Informality and Social Capital in Latin America: History and Political Economy

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Contents

Preface

The colonization experience has served as a good experiment in history for identifying institutions as a main cause of economic development. Many scholars have found a persistent influence of early institutions over time. However, the channels to explain these persistent effects are still an ongoing field of research.

The idea that current formal institutions account for the majority of development differences leaves several observed outcomes unexplained: Formal institutions have changed in former colonies, or have replicated those in western industrialized countries, but most former colonies with extractive activities in the past still seem trapped in underdevelopment equilibria. Development differences are also present within developing countries, where informality (or the fact of being outside the formal institutional environment) is a prevalent feature among these countries. Finally, as extensive scholarly work observes, same formal institutions can perform differently in different cultural environments (Tabellini, 2010).

This dissertation consists of three related papers that highlight the role of social capital and de facto institutions as channels for the well-known persistent effects of historical institutions. Whereas one of these studies gives evidence on the long run effects of de facto institutions present in colonial trade, the two other studies seek to show how extractive or non-pluralist (exclusive) states can have a serious impact on de facto institutions, so that they largely deviate from what is considered formal or suited to the law (i.e. legal), and/or they imply a deterioration of social capital. When formal institutions change, but their effects on de facto institutions are persistent, the outcomes mentioned above can be better understood.

My research uses the Latin American context. The first paper models historical evidence for Colombia on the emergence of informality as a consequence of an extractive colonial state, and provides empirical evidence of its long run persistence. In the second paper I present a more recent case of state failure in Colombia with negative effects on social capital. Finally, the third paper further emphasizes the importance

of informal (de facto) institutions in order to understand colonial legacies in Latin America by studying colonial overseas trade in Mexico. The following paragraphs give an overview of each of these studies, corresponding to the main chapters of this dissertation.

Chapter 1 presents the paper *"Explaining Informality: Extractive States and the Persistent Incentives for Being Lawless"*. In this paper I argue that informality is not a recent feature of underdevelopment, but an underlying historical cause of underdevelopment today. The literature indicates that colonial extractive states caused underdevelopment through persistent bad institutions for property rights protection.[1] I argue that extractive states also caused underdevelopment through persistent incentives to enforce property rights out of the law; in other words, they also created a persistent gap between de jure and de facto institutions. I present supporting historical evidence for the emergence of an informal sector due to a colonial extractive state, considering the region of Antioquia, a large gold producer under Spanish colonial rule, now a Colombian department. The paper provides a theoretical model to understand what is implied by this evidence, and reports empirical evidence of a persistent link between colonial informal mining and current informality outcomes within Antioquia.

I use the fact that colonial informal miners only extracted gold from rivers (or placer mines) and not from mountains. Therefore, exogenous variation in the treatment comes from variation in the number of placer mines during the colonial period, conditional on the total number of mines (which should capture the general effect of the presence of this extractive activity). I find significant persistence of informality that is not explained by persistent geographical conditions favoring informal production. Variation in current informality outcomes is only driven by the number of placer mines in the presence of a colonial extractive state. I then propose that persistence of informality can be explained by the channels of social capital and state capacity.

The study *"Political Inequality and the Origins of Distrust: Evidence for Colombia"* is developed in Chapter 2. This paper studies the effect of political exclusion on social capital in Colombia, suggesting social capital as an important channel through which political inequality has been central for Colombian economic development. With political exclusion I refer to the extent to which political institutions do not allow groups to access political power equally. I use the Colombian National Front agreement during 1958-1974 to test my hypothesis, as it institutionalized the political exclusion of non-traditional parties in that country. Whereas it affected all regions at the same time,

[1] See Acemoglu et al. (2001, 2002).

it implied differential effects according to the municipalities' initial political diversity. The political exclusion treatment is measured by the electoral share of non-traditional parties before the National Front. Outcome variables are given by survey measures of social capital and electoral turnout, which are used in a cross-section and a panel model, respectively.

I find that political exclusion imposed by the National Front may have led to less trusting individuals today, to a higher perception of free riding behaviors and to lower levels of electoral turnout. The cross-section approach controls for relevant observables and unobservables at the region level. Results are robust to two alternative placebo treatments that capture equivalent measures of the treatment for a recent period, and they are also robust to a within-propensity-score analysis. I also find that a possible channel through which political exclusion in the past may be able to explain social capital in the present is distrust towards the state, whereas presence of violence in treated municipalities does not seem to be a probable channel.

Finally, Chapter 3 presents the paper *"The Long-Run Influence of Institutions Governing Trade: The Case of Colonial and Pirates' Ports in Mexico"*, which is joint work with Jenny Guardado.[2] In this paper we examine the long-term development impact of overseas trade in colonial Mexico. We consider both formal and de facto institutions governing this colonial activity: Spanish rule and pirates. They differ in the presence of state institutions accompanying commercial activities, which implied, on the one hand, legal trade under a Spanish trade monopoly, an illegal trade conducted by pirates, on the other.

We use self-compiled historical records on the location of piracy and Spanish ports in New Spain (now Mexico) and avoid selection bias with several strategies. We control for unobservables among close neighboring municipalities, use the presence of a colonial town as a proxy for municipal-specific characteristics and identify natural harbors along Mexican coastlines as a source of exogenous variation in the possibility to trade. We find that being a Spanish or pirate port in the colonial period significantly led to less poverty, better access to basic utilities and a larger municipal taxing capacity today. The positive piracy effect, although in many cases lower than the Spanish, is interpreted as a strong support to the long term impact of trade, was it developed legally or not. Free trade underlying piracy activities, as opposed to a trade monopoly under Spanish rule, is considered a key factor to explain these findings. A positive impact of piracy on other state capacity outcomes is however less clear than the Spanish

[2]See separate coauthors' statement on the contributions of each of us to this project.

effect, thereby giving support to the influence of early state institutions.

The bibliography for all three studies follows at the end of this dissertation.

Chapter 1

Explaining Informality: Extractive States and the Persistent Incentives for Being Lawless

1.1 Introduction

Informality is one of the most salient features of developing countries. Recent estimates indicate that the size of the informal economy in these countries is huge, on average 40 percent of GDP, ranging from 14 percent to 70 percent of these countries' economies.[1] This has been an issue of concern, given the extensive negative effects that informality imposes on economic growth. It leads to fiscal losses, insecure property rights, uncertainty in markets, low public goods provision and low productivity of labor; it also undermines governance and may be related with criminal activities.[2] Informality is often understood as a by-product of other current underdevelopment features, and its long run implications have not been extensively studied.

This study argues that informality is not a recent feature, but an underlying historical cause of underdevelopment today, and that its roots go back to the colonization era. The literature indicates that colonial extractive states established institutions that deny property rights to the majority of the population, thereby hampering eco-

[1] See Buehn et al. (2010).

[2] For an analysis of the informal economy problem and its size see La Porta and Shleifer (2014) and Buehn et al. (2010).

nomic growth and perpetuating the institutional status quo.[3] Resorting to historical evidence and data, a theoretical model of informality under an extractive state, and contemporary data for Colombia, I argue that extractive colonial states not only left detrimental institutions for property rights, but also created long-lasting incentives to secure property rights out of the law. In other words, extractive colonial states have not only caused underdevelopment through persistent bad institutions, but through a persistent gap between de jure and de facto institutions as well.

The idea that formal institutions today account for the majority of development differences leaves several observed outcomes unexplained: Formal institutions have changed in former colonies, or have replicated those in western industrialized countries, but most former colonies with extractive activities in the past still seem trapped in underdevelopment equilibria. Development differences can be also found within developing countries, where high levels of informality are often observed regardless of relative prosperity in an area. Finally, as a large related literature observes, same formal institutions can perform differently in different cultural environments (Tabellini, 2010).[4] A persistent gap between de jure and de facto institutions, once created by the devastating experience of an extractive state, can help understand the above mentioned observations.

In this paper, I present historical evidence of the emergence of an informal sector as a consequence of an extractive state domination. This is the case of Antioquia during the colonial period. The region of Antioquia, in the Viceroyalty of New Granada before independence, now a Colombian department, was one of the main gold producers among Spanish colonies.[5] Registered gold production in Antioquia was not always consistent with the abundance of gold observed. The literature suggests that this was not a sign of an actual decrease in production, but the consequence of a "legality crisis in the tax base" (Alvarez and Uribe, 1985, p. 92). An extractive state was clearly in place in Antioquia with near absence of public goods investments and the imposition of high taxes. As a consequence, a decline in formal colonial enterprises occurred, as well as a growing number of informal miners extracting gold from rivers and evading colonial taxes (Alvarez and Uribe, 1985; Poveda, 1981; Restrepo, 1888).

[3] As in the seminal works by Engerman and Sokoloff (1997) and Acemoglu, Johnson and Robinson (2001, 2002).

[4] See also Putnam et al. (1993), Fukuyama (1996), Knack (2002), among others.

[5] The territory of Colombia as a whole had the largest cumulative gold production until 1875 among former Spanish colonies (Alvarez, 1900).

I proceed in three main steps in order to test my hypothesis: I analyze qualitative historical evidence on informality among miners in Antioquia. I present a theoretical model in order to understand the economic incentives leading to the outcomes observed by the historical literature, namely, the emergence of an informal sector due to a colonial extractive state and the availability of resources to be owned. Finally, I provide empirical evidence for a persistent link between colonial informal mining and current informality levels within Antioquia.

The model shows the influence of two colonization types on the relative profitability between the formal and informal sectors. It predicts the emergence of an informal sector of significant size in the presence of an extractive colonizer (with a high extraction rate relative to a low provision of public goods), where this size depends, all else equal, on the amount of resources that can be exploited outside the formal economy. This is useful to understand two simultaneous facts: Extractive colonial activities did not lead to the same production equilibria in all areas; and even areas with full employment can show very poor social outcomes.

The Antioquia region provides a scenario of a single extractive colonizer, with variation in the size of the informal sector across areas: Historical records indicate that informal miners in the colonial period worked in placer mines (gold found in rivers or that has been transported by water), rather than vein mines (gold found in mountains). This is explained by differences between these types of mines in the ease of extracting gold and concealing factors of production. Thus, the availability of placer mines in an area can be considered a necessary condition for the emergence of informality in the past. I consult the number and type of colonial mines in a unique catalogue of historic mines records from 1739 until 1900 for Antioquia. I take the number of placer mines during 1739-1810 (72 years before independence) as intention-to-treat, and use variation in this number across municipalities to test the persistence of informality in a within-department setting.

After controlling for the overall number of colonial gold mines in the same period (which should capture the effect of the number of slaves, the amount of gold in a given place and the size of colonial settlements) and under different specifications, I find that a larger number of colonial placer mines is significantly associated with a higher share of individuals not affiliated to the health or pension system, with a lower probability of employed individuals having a formal contract and with a higher probability that a child is working or looking for a job. I further control for placer and total mines during 90 years after independence. Current informality outcomes are not driven by the presence of placer mines in general; it is specifically the effect of colonial placer mines.

This supports the idea that the possibility of becoming informal in the past under an extractive state is an important determinant of current informality levels. Finally, I test my hypothesis using two different smaller and more homogeneous samples: One sample considers only municipalities with presence of colonial gold mining; the second sample only includes municipalities with no gold today. Results lead to the same conclusions. Interestingly, a higher overall number of colonial gold mines is associated with less informality in terms of the different measures.

I propose two channels through which persistence in informality can be explained. These are social capital and state capacity. The social capital channel is presented as an extension of the model, where individuals are allowed to inherit cultural values and social skills consistent with these values that are relevant to be productive in each sector. Inherited social capital is a function of parental initial cultural values and social skills, as well as of parental investments on social capital, which depend on their choice of being in the formal or informal sector. Once generations of individuals have developed rooted cultural values towards informality and have learned how to be 'successful' out of the control of the state, they will still have incentives to stay in the informal economy, even if profitability of the formal sector increases.

An alternative channel of persistence is state capacity. Following the literature on this topic,[6] weak states should have emerged in places where individuals could not be easily taxed and kept under control. If weak states persisted over time, persistent informality can be explained. I argue that the capacity of a state involves not only its size, but its legitimacy and real ability to make individuals comply with the law. Under this view, the evolution of state capacity is endogenous to social capital and vice versa. Nevertheless, I test one dimension of the state capacity channel, namely, state presence. I use number of colonial officials, presence of local colonial offices, and the municipality's year of foundation as exogenous sources of variation in the current size of local states in an IV approach. These historical variables have the expected relationship with the treatment, but evidence of an effect of state presence on informality outcomes is not conclusive. Persistent states that are weak in their performance and legitimacy seem a more likely channel.

The colonization experience has served as a good experiment in history for identifying institutions as a main cause of economic growth. The seminal works by Acemoglu et al. (2001, 2002) argue that extractive colonial activities have imposed a major

[6] Among others, Acemoglu (2005), Sánchez de la Sierra (2013), Besley and Persson (2009), Acemoglu et al. (2014).

obstacle to long run development by setting institutions that deny property rights to the majority of the population, which can then explain very low saving and investment rates, and thus backwardness after the Industrial Revolution. Several other studies, also based in the Engerman-Sokoloff Hypothesis[7], have found evidence for long lasting effects of specific colonial institutions, such as slavery (Nunn (2008), Acemoglu et al. (2012)), the mita forced labor system (Dell (2010)), land tenure institutions (Banerjee and Iyer (2005)), as well as of colonial activities resulting from different factor endowments (Naritomi et al. (2012), Bruhn and Gallego (2012)). This paper contributes to that literature by showing an additional possible channel through which these effects on current development could be also explained, namely, through a persistent condition of anarchy created by the rational will to escape an oppressive law in the past.

There is also significant literature that draws attention to the paradox that countries with more abundant natural endowments display worse economic outcomes or weaker democracies.[8] This paradox, known as the resource curse, has been consistently related to "dysfunctional state behavior" (Robinson et al, 2006, p. 448). In a long run perspective, my study helps to understand this paradox among former colonies or places that were once subject to an extractive state: The possibility of operating out of the reach of such a state, provided by the abundance of resources, can explain a persistent gap between formal and informal institutions that leads to poor development outcomes.

Finaly, this research complements the literature that examines causes and consequences of current informal economies. Several studies examine the effects of taxes and state regulations on the size of the informal sector[9]. Changes in these policy instruments are not always associated with a reduction of the existing informal economy (Bruhn (2008)) and well-functioning legal systems seem to play a central role (Dabla-Norris et al. (2008)). Other literature sees formal and informal economies as largely disconnected, where informality is foremost a by-product of poverty conditions such as low human capital and productivity (La Porta and Shleifer (2014)).[10] My paper is different to the literature mentioned above because it looks at more structural features

[7]Engerman and Sokoloff (1997).

[8]See Robinson et al. (2006), Ross (1999), Sachs and Warner (1995) and Gelb (1986), among others, for studies and evidence of this paradox.

[9]See de Paula and Scheinkman (2009), Dabla-Norris et al.(2008), Bruhn (2008), Monteiro and Assunção (2006).

[10]See also Rauch (1991) and Harris and Todaro (1970).

of informality and mechanisms of persistence. I conceive informality studied in these papers as a sign of a more pervasive deviation from the legal order.

The paper proceeds as follows: Section 1.2 analyzes historical evidence for the Antioquia region. Section 1.3 presents the model. I report empirical evidence for the persistence of informality in Antioquia in section 1.4, where I also describe the empirical strategy and data. In section 1.5, channels of persistence are briefly reviewed from the historical literature and state presence as a channel is empirically studied. Finally, section 1.6 concludes.

1.2 The case of colonial gold mining in Antioquia-Colombia

This section presents historical evidence on how an informal sector emerged in Antioquia during the Spanish colonial period, and it describes characteristics of both the informal sector and the formal economy. This informs how I set up the model in section 1.3.

1.2.1 Historical evidence for the emergence of informality

Gold mining was already present in the pre-colonial period along the Colombian territory, but this activity did not likely induce informality for several reasons: Precious metals were demanded for artistic and religious purposes and they were conceived as any other good to be exchanged (Alvarez and Uribe, 1985); the indigenous social structure was accepted by its members and social status could not be gained through the possession of gold.[11]

Why should extractive colonization have led to informality? First, colonization brought a change in the conception and use of gold; gold was demanded as the almost single means of exchange and it became the equivalent of wealth. Second, given an extractive colonial state, a new hierarchical structure was forcibly imposed and it established a highly unequal society. It is then logical to think that this colonial society rewarded gold accumulation. On the other hand, colonial gold taxes were most likely understood as an expropriation rate, given that they did not benefit the population, and the colonial unfair social structure was not chosen by the society.

[11] Although indigenous people had very rudimentary techniques to access minerals, they were able to accumulate a lot of them over time. These minerals were basically salt, coal, emeralds and gold. Provided access to these minerals, mining was an activity shared by the tribe members.

Historical literature points out the existence of informal miners and their increasing number during the colonial period in Antioquia, where these miners were characterized by escaping the colonial control and evading gold taxes. Informal miners replaced formal mining to a large extent: Formal mining, mainly based on slave work, was producing in the second half of the 18th century about only one third of all gold (Poveda, 1981), and towards 1851, around 80% of all workers in the mining industry were free informal miners. For this reason, the abolition of slavery in the Nueva Granada in that year did not have a big impact in gold production (Restrepo, 1888).[12]

In the presence of informality, gold could not be completely located in its production phase, but it was more likely found in its circulation, that is, in trade. Traders received gold dust from transactions with informal miners and then had to convert this gold into currency for further trading goods (Poveda, 1981). This amount of gold dust was not necessarily equivalent to the amount of gold not molten by miners; it was equivalent to what they changed with merchants, that was not used by the latter in smuggling trade.[13] Table 1.1 shows a decline over time, between 1670 and 1800, in the share of molten gold by miners relative to that share for merchants. This behavior indicates a decline in the miners' contributions, as taxes were paid at the time of melting, thereby suggesting the existence of illegal mining before the 18th century.

It is worth noting that illegality was already a concern for the colonial power in 1678, consistent with the picture shown in Table 1.1. An official communication signed in Madrid in that year established the reduction in colonial gold taxes in the whole territory of Nueva Granada. This was done provided the need to effectively set back the "deeply rooted crime of not taxing gold "(cited by Restrepo (1888), p.220).

Colonial extractive state and the emergence of informality.

Alvarez and Uribe (1985) claim that informal mining emerged in order to avoid the high fiscal burden and lack of subsistence means that characterized districts with big-mining enterprises. Mining districts did not properly develop other economic sectors and thus the amount of agricultural goods demanded by the labor force was not available (Colmenares, 1989; Poveda, 1981; Restrepo, 1888). It is even argued that

[12]The abolition of slavery in Antioquia was in 1813.

[13]Merchants were required to pay a gold tax since 1695. Although they were more likely forced to stay in the formal sector due to their need of currency, Alvarez and Uribe (1985) also show evidence of illegality in trade; that is, of smuggling by changing gold dust for unregistered foreign goods.

no other industry, except for gold mining, was developed in Colombia during three centuries of Spanish colonization (Alvarez, 1900). This is sign for the purely extractive aims of the colonial power, which saw gold as the unique goal and disregard the promotion of agriculture and trade for most of the colonial period.

The colonial fiscal burden was shouldered by enterprises that were legally identified by colonial offices that looked after tax collection - *Cajas Reales*. These enterprises were singled out due to their visible geographical presence and they had to give 20% of their total output to the colonial power, a tax called *quinto real*. Low returns given a high fiscal burden, and the difficulties to sustain miners' crews are considered two of the main causes of the big-mining enterprise crisis (Alvarez and Uribe, 1985). Besides, the lack of appropriate technologies, in particular, those needed for vein mines, is also important to explain a low productivity in the formal sector (Alvarez, 1900; Poveda, 1981; Restrepo, 1888). This is additional evidence of an extractive strategy by the colonizer, by which mineral resources should be obtained at very low investments levels. The crisis of big-mining companies may have not only increased relative returns of other activities, but as Alvarez and Uribe (1985) indicate, it released labor force suitable for mining.

In sum, the historical evidence suggests a causal link between an extractive state (high fiscal burden plus lack of subsistence means and technology) and the emergence of an informal sector, through the channel of impoverishing the formal economy.

Informal miners' characteristics: Why could they not be expropriated and their way of production.

Informal miners were not hired by anyone and not tied to any specific place. They were nomads and moved to places with an easy access to gold. They extracted gold from rivers and, in particular, they used to look for dry rivers, which were easier to exploit (Poveda, 1981; Restrepo, 1888). This mobility allowed them to obtain a certain amount of gold, conditional on this mineral being present in rivers, even though there were already other informal miners. Informal miners were able to move because they mostly worked on their own, if not, with a small group of slaves taken away from legal mines. The type of relationship between slaves and free men was different in the informal sector. Free-men informal miners were often mulattoes and their work, as well as their families', was as important as that of slaves. Slaves could also participate from gold output (Poveda, 1981).

Production costs and investments were lower than those in the formal sector. Informal miners did not inform any authority about their work and did not typically buy lands; therefore, they were also called invasive miners (Alvarez and Uribe, 1985).

Since they did not have any lasting place of work and did not display identifiable factors of production for tax collectors (e.g. big crew of slaves), they could not be taxed, nor restrained by the colonial power (Alvarez and Uribe, 1985).

Formal labor and the influence of public goods.

Formal miners worked in mines with a fixed and long-lasting geographical location, hence identified by the colonial power. They were tied to a given place, where big mines, either placer or vein mines, were exploited . Given the mines' big size, a large labor force was required. In the particular case of vein mines, it is also argued that more complex technologies than the ones used would have been needed in order to extract minerals in an efficient way (Poveda, 1981; Restrepo, 1888).

In this context, an adequate level of public goods would have a positive impact on the formal sector productivity, since more labor could be attracted and maintained, and technology would allow a more productive and lasting exploitation of mines. This corresponds to the counterfactual of a non-extractive state in Antioquia. Public goods provision was insufficient; as pointed before, agriculture and trade were not properly developed during most of the colonial period and, hence, there was lack of subsistence means relative to the size of the labor force. Since individuals were mainly forced to work, there was no incentive to attract workers with better welfare conditions; yet, given insufficient living conditions, part of the labor force died or escaped mines (Colmenares, 1989). Investments needed for production, such as technology, were also low or inexistent. Mines were still exploited with techniques learned from the indigenous people and with the most rudimentary instruments. The colonial power neglected the construction of roads and the establishment of river transportation means, which also prevented the entry of machines necessary for the exploitation of mines. As a result, the lack of appropriate technologies caused the desertion of many vein mines (Alvarez, 1900; Colmenares, 1989; Poveda, 2002; Restrepo, 1888).

Contrary to the formal sector, productivity in the informal sector would not have been likely affected by public goods provision. Informal miners would not easily access these goods if they wanted to be out of reach of colonial authorities. For instance, they would not be able to buy goods in a big market (if conditions for such a market

were provided by the colonial state) using gold dust instead of coins. That would imply being detected. Even if they could access public goods to some extent, the informal sector, in the way it existed, did not need to attract labor and sustain big miners crews in a given place and their work did not imply large investments.

1.2.2 Evidence for the long run persistence of informality

Colonial policies in Colombia began to change at the end of the colonial period. Historical evidence reports adjustments in colonial gold taxes since the late 17th century. On the other hand, agriculture and trade started to be promoted only at the end of the 18th century, when there were signs of a more enlightened Spain (González, 1983). However, there is no evidence in Antioquia of a reversion in informality during the colonial period, nor after independence: It is estimated that 60% of all gold production was informal in the second half of the 18th century (Poveda, 1981), this share was likely higher few decades after independence, when about 80% of all miners were informal (Restrepo, 1888), and the present is not different from two centuries ago: Giraldo and Muñoz (2012) find that about 80% of gold production in 2011 comes from illegal enterprises in Antioquia.

