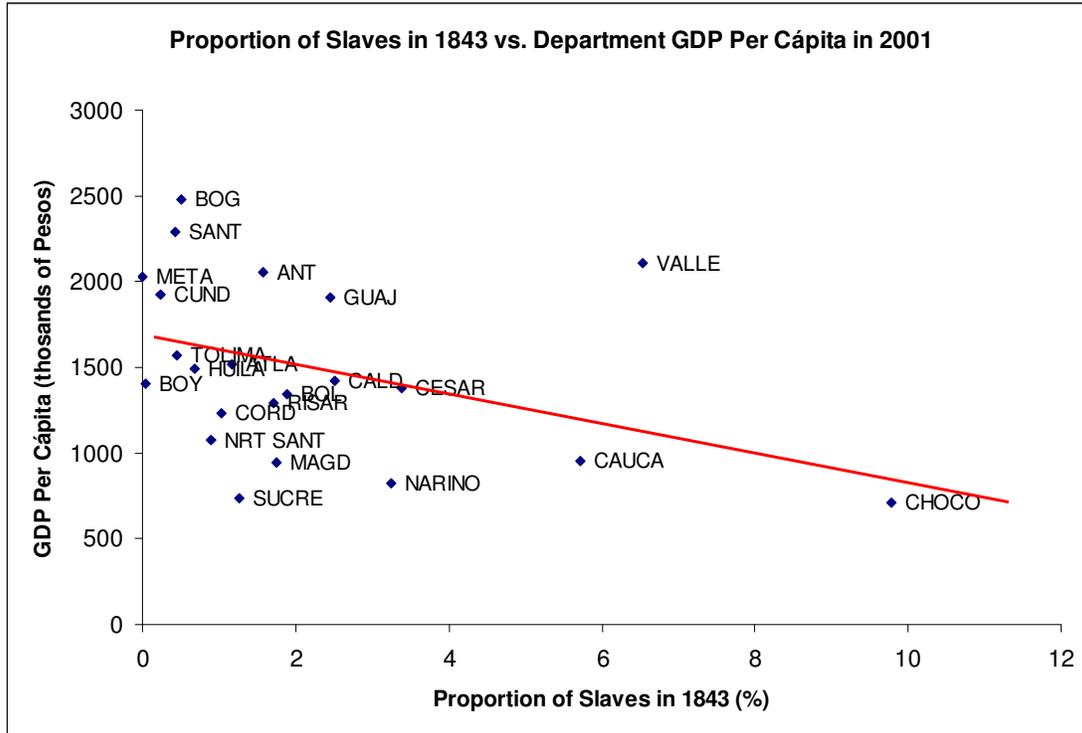


Source: Duran y Díaz (1794)

## Colonial Institutions and Economic Development

Figure No. 5

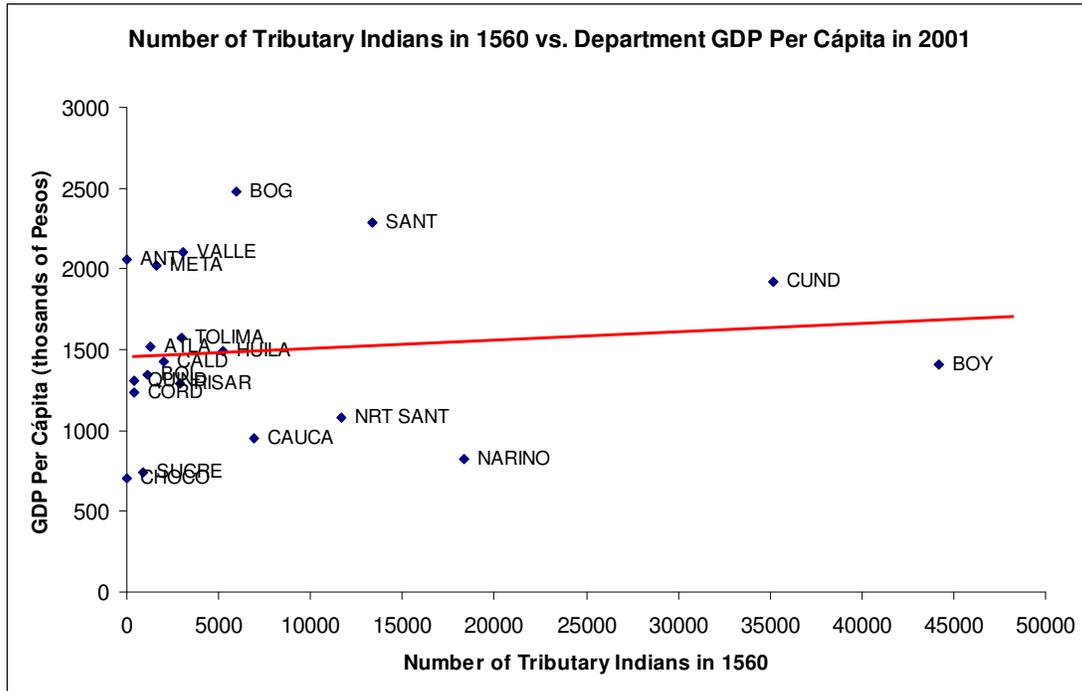
Proportion of Slaves in 1843 vs. Per Capita GDP in 2001