Considering Colombian mining industry as a whole, it has been also characterized by informality. Partial results from a mines' census in 2011 indicate that 63% of all identified mines are informal; in particular for Antioquia, this number rises to 79,1%.[14] These high levels of informality, especially in the gold sector, have implications beyond tax evasion and inferior job quality: Whereas some informal enterprises are run by 'artisan' miners, some other have become a financing source for illegal armed groups, either because these groups demand an output quota from existing informal miners (Giraldo and Muñoz, 2012) or because they exploit labor directly (Ronderos, 2011). Giraldo and Muñoz (2012) note that illegal gold mining is related with land property informality and bad fiscal performance of local governments.

Informality in Antioquia is not only present in the mining industry. The functioning of other natural resource-based sectors, such as wood, displays clear deviations from legal regulations (Giraldo and Muñoz, 2012). Considering all economic sectors, informality in the labor market is of important magnitude, and measures of such informality will be used as outcome variables in the empirical section.

[14]These results are partial since only around 50% of all municipalities have been examined by the census. This census is carried out by the Colombian Ministry of Mines and Energy.

1.3 A model to understand the emergence of informality

The colonizer and a continuum of individuals living in the colony are the players of the game. They are placed in an area with plenty of resources. These resources can be present in different forms or types in nature, according to which they can be more or less easily exploited in an informal way. Let $\gamma \in [0,1]$ be the amount of resources that are of the type exploitable for informal individuals, where total resources are normalized to be equal to one. This source of variation provided by γ is captured in the empirical strategy by the number of colonial placer mines.

The colonizer and individuals in society play in two stages.[15] In the first stage ($t = 0$) the colonizer chooses an expropriation rate, τ, and a level of public good investment, g, which determine the degree of extraction of colonial institutions. These institutions are persistent throughout the colonial period. In the second stage ($t = 1$), individuals decide whether to be formal or informal according to individual payoffs in both sectors, until an equilibrium is achieved.

Informal individuals perform productive activities for the economy, they do not steal from the formal sector, but are not identified in this sector; that is, informal individuals are not taxed, and they are not users of public and legal services. This implies that any strategy chosen by the colonizer only affects the formal sector of the economy: The colonizer can only expropriate individuals in the formal sector and the public good can only affect production in that sector (can be only considered a public good in the formal sector); i.e., it is not possible to avoid τ or to avoid being detected if the individual is user of the public good.[16] This public good may comprise housing, development of markets for subsistence goods, and services or infrastructure like legal services, education, roads, technology, among others.

1.3.1 Second stage

Individuals decide whether to be in the formal sector and be taxed, or to avoid τ and work on their own (be informal). I consider that such a distinction between sectors cannot be made in $t = 0$, as individuals do not know what it means being under the colonial rule. Once everyone has been subject to this rule (or has been

[15] My setup follows the model fashion in Nunn(2007) to some extent.

[16] This is not only consistent with the observation that colonial informal miners retracted from places where the main formal activity was established, but it is also in line with current literature on informality. It is argued that firms pay taxes and bear regulation costs in order to have expanded access to public goods, markets and financing sources (La Porta and Schleifer, 2008; 2014).

formal in $t = 0$), a formal payoff can be observed versus the alternative of escaping the colonial state. If it is more profitable to be out of the formal economy, individuals will move to informality until relative payoffs make them indifferent between both sectors. Denote the share of informal individuals in total population by Z.

All informal individuals can move their place of work so that they always secure an individual profit, as long as there are resources to be exploited in an informal way ($\gamma > 0$).

Total output produced by the informal sector at time t is given by:

$$Y_{I,t}(Z_t) = \gamma A_I Z_t^{\theta} \tag{1.1}$$

where $\theta \in (0, 1)$, and A_I denotes total factor productivity in the informal sector.

Individual payoff in the informal sector is then:

$$\Pi_{I,t} = \frac{\gamma A_I Z_t^{\theta}}{Z_t} = \frac{\gamma A_I}{Z_t^{1-\theta}} \tag{1.2}$$

If $\gamma = 1$, all resources could be exploited in an informal way, and the informal sector could realize the whole potential product, provided its production technology. For $\gamma = 0$, it is not possible to exploit resources in an informal way and so payoff is zero.

Total output produced by the formal sector at time t is given by:

$$Y_{F,t}(g, Z_t) = A_F(g)\,[1 - Z_t] \tag{1.3}$$

where total factor productivity in the formal sector, $A_F(g)$, is affected by the public good, and $A'_F(g) > 0$. Note that the amount of resources that are also exploitable for informal individuals (γ) does not affect production in the formal sector, except for the fact that individuals can move to the informal sector. Note also that production technology in the formal sector allows for constant returns to scale. Full replicability of the production process is possible provided no limitations in the access to resources and public goods. On the other hand, crowding effects are possible in the informal economy since acting out of the law entails the need of being undetectable, and thus, there is no open access to resources, even if these are the type that could be exploited in an informal way.

Individual payoff in the formal sector is thus total production after extraction,

divided by the number of formal individuals:

$$\Pi_{F,t} = [1 - \tau] A_F(g) \tag{1.4}$$

This payoff is increasing in g and decreasing in τ.

Finally, the colonizer payoff at a given time t is equal to extracted production minus the cost of the public good, which is normalized to be equal to g:

$$\Pi_{c,t} = \tau Y_{F,t}(g, Z_t) - g = \tau A_F(g) [1 - Z_t] - g \tag{1.5}$$

Individuals are indifferent between being formal or informal if the following condition holds:

$$1 - \frac{\gamma A_I}{A_F(g) Z_t^{1-\theta}} = \tau \tag{1.6}$$

In particular, we can distinguish between a full informality equilibrium and an interior equilibrium. A full informality equilibrium is achieved whenever:

$$1 - \frac{\gamma A_I}{A_F(g)} \leq \tau \tag{1.7}$$

Let us consider the case of Antiquia mentioned in the previous section. There is an extractive colonizer characterized by the almost absence of public goods investments and the imposition of a tax rate (equivalent to the *quinto real* or 20% of total outout). I will assume w.l.o.g. that $A_F(g) \geq A_I \; \forall g$, thereby indicating that total factor productivity in the formal sector is at its lowest level when the absence of the state, in terms of public goods, is comparable to that faced by informal individuals.[17] Thus, considering $A_F(g) = A_I$ as the Antioquia case in (1.6), the decision to become informal depends solely on how large is the extraction rate and how large are the possibilities to produce out of the formal economy (given by the amount of suitable resources, γ, and the size of the informal sector). This is depicted in Figure 1.1, where I plot payoffs in both sectors and allow variation in the parameter γ.

[17] This condition guarantees that $\frac{\gamma A_I}{A_F(g)} \in (0, 1] \; \forall \gamma \neq 0$ in (1.7).

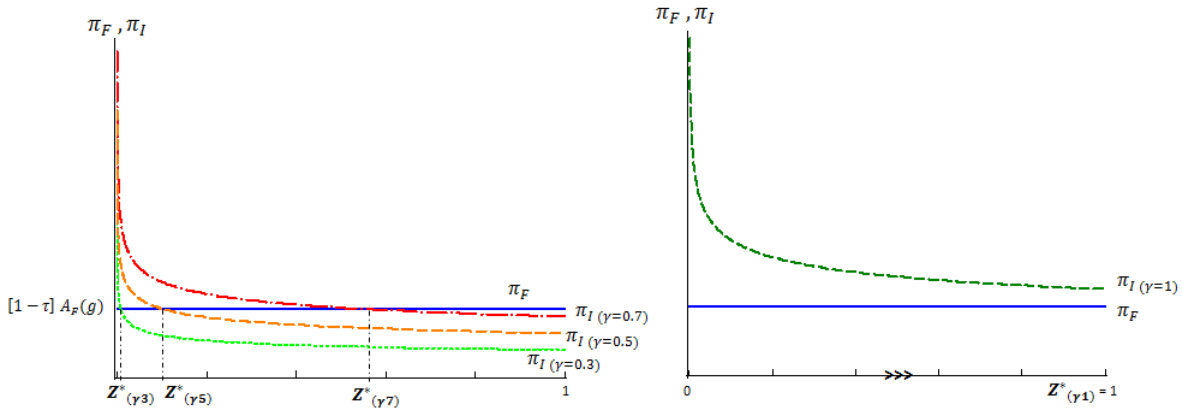


Figure 1.1: Equilibrium depending on the level of γ (τ and g fixed)
$[\tau = 0.2, \theta = 0.8, A_F(g) = A_I]$

As can be seen, there will be incentives to become informal for a larger share of the population, the higher is γ. This implies that places subject to the same colonial extractive strategy and production functions can face different informality levels in equilibrium depending on their resources' characteristics: Where more resources can be extracted easily by informal individuals, more people will be in the informal sector. The persistence of these different informality levels is my testable hypothesis in section 1.4, where τ and g are given and constant across places, and γ varies exogenously.

The model also allows to think about the counterfactual of a non-extractive state. As it is stressed by the historical literature, individuals were not informal because there were rivers with gold, but they went to mine informally in these rivers because the colonial state impoverished the formal sector. We can consider two types of colonizers in Figure 1.2. Here γ is fixed, and I consider variation in the level of public goods investment for the same τ.

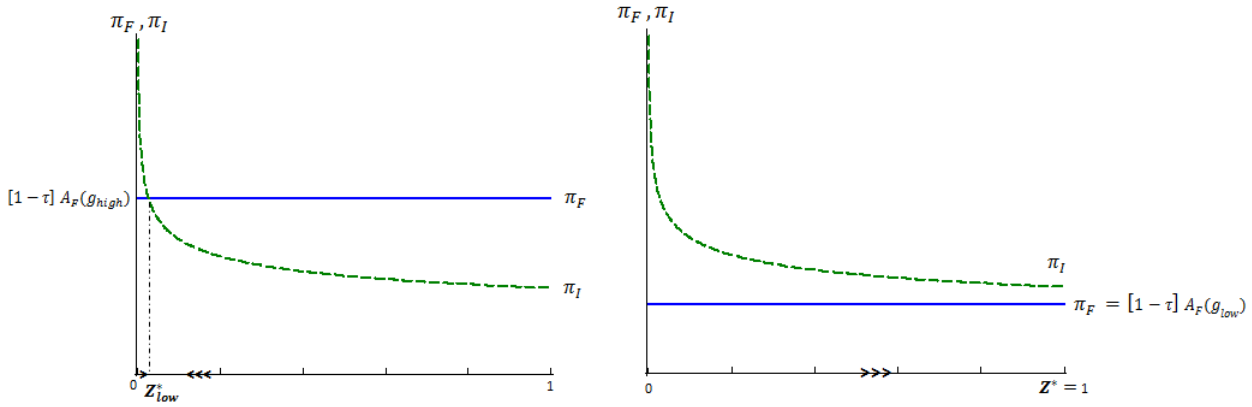


Figure 1.2: Equilibrium depending on the level of g
$[\tau = 0.2, \gamma = 1, \theta = 0.8, A_F(g_{low}) = A_I]$

If there is the possibility to exploit resources out of the formal sector ($\gamma > 0$), individuals will have incentives to become informal, but this high payoff will fall rapidly as they have to compete for resources. If the colony is under a non-extractive colonizer (that is, g is high), individual payoff in the formal sector will be high enough to make individuals indifferent between sectors at a very small Z level. This yields a stable low informality equilibrium Z^*_{low}. If the colony faces an extractive colonizer, formal payoff is low, and Z can grow until a full informality equilibrium, $Z^* = 1$, depending on γ and τ. This equilibrium is also stable.

1.3.2 First stage

In the first stage, the colony can face either a far-sighted or a short-sighted colonizer, which determines his degree of extraction. The colonizer maximizes his total payoff over the present and future period:

$$\sum_{t=0}^{1} \delta^t \Pi_{c,t} = \Pi_{c,0} + \delta \Pi_{c,1} \tag{1.8}$$

where $\delta < 1$ is the factor by which the colonizer discounts his payoff in the future. Provided $\gamma > 0$, $\Pi_{c,0}$ is higher than $\Pi_{c,1}$, as $Z = 0$ in $t = 0$. Once τ and g are observed, an informality equilibrium is achieved and the colonizer payoff in the future will be affected by this Z level. Hence:

$$\sum_{t=0}^{1} \delta^t \Pi_{c,t} = \tau A_F(g) - g + \delta \left(\tau A_F(g) \left[1 - Z_1(\tau, g, \gamma) \right] - g \right) \tag{1.9}$$

Consider a strategy (τ^{ss}, g^{ss}), such that $\Pi_I > \Pi_F \ \forall Z$, versus a less extractive strategy (τ^{fs}, g^{fs}), for which $\Pi_I > \Pi_F \ \forall Z$ is not fulfilled. (τ^{ss}, g^{ss}) then satisfies:

$$1 - \frac{\gamma A_I}{A_F(g^{ss})} < \tau^{ss} \tag{1.10}$$

Under (τ^{ss}, g^{ss}), the colonizer total payoff will be:

$$\tau^{ss} A_F(g^{ss}) - g^{ss} - \delta g^{ss} = \Pi^{ss}_{c,0} - \delta g^{ss} \tag{1.11}$$

as $Z(\tau^{ss}, g^{ss}, \gamma) = 1$ in $t = 1$. Note that the colonizer is incurring losses for the future period, as long as he wants to stay in the colony. This can be explained by the need to maintain a military and state infrastructure, without which the colonizer would not be able to stay.

It can be shown that this payoff is higher than any other obtained with a less extractive strategy (τ^{fs}, g^{fs}) if δ satisfies:[18]

$$\delta < \frac{\Pi^{ss}_{c,0} - \Pi^{fs}_{c,0}}{\Pi^{fs}_{c,1} + g^{ss}} = \check{\delta} \tag{1.12}$$

I thus call (τ^{ss}, g^{ss}) a short-sighted strategy, and (τ^{fs}, g^{fs}) a far-sighted strategy. A far-sighted colonizer (with $\delta > \check{\delta}$) will optimally choose to be less extractive in order to obtain gains in the future period, whereas a short-sighted colonizer will care about his present payoff, thus leading the economy to a full informality equilibrium $Z^* = 1$ after that.

1.3.3 Channels of persistence

In this subsection I aim to outline two channels through which we can understand the persistence of informality.

[18] $\check{\delta}$ is in the relevant range for $0 < \Pi^{ss}_{c,0} - \Pi^{fs}_{c,0} < \Pi^{fs}_{c,1} + g^{ss}$.

Social capital formation

The first proposed channel is social capital formation. Consider individuals living two periods. In the first period they are born and inherit from their parents a stock of social capital, which is defined by cultural values and social skills consistent with these values. This stock is comprised of a stock of values/skills towards formality and a stock of values/skills towards informality.[19] Denote it by $\phi = \{\phi_F, \phi_I\}$. In the second period, individuals decide whether to be formal or informal according to individual payoffs in both sectors. At the end of this period, individuals have deepened values and increased social skills for the sector they chose to be, and inherit their stock of social capital to their children. In other words, ϕ depends on parents' decision to be formal or informal in the previous period, and on parents' intial social capital; therefore, the social capital formation function for any sector $S \in \{F, I\}$ can be written as:[20]

$$\phi_{S,t} = f\left(\phi_{S,t-1}, \Omega_{S,t-1}\right) \tag{1.13}$$

where $\Omega_{S,t-1}$ are investments in social capital relevant for sector S that are realized while being in sector S in period $t-1$; $f'(\Omega_{S,t-1}) > 0$.

Total factor productivity in any given sector is now determined by a social capital component and a sector specific component. That is, individual payoffs depend on each sector's characteristics (that are common to all individuals), as well as on the individual's cultural values and social skills relevant to every sector. The intuition behind the social capital component is that stronger cultural values make individuals prone to put more effort on activities that are consistent with these values, and social skills give the know-how to be successful in a given sector.

Total output produced by the informal economy is now:

$$Y_{I,t}(Z) = \gamma A_I \bar{\phi_{I,t}} Z_t^{\theta} \tag{1.14}$$

where

$$\bar{\phi_{I,t}} = \frac{1}{Z_t} \int_0^{Z_t} \phi_{I,t}^i d_i \tag{1.15}$$

[19] For example: Knowing how to lie when reporting income without being detected is a social skill consistent with cultural values that favor informality.

[20] This is in line of the skills formation setting in Cunha, Heckman and Schennach (2010).

is the general level of social capital relevant for the informal sector (i denoting individuals).

Individual payoff in the informal sector is then given by:

$$\Pi^i_{I,t} = \frac{\gamma A_I \phi^i_{I,t}}{Z_t^{1-\theta}} = \phi^i_{I,t} \Pi_{I,t} \tag{1.16}$$

Equivalently, individual payoff in the formal sector can be written as:

$$\Pi^i_{F,t} = \phi^i_{F,t} \Pi_{F,t} \tag{1.17}$$

Consider that an informality equilibrium $Z^* \in (0,1)$ is achieved in $t = 1$. This implies that from that period onwards, everything else constant, two types of cultural values and social skills (social capital) will develop in the population; one type that is relevant to be productive in the formal sector and another type that is relevant to be productive out of the law.

The older becomes a dynasty in the informal sector, the higher is the accumulated stock of informal values/skills relative to formal ones. Figure 1.3 shows payoffs for individuals that moved to the informal sector (thus only accumulated social capital for that sector). The graph on the right hand side introduces a change at time T from a low to a high payoff in the formal economy, $\Pi'^i_F = \phi^i_{F,0} \Pi'_F$. A higher profitability in the formal sector can be produced, for instance, by the start of an independent state.

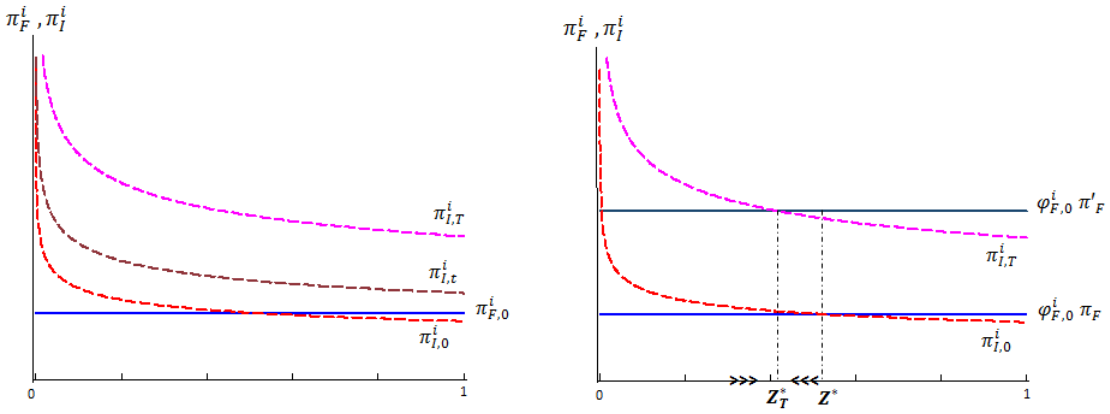


Figure 1.3: New equilibrium after a change in the formal economy
$[\gamma = 0.7, \theta = 0.8, A_F(g) \geq A_I, \phi_{I,T}^i > \phi_{I,T-1}^i > ... > \phi_{I,0}^i = \phi_{F,0}^i]$

This change in the formal economy would move back a large share of individuals to the formal sector in a scenario of no social capital formation. Yet, here, informal individuals and their dynasties have done a sufficient amount of investments in their informal values and social skills. As a consequence, only a very small portion of individuals would have incentives to move into the formal economy, while the majority will still perceive a higher payoff in the informal sector. Therefore, a high informality equilibrium persists.

State capacity

Persistence of informality can be also explained by persistent weak institutions for law enforcement. The extent to which the colonial state was present in a given territory, had control over its population and was legitimate may have persisted over time and translated into local state capacity, even after independence from the colonial power.

Literature on state capacity indicates that tax rates are proportional to the ability of states to tax people.[21] The larger is the share of population for which a state can enforce tax payment, either because of legitimacy or violent coercion, the higher should we expect those taxes to be. The level of taxes may not only provide a hint of the capacity of a state to raise taxes, but also a measure of the amount of potential revenues

[21] See Acemoglu (2005), Sánchez de la Sierra (2013), Besley and Persson (2009), Acemoglu et al. (2014).

that could be invested in state infrastructure and public goods.

In the context of the model in this section, the value for τ that maximizes the colonizer total payoff in (1.9) must satisfy the following foc:[22]

$$\tau^* = \frac{1}{Z'_\tau}\left[\frac{1}{\delta} + 1 - Z(\tau, g, \gamma)\right] \tag{1.18}$$

τ^* is decreasing in δ, Z and Z'_τ, where Z'_τ is the expected response of Z by the colonizer to a marginal increase in τ (it can be shown that the level of informality in equilibrium, Z^*, is increasing in τ). For a given discount factor δ, a higher expected informality equilibrium or a higher Z'_τ will lead to a lower optimal extraction rate. It can be also shown that Z^* and $Z^{*'}_\tau$ are increasing in γ. This implies that a higher observed level of γ leads, ceteris paribus, to a lower optimal τ.[23]

Predictions of the model are then consistent with a state capacity channel. We can assume that states after independence will have the same incentives as the colonial state, except for those reflected in δ. Whereas it is expected that an independent state has a much higher δ than any colonial state, given this δ, places for which a higher informality has been observed should be the ones where weaker states emerge and persist. A limited capacity to raise taxes implies a limited presence of the state in terms of public goods. In this way, individual payoff in the formal sector, even under a new state, will not be likely high enough to significantly reduce informality.

1.4 Empirical evidence for the persistence of informality

In the following, I present empirical evidence for a persistent link between colonial informal mining and current informality levels in Antioquia. As historical evidence points out, informal or illegal miners worked in placer mines, rather than vein mines, given their ease for being exploited. Hence, the availability of placer mines in an area can be considered a necessary condition for the emergence of informality in the past. I will then use an intention-to-treat approach, taking variation in the number of colonial placer mines across municipalities as variation for intensity assignment in the colonial informality treatment. As outcome variables, I will use three measures of current levels of informality across municipalities or households in Antioquia. Note that

[22] Second order condition guarantees that τ^* is a maximizing value.

[23] In the case of colonial Antioquia, an average γ should have been considered in order to set a single τ.

the Antioquia case allows variation in the possibility to become informal in the past, while keeping the nature of the colonizer constant across areas, namely, an extractive colonizer.

The number of placer mines before independence comes from historical mines records in the Antioquia region at the municipality level during 1739-1810 (72 years before independence). Although registered mines were not necessarily those exploited in an illegal way, they provide the only hint of an area's gold richness and the way this richness was available, if in rivers or mountains.

The treatment may proxy other features in the past that are important for later outcomes, such us the size of colonial settlements and the number of slaves. One strategy would be to control for population and its composition during the colonial period, however, these data are not available at the municipality level. Alternatively, the total number of gold mines can serve as an even better proxy for the above mentioned factors. Therefore, the baseline model below includes total number of mines in the same period (1739-1810) at the municipality level. In this way, the number of placer mines is not capturing the overall effect of colonial mining on current informality, but the effect of extractive colonization that goes through the potential of being informal in the past.

The baseline model is given by:

$$I_{ij} = \alpha + \beta\ placer\ mines_{1739-1810\,j} + \lambda\ total\ mines_{1739-1810\,j} + W'_{ij}\eta + X'_j\varphi + U_{ij} \quad (1.19)$$

where index i denotes individuals and index j refers to the corresponding municipality for individual i. I is a current informality outcome, *placer mines* is total number of placer mines during 1739-1810, *total mines* is total number of gold mines in the same period, W is a vector of individual controls and X is a vector of observables at the municipality level.

1.4.1 Data description

Data on the number of gold mines and their type were consulted in a unique catalogue of historic mines records from 1739 to 1900 for Antioquia. This catalogue was compiled by Mesa (1906). Figure 1.4 shows a map of Antioquia, where total number of mines and number of placer mines in 1739-1810 can be visualized across municipalities.

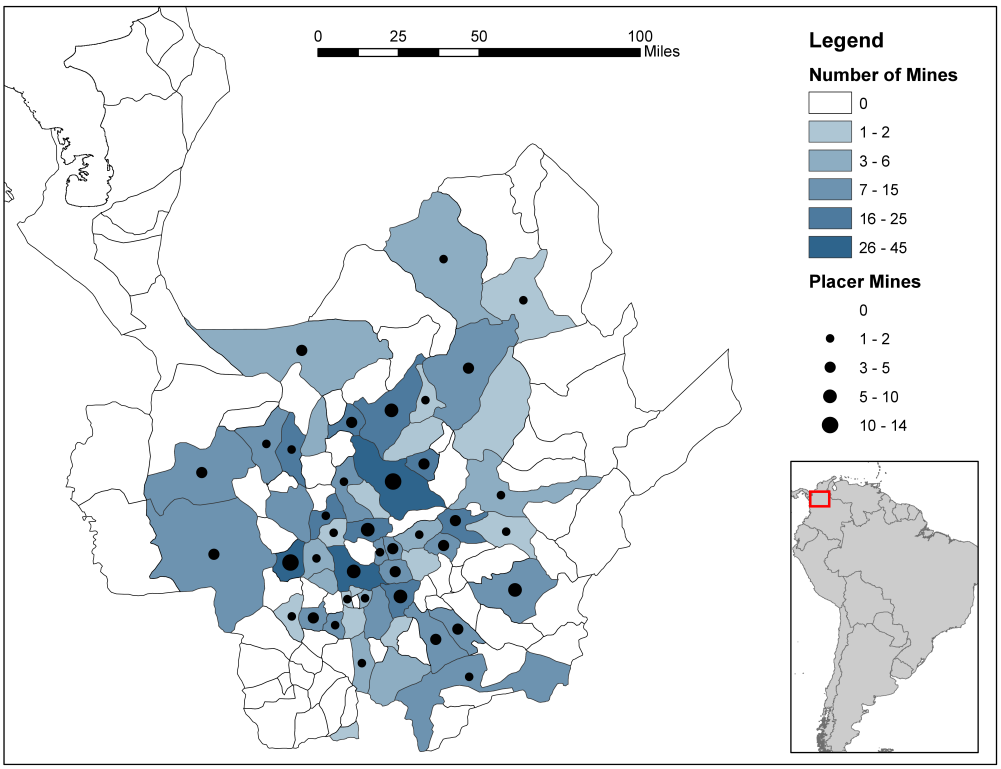


Figure 1.4: Map of Antioquia displaying colonial gold mines and the intensity of the treatment (number of colonial placer mines).

I observe the following informality outcomes: Whether a child[24] is working or looking for a job (*child labor*), whether an employed individual has a formal contract (*formal employment contract*), and the share of employed individuals registered by the Colombian Ministry of Health and Social Protection that are not affiliated to the health or pensions system (*no health or pension system*). The first two variables come from the 2006 Colombian household survey -*Encuesta Continua de Hogares*- performed by the Colombian National Administrative Department of Statistics, DANE. This survey contains a representative sample of individuals in Antioquia (49298 in 41 municipalities). Urban residency and literacy of the individual are taken as control variables from this survey. The third outcome is available for all 125 municipalities in Antioquia in year 2008.

[24]Child defined between 0 and 17 years old.

I divide observables in two sets of control variables. The first set includes relevant geographic characteristics of municipalities, namely, (log) altitude, presence of a river, as well as presence of gold, coal, and oil in 2002. The original source of these variables is the Geographic Institute Agustin Codazzi - IGAC. The aim of using this set of controls is to capture development differences related to the way that economic activity is organized, and to exclude the effect of currently available resources (including gold and rivers) on informality outcomes.

The second set of control variables comprise current socioeconomic characteristics at the municipality level. The Colombian National Administrative Department of Statistics (DANE) is the main source for these variables, and most of them are taken from the latest census in 2005. These are: population size, share of urban population, share of immigrants from other municipalities, share of forced migration, share of the population that belongs to an ethnic group, literacy rate, share of individuals with secondary/university education and employment rate. Unobserved features related to remoteness and historical development are captured by distance to the department capital city, and additional variables include mean unsatisfied basic needs index (1985-2002), population density and presence of indigenous population in the first half of the 16th century; these variables were provided by the Center of Economic Development Studies (CEDE) at Universidad de los Andes. Finally, I further add the presence of FARC and ELN guerrilla groups (1993-2010), the presence of AUC paramilitary group (1993-2010)[25] and mean coca-farmed area (2000-2008) in this set of controls, given the need to account for the effects of violence and delinquency activities related to illegal armed groups. Data on the presence of these groups is reported by the Colombian Presidency Observatory of Human Rights, and the original source for coca-farmed area is the Colombian National Department of Narcotics. These data were also provided by the CEDE.

It is worth noting that to the extent that these control variables are arguably endogenous to historical informality, including them in the estimation implies 'overcontrolling' and likely leads to underestimate the coefficient of interest.

Descriptive statistics of all variables are shown in Table 1.2. Additionally, Table 1.2 presents a comparison of the balancedness of these covariates across treatment status. Municipalities are defined as treated, for the purposes of this table, if they had a positive number of placer mines in the colonial period 1739-1810. It can be observed from

[25]Presence of illegal armed groups are binary variables that inform if there is prevalence or not of these groups during the period 1993-2010.

a mean comparison test that municipalities in Antioquia are homogeneous between treatment and control group in terms of socioeconomic characteristics. The only significant difference in means is present in the distance to the department capital city, which is explained by the fact that places with colonial state presence have had a greater historical importance (and thus are closer to the capital city, or are the capital city itself).[26] This can be confirmed by considering historical state presence variables[27], also reported in the table; they indicate a significantly higher presence of the colonial state and an earlier municipality's foundation year in treated municipalities. Finally, the mean comparison test indicates that treated municipalities have on average more mines before and after independence, are at a higher altitude, and a higher share of them has presence of gold today. In sum, it is reasonable to conclude that municipalities with colonial placer mines compared with all other municipalities in Antioquia are quite homogeneous in terms of socioeconomic observables; they are, not surprisingly, different in geographical characteristics mostly related to gold richness, as well as historical variables. I control for these characteristics in my regressions.

1.4.2 Results and robustness checks

Table 1.3 shows OLS estimates for the baseline model. The first column under each dependent variable features no control variables; the second column includes only geographic characteristics mentioned above, while the set of socioeconomic control variables is added in the third column.

Conditional on the total number of colonial gold mines, a larger treatment is related to a higher share of individuals not affiliated to the health or pension system, to a lower probability of having a formal contract if employed and to a higher probability that a child is working or looking for a job. The treatment effect is significant under different specifications (with/without controls) and its sign remains stable in cases of no statistical significance.

Considering specifications that only control for geographical observables, one standard deviation increase in the number of colonial placer mines (equal to 2.2428 mines) is related to an increase equivalent to 25% of one standard deviation in the share of

[26]This difference in means thus disappears when only municipalities with colonial gold mining are considered. See Table 1.10 in the Appendix for descriptive statistics and balancedness among control and treatment municipalities with colonial mining history.

[27]These variables are described in section 1.5, where the channel of state presence is empirically studied.

non-affiliated individuals, to a decrease equivalent to 20% of one standard deviation in the formal employment contract variable, as well as to an increase equivalent to 41% of one standard deviation in the child labor variable.

Interestingly, a larger total number of colonial mines is associated with lower levels of informality throughout the different measures.

[Table 1.3 here]

Robustness checks

Results above indicate there is a significant link between placer mines in the colonial period and current informality outcomes. This can be suggestive evidence for the persistence of informality since colonial times; nevertheless, this evidence would be also consistent with the idea that placer mines provide in general favorable conditions for informality. In particular, in today's developing countries, low quality institutions and other underdevelopment features may allow the emergence of informality in places where placer mines are available. According to the literature, however, current gold production in Colombia from colonial gold deposits can be considered insignificant as these deposits are now empty (Acemoglu et al., 2012). Thereby, current placer mines should not be related with the treatment.

On the other hand, there may be still the concern that the estimated effect captures something related to placer mines in the past (which are more likely correlated with the treatment), but not necessarily the effect of placer mines during the colonial period. In order to rule this out, Table 1.4 includes number of placer mines and number of total mines during the next 90 years after independence (1811-1900)[28] in each municipality. If informality emerged in the colonial period and has persisted since then, variation in the number of colonial placer mines should still explain variation in informality today, after controlling for placer and total mines after independence. Results show that it is not a general effect of placer mines the one driving current informality outcomes; colonial placer mines are persistently related to informality, while placer mines after independence are not significant to explain these outcomes. The treatment effect is now significant in all specifications with formal employment contract and child labor as dependent variables, and it has a larger magnitude.[29]

[28]Independence battles started around 1811 and Antioquia was self-declared independent in 1813, as many other Colombian regions, although definitive independence of Colombia was achieved in 1819. I take 1810 as the independence threshold in order to have a more conservative measure of colonial mines.

[29]Estimates from specifications only controlling for geographical features indicate a decrease equivalent

[Table 1.4 here]

An additional robustness check considers only municipalities with presence of colonial gold mining. This is meaningful as these municipalities may share many unobserved characteristics that make them different from municipalities with no mining industry in the colonial period. They have a longer common history of state presence, early settlements and gold exploitation, but still differ in the amount of resources suitable for informal extraction. Results for this reduced sample are reported in Table 1.5. The colonial placer mines treatment is still robust under specifications with no controls and all control variables, whereas it is not statistically significant to explain the share of individuals not affiliated to the health or pension system.

[Table 1.5 here]

Finally, I perform regressions taking only municipalities with no gold today. This exercise seeks to clarify any concern that informality levels are driven by persistent geographical conditions favoring informality, and not only by the fact that such conditions under a colonial extractive state created a persistent gap between the legal order and reality. Besides, municipalities with gold today may be different in many dimensions that we would like to exclude. Estimates are shown under odd columns of Table 1.6 and results lead to the same conclusions as before.

Even columns in this table report estimates for the whole sample, and they replace the original treatment by the share of placer mines in total mines in 1739-1810. The intuition provided by historical evidence suggests that the extensive margin should have been of major importance, given the need of informal miners to be out of reach of the colonial state. Therefore, the number of available placer mines, and not the share of placer mines, should have explained variation in the size of the informal sector during the colonial period. Results confirm this intuition since the coefficient for the share of placer mines is not significant, contrary to the treatment effect in Table 1.4.

[Table 1.6 here]

to 47% of one standard deviation in the formal employment contract variable, and an increase equivalent to 52% of one standard deviation in the child labor variable, due to one standard deviation increase in the treatment.

1.5 Investigating the channels of persistence

How can we explain such a long persistence of informality? In the model in section 1.3 I suggest two possible channels: Social capital and weak state capacity. Social capital formation over generations can be highly influenced by past experiences. Individuals whose dynasties have only learned how to live out of the control of the state, will have internalized inherited values as their own and social skills as habits; as a result, these individuals will remain more likely in the informal economy, thereby increasing their social capital towards informality. In sum, we can think that the past experience of an extractive state, and the extent to which it could be avoided, gave rise to the formation of different types of deeply-rooted behavior.

An alternative channel of persistence is state capacity. I argue that the capacity of a state involves not only its size, but its legitimacy and real ability to make individuals comply with the law. If individuals have incentives to escape the law and are able to conceal production, the state has by definition a reduced capacity; moreover, under theses conditions, incentives to build state presence and undertake investments are low, provided low expected returns in the future. Hence, the pesistence of weak states, once in the past determined by the existence of an informal sector, can then explain persistent levels of informality today.

These two channels can be seen as two sides of the same story, where the development of each channel is endogenous to the other: Informal behavior reduces the ability of a state to control its population and influences de facto institutions, thereby affecting the way that formal institutions perform; on the other hand, weak states are not fully able to enforce the law and this allows the presence of informality. Nevertheless, it seems worth disentangling the independent effect of each channel on current outcomes. Since exogenous sources of variation for cultural values or behavior (independent from institutions) are unsual to find,[30] I test one dimension of the state capacity channel, namely, state presence. At the end of this section, I come again to the historical literature in order to complement the understanding of these channels.

I use measures of colonial local state presence, as well as the municipality's year of foundation, as exogenous sources for local state presence today. First, it is reasonable to assume that they are sources for the development of state presence since colonial state infrastructure was likely taken on after independence, and it allowed to build easily on a previous state. On the other hand, the municipality's year of foundation can

[30] I cannot identify second generation immigrants in my data; they could be otherwise considered in an epidemiological approach.

proxy the degree of consolidation of its local state.[31] We can believe these sources are exogenous as these variables are not affected by current informality levels, although they should in fact be affected by colonial informality in order to be valid as a channel. I first check the relationship between these measures and the treatment; then I report reduced form regressions; finally, I use these measures as instruments for a current measure of local state presence, controlling for colonial placer mines in both stages of the IV estimation.

Historical data of Spanish colonial state presence are documented by Durán y Díaz (1794). From these records, Acemoglu, García-Jimeno and Robinson (2012) have compiled municipality-level data on the number of colonial officials and the presence of several local state offices, namely, post office, *alcabala*-tax (sales tax) collection agency, as well as agencies in charge of managing state monopolies over tobacco, playing cards, liquor and gunpowder; indicators on the presence of local state offices are aggregated in a single index. I will use the number of *colonial officials* and the index (*colonial state presence*) as measures of colonial state presence.

In Table 1.7 I study the relationship between historical presence of local states and the treatment, where I only control for observables in the colonial period (total gold mines in 1739-1810 and presence of native population in the first half of the 16th century) and altitude, which is time-invariant. I find that the treatment, i.e. the number of placer mines, is in general related to a lower number of colonial officials and a lower index of colonial state presence, although it is only significant to explain the latter outcome. A larger treatment is also associated with a later foundation year, but this relationship is not statistically significant. The sign of the coefficients for the treatment goes then in line with a state presence channel. On the other hand, a higher total number of gold mines is significantly associated with a larger state presence and an earlier foundation year. This is also in line with results from the previous section, where total gold mines can explain lower informality levels.

[Table 1.7 here]

In Table 1.8 I include the same historical measures of state presence as explanatory variables for informality outcomes. Columns (1), (4) and (7) only include these measures, whereas the remaining columns include both the treatment and the measures for the proposed channel. If informality during the colonial period is solely operating

[31] These years can be found in Credencial Histórica (2001) and are also documented by the Antioquia departmental government.

through the channel of a lower state presence, historical measures of state presence should be negatively associated with informality levels today and they should remove the effect of the colonial placer mines treatment. Estimates indicate, however, that variables of colonial state presence are generally not significant to explain informality outcomes, while a later municipality's foundation year is significant to explain a lower probability of child labor, which is not the expected relationship. Direction and significance of the placer mines treatment effect remain unchanged.

[Table 1.8 here]

In an additional exercise, I use a current measure of local state presence in order to verify this channel. Data on state presence at the municipality level in 1995 are available from a detailed study developed by Fundación Social, a Colombian NGO, that covers all municipalities in Antioquia. I build a measure of local state presence, as the mean of per capita local public employees, tax collection offices, deed registry offices, notary offices, public health centers, health posts and public schools. This measure (*local state presence 1995*) is used as explanatory variable in Table 1.9.[32] Given that current state presence is endogenous to informality levels today, I use historical state presence variables from the previous exercise as instruments. I report in Table 1.9 first stage regressions, as well as second stage and OLS estimates for every outcome variable. I control for placer and total colonial mines, mines after independence and the set of geographic characteristics.

OLS estimates indicate that current state presence is associated with lower informality levels, and this relationship is significant considering the share of non-affiliated individuals as dependent variable. Nevertheless, state presence is no longer significant under the IV estimation. It must be noted that historical state presence measures are weak instruments. In this scenario, conventional inference may be misleading; therefore, I further perform a robust significance test[33] of the coefficients on local state presence in the second stage. It suggests that local state presence is significantly associated to a higher probability of child labor.

Placer mines during the colonial period are mostly significant under OLS or IV estimates (not as explanatory variable for individuals not affiliated to the health or

[32] I also consider tax revenue per capita (Table 1.11) and the share of tax revenue in total municipal revenues (Table 1.12) as explanatory variables in the Appendix. I obtain similar results to those mentioned here.

[33] I perform the Conditional Likelyhood Ratio test (CLR) suggested by Moreira (2003) and Andrews et al. (2006).

pensions system), and the coefficients' sign and magnitude remain stable.

[Table 1.9 here]

In sum, there is no conclusive evidence in favor of physical presence of the state as a channel. State capacity, as defined at the beginning of this section, may be a more likely channel, which definitely depends on the de facto institutions governing the performance of the state. Under this broader definition, the channels of social capital and state capacity are no longer separable; however, the historical literature can provide important insights on the way informal behaviors greatly affected the functioning of institutions. It notes, although very briefly, several events in which informality implied changes beyond the mining industry and tax evasion. One important change occurred in slavery: Whereas slavery was abolished in 1813 in Antioquia (38 years before than in the whole country), there were already registered volunteer liberations of slaves since the end of the 18th century, despite those liberations being considered 'subversive' by colonial authorities (Poveda, 1981). Other events were related to an improved political representation of creoles (Spanish descendants born in the colony) and an increased power of miners and merchants. Creole people became a majority in the Medellín administrative council -*cabildo*- since 1789[34], and policies applied by this council reflected prevalent miners' interests, even going against the colonial law. The illegal regulation of prices in the benefit of miners is one example of permeability in the functioning of institutions to informal behaviors. It is also known that there was no penalty applied by local justice when merchants openly refused to pay gold taxes between 1786 and 1803 (Alvarez and Uribe, 1985).

1.6 Conclusion

This paper argues that informality is not a recent feature of underdevelopment, but an underlying historical cause of underdevelopment today, which emerged as a reaction to escape an oppressive extractive state in the past. I present historical qualitative evidence for the emergence of an informal sector due to a colonial extractive state, considering the case of Antioquia, a large gold producer under Spanish colonial rule, now a Colombian department. I provide a theoretical model in order to understand the economic incentives leading to this outcome observed by the historical literature.

[34]Twinam (1985), cited by Alvarez and Uribe (1985), p. 75.

Finally, I find empirical evidence for a persistent link between colonial informal mining and current informality levels within Antioquia. I argue that informality has been persistent through the channels of social capital formation and weak state capacity.

The emergence of informality as a consequence of extractive states is interesting in the light of the economics literature, as it implies that these states not only set conditions for institutions that deny property rights to the common people, but also give incentives to enforce property rights out of the law. In particular, it implies that colonial extractive states in the past may have not only caused underdevelopment through persistent bad institutions, but also through a persistent gap between de jure and de facto institutions. Thus, the argument in this study sheds light on structural features and mechanisms of persistence of informality. Findings in this paper also highlight how the abundance and type of resources were important to enable individuals to escape the state, produce outside the formal economy and consolidate an informal sector in the past.

Informality can be understood as a response to overcome the negative effects of extractive institutions, that is, as a response to avoid expropriation. However, informality is detrimental for economic development, as it may be related with criminal (unproductive) activities, and lead to insecure property rights, uncertainty in markets, and low public goods provision, among other consequences.

Informality may have had a different effect on economic growth in different time periods. The literature notes that informal miners gave gold mining the character of an egalitarian and popular activity in Antioquia during the colonial period. This significantly pushed the independence movement, in particular due to former slaves' support (Poveda, 1981). A higher economic power of a broader share of the population in the informal economy had effects on the way institutions performed. Not only individuals were informal, but formal institutions deviated from their legal command. Institutions performing outside the law might have allowed economic growth given a law that was defined for the interests of a colonial extractive state, but neglecting the law as a persistent feature of de facto institutions is now detrimental for economic growth and welfare.

Incentives to become informal considered in this paper may be also relevant for other events in history or in the present involving extractive states. Modern states may come close to be extractive if public goods are clearly lower than taxes, thereby making informality an attractive option. Hence, state failures causing this gap, such as corruption, may have larger and more persistent detrimental effects than expected.

Tables

Table 1.1: **Antioquia. Share of molten gold by miners and traders by decades, 1670 -1800.**

Decade	Miners share in molten gold	Traders share in molten gold
1670	46,9%	53,1%
1680	24,0%	76,0%
1690	27,4%	72,6%
1700	10,9%	89,1%
1710	40,3%	59,7%
1720	19,4%	80,6%
1730	20,6%	79,4%
1740	14,5%	85,5%
1750	31,6%	68,4%
1760	3,0%	97,0%
1770	0,4%	99,6%
1780	5,7%	94,3%
1790	4,2%	95,8%
1800	10,2%	89,8%

Source: Twinam (1985), Table 3, p.70.

Table 1.2: **Descriptive statistics**

	colonial placer mines = 0			colonial placer mines > 0			Total sample		
	N	mean	sd	N	mean	sd	N	mean	sd
no health or pension system	86	0.6794	0.0105	39	0.6812	0.0147	125	0.6800	0.0119
formal employment contract	26	0.231	0.181	15	0.303	0.193	41	0.257	0.186
child labor	26	0.160	0.120	15	0.106	0.081	41	0.140	0.109
placer mines (1739-1810)***	86	0	0	39	3.3590	2.9063	125	1.0480	2.2428
total mines (1739-1810)***	86	0.4302	1.5072	39	10.6667	9.1085	125	3.6240	7.0467
placer mines(1811-1900)***	86	13.2558	50.7713	39	54.8205	71.9301	125	26.2240	61.0441
total mines (1811-1900)***	86	41.1744	133.4357	39	133.3590	130.4043	125	69.9360	138.7633
Socioeconomic control variables									
presence of natives in first half of 16th century	86	0.5233	0.5024	39	0.5128	0.5064	125	0.5200	0.5016
population size	86	26901.1	49869.2	39	84308.0	352300.8	125	44812.1	201130.2
share of urban population	86	0.4602	0.1945	39	0.4203	0.2007	125	0.4477	0.1965
population density	85	248.7	1180.0	39	409.6	1190.0	124	299.3	1180.7
share of immigrants	86	0.3297	0.1239	39	0.3258	0.1469	125	0.3285	0.1309
share of forced migration	86	0.0155	0.0287	39	0.0180	0.0224	125	0.0163	0.0268
share of ethnic population	86	0.1101	0.1487	39	0.0893	0.1329	125	0.1036	0.1437
literacy rate	86	0.7374	0.0677	39	0.7550	0.0789	125	0.7429	0.0715
share secondary/university education	86	0.1949	0.0822	39	0.2232	0.1230	125	0.2037	0.0971
employment rate	86	0.9654	0.0223	39	0.9665	0.0155	125	0.9657	0.0204
mean unsatisfied basic needs index*	85	50.0492	18.6841	39	43.7966	17.1213	124	48.0826	18.3703
distance to department capital city***	85	151.8353	104.7152	39	90.8718	62.1607	124	132.6613	97.4167
mean coca-farmed area	86	39.8962	131.7487	39	58.1561	202.1636	125	45.5933	156.5097
presence of guerrilla	86	0.6395	0.4830	39	0.6154	0.4929	125	0.6320	0.4842
presence of paramilitaries	86	0.4419	0.4995	39	0.4872	0.5064	125	0.4560	0.5001
Geographic control variables									
presence of river	86	0.8256	0.3817	39	0.8974	0.3074	125	0.8480	0.3605
(log) altitude**	85	6.4482	1.8646	39	7.1924	0.7791	124	6.6823	1.6377
presence of gold**	85	0.3412	0.4769	39	0.5385	0.5050	124	0.4032	0.4925
presence of coal	85	0.0353	0.1856	39	0.0513	0.2235	124	0.0403	0.1975
presence of oil	85	0.0353	0.1856	39	0	0	124	0.0242	0.1543
State presence variables									
colonial officials**	85	0.2471	1.2335	39	1.2051	3.4042	124	0.5484	2.1952
colonial state presence***	85	0.2824	0.6289	39	0.9231	1.1559	124	0.4839	0.8787
foundation year***	86	1895	74.0126	39	1824	54.5512	125	1872	75.9126
local state presence	84	0.0381	0.0276	39	0.0456	0.0523	123	0.0405	0.0372

Notes: Municipalities are divided into treatment and control group, according to the availability of placer mines in the colonial period 1739-1810. Difference in means between treated and control municipalities is: ***statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.