Source: DANE (2004) and Secretaría del Interior (1843).

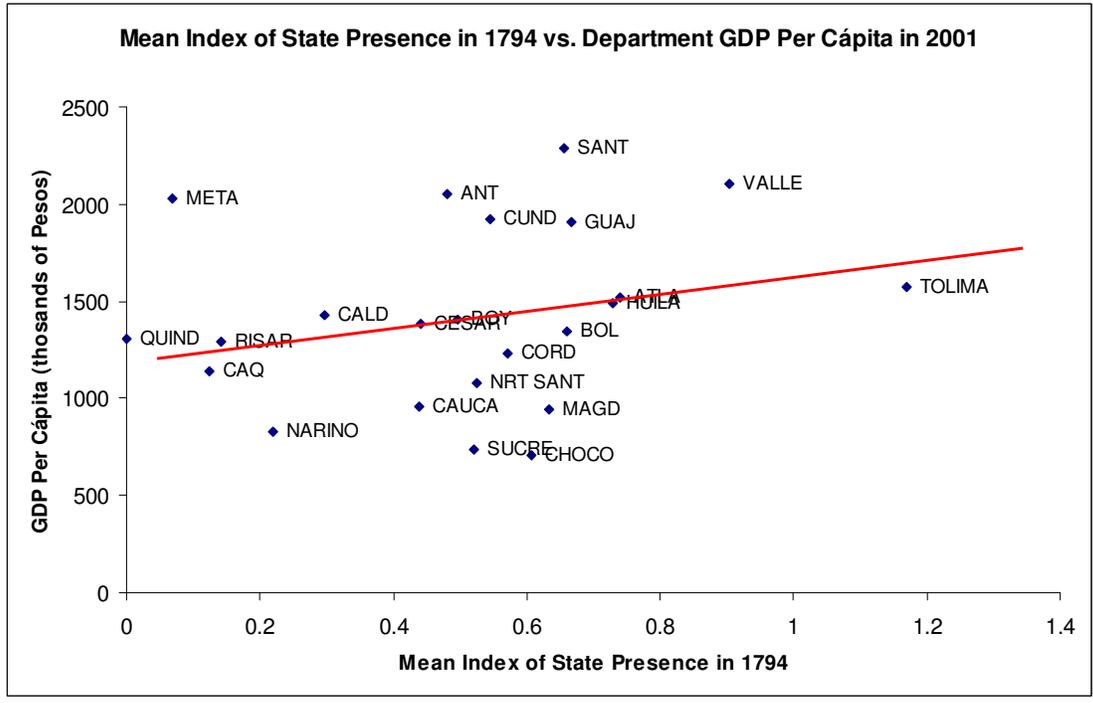
Figure No. 6

Number of Tributary Indians in 1560 vs. Per Capita GDP in 2001



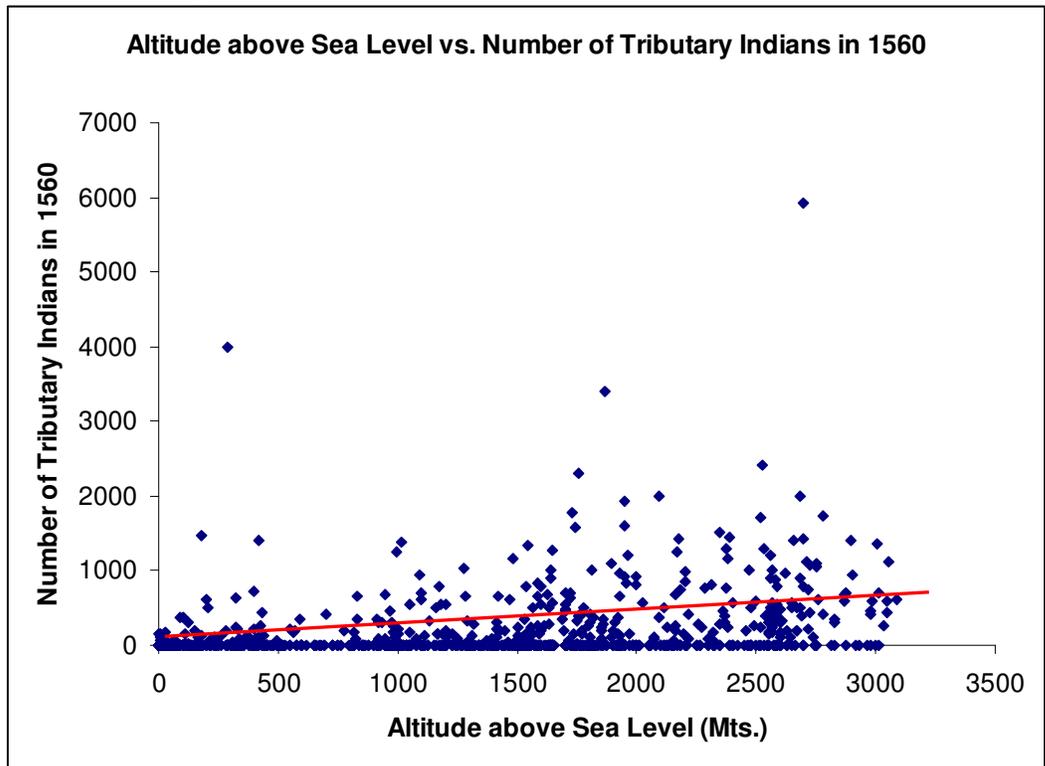