Table 1.3: **OLS estimates for the baseline model**

	no health or pension system			**formal employment contract**			**child labor**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
placer mines	0.0014	0.0013	0.0023**	-0.0544**	-0.0166	-0.0295*	0.0278***	0.0199*	0.0152
(1739-1810)	(0.0010)	(0.0011)	(0.0011)	(0.0264)	(0.0203)	(0.0157)	(0.0074)	(0.0108)	(0.0185)
total mines	-0.0005	-0.0005	-0.0008**	0.0189***	0.0043	0.0094*	-0.0090***	-0.0064**	-0.0053
(1739-1810)	(0.0003)	(0.0003)	(0.0004)	(0.0065)	(0.0057)	(0.0051)	(0.0020)	(0.0028)	(0.0061)
Control variables									
Geographic	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Socioeconomic	No	No	Yes	No	No	Yes	No	No	Yes
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.0116	0.0497	0.1836	0.0287	0.0634	0.1156	0.0107	0.0213	0.0450
Mean dependent variable	0.680	0.680	0.680	0.257	0.257	0.257	0.140	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. Geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002). Socioeconomic control variables: (2005) population size, share of urban population, share of immigrants from other municipalities, share of forced migration, share of the population that belongs to an ethnic group, literacy rate, share of individuals with secondary/university education, employment rate; presence of indigenous population in the first half of the 16th century, distance to the department capital city, population density (2008), mean unsatisfied basic needs index (1985-2002), mean coca-farmed area (2000-2008), high/low presence of guerrilla groups (1993-2010) and high/low presence of auc paramilitary goup (1993-2010). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.4: **OLS regressions controlling for mines after independence**

	no health or pension system			**formal employment contract**			**child labor**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
placer mines (1739-1810)	0.0014	0.0014	0.0023**	-0.0588***	-0.0387**	-0.0576***	0.0253**	0.0252*	0.0511***
	(0.0010)	(0.0011)	(0.0011)	(0.0170)	(0.0185)	(0.0147)	(0.0113)	(0.0136)	(0.0157)
total mines (1739-1810)	-0.0006*	-0.0006*	-0.0008**	0.0244***	0.0151**	0.0208***	-0.0097***	-0.0093***	-0.0196***
	(0.0003)	(0.0003)	(0.0004)	(0.0043)	(0.0060)	(0.0050)	(0.0026)	(0.0034)	(0.0053)
placer mines (1811-1900)	-0.0001*	-0.0001	-0.0001	0.0005	0.0004	-0.0008*	-0.0004	-0.0004	-0.0000
	(0.0000)	(0.0000)	(0.0001)	(0.0006)	(0.0010)	(0.0005)	(0.0007)	(0.0009)	(0.0004)
total mines (1811-1900)	0.0000	0.0000	0.0000	-0.0014***	-0.0013**	-0.0002	0.0005	0.0005	0.0006***
	(0.0000)	(0.0000)	(0.0000)	(0.0004)	(0.0005)	(0.0003)	(0.0003)	(0.0003)	(0.0002)
Control variables									
Geographic	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Socioeconomic	No	No	Yes	No	No	Yes	No	No	Yes
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.0351	0.0696	0.2005	0.0525	0.0781	0.1170	0.0176	0.0261	0.0492
Mean dependent variable	0.680	0.680	0.680	0.257	0.257	0.257	0.140	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. Geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002). Socioeconomic control variables: (2005) population size, share of urban population, share of immigrants from other municipalities, share of forced migration, share of the population that belongs to an ethnic group, literacy rate, share of individuals with secondary/university education, employment rate; presence of indigenous population in the first half of the 16th century, distance to the department capital city, population density (2008), mean unsatisfied basic needs index (1985-2002), mean coca-farmed area (2000-2008), high/low presence of guerrilla groups (1993-2010) and high/low presence of auc paramilitary goup (1993-2010). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.5: **OLS regressions among municipalities with presence of colonial gold mining**

	no health or pension system			**formal employment contract**			**child labor**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
placer mines (1739-1810)	0.0014	0.0016	0.0014	-0.0554***	0.0173	-0.0167**	0.0272**	-0.0225	0.1295***
	(0.0011)	(0.0011)	(0.0016)	(0.0156)	(0.0210)	(0.0070)	(0.0104)	(0.0151)	(0.0050)
total mines (1739-1810)	-0.0005	-0.0006	-0.0003	0.0209***	-0.0072	0.0077**	-0.0105***	0.0084	-0.0437***
	(0.0004)	(0.0004)	(0.0005)	(0.0042)	(0.0078)	(0.0028)	(0.0028)	(0.0055)	(0.0034)
placer mines (1811-1900)	-0.0001	-0.0002**	-0.0001	0.0002	-0.0007	0.0034***	-0.0003	0.0002	0.0155***
	(0.0001)	(0.0001)	(0.0002)	(0.0016)	(0.0007)	(0.0003)	(0.0009)	(0.0005)	(0.0006)
total mines (1811-1900)	0.0000	0.0001*	0.0000	-0.0016*	0.0006	-0.0026***	0.0004	-0.0009*	-0.0080***
	(0.0000)	(0.0000)	(0.0001)	(0.0008)	(0.0007)	(0.0002)	(0.0004)	(0.0004)	(0.0005)
Control variables									
Geographic	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Socioeconomic	No	No	Yes	No	No	Yes	No	No	Yes
Unit of observation		Municipality			Household			Household	
Obs	52	52	52	16985	16985	16985	4827	4827	4827
R^2	0.0598	0.1375	0.4102	0.0485	0.0653	0.0871	0.0222	0.0364	0.0521
Mean dependent variable	0.680	0.680	0.680	0.257	0.257	0.257	0.140	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. Geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002). Socioeconomic control variables: (2005) population size, share of urban population, share of immigrants from other municipalities, share of forced migration, share of the population that belongs to an ethnic group, literacy rate, share of individuals with secondary/university education, employment rate; presence of indigenous population in the first half of the 16th century, distance to the department capital city, population density (2008), mean unsatisfied basic needs index (1985-2002), mean coca-farmed area (2000-2008), high/low presence of guerrilla groups (1993-2010) and high/low presence of auc paramilitary goup (1993-2010). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.6: **OLS regressions among municipalities with no gold today and using the share of placer mines**

	no health or pension system		**formal employment contract**		**child labor**	
	With no gold today		With no gold today		With no gold today	
	(1)	(2)	(3)	(4)	(5)	(6)
placer mines (1739-1810)	0.0018		-0.1208**		0.0428**	
	(0.0013)		(0.0495)		(0.0175)	
share of placer mines (1739-1810)		0.0064		-0.0367		-0.0294
		(0.0064)		(0.1303)		(0.0783)
total mines (1739-1810)	-0.0006**	-0.0002*	0.0419**	0.0048**	-0.0055	-0.0022
	(0.0002)	(0.0001)	(0.0185)	(0.0020)	(0.0055)	(0.0013)
placer mines (1811-1900)	0.0001	-0.0001*	0.0003	0.0006	-0.0093***	-0.0004
	(0.0002)	(0.0000)	(0.0077)	(0.0009)	(0.0016)	(0.0008)
total mines (1811-1900)	-0.0000	0.0000	-0.0034	-0.0013**	0.0029***	0.0004
	(0.0001)	(0.0000)	(0.0023)	(0.0005)	(0.0005)	(0.0003)
Unit of observation	Municipality		Household		Household	
Obs	73	123	16918	19419	4743	5739
R^2	0.0657	0.0690	0.0321	0.0755	0.0224	0.0232
Mean dependent variable	0.680	0.680	0.257	0.257	0.140	0.140

In columns (1)-(2): Robust standard errors in parentheses. In columns (3)-(6): Robust standard errors (in parentheses) clustered at the municipality level. All regressions controlling for geographic control variables: (log) altitude, presence of a river, as well as presence of gold (in columns 2, 4 and 6), coal, and oil (2002). .***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.7: **OLS regressions for historical state presence outcomes**

	colonial officials	**colonial state presence**	**foundation year**
	(1)	(2)	(3)
placer mines (1739-1810)	-0.5816	-0.1984*	13.0491
	(0.4388)	(0.1120)	(10.2960)
total mines (1739-1810)	0.2877	0.1250***	-7.8074**
	(0.1753)	(0.0373)	(3.4324)
Obs	123	123	123
R^2	0.2024	0.3501	0.2677
Mean dependent variable	0.5484	0.4839	1872

Robust standard errors in parentheses. Units of observation are municipalities. All specifications controlling for presence of indigenous population in the first half of the 16th century and (log) altitude. ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.8: **OLS regressions - with historical measures of state presence as explanatory variables**

	no health or pension system			**formal employment contract**			**child labor**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
colonial officials	0.0000	0.0001	0.0004	-0.0002	-0.0087	0.0058	-0.0071	-0.0012	-0.0199
	(0.0004)	(0.0004)	(0.0008)	(0.0074)	(0.0070)	(0.0160)	(0.0050)	(0.0041)	(0.0182)
colonial state presence	-0.0011	-0.0009	0.0004	0.0300	0.0234	-0.0114	0.0059	0.0181	0.0622
	(0.0019)	(0.0019)	(0.0022)	(0.0361)	(0.0284)	(0.0331)	(0.0248)	(0.0221)	(0.0400)
foundation year	0.0000	0.0000	0.0000	0.0001	0.0001	-0.0003	-0.0006**	-0.0006**	-0.0008**
	(0.0000)	(0.0000)	(0.0000)	(0.0006)	(0.0006)	(0.0006)	(0.0003)	(0.0003)	(0.0003)
placer mines (1739-1810)		0.0012	0.0024**		-0.0660**	-0.0680***		0.0560***	0.0659***
		(0.0011)	(0.0012)		(0.0267)	(0.0200)		(0.0178)	(0.0217)
total mines (1739-1810)	-0.0001	-0.0005	-0.0009**	0.0024	0.0255**	0.0242***	-0.0022	-0.0216***	-0.0262***
	(0.0002)	(0.0004)	(0.0004)	(0.0020)	(0.0100)	(0.0070)	(0.0019)	(0.0062)	(0.0079)
Control variables									
Geographic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socioeconomic	No	No	Yes	No	No	Yes	No	No	Yes
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.0655	0.0722	0.2036	0.0767	0.0796	0.1173	0.0272	0.0320	0.0514
Mean dependent variable	0.680	0.680	0.680	0.257	0.257	0.257	0.140	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. All regressions also controlling for mines after independence. Geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002). Socioeconomic control variables: (2005) population size, share of urban population, share of immigrants from other municipalities, share of forced migration, share of the population that belongs to an ethnic group, literacy rate, share of individuals with secondary/university education, employment rate; presence of indigenous population in the first half of the 16th century, distance to the department capital city, population density (2008), mean unsatisfied basic needs index (1985-2002), mean coca-farmed area (2000-2008), high/low presence of guerrilla groups (1993-2010) and high/low presence of auc paramilitary goup (1993-2010). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.9: **IV/OLS regressions - instrumenting local state presence in 1995.**

	no health or pension system			**formal employment contract**			**child labor**		
	First stage	IV	OLS	First stage	IV	OLS	First stage	IV	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
local state presence 1995		-0.0962	-0.0624**		0.0716	0.3617		1.6997	-0.3241
		(0.2064)	(0.0265)		(1.2519)	(0.8422)		(1.4294)	(0.5569)
placer mines (1739-1810)	0.0008	0.0013	0.0014	0.0196**	-0.0392*	-0.0411**	0.0138*	0.0234	0.0255*
	(0.0042)	(0.0010)	(0.0010)	(0.0077)	(0.0208)	(0.0176)	(0.0074)	(0.0174)	(0.0135)
total mines (1739-1810)	0.0000	-0.0005	-0.0005*	-0.0069**	0.0152**	0.0156***	-0.0050*	-0.0096**	-0.0093**
	(0.0017)	(0.0003)	(0.0003)	(0.0027)	(0.0064)	(0.0058)	(0.0026)	(0.0045)	(0.0035)
foundation year	0.0000			-0.0000			-0.0000		
	(0.0000)			(0.0001)			(0.0001)		
colonial officials	0.0009			-0.0001			-0.0003		
	(0.0018)			(0.0013)			(0.0010)		
colonial state presence	0.0042			0.0195***			0.0170**		
	(0.0080)			(0.0074)			(0.0080)		
F stat for instruments	0.29			3.48			2.28		
p-value for CLR		0.886			0.752			0.024	
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.1471	0.0929	0.1026	0.5599	0.0782	0.0783	0.5550	0.0137	0.0264
Mean dependent variable	0.040	0.680	0.680	0.040	0.257	0.257	0.040	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. All regressions controlling for mines after independence and geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002).***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Appendix

Table 1.10: **Descriptive statistics for municipalities with colonial gold mining**

	colonial placer mines = 0			colonial placer mines > 0			Total sample		
	N	mean	sd	N	mean	sd	N	mean	sd
no health or pension system	13	0.6745	0.0072	39	0.6812	0.0147	52	0.6795	0.0134
formal employment contract	5	0.3476	0.2381	15	0.3032	0.1926	20	0.3143	0.1992
child labor	5	0.1616	0.0939	15	0.1056	0.0806	20	0.1196	0.0852
placer mines (1739-1810)***	13	0.0000	0.0000	39	3.3590	2.9063	52	2.5192	2.9070
total mines (1739-1810)***	13	2.8462	2.9396	39	10.6667	9.1085	52	8.7115	8.6915
placer mines(1811-1900)	13	40.6154	84.5069	39	54.8205	71.9301	52	51.2692	74.6593
total mines (1811-1900)	13	117.5385	186.4759	39	133.3590	130.4043	52	129.4038	144.5697
Socioeconomic control variables									
presence of natives in first half of 16th century	13	0.6154	0.5064	39	0.5128	0.5064	52	0.5385	0.5034
population size	13	37696	62018.6	39	84308	352300.8	52	72655	306266.0
share of urban population	13	0.4917	0.2209	39	0.4203	0.2007	52	0.4381	0.2061
population density	13	907.1392	2874.5220	39	409.5944	1189.9830	52	533.9806	1745.4620
share of immigrants	13	0.3415	0.1578	39	0.3258	0.1469	52	0.3297	0.1482
share of forced migration*	13	0.0068	0.0041	39	0.0180	0.0224	52	0.0152	0.0200
share of ethnic population	13	0.0597	0.0617	39	0.0893	0.1329	52	0.0819	0.1193
literacy rate	13	0.7791	0.0723	39	0.7550	0.0789	52	0.7610	0.0774
share secondary/university education	13	0.2269	0.1168	39	0.2232	0.1230	52	0.2241	0.1203
employment rate	13	0.9698	0.0115	39	0.9665	0.0155	52	0.9674	0.0145
mean unsatisfied basic needs index	13	39.1938	17.0746	39	43.7966	17.1213	52	42.6459	17.0607
distance to department capital city	13	76.9231	52.9944	39	90.8718	62.1607	52	87.3846	59.8082
mean coca-farmed area	13	12.8652	46.2194	39	58.1561	202.1636	52	46.8333	177.0510
presence of guerrilla	13	0.5385	0.5189	39	0.6154	0.4929	52	0.5962	0.4955
presence of paramilitaries	13	0.4615	0.5189	39	0.4872	0.5064	52	0.4808	0.5045
Geographic control variables									
presence of river	13	0.9231	0.2774	39	0.8974	0.3074	52	0.9038	0.2977
(log) altitude	13	7.3696	0.3858	39	7.1924	0.7791	52	7.2367	0.7024
presence of gold	13	0.3077	0.4804	39	0.5385	0.5050	52	0.4808	0.5045
presence of coal	13	0	0	39	0.0513	0.2235	52	0.0385	0.1942
presence of oil	13	0	0	39	0	0	52	0	0
State presence variables									
colonial officials	13	0.8462	2.7642	39	1.2051	3.4042	52	1.1154	3.2337
colonial state presence	13	0.5385	0.8771	39	0.9231	1.1559	52	0.8269	1.0976
foundation year	13	1807	88.1399	39	1824	54.5512	52	1819	64.0180
local state presence	13	0.0527	0.0267	39	0.0456	0.0523	52	0.0474	0.0471

Notes: Municipalities are divided into treatment and control group, according to the availability of placer mines in the colonial period 1739-1810. Difference in means between treated and control municipalities is: ***Statistically significant at the 1% level; *statistically significant at the 10% level.

Table 1.11: **IV/OLS regressions - instrumenting tax revenue per capita.**

	no health or pension system			**formal employment contract**			**child labor**		
	First stage	IV	OLS	First stage	IV	OLS	First stage	IV	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
tax revenue per capita		-0.0278 (0.0343)	-0.0645*** (0.0171)		-0.1641 (0.9443)	0.9889*** (0.3634)		1.3992 (0.9217)	-0.3870 (0.3218)
placer mines (1739-1810)	0.0088 (0.0067)	0.0014 (0.0010)	0.0014 (0.0010)	0.0055 (0.0167)	-0.0413* (0.0229)	-0.0234 (0.0200)	0.0028 (0.0153)	0.0575** (0.0266)	0.0162 (0.0181)
total mines (1739-1810)	-0.0033 (0.0021)	-0.0005* (0.0003)	-0.0005* (0.0003)	-0.0022 (0.0059)	0.0162* (0.0083)	0.0082 (0.0061)	-0.0010 (0.0053)	-0.0221** (0.0093)	-0.0058 (0.0055)
foundation year	-0.0002 (0.0001)			-0.0003* (0.0002)			-0.0001 (0.0001)		
colonial officials	0.0037 (0.0028)			-0.0014 (0.0030)			0.0011 (0.0025)		
colonial state presence	0.0118 (0.0105)			0.0269** (0.0126)			0.0204 (0.0126)		
F stat. for instruments	3.23			2.46			2.14		
p-value for CLR		0.581			0.207			0.006	
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.2740	0.1098	0.1292	0.8310	0.0762	0.0836	0.8545	.	0.0277
Mean dependent variable	0.051	0.680	0.680	0.051	0.257	0.257	0.051	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. All regressions controlling for mines after independence and geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002).***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 1.12: **IV/OLS regressions - instrumenting share of taxes in total municipal revenue.**

	no health or pension system			**formal employment contract**			**child labor**		
	First stage	IV	OLS	First stage	IV	OLS	First stage	IV	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
share of tax revenue		-0.0128	-0.0275***		0.2653	0.7401***		0.2766	-0.2301
		(0.0151)	(0.0057)		(0.4256)	(0.1166)		(0.5365)	(0.1373)
placer mines (1739-1810)	0.0170	0.0014	0.0014	-0.0220	-0.0289	-0.0113	-0.0196	0.0377	0.0148
	(0.0148)	(0.0010)	(0.0010)	(0.0233)	(0.0226)	(0.0191)	(0.0245)	(0.0262)	(0.0157)
total mines (1739-1810)	-0.0070	-0.0005*	-0.0005	0.0072	0.0112	0.0043	0.0064	-0.0140	-0.0055
	(0.0046)	(0.0003)	(0.0003)	(0.0091)	(0.0077)	(0.0054)	(0.0090)	(0.0091)	(0.0046)
foundation year	-0.0004**			-0.0002			0.0001		
	(0.0002)			(0.0004)			(0.0004)		
colonial officials	0.0037			-0.0076			-0.0025		
	(0.0078)			(0.0064)			(0.0064)		
colonial state presence	0.0351			0.0660**			0.0545*		
	(0.0269)			(0.0298)			(0.0297)		
F stat for instruments	3.90			1.66			1.66		
p-value for CLR		0.525			0.373			0.119	
Unit of observation		Municipality			Household			Household	
Obs	123	123	123	19419	19419	19419	5739	5739	5739
R^2	0.2050	0.1232	0.1447	0.7452	0.0880	0.0948	0.7566	0.0127	0.0296
Mean dependent variable	0.153	0.680	0.680	0.153	0.257	0.257	0.153	0.140	0.140

In columns (1)-(3): Robust standard errors in parentheses. In columns (4)-(9): Robust standard errors (in parentheses) clustered at the municipality level. All regressions controlling for mines after independence and geographic control variables: (log) altitude, presence of a river, as well as presence of gold, coal, and oil (2002).***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Chapter 2

Political Inequality and the Origins of Distrust: Evidence for Colombia

2.1 Introduction

Institutions and social capital are considered in the literature as causes of differences in economic development across countries. They are highly persistent over time, but the channels through which they persist and affect economic development are still an ongoing field of research. The aim of this paper is to identify the impact of political inequality on social capital in Colombia. With political inequality (or political exclusion) I refer to the extent to which political institutions do not allow groups to access political power equally. I hypothesize that political exclusion in Colombia has damaged generalized trust and induced free-riding behaviors. This would mean that political inequality has not only affected economic development in the usual ways claimed in the literature, for example, through the establishment of economic institutions that favor the elites, but also that political inequality may have affected economic development through the damage of social capital. The latter supports the idea that formal institutions have a broader effect on society that is also important for economic development and for their own persistence.

The way I test this hypothesis is by using an important event for the Colombian political system in the 1950s: The National Front agreement. The National Front institutionalized the dominance of the two traditional parties, Liberal and Conservative. According to it, these parties had to alternate the presidency every four years during the period 1958-1974, while maintaining half share of all executive branch offices, as well as legislative, judicial and bureaucratic positions in each presidential period. The

National Front not only imposed a formal barrier to political participation, but it notably increased clientelism as suggested by qualitative evidence. The literature also claims that there was an increasing distrust in government, elections and democracy after the National Front.

Political inequality, as a result of the National Front, did not affect regions in Colombia equally. Municipalities and departments with a stronger preference for parties other than the Liberal and Conservative should have experienced a higher political exclusion than those that only had a traditional political affiliation. I thus investigate the relationship between the intensity of the National Front treatment, as measured by the mean electoral share of non-traditional parties before the National Front, and various measures of social capital.

I first use survey measures from the Social Capital Barometer for Colombia –Barcas- in 2011. Since variation in the political exclusion treatment might be related with social capital in the past or with other factors that determine social capital today, I deal with this potential endogeneity in the empirical strategy. After controlling for relevant observables at the individual and municipality level, and unobservables at the region level, I find that a larger political exclusion treatment (electoral share of non-traditional parties at the municipality level before the National Front) is associated with less trusting individuals today and with a higher perception of free riding behaviors. Using the same measure of the treatment today and present electoral share of communist parties as placebos yields no significant effects on social capital, while the treatment is equally significant, also similar in magnitude, when including both the treatment and any of the placebos. However, I further try to control for past social capital by using mean electoral turnout before the National Front as a proxy. After controlling for past social capital with this proxy, a higher treatment is still significantly related to lower social capital outcomes. Results are robust when considering variation within blocks of municipalities comparable before the treatment (as suggested by a propensity score calculation), and when performing regressions weighted by the share of non-immigrants in each municipality.

Second, I find additional evidence of a deterioration of social capital in terms of electoral turnout, which I use at the department level in a panel fixed effects model. After controlling for department fixed effects and time fixed effects, departments affected by a higher political exclusion have, on average, a lower electoral turnout for the period after the National Front. Pre-trends are not observed, as this negative association is only significant for years after the treatment.

The intuition behind the hypothesis in this study is that political exclusion creates

distrust towards the state, which then harms social capital. To the extent that abstentionism reflects distrust towards the state, results for electoral turnout above support this channel: Departments facing a larger political exclusion due to the National Front would be the ones with lower levels of trust towards the state after the treatment. I further investigate the proposed channel using survey measures of state perception today. I find that a higher National Front treatment is associated with a higher perception of corruption in the state, and this, in turn, is associated with lower trust levels and a higher perception of free-riding behaviors.

Although these results may be evidence in favor of distrust towards the state as a channel, there might be additional channels through which the treatment is also operating. This is clear in that the National Front treatment still matters for social capital after controlling for the suggested channel. Presence of violence may seem a likely way through which political exclusion damaged social capital, since political exclusion produced violence against the state with the emergence of guerrilla groups during the NF period. However, results cannot support presence of violence as a channel.

Extensive literature has claimed institutions as the major cause of differences in development outcomes, not only explaining the unprecedented economic growth after 1800,[1] but also the present underdevelopment of many countries.[2] The question is still how institutions are determined. In this sense, the literature has given a fundamental role to political power. It is argued that the evolution of political power reinforces particular initial conditions and its distribution determines economic institutions (Acemoglu et al., 2005b).

Empirical literature on Colombian development identifies political inequality as a major cause of underdevelopment. Acemoglu et al. (2007) find for the Colombian region of Cundinamarca that political rather than economic inequality in the 19th century is significantly related with underdevelopment paths among municipalities. Accordingly, historical and theoretical literature also claims that political inequality is central to explain Colombia's economic development. Robinson (2005) suggests, for instance, that the incoherence of Colombia's poor development outcomes with its long history of economic stability and excellent macroeconomic policy can be explained by the persistence of political elites and traditional parties.

[1] North and Thomas (1970); North and Weingast (1989); Acemoglu et al. (2005a); La Porta et al. (2008); Acemoglu et al. (2011).

[2] Engerman and Sokoloff (1997, 2002); Acemoglu et al. (2001); Acemoglu et al. (2002); Banerjee and Iyer (2005); Nunn, (2008); Feyrer and Sacerdote (2009); Dell (2010).

On the other hand, extensive literature would claim an important role for social capital in the Colombian context. In general, social capital is considered to have a direct impact on economic development since it establishes the degree of cooperation and mutual trust among individuals, which are key elements for the development of markets, for solving collective problems, and thus for public goods provision. Several studies[3] have then reported a positive and significant relationship between social capital and development outcomes across and within countries (arguably causal). Social capital may also matter indirectly by influencing formal institutions and their performance. Accordingly, the literature has shown a significant association between social capital and institutional outcomes.[4]

Literature on social capital often casts doubts on the dominance of formal institutions in determining economic growth and claims that culture has been severely understated. The main fact it brings into question is that same formal institutions can perform differently in different cultural environments, where also different economic outcomes are observed (Tabellini, 2010), although this relationship does not necessarily mean a causal effect of culture on institutions performance or economic development. Additionally, this literature points out the need to understand the way cultural values are formed and transmitted over time. Hence, several studies have searched for the historical origins of social capital differences;[5] to the best of my knowledge, this has not been studied in Colombia.

This paper provides the following intuition: Political inequality creates in the first place distrust towards the state; citizens may not agree with, nor trust the use and destination of public resources and they may not believe, in general, that governmental policies will be socially optimal. If everyone has to fend for oneself because the state is not trustworthy to represent the society's interests, a greater sense of individualism or selfishness is likely induced, and this becomes common knowledge so that everybody is in a non-cooperative equilibrium. This intuition implies that the interplay between citizens and state under political inequality probably causes a broader effect that spreads out free riding and distrust to culture as a whole.[6] Like the papers

[3]Putnam et al. (1993); Helliwell and Putnam (1995); Fukuyama (1996); Knack and Keefer (1997); Guiso et al. (2004); Algan and Cahuc (2007).

[4]Putnam et al. (1993); Fukuyama (1996); La Porta et al. (1997); Knack (2002); Uslaner (2006).

[5]Putnam (1993); Guiso et al. (2008); Tabellini, (2010); Nunn and Wantchekon (2011); Durante (2010); Jacob and Tyrell (2010).

[6]When I argue that political inequality affects social capital, I do not refer to attitudes that appear as

by Jacob and Tyrell (2010) and Nunn and Wantchekon (2011), this paper shows a case of social capital erosion.

The paper proceeds as follows. In the next section I give a brief historical background of the Colombian National Front. Section 2.3 describes the data. Section 2.4 presents the empirical strategy. In section 2.5 I report results and robustness checks. Section 2.6 investigates the proposed channel in the hypothesis. Finally, section 2.7 concludes.

2.2 The Colombian National Front

The economic development of Colombia seems to be contradictory, as highlighted by Robinson (2005). He notes that Colombia, while being a country with a history of good macroeconomic policy, has very disappointing socio-economic outcomes, just as those of any other Latin American country.

Unlike the rest of countries in Latin America, Colombia's economic performance during the 20th century has shown a very low volatility. A prudent macroeconomic policy has avoided inflation problems and debt crisis, whereas they have been a major source of instability for countries in the region. Colombia has been also unique in the continuity of its political elites and traditional parties since their foundation in the 1840s (Robinson, 2005).

One reason for a prudent macroeconomic policy might be that persistent elites that receive a high share of national income and seek to maximize the value of their rents are willing to carry out appropriate macroeconomic policies. The question posed by Robinson (2005) is: how can this persistence of elites be explained without satisfying social improvements and without recurring to populism? And the answer comes from large literature that points out clientelism as an outstanding feature of Colombian politics.[7] Robinson (2005), in particular, argues that "Colombian elites have long-developed social networks and specific investments in delivering patronage" (Robinson, 2005, p. 11) and as a consequence, clientelism has become increasingly efficient as a means of maintaining control of the political system (Robinson, 2005).

One chapter in the continuity of political elites in Colombia is given by the National

a direct outcome of institutions-driven incentives; for example, that there are less entrepreneurs because property rights are not well protected, or that people cheat on taxes because law enforcement is weak. I refer to an effect on everyday behaviors.

[7]Duarte (2003), Martz (1997), Carey and Shugart (1995), Leal and Davila (1990), Diaz (1986), Losada (1984), Schmidt (1977).

Front agreement –*El Frente Nacional* (hereafter NF). This agreement institutionalized the exclusive dominance of the two traditional parties, Liberals and Conservatives, for the period 1958-1974. Liberals and Conservatives had to alternate the presidency every four years during that period, while maintaining half share of all executive branch offices, as well as legislative, judicial and bureaucratic positions in each presidential period.[8] The NF was a key element for policy makers to achieve a long run perspective in economic policy (Hartlyn, 1988; Cárdenas, 2009), but also for the rise of clientelism according to qualitative historical evidence.

2.2.1 Emergence and consequences of the National Front

The NF emerged as a way to stop violence at that time and as an urgent measure conceived by the political elites, who feared to be excluded from power during the military government of General Gustavo Rojas Pinilla. Before the NF, Liberals and Conservatives had always fought against each other for holding control over the state and public offices. Precisely during the decade before (period called *La Violencia*), Colombia experienced great violence as a result of an increased political polarization between these parties; this started with the presidential elections in 1946. Although Liberals were a majority at that moment, a fracture within this party allowed a minority of Conservatives to win the presidency, and this was the trigger for a civil war (Hartlyn, 1984). Violence became even worse after the assassination in 1948 of the Liberal populist leader Jorge Eliecer Gaitán, who was a main figure in the political context. This period of chaos was ruled by two conservative governments until the overthrow by General Rojas Pinilla in 1953.[9]

Although Rojas Pinilla (1953-1957) came to power with support of sectors from both parties, his government distanced these political actors, wide sectors of the population and main economic players. Corruption, violence and populist policies, on the one hand, and Rojas Pinilla's desire to stay in power, on the other, were the causes of an increased opposition that derived in the NF agreement. Rojas' attempts to stop the elites' NF led to a generalized strike promoted by bankers, industrialists and mer-

[8]Power parity between the two traditional parties remained even beyond the period of the NF thanks to a constitutional reform made in 1968. According to it, Conservatives and Liberals should share administrative posts until 1978, although free electoral competition for presidency would return in 1974; moreover, after 1978, the winning party should cede some power to the second one, which was the case until 1986 (Pizarro, 2004).

[9]This event was the result of the intensified violence under the government period 1950-1953 and the conspiracy of Conservative leaders with the military (Hartlyn, 1984).

chants, which made Rojas finally withdraw in 1957 (Hartlyn, 1984). The NF was signed in 1957 and the first presidency started in 1958 with a Liberal candidate.

The NF indeed eliminated conflicts among the two traditional parties and encouraged cooperation between them, while they were becoming more similar over time (Melo, 1978; Acevedo and Castao, 2002). The NF implied institutional stability, but political leaders did not take advantage of it in order to gain real democratic support. For instance, although some social reforms were proposed during that period, they were not fully executed or not even undertaken and were just credible as attempts to legitimizing an exclusive and unfair political system (Melo, 1978; Acevedo and Castaño, 2002). Accordingly, Hartlyn (1984; 1988) points out the marginalization of the common people from policymaking: "[The National Front] promoted the defense of organized minority rights over majority rights, thwarted reform, and produced governments with strong immobilist tendencies" (Hartlyn, 1984, p. 247).

One important effect attributed to the NF was increased clientelism. As the NF promoted intraparty competition, not competition across parties, the NF produced fragmentation within parties (Pizarro, 2004). Members of a same party had to compete for the presidency, as well as for the share of bureaucratic quotas. This fragmentation was likely to increase clientelism due to the increasing need of support outside the own party (Pizarro, 2004), and due to the obstacles to governance faced by the executive.[10] On the other hand, following the hypothesis of Robinson (2005), it can be argued that the NF gave the traditional parties the time and space to build the necessary networks in order to keep power easily through clientelism.

One salient fact during the NF was the emergence of illegal armed groups, some of which persist until these days. Hence, while the NF eliminated violence between traditional parties, it induced another form of violence as a response to political exclusion (Acevedo and Castaño, 2002; Pizarro, 2004).

While the emergence of these armed groups is important evidence that the NF represented a political shock, the latter probably had other less visible, but no less relevant, effects. The literature clearly identifies an increasing distrust in elections and democracy and thus a rise in abstentionism during the period of the NF (Acevedo-Castaño, 2002). There was a feeling that electoral results were predetermined (Tirado, 1989); on the other hand, as Liberals and Conservatives were turning more ideologically equal, they could not offer distinguishable options to the citizens (Melo, 1978).

[10]The NF agreement also established a mandatory two-thirds majority vote in the Congress until 1968 (Hartlyn, 1984).

As Melo (1978) points out, rising abstentionism was even resistant to processes like the growth of urban population, the increase in the literacy and numeracy rate, as well as the improvement of media. It is then argued that the linkages between parties and citizens turned more dependent on the provision of private benefits (Melo, 1978).

2.2.2 Variation in the magnitude of the National Front impact

The NF agreement imposed a formal barrier to political participation and may have increased clientelism as a consequence of intraparty competition, political exclusion, and the absence of an opposition control, which made clientelistic networks easier to build. Although this agreement was valid in the whole country, the magnitude of its impact was not likely equal across regions. Some regions were more politically diverse than others before the NF, or in other words, some regions had a stronger preference for parties other than the Liberal and Conservative and, as a consequence, these regions experienced a higher political exclusion.

Non-traditional parties in the first half of the twentieth century were already facing high entry barriers to the political system, and therefore many of these third parties did not have continuity in the political scene. The only exception was the Communist party (Pizarro, 1997); it was founded in 1930 and its main support came from previous farmers and laborers' political movements grouped into the former Socialist party (Medina, 1989).

Figure 2.1 shows a map of Colombia locating the 57 municipalities in the main survey sample used in the empirical analysis below; it displays differences in their mean electoral share of non-traditional parties before the NF.[11] As can be seen, preference for non-traditional parties in the sample is fairly well spread across departments. Figure 2.2, in turn, shows mean electoral share of non-traditional parties before the NF at the department level. Now some regions (areas including more than one department)[12] look more homogeneous than others; for instance, the Pacific-north region with a high mean electoral share of non-traditional parties, and the south-west region, which exhibits in contrast a very low share. Also homogeneous is the 'Viejo Caldas'-Antioquia region, whereas the Atlantic coast, the central region of the country and the 'Santanderes' (Santander and Norte de Santander departments) display more

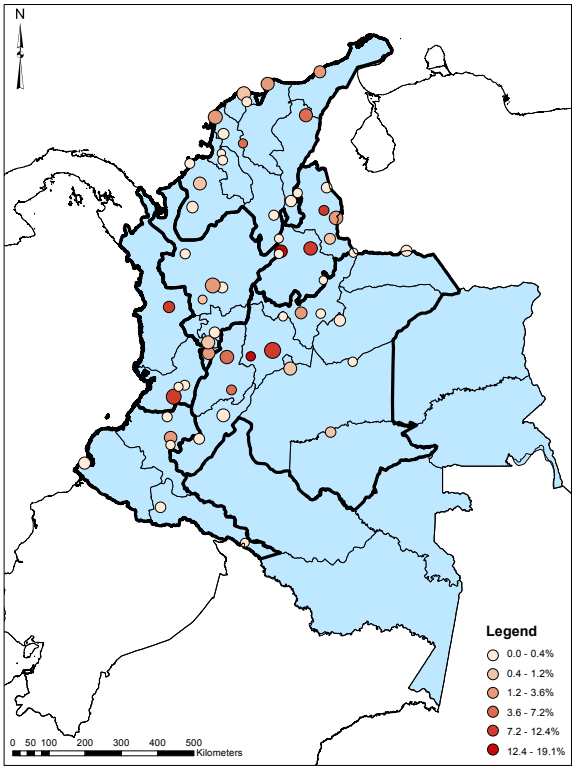
[11] Figure 2.4 (in the Appendix) indicates municipalities with a mean electoral share of non-traditional parties before the NF higher than 1% in order to ease the observation of 'treated' municipalities according to this threshold.

[12] These regions are bordered with a thicker line in the figures.

heterogeneity.

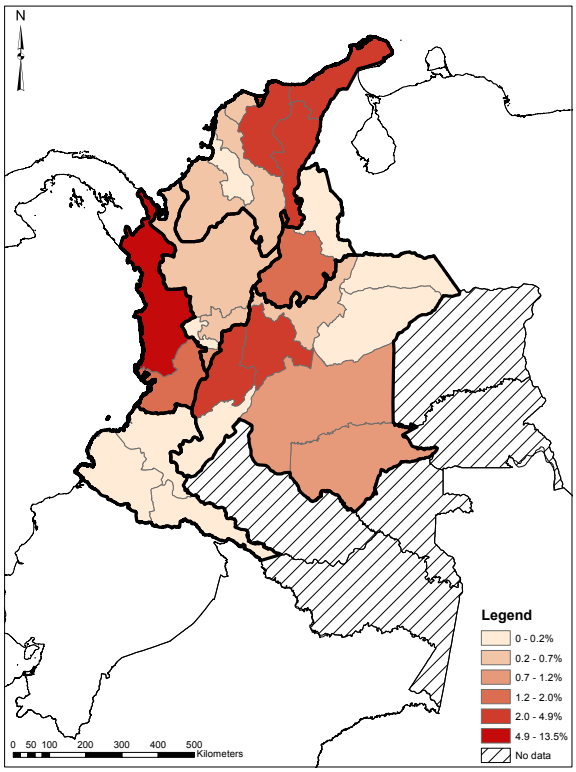
The variation observed in these figures is used in this paper in order to measure the effect of political exclusion on social capital in a within-country setting. The conditions for identification of such effect will be discussed in the empirical strategy.

Figure 2.1: Mean electoral share of non-traditional parties 1941-1951 across municipalities in the sample.



Notes: Circle size is proportional to (log) municipality population. Regions bordered with a thicker line are used for defining region fixed effects in the empirical strategy.

Figure 2.2: Mean electoral share of non-traditional parties 1943-1951 across departments



Notes: Mean electoral share of non-traditional parties before the NF was not available for San Andrés -archipelago not shown in the map-, Amazonas, Caquetá, Vaupés, Guainía and Vichada, as indicated in the map. Although it was not available for the Arauca, Casanare and Guaviare departments, either, this measure in their respective capital city is shown in order to cover all departments in the sample. These three departments are not included in Figure 2.3, nor in panel regressions presented in Table 2.3.

2.3 Data description

2.3.1 Social capital and state perception data

I use the Colombian social capital survey –Barcas- for the year 2011 in order to obtain measures of interest. Barcas is the source used by the World Values Survey and has a representative sample of individuals from 57 Colombian municipalities, 26 of which are departments' capital cities.[13] It surveys a total of 3028 individuals.

Social capital outcomes are based on the following questions: 1) Generally speaking would you say most people can be trusted, or one cannot be that trusting when dealing with people?; 2) Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? With the first question I aim to measure generalized trust; I then define the variable *trust*. With the second question I measure perception of free riding behaviors, and based on it I define the variable *fair*.[14] *trust* and *fair* will be used as dependent variables in the empirical strategy.[15]

The Barcas survey also allows observing some individuals' characteristics that I would like to control for. I can observe if the individual considers himself as belonging to an ethnic/racial group, namely, black or indigenous. I also identify if the individual has been a victim of the armed conflict in Colombia, by considering positive answers in any of the following three questions: Have you lost any member of your family or close relative because of the armed conflict? Has any member of your family, or have you had to take refuge or to leave your home because of the armed conflict? Has any member of your family had to leave the country because of the armed conflict?

Some questions in the Barcas survey are related to distrust towards the state, which is the suggested channel in this study. I construct a *corruption* variable based on the reported corruption perception in public offices; I also construct the variable *all_equal*, which indicates the extent to which individuals believe that state's decisions are not applied equally to everybody.

[13] Given that a significant part of the regions' population is concentrated in capital cities, total population of the 57 municipalities in the sample would account for 46% of the country population.

[14] Although the Barcas survey also provides questions on the extent to which individuals accept free riding behavior (or are free riders), these questions are subject to be dishonestly answered as these kinds of behavior should not be socially acceptable. Yet, some literature based on experimental data has pointed out that people's statements about the behavior of others may reflect to some extent how they behave themselves (Glaeser et al., 2000).

[15] Mean values of trust and fair in each municipality are shown in the Colombian map in Figure 2.5 and Figure 2.6, respectively.

2.3.2 Electoral data

The Colombian national electoral office (*Registraduría Nacional del Estado Civil*) is the source for electoral data. Variables of interest are electoral share of non-traditional parties, defined as the share of votes for non-traditional parties in total votes for a given elections, and electoral turnout, defined as total number of votes over electoral potential (individuals able to vote).

Electoral reports were directly consulted for electoral share of non-traditional parties and electoral turnout at the municipal level before 1958. Some (10) municipalities in the Barcas survey did not exist before 1958 (were not recognized as municipalities given their small size). However, the electoral share of non-traditional parties before the NF could be established for them as being zero, since this share was either zero for the whole department, or, if positive, this share was the outcome of votes in other municipalities within the department, where these other municipalities also exist today.

On the other hand, electoral share of non-traditional parties in recent decades (1994 onwards) is calculated with databases provided by Universidad de los Andes, and electoral turnout at the department level was consulted at the Electoral Processes Observatory - Universidad del Rosario.

2.3.3 Socio-economic and geographical data for municipalities

I use two Colombian censuses in order to construct socio-economic variables at the municipality level. One census is the one closest before the treatment in 1951;[16] the second census in 2005 is the one closest to social capital outcomes. An important problem faced with the 1951 Census is heterogeneity in the type of information available for all municipalities. This restricts the number of covariates I can construct from it.

Additional variables are provided by the Center of Economic Development Studies (CEDE) at Universidad de los Andes. Their original sources are the National Administrative Department of Statistics –DANE (for poverty and inequality indexes), the Geographic Institute Agustin Codazzi –IGAC (for geographic data) and the Colombian Presidency Observatory of Human Rights (for presence of illegal armed groups and violence).

[16]For municipalities in the Barcas survey that did not exist in 1951, I have to assume departments averages for some variables and estimate their population in that year according to population growth rates.

2.3.4 Descriptive statistics

All variables presented above are defined in Table 2.24 in the Appendix and descriptive statistics of them are shown in Table 2.1. Municipalities are divided into treatment and control group in Table 2.1 using a binary treatment, which takes the value of one if mean electoral share of non-traditional parties in 1941-1951 is higher than one percent. The comparison of covariates by treatment status is further discussed in section 2.4.2 below.

[Table 2.1 here]

2.4 Empirical strategy

The empirical strategy pursues the identification of a causal effect of political exclusion on social capital in Colombia. I have argued that the National Front –NF- implied a major shock as it institutionalized political exclusion of non-traditional parties; moreover, I claim there was variation in its impact, considering the extent to which individuals identified with those parties, and were therefore excluded from the political system.

The employed measure for political exclusion treatment is thus the mean electoral share of non-traditional parties in each municipality before the NF, more precisely, during the period 1941-1951[17] (*political_exclusion*). The main issue of concern is, however, that the variation in the treatment may not be exogenous for social capital; electoral share of non-traditional parties might be related with social capital in the past or with some other factors that determine social capital today.

In the following subsections I will present the baseline model for cross-sectional data (which uses social capital outcomes from the Barcas survey), the conditions for identification of a causal effect, and finally, a panel approach using an alternative measure of social capital.

[17]This period corresponds to 6 legislative elections before the NF. See Table 2.24 for a more precise definition.

2.4.1 Baseline model

The baseline model is given by equation (2.1), where social capital outcomes at the individual level are a function of region fixed effects, treatment and control variables.

$$Social\ Capital\ Outcome_{ij} = \eta_R + \beta\ political\_exclusion_j + X'_{ij}\theta + Z'_j\gamma + \epsilon_{ij} \qquad (2.1)$$

Index i denotes individuals in the sample, whereas index j refers to the corresponding municipality for individual i. *Social Capital Outcome* is either the variable *trust* or $fair$. η_R are region fixed effects. These Colombian regions are wider than departments and can be clearly identified in that country, since cultural and economic characteristics are similar within them, and also different from these characteristics in other regions. Municipalities in the sample can be classified into six regions, which were already mentioned in section 2.2.2.[18] Department fixed effects would be preferable, but for some departments I do not have more than one municipality in the sample and hence they would capture the treatment. X is a vector of individual controls; Z is a vector of control variables at the municipality level.

Since the political exclusion treatment is defined for each municipality, standard errors are clustered at the municipality level. I also estimate the baseline model considering mean social capital outcomes in each municipality. By doing so, I am restricting the sample to 57 observations, which makes hypotheses tests more demanding.

2.4.2 Conditions for identification

The empirical setting above uses the NF event in order to measure a political exclusion treatment. This can be understood as a quasi-experimental setting if the following conditions hold.

First, individuals should be comparable among treated and control municipalities. An important step in that direction is to know what makes treated municipalities different from non-treated, in order to avoid that the estimated treatment effect captures influences on social capital other than that of political exclusion. Table 2.1 reports results of a mean comparison test between treated and non-treated municipalities for covariates before and after the treatment. For this purpose a binary treatment is now

[18] Central region (including Bogotá), Atlantic coast, Pacific-north, south-west, 'Viejo Caldas'-Antioquia (region associated with coffee production in Colombia), and 'Santanderes' in the north-east (formed by two departments: Santander and Norte de Santander).

used.[19]

Treated municipalities have, on average, a significantly greater population size and urbanization rate in 1951 as well as in 2005. On the one hand, a larger population size may reflect a higher level of economic activity, but also the fact that individuals are more exposed to an unfamiliar environment (i.e. to treat with strangers). On the other hand, urbanization is likely related with the type of economic activities performed (treated municipalities have indeed a significantly lower share of the population in the agricultural sector), and may also be a measure of population density, both of which might be able to explain differences in social capital. Hence, I control for population size and urbanization rate in 1951 and 2005, as well as for share of the population in the agricultural sector in 2005.

Bigger and more urbanized municipalities considerably attract migrants from many regions in Colombia, and this fact could be the reason why these municipalities exhibit a greater dispersion of political preferences and lower levels of trust. Although the mean share of immigrants (including Colombians from other departments) is not significantly different between treated and non-treated municipalities, I control for the latter measure in the model.