Source: DANE (2004) and Tovar (1988).

Figure No. 7  
 Mean State Presence Index in 1794 vs. Per Capita GDP in 2001 (Excluding Bogotá)



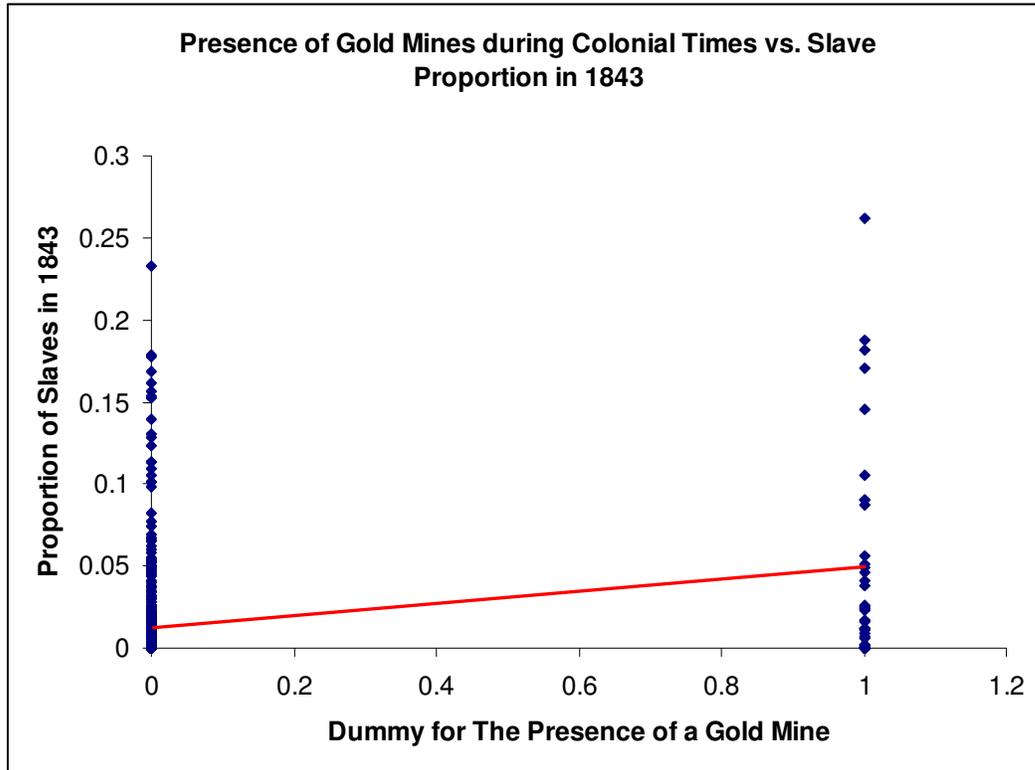
Source: DANE (2004) and Duran y Díaz (1794).