Geographical conditions can also tell how a given community is organized and which incentives it may have for cooperation. I include altitude, as well as the presence of main export mineral resources in Colombia, namely gold, emeralds and coal, as control variables in the model.

Treated and control municipalities significantly differ in poverty and inequality outcomes measured by the unsatisfied basic needs index –ubn- and gini coefficient, respectively. Along with them, schooling years of the population in 2005 and literacy rate in 1951 also differ between treatment and control group. It is then meaningful to observe these development features in the model, as they not only affect social capital, but might be also an outcome of social capital in the past. Unobserved development characteristics at the municipality level are captured by distance to the department capital city (thereby also controlling for the capital-city effect).

Whereas differences in municipalities' development are important to explain social capital outcomes, I am also able to observe individual characteristics from the

[19] A municipality is treated if *political_exclusion* is higher than 1%. 20 out of 57 municipalities are considered treated in Table 2.1, where the median value of *political_exclusion* is 0,09%. This value indicates the lowest positive electoral share of non-traditional parties, which means that 28 municipalities have no electoral share of these parties before the NF. Although this value would be a natural treatment threshold for the purposes in Table 2.1, I take a higher, more conservative threshold.

Barcas survey. Individual covariates used in the model are exogenous for answers measuring social capital, but can very likely explain differences in trust levels or perception of free-riding behaviors. Individuals belonging to ethnic minorities have a broader history of exclusion (not only from the political system) and are likely to share many cultural characteristics within their groups. Hence, I capture variation in social capital coming from these historical differences using dummy variables that indicate the membership to black ethnicity and indigenous ethnicity. On the other hand, individuals in the sample that have been affected by the armed conflict in Colombia can be identified. They probably exhibit lower levels of trust given their particular experiences and this is captured by including a victim dummy variable. It is also possible to observe if political violence from the period 1948-1953 (violence 1948-1953) was present in a given municipality. This well-known period of violence in Colombia (which led to the military coup in 1953, and this, in turn, to the NF) may have damaged social capital and led to particular attitudes towards parties and democracy.

Finally, region fixed effects defined in the previous subsection allow capturing any unobservable characteristics that are common within these regions, which are probably the outcome of the country's historical development. In this sense, I can be more confident about the orthogonality of the treatment with respect to unobservable variables.

A second condition for identification (or a particular case from the first condition) is that individuals with a specific level of social capital did not select into non-traditional parties. Despite the above mentioned set of controls at the individual and the municipality level, we may still be concerned that individuals with a lower social capital selected into non-traditional parties before the NF, and just because of cultural transmission we would observe worse social capital outcomes for treated municipalities today. In order to deal with this possibility, I would like to have a measure of social capital in the past or some observable that be an outcome of social capital. Following the literature,[20] electoral turnout should be a good outcome measure of social capital: It is likely to reflect civism and cooperation among individuals in a society and, in general, it expresses revealed behavior rather than stated preference. It is also a measure that is often available and comparable between periods of time within a same place (advantage that is used in the next subsection). I thus extend the baseline model by adding mean electoral turnout at the municipality level before the NF (1941-1947) as a regressor.

[20] See Putnam (1995), Ostrom (2000), Fowler (2006).

2.4.3 Using electoral turnout as dependent variable

As an alternative to the cross-sectional survey data approach delineated above, I use a panel of electoral turnout data to test if political exclusion implied by the NF affected the evolution of this variable. Electoral turnout at the department level in the period 1947-2006 (with gaps) is used in two different panel fixed effects models.

With the first model I want to establish the average effect of the NF treatment, and this model is given by:

$$turnout_{dt} = \mu_d + \delta_t + \beta\ postNF_t \cdot political\_exclusion_d + \epsilon_{dt} \tag{2.2}$$

where μ_d are department fixed effects, δ_t are time fixed effects and $postNF_t \cdot political\_exclusion_d$ is the interaction term between the treatment measure at the department level and a dummy variable that takes the value of one since 1974 onwards (i.e. the period after the NF).

The second model is described by:

$$turnout_{dt} = \mu_d + \delta_t + \sum_{\tau} \beta_\tau \cdot d_\tau \cdot political\_exclusion_d + \epsilon_{dt} \tag{2.3}$$

This model allows the estimation of the treatment effect for each year before and after the NF (d_τ are time dummies, where τ is an index for every year except for one). This is meaningful in that now it is possible to observe pre-trends according to treatment level, although the effect of political exclusion should be only observed after the treatment. Thus, it allows for a 'placebo' exercise.

It is worth noting several other advantages of the empirical setting proposed in this subsection. First, it allows capturing observed and unobserved characteristics that are time-invariant and specific to each department.[21] It also captures the effect of other events in the recent country history that may have affected electoral turnout in a given year within the time span used here. Foremost, the panel setting allows observing the timing of the political exclusion effect and what might have happened to social capital (as measured by electoral turnout) during the years right after the NF.

[21] Several factors may cause systematic differences in electoral turnout across departments, for instance, historical attitudes towards democracy. These are captured by department fixed effects.

2.5 Results

Estimates for the baseline model are shown in columns (1) and (5) in Table 2.2.[22] A higher political exclusion treatment, as measured by the mean electoral share of non-traditional parties before the NF, is significantly associated with lower levels of trust and with a higher perception of free-riding behaviors. To understand the magnitude of the coefficients, one can relate the estimated effect to a one-standard-deviation change in *political_exclusion*. Increasing the level of *political_exclusion* by one standard deviation reduces the probability that an individual trusts most people by 2 percentage points, or, equivalently, by 27% of one standard deviation in the trust variable. The same change in the treatment also increases the perception that others will take advantage by 36% of one standard deviation in the *fair* variable.

I include the proxy for social capital before the NF (mean electoral turnout) in columns (2) and (6). The estimated treatment effect is slightly lower, but still significant for both outcomes (at the 10% level with the *trust* variable). Mean electoral turnout in the period before the treatment is not significant in either case.

[Table 2.2 here]

Using social capital outcomes aggregated at the municipality level in columns (3), (4), (7) and (8), rather than at the individual level, results from the previous regressions are confirmed for the *fair* variable. The treatment preserves its negative association with the *trust* variable, although its coefficient is not statistically significant.

Table 2.3 reports estimates for the panel fixed effects models using electoral turnout at the department level as dependent variable. After controlling for time fixed effects, a higher political exclusion imposed by the NF is significantly associated with a lower average electoral turnout after the treatment (column (1)).

Figure 2.3 shows a corresponding picture. To allow for a graphic representation of the relationship, a binary treatment definition is used (department is treated if mean electoral share of non-traditional parties before the NF is higher than 0.5%)[23]. Electoral turnout is very similar among treated and non-treated departments before and during the NF, but for all the period after 1974 treated departments have always a clearly

[22] Table 2.2 reports OLS estimates. Logit and ordered logit estimates in tables 2.15 and 2.16 (in the Appendix) confirm results presented here.

[23] 0,5% is approximately the median value of mean electoral share of non-traditional parties in 1943-1951.

lower level of electoral participation.[24]

Figure 2.3: Mean electoral turnout among Colombian departments 1947 - 2006

Notes: Vertical lines delimit the National Front period. This graph includes 23 departments since the treatment measure is not available for the remaining 9 Colombian departments. Treated departments by the National Front are defined in this graph as the ones with a mean electoral share of non-traditional parties higher than 0.5% (approximately the median) for the period 1943-1951.

Column (2) in Table 2.3 shows estimated coefficients for interaction terms between the treatment measure and year dummies, where the omitted interaction term is the one for 1962. A higher mean electoral share of non-traditional parties before the NF is only significantly related to lower electoral turnout for years after the NF, namely, the period 1986-2002. In other words, non-treated and treated departments do not seem to be in different trends before the NF, whereas they clearly diverge after the treatment.

[Table 2.3 here]

[24]Figure 2.7 displays mean standardized turnout after the NF across departments in the Colombian map. The mean standardized turnout in a given department tells, on average for the period after the NF, by how many standard deviations (and in which direction) electoral turnout deviates from the mean electoral turnout in a given year.

Coefficients have a negative sign for all the period after the treatment, and they start to be statistically significant after the first three election years right after the NF. A simple intuition would tell that individuals were more willing to vote in the first election years for which alternative parties were allowed again to participate, and that this effect should have been stronger among departments with a higher treatment. This is clear in Figure 2.3 if electoral turnout in 1974 is considered (first elections with other parties). However, it is likely that the constitutional reform of 1968, which extended power sharing at some levels until 1986 (see footnote 8), made people feel their voting efforts were in vain.

These results suggest that political exclusion imposed by the NF implied a deterioration of civic engagement. In such a way, a negative association between political exclusion in the past and social capital in 2011, as reported by the estimates in Table 2.2, is more likely to be causally interpreted.

2.5.1 Robustness checks

I perform two alternative placebo treatments in the baseline model. First, I use the same measure of the treatment –mean electoral share of non-traditional parties- for the period 1994-2010 (*mean other 1994-2010*).[25] Second, I use mean electoral share of communist parties for the period 1994-2002 (*mean communist 1994-2002*).[26] Although the former seems by definition a more natural placebo, it is worth noting the following: The communist party was the main actor among non-traditional parties before the NF, and a large number of non-traditional parties have emerged today. An additional advantage of the recent electoral share of communist parties, besides being a more precise placebo, is that it allows checking for ideology effects on social capital. Both placebos aim at clarifying the same concern: If there is something about the treatment measure that is related to social capital and that I cannot observe, this measure today should be correlated with social capital and should capture any effect that does not respond to political exclusion by the NF.

Table 2.4 and Table 2.5 show OLS estimates for *trust* and *fair* at the individual level,

[25]Only independent parties are taken as non-traditional, not the different ones that have emerged from the Liberal and Conservative parties. These independent parties comprise left-wing parties, minorities' political movements and parties that have emerged to support independent candidates.

[26]There is no registered participation of communist parties after 2002 for Chamber elections, which are the ones considered throughout this study precisely because of their historically greater diversity of political parties.

respectively.[27] Columns (1) and (2) report again the baseline model results for comparison. Columns (3) and (5) show estimates using one placebo treatment at a time, and columns (4) and (6) include both the treatment and one of its measures today. For both dependent variables, placebo treatments are not significant, and when including the treatment and its measures today, mean electoral share of non-traditional parties before the NF is equally significant, bigger in magnitude, while the same measures today are not (except for the *mean other* coefficient in explaining the *trust* variable, which is significant at the 10% level).

[Table 2.4 here]
[Table 2.5 here]

I perform a propensity score approach in order to make municipalities comparable before the treatment. I use (log) altitude, distance to department capital city, presence of violence between 1948 and 1953, population, share of urban population and literacy rate in 1951, as well as mean turnout in 1941-1947, as pre-treatment characteristics to predict the probability of having a mean electoral share of non-traditional parties higher than 1% before the NF. This procedure suggests blocks of municipalities that can be considered comparable at the baseline (with the same propensity); I then create a dummy for each block of municipalities and include these dummies in the previous regressions with the continuous treatment. Estimates are presented in columns (7)-(12) of tables 2.4 and 2.5. All previous results concerning the political exclusion treatment are robust to this within-propensity-blocks analysis, and none of the placebo measures is significant to explain social capital outcomes in any specification.[28]

Migration during and after the NF treatment could be a concern, as it might dilute the observed effects or even lead to spurious correlations. I therefore estimate the different specifications in columns (1)-(6) using regressions weighted by the share of non-immigrants in each municipality in 2005.[29] Results for these weighted regressions are shown in Table 2.14 in the Appendix and they lead to same conclusions as before: A higher political exclusion treatment is significantly associated with a higher perception of free-riding behaviors and lower trust levels, also after controlling for a proxy

[27] Logit and ordered logit estimates are shown in tables 2.15 and 2.16 in the Appendix and they lead to the same conclusions as the results presented here.

[28] These results are confirmed by logit and ordered logit estimates in tables 2.15 and 2.16.

[29] Unfortunately, I am not able to know the year of migration of individuals born in Colombia. Thus, I am also including in immigrants those people who had already migrated before the NF. These are likely to be few in 2005.

of past social capital; measures of the treatment today are not significantly related to social capital outcomes.[30]

[Table 2.14 here]

2.6 Investigating the channel

The hypothesized channel through which political exclusion about 50 years ago can explain social capital differences today is distrust towards the state. In that case, variation in political exclusion across regions should lead to a corresponding variation in this channel. To the extent that abstentionism reflects distrust towards the state, electoral turnout results presented in the previous section would support the idea that the NF had a differential effect, and that regions facing a higher political exclusion due to the NF are the ones with lower levels of trust towards the state after the treatment.

I further investigate the proposed channel using direct measures of state perception from the Barcas social capital survey, namely corruption perception in public offices (*corruption*) and the perception that state's decisions are not applied equally to everybody (*all_equal*). First, I want to establish if political exclusion affected these measures. I perform the same regressions as before, but now with state perception as dependent variable. Results for these regressions are shown in Table 2.6 at the individual and municipality level, as well as in Table 2.7 (for *corruption*) and Table 2.8 (for *all_equal*) including robustness checks.[31] They indicate that a higher political exclusion treatment is associated with a higher perception of corruption in the state, where this association becomes significant (at the 10% level) for the within-propensity-blocks analysis. On the other hand, the NF treatment is not clearly related to the perception that state's decisions are not applied equally to everybody.

[Table 2.6 here]
[Table 2.7 here]
[Table 2.8 here]

Second, I want to verify the extent to which the treatment affects social capital through the suggested channel. For this purpose, I proceed in two steps. I first relate

[30]Table 2.17 and Table 2.18 in the Appendix show robustness checks with *trust* and *fair* aggregated at the municipality level, rather than at the individual level, as dependent variables.

[31]See tables 2.19 and 2.20 in the Appendix for ordered logit estimates.

state perception measures with social capital outcomes (odd columns in tables 2.9 and 2.10), and next I include both, the channel and the political exclusion treatment, as explanatory variables for social capital (even columns in tables 2.9 and 2.10).[32] I have to note that for this part of the exercise I can only determine correlations between state perception and social capital, rather than causal relationships, as it is hard to establish if it is just because individuals have low levels of trust that they also distrust the state as any other agent, or if the reverse is true. Nevertheless, these correlations are reported here for the purpose of linking the channel to the outcomes.

[Table 2.9 here]
[Table 2.10 here]

Table 2.9 indicates that a higher corruption perception is related to lower trust levels and a higher perception of free-riding behaviors. This significant relationship is also observed when including the political exclusion treatment, which is still significant, although lower in magnitude, to explain social capital outcomes. Table 2.10 reports a significant association between the perception that state's decisions are not equally applied to everybody (*all_equal*) and perception of free-riding behaviors. The political exclusion treatment is again significant to explain both social capital outcomes.

Results for the *corruption* variable may support the proposed channel in this paper: More politically excluded places would have a stronger feeling that individuals in power work for their own interests, which might have led to generalized selfishness and distrust. Nonetheless, results suggest that political exclusion still matters for social capital outcomes when controlling for the proposed channel. On the one hand, it is likely that state perception variables today cannot fully reflect state perception during and right after the treatment, which is the one argued to have undermined social capital. The latter could also explain why the treatment is not significantly related in some cases to state perception measures today. On the other hand, this can be evidence that political exclusion may have had an effect on social capital through other channels, as well.

An important possible channel to explore is presence of violence. As indicated by qualitative evidence, political exclusion produced violence against the state with the emergence of guerrilla groups during the NF period. If more politically excluded

[32] *corruption* is the explanatory variable of interest in Table 2.9 and *all_equal* in Table 2.10. Table 2.21 in the Appendix shows regressions weighted by the share of non-immigrants for this exercise, and tables 2.22 and 2.23 present logit and ordered logit estimates.

places had to suffer from a heavier and longer presence of violent groups, violence (coming from these groups or their opponents) could be the means by which social capital got damaged in treated places. Regressions in Table 2.11 examine if political exclusion is related to presence (share of years with presence within the periods 1985-1992 and 1993-2010) of ELN and FARC guerrilla groups, AUC paramilitary group (1993-2010) and to total attacks against civilians coming from any group as a share of total population (1993-2010). Results indicate no significant relationship between the treatment and violence measures, also when performing the within-propensity-blocks estimation.

[Table 2.11 here]

Tables 2.12 and 2.13 relate violence measures, as well as these measures together with the treatment, to social capital outcomes. No general significant association can be verified between violence measures and social capital, whereas the treatment is always significant to explain trust levels or perception of free-riding. These results may seem surprising, as one would expect a clear negative relationship between violence and social capital. However, it is possible to think that individuals have incentives to preserve or increase cooperation if they are facing a clear common threat.

[Table 2.12 here]
[Table 2.13 here]

2.7 Conclusion

This paper gives evidence for Colombia that political inequality may be an important cause of low social capital, this measured by generalized trust levels and perception of free-riding behaviors. I use an important institutional agreement in Colombia in order to test the effect of political exclusion on social capital. This was the National Front agreement, which for 16 years, between 1958 and 1974, established that political power could only be shared by the two traditional parties in that country. The National Front, although only a little part in the political inequality history in Colombia, gives the opportunity to test the effect of a formal institutionalized political exclusion that affected all regions in the country at the same time, even though with differential effects according to the initial political diversity in each region.

Since this source of variation in the treatment is not likely exogenous for social capital, the empirical strategy seeks the identification of a causal effect of political

exclusion. I find that the National Front treatment (defined as the mean electoral share of non-traditional parties in 1941-1951) is associated with less trusting individuals today and with a higher perception of free-riding behaviors.

Additional evidence that political exclusion implied a deterioration of social capital is given by a decline in electoral turnout. Departments facing a higher political exclusion have, on average, a lower electoral turnout for all the period after the National Front and this negative association is only significant for years after the treatment. On the other hand, this finding also supports the idea that distrust towards the state may be a channel through which political exclusion in the past is able to explain social capital today.

Using survey measures of state perception today, results indicate that a higher National Front treatment is associated with a higher perception of corruption in the state, and this, in turn, is associated with lower social capital outcomes.

Political inequality may harm social capital, but can a low social capital explain the persistence of political inequality? In the following, I will sketch some possible explanations on why this could be the case. Distrust and free riding make elites more prone to work for their particular interests, as these features are also part of their behavior. A lower social capital, on the other hand, is likely to facilitate corruption, as there are more citizens willing to do favors for money or pay for personal favors (accept or give bribes), and so they ease the persistence of corrupt individuals in power. Finally, distrust and free riding represent an obstacle for the society to converge into unified objectives and to demand socially optimal institutions. As a result, institutions may become even more dependent on the ruling elite.

The idea behind this study implies that social capital responds to incentives and thus should not be understood as a country fixed endowment. Furthermore, this paper wants to provide an argument for the idea that formal institutions also matter through their effect on social capital, or more precisely in this case, that social capital may be an important channel through which political inequality has been central for Colombian development. Therefore, this paper may contribute to the literature that examines how social capital is formed (or damaged), how political institutions are relevant for economic development, and to the literature on the persistence of culture and institutions.

Further research on social capital in the context of developing countries is not only relevant for its potential direct effects on economic development, but it should be of interest given the extent to which it allows the persistence of other main causes of underdevelopment. Such an analysis would help to fill a gap in the range of development

policies.

Tables

Table 2.1: **Descriptive statistics**

	Municipalities by treatment status						Whole sample		
	No treated			Treated					
	N	mean	sd	N	mean	sd	N	mean	sd
trust	37	0.121	0.077	20	0.111	0.075	57	0.118	0.076
fair	37	5.619	1.313	20	5.130	1.217	57	5.448	1.291
political_exclusion ***	37	0.001	0.003	20	0.064	0.053	57	0.023	0.043
mean turnout 1941-1947 ***	35	0.496	0.112	20	0.362	0.084	55	0.447	0.121
*mean other 1994-2010***	37	0.215	0.127	20	0.291	0.124	57	0.242	0.130
mean communist 1994-2002	37	0.015	0.030	20	0.015	0.022	57	0.015	0.027
all_equal	37	2.209	0.370	20	2.335	0.364	57	2.253	0.369
corruption	37	3.177	0.253	20	3.254	0.271	57	3.204	0.259
*eln presence 1985-1992****	37	0.240	0.311	20	0.519	0.350	57	0.338	0.349
*eln presence 1993-2010***	37	0.326	0.345	20	0.578	0.367	57	0.414	0.370
farc presence 1985-1992	37	0.257	0.276	20	0.275	0.193	57	0.263	0.249
farc presence 1993-2010	37	0.599	0.377	20	0.704	0.305	57	0.636	0.354
auc presence 1993-2010	37	0.221	0.238	20	0.260	0.206	57	0.235	0.226
attacks rate 1993-2010	37	0.00009	0.00009	20	0.00008	0.00007	57	0.00009	0.00009
Socio-economic control variables									
black	37	0.028	0.086	20	0.049	0.133	57	0.035	0.104
indigenous	37	0.019	0.045	20	0.015	0.033	57	0.018	0.041
victim	37	0.319	0.197	20	0.247	0.142	57	0.294	0.181
population ***	37	71228.5	113405.8	20	832589.1	1534596	57	338372.5	970394.2
urban ***	37	0.570	0.209	20	0.770	0.193	57	0.640	0.223
immigrants	37	0.175	0.136	20	0.177	0.086	57	0.176	0.120
schooling ***	37	6.131	0.984	20	7.540	1.138	57	6.625	1.233
agric ***	37	0.429	0.228	20	0.218	0.245	57	0.355	0.253

(Continuation) Table 2.1: Descriptive statistics

	Municipalities by treatment status						Whole sample		
	No treated			Treated					
	N	mean	sd	N	mean	sd	N	mean	sd
*ubn***	37	46.448	20.413	20	29.393	20.979	57	40.464	22.014
*gini***	37	0.551	0.186	20	0.649	0.116	57	0.585	0.171
gold or emeralds	37	0.189	0.397	20	0.100	0.308	57	0.158	0.368
*coal**	37	0.054	0.229	20	0.200	0.410	57	0.105	0.310
(log) altitude	37	5.612	1.814	20	5.413	2.141	57	5.542	1.918
*distance to capital****	37	137.676	145.926	20	27.000	49.427	57	98.842	131.749
violence 1948-1953	37	0.108	0.315	20	0.150	0.366	57	0.123	0.331
*population 1951 ****	37	14787.4	23136.2	20	118464.5	160644.2	57	51165.3	107665.3
*urban 1951 ****	37	0.305	0.187	20	0.648	0.284	57	0.426	0.277
*literate 1951 ****	37	0.486	0.161	20	0.645	0.158	57	0.542	0.176

Notes: Municipalities are divided into treatment and control group according to a binary treatment, which takes the value of one if mean electoral share of non-traditional parties is higher than 1% for the period 1941-1951. Difference in means between treated and non-treated municipalities is: *** Statistically significant at the 1% level; ** statistically significant at the 5% level; * statistically significant at the 10% level.

Table 2.2: **OLS estimates at the individual and municipality level for social capital outcomes**

	trust				*fair*			
Unit of observation:	Individual[1]		Municipality[2]		Individual[1]		Municipality[2]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
political_exclusion	-0.473**	-0.396*	-0.379	-0.358	-10.888***	-7.912**	-9.332**	-9.573*
	[0.205]	[0.229]	[0.241]	[0.273]	[3.368]	[3.657]	[3.761]	[4.715]
mean turnout 1941-1947		0.047		-0.004		2.278		-0.336
		[0.084]		[0.113]		[1.886]		[2.090]
Obs	2967	2901	57	55	2943	2871	57	55

Notes: 1) Standard errors (in brackets) clustered at the municipality level. 2) Robust standard errors in brackets. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). ***Statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.

Table 2.3: **Panel fixed effects estimates for electoral turnout across Colombian departments as dependent variable**

	turnout			
	(1)		(2)	
	Coef.	se	Coef.	se
postNF_political_exclusion	-0.745***	[0.265]		
1947_ political_exclusion			-0.509	[0.820]
1966_ political_exclusion			0.022	[0.613]
1970_ political_exclusion			-0.673	[0.606]
1974_ political_exclusion			-0.712	[0.606]
1978_ political_exclusion			-0.428	[0.606]
1982_ political_exclusion			-0.779	[0.606]
1986_ political_exclusion			-1.820***	[0.606]
1991_ political_exclusion			-1.184**	[0.577]
1994_ political_exclusion			-0.977*	[0.577]
1998_ political_exclusion			-0.995*	[0.577]
2002_ political_exclusion			-1.246**	[0.577]
2006_ political_exclusion			-0.911	[0.577]
Obs	278		278	

Notes: 23 departments are used for these regressions since the treatment measure is not available for the remaining 9 Colombian departments. Both specifications include time fixed effects. The omitted interaction term in column (2) is the one for 1962. ***Statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.

Table 2.4: **OLS regressions for *trust* as dependent variable**

	trust											
							Within pscore blocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	-0.473**	-0.396*		-0.511***		-0.541**	-0.451*	-0.401*		-0.465**		-0.442*
	[0.205]	[0.229]		[0.190]		[0.209]	[0.227]	[0.233]		[0.218]		[0.223]
mean turnout 1941-1947		0.047						0.083				
		[0.084]						[0.089]				
mean other 1994-2010			-0.089	-0.111*					-0.030	-0.043		
			[0.067]	[0.066]					[0.070]	[0.071]		
mean communist 1994-2002					-0.231	-0.475					0.255	0.041
					[0.309]	[0.312]					[0.342]	[0.331]
Obs	2967	2901	2967	2967	2967	2967	2901	2901	2901	2901	2901	2901

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(6) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (7)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947).

***Statistically significant at the 1% level; **statistically significant at the 5% level; *statistically significant at the 10% level.

Table 2.5: **OLS regressions for *fair* as dependent variable**

	fair											
							Within pscore blocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	-10.888***	-7.912**		-11.040***		-11.641***	-11.025***	-9.851***		-10.639***		-10.546***
	[3.368]	[3.657]		[3.353]		[3.608]	[3.560]	[3.272]		[3.643]		[3.891]
mean turnout 1941-1947		2.278						2.087				
		[1.886]						[1.819]				
mean other 1994-2010			-0.006	-0.450					1.529	1.223		
			[1.275]	[1.206]					[1.170]	[1.126]		
mean communist 1994-2002					0.134	-5.143					7.393	2.276
					[6.178]	[6.728]					[5.570]	[6.393]
Obs	2943	2871	2943	2943	2943	2943	2871	2871	2871	2871	2871	2871

Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(6) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (7)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947).

***Statistically significant at the 1% level; **statistically significant at the 5% level.

Table 2.6: **OLS estimates at the individual and municipality level for state perception measures**

	corruption				*all_equal*			
Unit of observation:	Individual[1]		Municipality[2]		Individual[1]		Municipality[2]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
political_exclusion	1.704	1.998	1.274	1.919	0.740	-0.293	0.106	-0.255
	[1.343]	[1.496]	[1.851]	[2.017]	[0.972]	[0.882]	[1.043]	[1.055]
mean turnout 1941-1947		0.223		0.545		-0.896*		-0.431
		[0.486]		[0.542]		[0.492]		[0.651]
Obs	2933	2861	57	55	2976	2905	57	55

1) Standard errors (in brackets) clustered at the municipality level. 2) Robust standard errors in brackets. Higher values for *corruption* and *all_equal* indicate a higher perception of corruption and that state's decisions are not equally applied to everybody. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). *Statistically significant at the 10% level.

Table 2.7: **OLS regressions for *corruption* as dependent variable**

	corruption											
							Within pscore blocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	1.704	1.998		1.729		1.714	2.560*	2.303*		2.482*		2.486
	[1.343]	[1.496]		[1.354]		[1.419]	[1.363]	[1.348]		[1.413]		[1.492]
mean turnout 1941-1947		0.223						-0.490				
		[0.486]						[0.659]				
mean other 1994-2010			-0.001	0.073					-0.309	-0.234		
			[0.263]	[0.251]					[0.286]	[0.258]		
mean communist 1994-2002					-0.736	0.071					-1.612	-0.340
					[1.251]	[1.361]					[1.191]	[1.268]
Obs	2933	2861	2933	2933	2933	2933	2861	2861	2861	2861	2861	2861

Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(6) also controlling for pretreatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (7)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). *Statistically significant at the 10% level.

Table 2.8: **OLS regressions for *all_equal* as dependent variable**

	all_equal											
							Within pscore blocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	0.740	-0.293		0.803		0.791	0.483	0.330		0.527		0.465
	[0.972]	[0.882]		[1.042]		[1.037]	[1.084]	[1.000]		[1.138]		[1.203]
mean turnout 1941-1947		-0.896*						-0.243				
		[0.492]						[0.703]				
mean other 1994-2010			0.149	0.183					0.117	0.133		
			[0.317]	[0.336]					[0.280]	[0.291]		
mean communist 1994-2002					-0.015	0.347					-0.311	-0.086
					[1.225]	[1.311]					[1.142]	[1.321]
Obs	2976	2905	2976	2976	2976	2976	2905	2905	2905	2905	2905	2905

Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(6) also controlling for pretreatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (7)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). *Statistically significant at the 10% level.

Table 2.9: **OLS regressions for social capital outcomes -*corruption* as explanatory variable of interest**

	trust				*fair*			
			Within pscore blocks				**Within pscore blocks**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
corruption	-0.024***	-0.023***	-0.025***	-0.024***	-0.404***	-0.381***	-0.447***	-0.418***
	[0.008]	[0.008]	[0.008]	[0.008]	[0.074]	[0.075]	[0.075]	[0.075]
political_exclusion		-0.396**		-0.377*		-10.411***		-10.465***
		[0.180]		[0.200]		[3.244]		[3.438]
Obs	2875	2875	2812	2812	2858	2858	2788	2788

Table 2.10: **OLS regressions for social capital outcomes -*all_equal* as explanatory variable of interest**

	trust				*fair*			
			Within pscore blocks				**Within pscore blocks**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all_equal	-0.014	-0.013	-0.015	-0.015	-0.283***	-0.270***	-0.294***	-0.286***
	[0.010	[0.010]	[0.010]	[0.010]	[0.089]	[0.087]	[0.094]	[0.092]
political_exclusion		-0.477**		-0.500**		-10.284***		-10.688***
		[0.210]		[0.224]		[3.282]		[3.427]
Obs	2921	2921	2859	2859	2900	2900	2831	2831

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Within-pscore-blocks regressions include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics ((log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951)) and mean turnout (1941-1947). Remaining regressions control for pre-treatment characteristics, as well. ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 2.11: **OLS regressions for violence measures at the municipality level as dependent variables**

	eln presence 1985-1992	eln presence 1993-2010	farc presence 1985-1992	farc presence 1993-2010	auc presence 1993-2010	attacks rate 1993-2010
	(1)	(2)	(3)	(4)	(5)	(6)
political_exclusion	0.606	0.795	0.486	-0.500	-0.645	0.0001
	[0.892]	[1.263]	[1.004]	[1.385]	[0.497]	[0.0003]
Obs	57	57	57	57	57	57
	Within pscore blocks					
political_exclusion	0.217	0.936	0.800	-1.169	-0.484	0.0002
	[0.895]	[0.814]	[0.788]	[1.281]	[0.692]	[0.0003]
Obs	55	55	55	55	55	55

Notes: Robust standard errors in brackets. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions in the top panel also control for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Within-pscore-blocks regressions include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947).

Table 2.12: **OLS regressions for *trust* -violence measures as explanatory variables of interest**

	trust											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
eln presence	-0.058	-0.044										
1985-1992	[0.035]	[0.033]										
eln presence			-0.021	-0.012								
1993-2010			[0.027]	[0.025]								
farc presence					-0.014	-0.001						
1985-1992					[0.036]	[0.033]						
farc presence							-0.021	-0.020				
1993-2010							[0.020]	[0.019]				
auc presence									0.028	0.017		
1993-2010									[0.034]	[0.031]		
attacks rate											-61.546	-49.708
1993-2010											[97.251]	[96.519]
political_exclusion		-0.436**		-0.466**		-0.480**		-0.477**		-0.467**		-0.476**
		[0.193]		[0.202]		[0.205]		[0.194]		[0.205]		[0.205]
Obs	2976	2976	2976	2976	2976	2976	2976	2976	2976	2976	2976	2976

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). **Statistically significant at the 5% level.

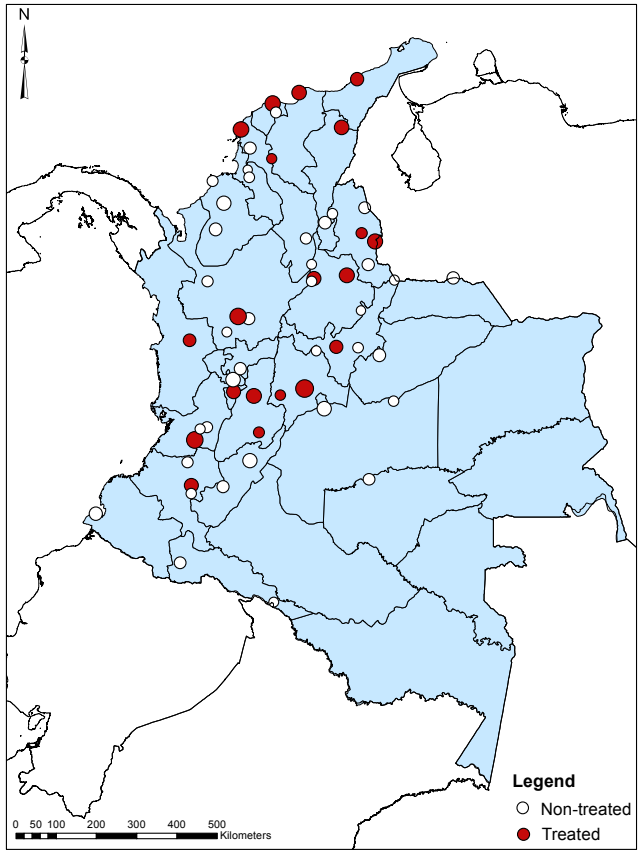
Table 2.13: **OLS regressions for *fair* -violence measures as explanatory variables of interest**

	fair											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
eln presence 1985-1992	-0.015	0.351										
	[1.025]	[0.895]										
eln presence 1993-2010			0.346	0.594								
			[0.617]	[0.541]								
farc presence 1985-1992					0.342	0.657						
					[0.694]	[0.628]						
farc presence 1993-2010							-0.315	-0.301				
							[0.394]	[0.325]				
auc presence 1993-2010									1.302**	1.063**		
									[0.527]	[0.497]		
attacks rate 1993-2010											1478.4	1674.8
											[2167.3]	[2073.1]
political_exclusion		-11.639***		-12.052***		-11.823***		-11.254***		-10.419***		-11.399***
		[3.643]		[3.843]		[3.877]		[3.238]		[3.468]		[3.639]
Obs	2943	2943	2943	2943	2943	2943	2943	2943	2943	2943	2943	2943

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). ***Statistically significant at the 1% level. **Statistically significant at the 5% level.

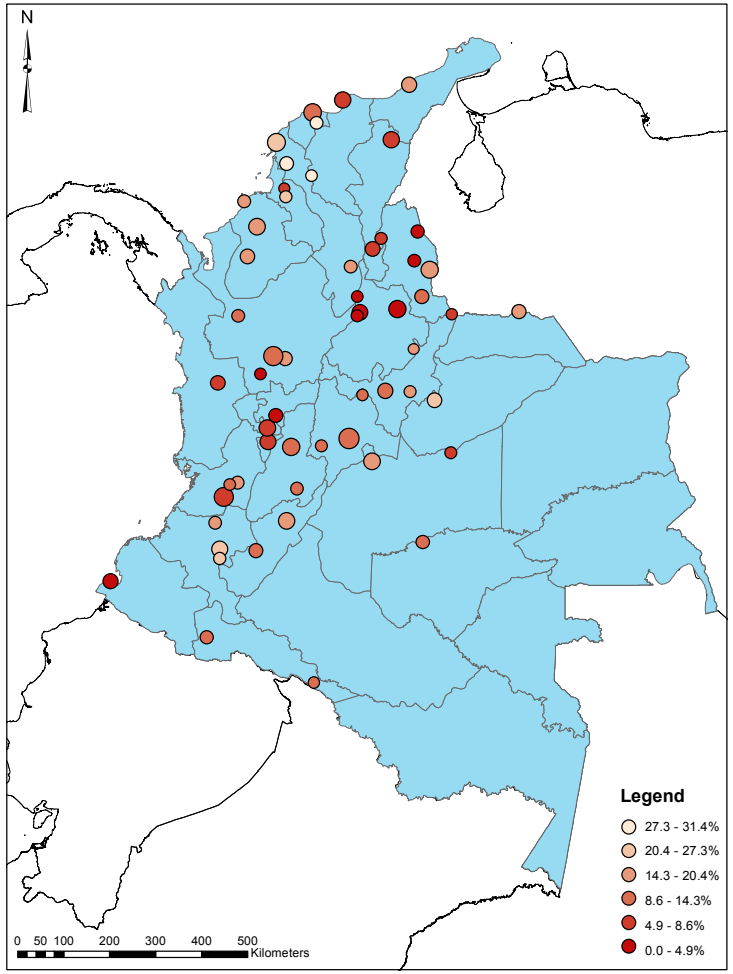
Appendix

Figure 2.4: Municipalities in the sample according to a binary treatment definition



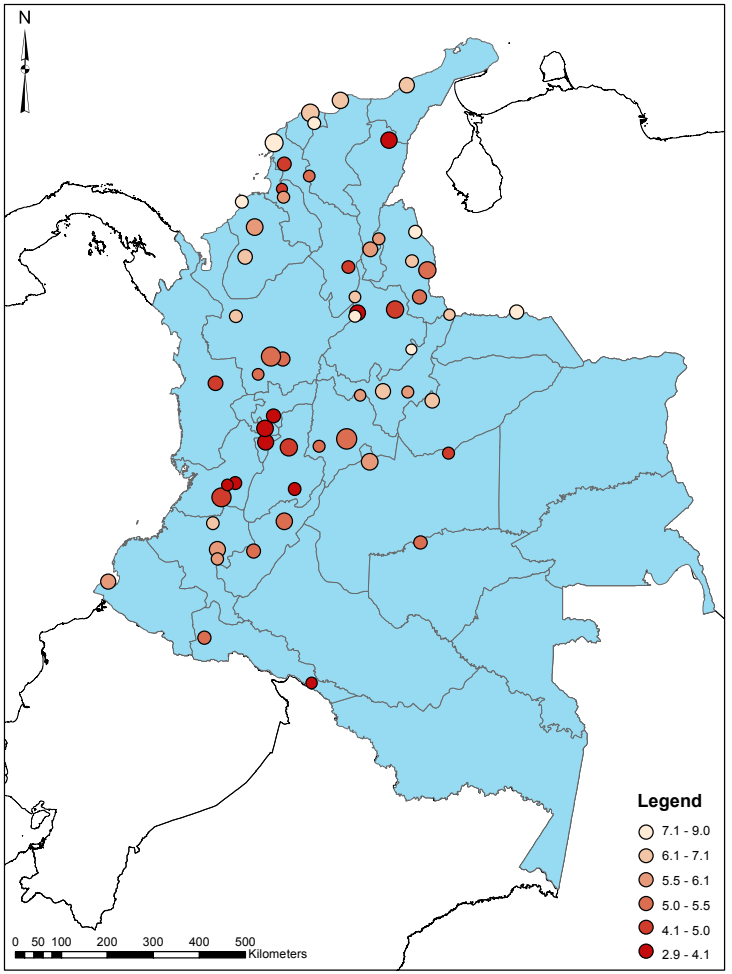
Notes: Treated municipalities in this graph are the ones with mean electoral share of non-traditional parties in 1941-1951 higher than 1%. Circle size is proportional to (log) municipality population.

Figure 2.5: Mean *trust* at the municipal level



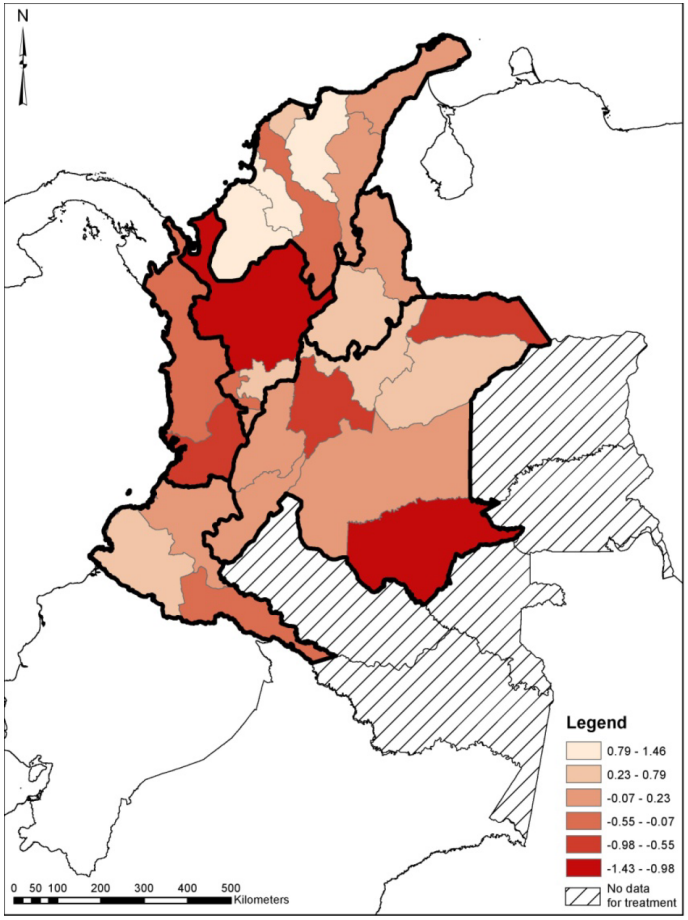
Notes: Legend indicates the share of individuals who answered that most people can be trusted. Circle size is proportional to (log) municipality population.

Figure 2.6: Mean *fair* at the municipal level



Notes: *fair* ranges from 1 (people take advantage) to 10 (people are fair). Circle size is proportional to (log) municipality population.

Figure 2.7: Standardized electoral turnout after treatment (1974 - 2006) across departments



Notes: The color scale indicates the mean value for the period 1974 - 2006 (after the NF) of the standardized turnout in each year (i.e. how many standard deviations does electoral turnout deviates from the mean electoral turnout in a given year). Regions bordered with a thicker line are used for defining region fixed effects in the empirical strategy.

Table 2.14: **OLS regressions weighted by non-immigrants for social capital outcomes**

	trust						*fair*					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	-0.481**	-0.413*		-0.512**		-0.547**	-10.889***	-8.300**		-11.102***		-11.838***
	[0.210]	[0.235]		[0.194]		[0.213]	[3.315]	[3.662]		[3.253]		[3.482]
mean turnout 1941-1947		0.039						1.970				
		[0.085]						[1.824]				
mean other 1994-2010			-0.087	-0.105					-0.377	-0.759		
			[0.068]	[0.066]					[1.235]	[1.142]		
mean communist 1994-2002					-0.234	-0.477					-1.517	-6.818
					[0.320]	[0.322]					[6.213]	[6.627]
Obs	2967	2901	2967	2967	2967	2967	2943	2871	2943	2943	2943	2943

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 2.15: **Logit regressions for *trust* as dependent variable**

	trust																	
							Weighted by non-immigrants						**Within pscore blocks**					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
political_exclusion	-7.010**	-6.583*		-7.245**		-7.688**	-7.151**	-6.921*		-7.330**		-7.818**	-7.640**	-7.078**		-7.912**		-7.567**
	[3.382]	[3.808]		[3.205]		[3.368]	[3.370]	[3.833]		[3.181]		[3.326]	[3.465]	[3.340]		[3.419]		[3.501]
mean turnout 1941-1947		0.232						0.077						1.077				
		[0.954]						[0.955]						[1.011]				
mean other 1994-2010			-1.027	-1.229*					-1.098	-1.271*					-0.677	-0.828		
			[0.748]	[0.743]					[0.751]	[0.738]					[0.749]	[0.739]		
mean communist 1994-2002					-3.540	-6.712*					-3.796	-7.033*					3.944	0.446
					[4.648]	[4.036]					[4.890]	[4.206]					[5.181]	[4.806]
Obs	2967	2901	2967	2967	2967	2967	2967	2901	2967	2967	2967	2967	2901	2901	2901	2901	2901	2901

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(12) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (13)-(18) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947).***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 2.16: **Ordered logit regressions for *fair* as dependent variable**

	fair																	
							Weighted by non-immigrants						Within pscore blocks					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
political_exclusion	-6.860***	-4.778**		-7.012***		-7.395***	-6.836***	-5.002**		-7.014***		-7.512***	-6.725***	-6.117***		-6.556***		-6.495***
	[2.206]	[2.215]		[2.150]		[2.394]	[2.153]	[2.214]		[2.051]		[2.280]	[2.145]	[2.000]		[2.225]		[2.351]
mean turnout 1941-1947		1.723						1.530						1.302				
		[1.282]						[1.247]						[1.102]				
mean other 1994-2010			-0.222	-0.490					-0.496	-0.717					0.783	0.596		
			[0.864]	[0.816]					[0.839]	[0.772]					[0.765]	[0.739]		
mean communist 1994-2002					-0.004	-3.504					-1.200	-4.694					4.288	1.104
					[3.965]	[4.501]					[3.966]	[4.410]					[3.430]	[3.999]
Obs	2943	2871	2943	2943	2943	2943	2943	2871	2943	2943	2943	2943	2871	2871	2871	2871	2871	2871

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(12) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (13)-(18) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). ***Statistically significant at the 1% level. **Statistically significant at the 5% level.

Table 2.17: **OLS regressions for mean *trust* at the municipality level as dependent variable**

	mean trust											
					Weighted by non-immigrants				**Within pscore blocks**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	-0.379	-0.358		-0.461*	-0.390	-0.373		-0.470*	-0.348	-0.303		-0.369
	[0.241]	[0.273]		[0.235]	[0.250]	[0.285]		[0.245]	[0.241]	[0.259]		[0.244]
mean turnout 1941-1947		-0.004				-0.009				0.096		
		[0.113]				[0.114]				[0.113]		
mean communist 1994-2002			-0.491	-0.713			-0.477	-0.709			0.030	-0.139
			[0.432]	[0.486]			[0.435]	[0.495]			[0.408]	[0.440]
Obs	57	55	57	57	57	55	57	57	55	55	55	55

Notes: Robust standard errors in brackets. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(8) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (9)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). *Statistically significant at the 10% level.

Table 2.18: **OLS regressions for mean *fair* at the municipality level as dependent variable**

	mean fair											
					Weighted by non-immigrants				**Within pscore blocks**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
political_exclusion	-9.332**	-9.573*		-10.546***	-9.666**	-10.061**		-11.163***	-10.432**	-10.690**		-10.890**
	[3.761]	[4.715]		[3.708]	[3.826]	[4.820]		[3.609]	[4.003]	[4.231]		[4.206]
mean turnout 1941-1947		-0.336				-0.510				-0.334		
		[2.090]				[2.010]				[2.057]		
mean communist 1994-2002			-5.547	-10.648			-7.687	-13.195			1.924	-3.052
			[9.124]	[9.927]			[8.872]	[9.397]			[8.689]	[9.728]
Obs	57	55	57	57	57	55	57	57	55	55	55	55

Notes: Robust standard errors in brackets. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(8) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (9)-(12) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). ***Statistically significant at the 1% level. **Statistically significant at the 5% level. *Statistically significant at the 10% level.