Figure No. 8  
 Number of Tributary Indians in 1560 vs. Altitude (Mts.)



Source: Bernard and Zambrano (1993) and Tovar (1988)

Figure No. 9  
Slaves as a Proportion of Municipality Population in 1843 vs. Gold Mines Dummy Variable.



Source: Colmenares (1999) and Secretaría del Interior (1843).

## Appendix 1: Data Description and Sources

### Presence of the State Variables

The proxies for presence of the Colonial State were constructed based on the *Guía de Forasteros del Nuevo Reino de Granada* by Joaquín Duran y Díaz (1794). Duran y Díaz constructed a full account of the Colonial State bureaucracy and fiscal accounts for 1794, coding all the crown employees in each city, villa or town and their salaries, along with information about the presence of *estancos* (State monopolies over tobacco, playing cards, aguardiente and gunpowder), *alcabalas* (consumption taxes), mail services and mail administrations among much more data. This book provided data for more than 600 colonial locations, which were successfully matched to 513 current municipalities. The matching between Duran y Díaz locations and current municipalities required a careful comparison of the names of all the different geographical locations even within a municipality, since from 1794 onwards many new municipalities have been created. Though new municipalities may have been created later than 1794, probably small towns or villages which were to become future municipalities did exist in 1794, and were registered as such by Duran y Díaz. This allowed us to find State presence data even for non-existent municipalities in 1794.

We created several municipality-level variables:

Number of crown employees.

Dummy variable equal to 1 if the municipality had a tobacco or playing cards *estanco*.

Dummy variable equal to 1 if the municipality had an aguardiente or gunpowder *estanco*.

Discrete variable equal to 1 if the municipality had of the latter, 2 if it had both, and 0 if it had none.

Dummy variable equal to 1 if the municipality had an *alcabala*.

Dummy variable equal to 1 if the municipality had mail service.

Index taking values from 1 to 4 aggregating the presence of Tobacco or playing cards *estanco*, *aguardiente* and gunpowder *estanco*, *alcabala* and mail service.

### Encomienda Variables

The population data on tributary indians must be based on the *Visitas de la Tierra*, censuses built up by crown officials specifically in charge of counting the tributary populations in the different provinces. This *Visitas* had the purpose of establishing the tribute indigenous communities should pay, for which the number of tributaries was necessary. The State officials travelled all along the region where they were supposed to do the censuses. Many of these were built during all the three centuries of colonial control, though some have more systematic and thorough information than others. For the purpose of this research, it was important to have a source that could provide a comprehensive coverage of the kingdom, and that could offer comparable data. This was the reason for choosing the 1560 anonymous visit transcribed by Hermes Tovar (1988) in *No hay Caciques ni Señores*, which has useful data on tributary indians for the actual departments of *Bolívar*, *Sucre*, *Córdoba*, *Cauca*, *Cundinamarca*, *Boyacá*, *Tolima*, *Huila*, *Nariño*, *Caldas*, *Risaralda*, *Valle*, *Santander* and *Norte de Santander*, and even for some municipalities of *Casanare*, *Arauca* and *Putumayo*. The visit of Rodrigo Zapata in 1658 also has comprehensive data on tributary indians for the same regions.

The Visits present the data assigning a number of tributary indians to an *encomienda*. The name of each *encomienda* was usually related to the name of the tribe or to the name of the tribe's *cacique*. To find the specific location of each *encomienda*, it was necessary to look for all the geographical and historical information about place names, as well as toponimics, with the help of anthropological investigations. *Los Nombres Originales*, a book on toponimics for all Colombia done by the IGAC which includes maps, was especially helpful.

We were also able to assign different number of *encomiendas* to each municipality, since several observations in the visits could be matched to the same current municipality. As a result, we have three measures of *encomienda* at the municipality-level:

The number of tributary indians

The number of *encomiendas*

Dummy variable equal to 1 if the municipality had one or more *encomiendas*.

### Slavery Variables

African slaves brought to America were introduced to the actual Colombia since the late 16<sup>th</sup> century, and taken mainly to the Caribbean Coast where they served in plantations, or to the Pacific lowlands where gold alluvial deposits were found. It is only until 1778 that a systematic census which includes slave population can be found for the *Nueva Granada*. Though the 1778 census was based on a village to village population count, information at some more aggregate level remains available only. The 1843 census published by the *Secretaría del Interior*

in the *Estadística General de la Nueva Granada* (by this time the *Nueva Granada* had achieved its independence though slavery had not been abolished) has more disaggregated data (for 628 current municipalities). By this time slave population had declined considerably, but the slave proportions are very similar between the 1778 and the 1843 censuses between regions. Because of the more disaggregated data with a very similar pattern, we decided to use the 1843 census as the main source for measuring slavery. The measure of this institution at the municipality level is:

Number of slaves as a proportion of total population

### **Outcome variables**

Land Gini coefficients were taken from Caballero, Hillón and Offstein (2003), who built them based on the *Catastros* of the Instituto Geográfico Agustín Codazzi (IGAC) for the year 2002. The IGAC *Catastros* do not present data for Antioquia.

Primary and Secondary Gross Enrolment Rates were taken from the *Centro de Estudios sobre Desarrollo Económico* (CEDE-*Universidad de los Andes*) database, as the average for the period 1992-2002. They are calculated as the total number of enrolled children in each educational level divided by the estimated number of children in the age range specific to each school level.

Infant Mortality Rates were also taken from the *Centro de Estudios sobre Desarrollo Económico* (CEDE-*Universidad de los Andes*) database, as the average for the period 2000-2002. It is calculated as the ration between the number of deaths of children less than 1 year old and the number of births over the last year.

The Unmet Basic Needs Index was calculated with information provided by the *Departamento Nacional de Estadística* (DANE) based on the 1993 Population Census. This index measures the proportion of the population under one or more of the following criteria: Inadequate house materials, high economic dependency, school unassistance of any child, lack of a public service or critical home overcrowding.

### **Control Variables**

Geographical variables were taken from the *Centro de Estudios sobre Desarrollo Económico* (CEDE-*Universidad de los Andes*) database:

Altitude is measured as the altitude above sea level, in meters, of the urban center of each municipality.

Rainfall is measured as the mean annual rainfall in each municipality.

Latitude

Longitude

Density of primary, secondary and tertiary rivers were built as the quotient between the longitude of each kind of river in meters and the surface area of each municipality in square kilometers. The classification of rivers was taken from IGAC.

Foundation Dates were taken from the original database constructed by Bernand and Zambrano (1993).

Current Indigenous population was taken from Roldán, Sánchez and Sánchez (1990), which present data for the 1985 census.

Distance to Department Capital was built directly by María Angélica Bautista, as the linear distance in kilometers from the urban center of each municipality to the center of the Capital city of its department.

The Gold Mines dummy variable was built by the author based on Colmenares (1999).

Regions dummies were built for five different regions; Caribbean Coast, Pacific Coast, Central Andean, Eastern Andean and East.

Caribbean Coast dummy takes the value of 1 if the municipality is in any of the following departments: Guajira, Cesar, Atlántico, Magdalena, Bolivar, Sucre or Córdoba.

Pacific Coast dummy takes the value of 1 if the municipality is in any of the following departments: Chocó, Valle del Cauca, Cauca or Nariño.

Central Andean dummy takes the value of 1 if the municipality is in any of the following departments: Antioquia, Caldas, Risaralda, Quindío, Tolima or Huila.

Eastern Andean dummy takes the value of 1 if the municipality is in any of the following departments: Norte de Santander, Santander, Boyacá or Cundinamarca.

Eastern dummy takes the value of 1 if the municipality is in any of the following departments: Arauca, Casanare, Meta, Caquetá or Putumayo.