Table 2.19: **Ordered logit regressions for *corruption* as dependent variable**

	corruption																	
							Weighted by non-immigrants						**Within pscore blocks**					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
political_exclusion	3.932	4.600		4.027		3.959	4.485	5.249		4.589		4.676	6.222*	5.551*		6.020*		6.001
	[3.386]	[3.843]		[3.396]		[3.586]	[3.499]	[4.003]		[3.478]		[3.680]	[3.442]	[3.377]		[3.562]		[3.764]
mean turnout 1941-1947		0.501						0.570						-1.273				
		[1.164]						[1.165]						[1.568]				
mean other 1994-2010			0.090	0.265					0.171	0.346					-0.726	-0.524		
			[0.598]	[0.576]					[0.631]	[0.591]					[0.666]	[0.610]		
mean communist 1994-2002					-1.693	0.175					-0.889	1.306					-4.007	-0.990
					[2.800]	[3.119]					[2.926]	[3.193]					[2.730]	[2.956]
Obs	2933	2861	2933	2933	2933	2933	2933	2861	2933	2933	2933	2933	2861	2861	2861	2861	2861	2861

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(12) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (13)-(18) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947).*Statistically significant at the 10% level.

Table 2.20: **Ordered logit regressions for *all_equal* as dependent variable**

	all_equal																	
							Weighted by non-immigrants						**Within pscore blocks**					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
political_exclusion	2.171	-0.129		2.274		2.457	1.892	-0.422		1.979		2.200	1.561	1.195		1.602		1.585
	[2.421]	[2.203]		[2.544]		[2.568]	[2.516]	[2.304]		[2.630]		[2.664]	[2.664]	[2.435]		[2.747]		[2.940]
mean turnout 1941-1947		-2.012*						-2.024*						-0.507				
		[1.174]						[1.169]						[1.691]				
mean other 1994-2010			0.399	0.463					0.476	0.520					0.135	0.170		
			[0.764]	[0.794]					[0.807]	[0.834]					[0.670]	[0.687]		
mean communist 1994-2002					1.065	2.097					1.493	2.409					-0.591	0.122
					[3.001]	[3.172]					[3.139]	[3.336]					[2.761]	[3.169]
Obs	2976	2905	2976	2976	2976	2976	2976	2905	2976	2976	2976	2976	2905	2905	2905	2905	2905	2905

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Regressions (1)-(12) also controlling for pre-treatment characteristics: (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951). Regressions (13)-(18) include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics above and mean turnout (1941-1947). *Statistically significant at the 10% level.

Table 2.21: **OLS regressions weighted by non-immigrants –state perception measures as explanatory variables of interest**

	trust				*fair*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
corruption	-0.022***	-0.022***			-0.390***	-0.364***		
	[0.008]	[0.008]			[0.073]	[0.074]		
all_equal			-0.014	-0.013			-0.299***	-0.287***
			[0.010]	[0.010]			[0.090]	[0.088]
political_exclusion		-0.400**		-0.488**		-10.361***		-10.300***
		[0.183]		[0.216]		[3.204]		[3.240]
Obs	2875	2875	2921	2921	2858	2858	2900	2900

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), population size (1951 and 2005), share of urban population (1951 and 2005), literacy (1951), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), (log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). ***Statistically significant at the 1% level. **Statistically significant at the 5% level.

Table 2.22: **Logit/Ordered logit regressions for social capital outcomes -*corruption* as explanatory variable of interest**

	trust						*fair*					
			Weighted by non-immigrants		Within pscore blocks				Weighted by non-immigrants		Within pscore blocks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
corruption	-0.243***	-0.233***	-0.228***	-0.217***	-0.257***	-0.246***	-0.250***	-0.234***	-0.240***	-0.221***	-0.280***	-0.259***
	[0.072]	[0.071]	[0.074]	[0.074]	[0.075]	[0.074]	[0.046]	[0.048]	[0.045]	[0.047]	[0.046]	[0.047]
political_exclusion		-6.002**		-6.098**		-6.759**		-6.562***		-6.495***		-6.339***
		[2.953]		[2.931]		[2.957]		[2.142]		[2.093]		[2.081]
Obs	2875	2875	2875	2875	2812	2812	2858	2858	2858	2858	2788	2788

Table 2.23: **Logit/Ordered logit regressions for social capital outcomes -*all_equal* as explanatory variable of interest**

	trust						*fair*					
			Weighted by non-immigrants		Within pscore blocks				Weighted by non-immigrants		Within pscore blocks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
all_equal	-0.130	-0.122	-0.129	-0.121	-0.149	-0.143	-0.187***	-0.180***	-0.197***	-0.191***	-0.185***	-0.183***
	[0.099]	[0.100]	[0.096]	[0.096]	[0.095]	[0.096]	[0.056]	[0.054]	[0.057]	[0.055]	[0.059]	[0.059]
political_exclusion		-7.025**		-7.184**		-8.299**		-6.557***		-6.555***		-6.634***
		[3.363]		[3.358]		[3.563]		[2.175]		[2.132]		[2.082]
Obs	2921	2921	2921	2921	2859	2859	2900	2900	2900	2900	2831	2831

Notes: Standard errors (in brackets) clustered at the municipality level. All specifications controlling for region fixed effects, individuals with black ethnicity (2011), indigenous ethnicity (2011), victims of violence (2011), population size (2005), share of urban population (2005), share of immigrants including Colombians from other departments (2005), mean schooling years (2005), share of the population in the agriculture sector (2005), unsatisfied basic needs index ubn-(2005), gini (2002), presence of gold or emeralds and presence of coal (2000). Within-pscore-blocks regressions include dummies for blocks of the propensity score, which is calculated with pre-treatment characteristics ((log) altitude, distance to the department capital city, presence of violence between 1948 and 1953, population size (1951), share of urban population (1951) and literacy rate (1951)) and mean turnout (1941-1947). Remaining regressions control for pre-treatment characteristics, as well.***Statistically significant at the 1% level. **Statistically significant at the 5% level.

Table 2.24: **Variables description**

Variable	Description
trust	Generally speaking would you say most people can be trusted, or one cannot be that trusting when dealing with people? most people can be trusted: 1 one cannot be that trusting: 0
fair	Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair? 1 2 3 4 5 6 7 8 9 10 people would try to take advantage … people would try to be fair
political_exclusion	Mean share of votes for non-traditional parties in total votes for Chamber elections in 1941, 1943, 1945, 1947, 1949 and 1951. Non-traditional parties are those different from the Liberal and Conservative parties.
mean turnout 1941-1947	Mean share of total number of votes in electoral potential (individuals able to vote) for legislative elections in 1941, 1943, 1945, 1947.
mean other 1994-2010	Mean share of votes for non-traditional parties in total votes for Chamber elections in 1994, 1998, 2002, 2006 and 2010. Only independent parties are taken as non-traditional parties, not the different ones that have emerged from the Liberal and Conservative parties. These independent parties comprise left-wing parties, minorities' political movements and parties that have emerged to support independent candidates.

(Continuation) Table 2.24: Variables description

Variable	Description
mean communist 1994-2002	Mean share of votes for communist parties in total votes for Chamber elections in 1994, 1998 and 2002. There is no registered participation of communist parties after 2002 (at least until 2010) for Chamber elections.
corruption	How common do you believe are bribes and corruption in this country? Almost no public official is involved in corruption: 1 Some public officials are involved in corruption: 2 The majority of public official are involved in corruption.: 3 Almost every public official is involved in corruption: 4
all_equal	Do you agree, disagree or neither agree or disagree with the following statement: When the state makes a decision, it is applied equally to everybody. Agree: 1 Neither agree or disagree: 2 Disagree: 3
eln presence 1985-1992	Share of years within 1985-1992 for which there is registered presence of ELN guerrilla group in the municipality.
eln presence 1993-2010	Share of years within 1993-2010 for which there is registered presence of ELN guerrilla group in the municipality.
farc presence 1985-1992	Share of years within 1985-1992 for which there is registered presence of FARC guerrilla group in the municipality.
farc presence 1993-2010	Share of years within 1993-2010 for which there is registered presence of FARC guerrilla group in the municipality.
auc presence 1993-2010	Share of years within 1993-2010 for which there is registered presence of AUC paramilitary group in the municipality.
attacks rate 1993-2010	Mean ratio of total attacks against civilians (coming from any group) to population size for the period 1993-2010.

(Continuation) Table 2.24: Variables description

Variable	Description
black	Individual reports to be from black ethnicity: 1 otherwise: 0
indigenous	Individual reports to be from indigenous ethnicity: 1 otherwise: 0
victim	Individual gives an affirmative answer to any of the following questions: ▪ Have you lost any member of your family or close relative because of the armed conflict? ▪ Has any member of your family, or have you had to take refuge or to leave your home because of the armed conflict? ▪ Has any member of your family had to leave the country because of the armed conflict?: 1 otherwise: 0
population	Municipality´s population in 2005
urban	Share of individuals living in the urban area of the municipality in 2005
immigrant	Share of individuals in 2005 in the municipality that were born in a different department or different country.
schooling	Average number of schooling years of the municipality´s population in 2005.
agric	Share of individuals in the municipality working in the agricultural sector in 2005.
ubn	Unsatisfied Basic Needs Index in 2005. This measure of poverty degree ranges from 0 to 100.
gini	Gini coefficient in 2002.
gold or emeralds	Takes the value of 1 if there is presence of gold or emeralds; is zero otherwise.
coal	Takes the value of 1 if there is presence of coal; is zero otherwise.
(log) altitude	Natural logarithm of the municipality's altitude.
distance to capital	Distance in km from the municipality to its correspondent department capital city.

(Continuation) Table 2.24: Variables description

Variable	Description
violence 1948-1953	Takes the value of 1 if there was presence of violence in the period 1948-1953.
population 1951	Municipality´s population in 1951.
urban 1951	Share of individuals living in the urban area of the municipality in 1951.
literate 1951	Share of literate individuals in 1951.

Chapter 3

The Long Run Influence of Institutions Governing Trade: The Case of Colonial and Pirates' Ports in Mexico[1]

3.1 Introduction

The idea that free commercial activity can lead to the improvement of households and nations dates back to Ricardo's *On the Principles of Political Economy and Taxation*. Indeed, a number of studies have documented how overseas trade can have positive lasting effects for inter-ethnic cooperation and social peace (Jha, 2013); the emergence of institutions favoring economic growth (Acemoglu et al., 2005a); or sectoral composition and geographical/social patterns of economic organization (Jia, 2014; Gaikwad, 2015). Despite these findings, the role of state institutions accompanying commercial activities (e.g. for tax collection, organizing economic activity within a legal framework or defense) is less well understood. In this paper we exploit variation in the institutions governing trade between Spain and its American colonies to better understand their long run influence.

Specifically, we examine the long-term development impact of overseas trade in colonial Mexico conducted under two different institutional arrangements. The first of them was established by the Spanish state in recognized colonial ports, where ship-

[1]This is joint work with Jenny Guardado, University of Chicago.

ments of goods to and from Mexico were carefully overseen by the Spanish Crown bureaucracy, so that the levy of taxes and colonial laws were enforced. Yet, this was not the only way in which goods were traded with Mexico. In fact, a large share of goods in colonial Mexico came from contraband occurring in "pirate-ports" or ports in which goods were exchanged without the vigilant eye of the Crown; more precisely, with the explicit aim of avoiding colonial taxes and undermining the Spanish trade monopoly. Based on this clear distinction between Spanish state institutions and piracy, and using self-compiled historical records on the location of piracy and Spanish ports in New Spain (now Mexico), we assess how these institutional arrangements affected long-term economic development.

The empirical challenge when studying the impact of these two different institutional settings governing trade is that several conditions making trade profitable may have also led to better economic outcomes in the long-run. Pre-treatment conditions such as proximity to population and mineral resources may have driven the choice of ports by colonizers and pirates. Our strategy deals with these concerns by: 1) Controlling for unobservables among close neighboring municipalities; 2) using the presence of a colonial town as a proxy for municipal-specific characteristics related to development potential, settlements and the presence of a local political organization; and 3) identifying natural harbors along Mexican coastlines as a source of exogenous variation in the possibility to trade, thereby considering only municipalities with this clear (and common) geographical advantage.

Our results show that being a Spanish or pirate port in the colonial period led to significantly better long run development outcomes: A lower share of poor population, lower share of population lacking basic utilities and higher municipal tax income per capita. We further find that these results are not driven by a mechanical effect of carrying out trade in the present. Results indicate, however, that the presence of piracy is not significantly (or even negatively) related to some state presence outcomes as the ratio of roads network over municipal surface and number of agents at the Public Prosecution Office relative to population size, for which the presence of a Spanish port is positively associated. This finding is consistent with the idea that state institutions present in royal ports should have had an influence on public goods provision, as well as on the later presence of the state.

Although the magnitude of the Spanish treatment effect is in many cases significantly bigger than that of the piracy effect, our findings for piracy are rather surprising. Conventional wisdom would assert that piracy was detrimental for economic growth and development. Pirate ports were not only subject to attacks and pillage (which,

according to evidence, were more likely at the beginning of the colonial period), but also the state was either absent or weak, and thus no formal organization should have fostered economic growth. Our results suggest that the long development of trade since colonial times and the early relative prosperity of these places may have compensated the damaging effects of lacking a state. In particular, free trade underlying piracy activities, as opposed to a trade monopoly under Spanish rule, is a key factor to understand our findings. Free trade likely led to a considerable volume of traded goods and consumption, but also importantly to a broader merchant middle class.

This study contributes to the literature in several ways. First, consistent with other papers, it indicates that historical trade implied important developments that go beyond its direct effects on economic activity. Acemoglu et al. (2005a) argue, for instance, that Atlantic trade after 1500 induced fundamental institutional changes in Europe depending on pre-existing institutions. In countries where initial political institutions imposed constraints on the monarchy, Atlantic trade should have increased the power of merchants to demand institutions favoring property rights. Our paper shows, in contrast, that different institutions operating in Spanish colonies, as a result of this trade, influenced the colonies' later development.

In other contexts, Jha (2013) argues that inter-ethnic exchange in medieval trading ports in South Asia left a legacy of ethnic tolerance. More recently, Gaikwad (2015) claims that the establishment of trading settlements in India before colonization induced important economic transformations, not driven by formal institutions, resulting in very long term effects. These two studies use the idea of natural harbors as an exogenous endowment enabling trade. We use their approaches here in order to identify natural harbors along Mexican coastlines.

Second, this paper provides additional evidence of the heterogeneous legacies from different colonial activities.[2] We study the long term effects of colonial trade, but also of the prevalent different institutions governing this activity. Despite the strategic value of trade for the colonial power, the long term effects of colonial trade have not been extensively studied in former Spanish colonies. Piracy, although not classifiable as a Spanish colonial institution, was spread throughout Spanish America as a by-product of colonization. To the best of our knowledge, this is the first paper to study the long run effects of piracy in Spanish colonies.

While colonial institutions facilitating rent seeking and the profiting from office

[2]See, among others, Engerman and Sokoloff (1997), Bruhn and Gallego (2012) and Naritomi et. al. (2012) for evidence on the long run impact of different type of colonial activities related to production and resource extraction.

have been found responsible for long-run underdevelopment (Guardado, 2015), other studies highlight how certain investment decisions and tax-collection practices from colonial times lead to better bureaucratic outcomes in Nigeria (Berger, 2009), lasting public goods in West Africa (Huillery, 2009) or better investments in agriculture in India (Banerjee and Iyer, 2005). In this paper we highlight the long-term beneficial effect of colonial trade, despite the fact that trade was conducted under less than ideal conditions.

Finally, this paper documents the importance of informal (de facto) institutions in order to understand these legacies. As pointed out by other studies, the presence of extractive colonial institutions may have created long-lasting incentives to deviate from the law, this explaining a persistent gap between de jure and de facto institutions (Alvarez-Villa (2014)). Deviating from an extractive colonial law can result beneficial, as it was the case in commercial contracts between natives and state officials in colonial Mexico: Diaz-Cayeros and Jha (2014) find that places where indigenous individuals were better able to renege from unfavorable trade contracts and sell their crop on the spot market are better off in the long run. Our paper complements this perspective: Piracy and smuggling appeared as de facto institutions that had a significant role in the colonies' long run development. They emerged as a result of a rigid trade monopoly, and constituted the main way in which the law was escaped in the trade sector of the economy.[3]

The remainder of the paper is organized as follows: Section 3.2 presents a brief historical review on colonial trade and piracy in Spanish America. Our data is described in section 3.3. In section 3.4 we explain our empirical strategy for the identification of the Spanish and piracy treatment effects. Section 3.5 reports main results and robustness checks. Finally, section 3.6 concludes.

3.2 Colonial trade and piracy in Spanish America

For many scholars, overseas trade was a central feature of the colonial system linking the Iberian metropolis to the colonial territories overseas. The commercial relations between Madrid and the American territories can be best described as mercantilistic for most of the colonial period.[4] This approach to colonial trade followed both economic thinking at the time and economic goals of the Crown. Colonial trade, or more

[3]See Alvarez-Villa (2014) for evidence in the colonial mining industry.

[4]This would change towards the end of the colonial period under Bourbon rule.

precisely, "... a trade structure biased towards the metropolitan country became a necessary condition for the economic exploitation of colonial territories" (Kleiman, 1976, p. 459).

A trade monopoly with the colonies was important at securing a profitable market for Spanish products, but also for having privileged access to novel goods. As it is argued by Hersh and Voth (2009), an increased variety of goods resulting from colonial trade may have raised European living standards after 1492. More important to colonial powers, however, was the shipment of gold and silver from the colonies. The trade monopoly also shielded colonies from direct access to foreign traders, thereby reducing the likelihood that local production of gold and silver could be used to purchase foreign goods, undermining the export of these precious metals to Spain. For some historians, the discovery of large amounts of gold and silver in Spanish colonies led to "one of the most rigid systems of state regulation of colonial trade ever adopted by any country" (Hamilton, 1948, p. 41).

Finally, a monopoly on colonial trade also provided warranties to individuals willing to engage in discovery and colonization. By acting as a guarantor, the monopoly allowed enough capital to be raised for these purposes, despite of long waiting periods for returns, as well as risks involved in sailing to distant and barbarous places (Hamilton, 1948).

3.2.1 Spanish trade to the colonies

Spanish trade with the colonies, molded on the mercantilistic tradition, had the following characteristics: First, it restricted the number of actors who could officially engage in this activity. For instance, only "official fleets" were allowed to enter and leave Spanish ports. By decree, territories under Spanish rule were obliged to buy and sell only from authorized Spanish merchant houses; thereby, direct trade between the colonies and other foreign powers was considered illicit (Christelow, 1942). These restrictions were meant to guarantee favorable terms of exchange and rent accumulation, thus making trade highly profitable for a select group of merchants in the metropolis.

Second, along with limiting the number of actors involved, it also limited designated "ports of entry", and goods were heavily taxed upon arrival. Ships coming directly from Spain were only allowed to arrive in major ports, where they had to pay royal and municipal duties. Goods were then shipped from major to minor ports, only paying municipal duties in the latter. According to historical records presented by Walton (1810), duties on entry were equivalent to 9.5 percent for Spanish goods.

Foreign goods had higher charges: They paid 15 percent when arriving in Spain, 10 percent for being re-shipped and 7 percent as royal duty on entry, "besides municipal and other duties, which altogether amount to about 45 per cent" (Walton, 1810, p. 161). Export goods from the colonies, in turn, also had different customs treatment depending on the importing European country.[5]

All major aspects of trade were regulated by the House of Trade, which was first established in Seville in 1503, and then moved to Cadiz in 1717. Trade, navigation and migration licenses to America had to be requested there and all ships were to be rigorously inspected by Spanish officials upon returning to Spain (Hamilton, 1948).

3.2.2 Contraband trade

The natural consequences of this strict regulation was the emergence of a highly lucrative contraband trade. According to the British naval commander Sir John Narborough, "...the inhabitants of Chile had silver buckles to their belts and golden hilts to their swords but lacked the commonest of European manufactures" (Sir John Narborough's Voyage to the South Sea: 85-87, cited by Christelow (1942: 311)), thus highlighting the numerous opportunities for those willing to engage in this business.

As already mentioned, Spanish customs tariffs were responsible for extremely high prices of foreign goods. Foreign traders could not only offer goods at much lower prices if avoiding the legal course through Spain, but they could obtain a much higher profit rate, equivalent to that of the Spanish exporter in Cadiz (Walton, 1810). Therefore, as reported by Brown (1926), foreign traders never had difficulties in selling their goods, even more considering that they also sold on credit.

The considerable extent of smuggling during the Spanish colonial period is well-known.[6] Although there are no precise numbers for the volume of goods smuggled, there is evidence that foreign goods coming to Spanish colonies, both legal and contraband, exceeded by a large amount Spanish goods. At the beginning of the 19th century, colonies had larger deficits in their foreign trade[7] than in trade with Spain. Considering only trade with neutral ships, money outflows in 1807 amounted to 19.3 million pesos, as opposed to 15.8 million pesos flowing on average to Spain in the peace years 1802-1804 (Cuenca-Esteban, 1981).

[5]Llama, vicuña and sheep's wools were, for example, duty-free if they were sent to Spain, whereas they bore heavy taxes when shipped to a foreign country (Walton, 1810).

[6]See, among others, Brown(1926), Brown(1928), Nettels(1931), Goebel(1938) and Christelow(1942).

[7]Foreign trade refers to commerce with places other than Spain.

Contraband trade was greatly facilitated by the role played by foreign actors, such as Britain. Throughout the colonial period, British law constantly sought to foster and legitimize trade between the British West Indies and Spanish colonies, yet, such attempts were labeled as contraband and punished as a crime by Spanish officials. There is evidence that the large contraband trade carried by these British colonies during the first half of the 18th century was useful in undermining the Spanish monopoly (Goebel, 1938).

Wars in Europe also increased the value of contraband trade and provided further incentives to foreign merchants to engage in it. For instance, during the war between England and Spain in 1796 and the English blockade, trade was closed between their colonial ports and, therefore, commercial intrusion was needed by the British in order to secure metals and essential commodities for their colonies. Until the end of the Napoleonic Wars, communication and trade between Spain and its colonies was also frequently disrupted, of which the British took commercial advantage by meeting the increasing demands for goods among Spanish colonies (Goebel, 1938).

The Spanish Crown was well aware of these contraband activities and sought to counteract them in the following ways. First, channeling trade through few ports in order to ease the control of goods' flows and the enforcement of tax payment. Second, the Spanish government also conducted random searches of foreign vessels in the Caribbean, and maintained the presence of *guarda costas* or coast guards at all times in the region (Hamilton, 1948; Goebel, 1938). Despite such efforts, contraband trade was a lucrative business in the Americas during the whole period of restrictive trade and even in the late colonial period of the 18th century when trade was freed under Bourbon rule.

In addition to these limited measures, corruption among Spanish officials made smuggling possible in royal ports (Goebel, 1938; Brown, 1926; Walton, 1810). Spanish officials were eager to share profits or receive bribes in exchange of which they would supply false certificates, give assistance or "... close their eyes to the illicit introduction of English goods" (Brown, 1926, p. 665).

Aside from bribes, other practices linked to the South Sea Company, who was granted a trade monopoly by the English crown, were false measurements and excessive crowding of ships with permits,[8] charging goods on packet-boats only intended for slaves, and allowing its employees to individually trade, otherwise "sailors refused

[8]Goods offered for sale were measured by colonial officials as the ship's full load, while they were usually one third or less than the total charge (Brown, 1926).

to sail with captains who ventured to restrict their commercial activities" (Brown, 1926, p. 671). Similarly, boats loaded with contraband goods would follow licensed vessels until these have consumed their supplies, so that smuggled goods could then be transferred. English warships could also escort illegal vessels until they were safe, where it was customary that captains of such warships received a percentage of the profits of contraband trade. Finally, there is evidence that contraband trade was even carried out in camps of mines, where English traders could receive gold or silver before the legal fifth tax (Brown, 1926).

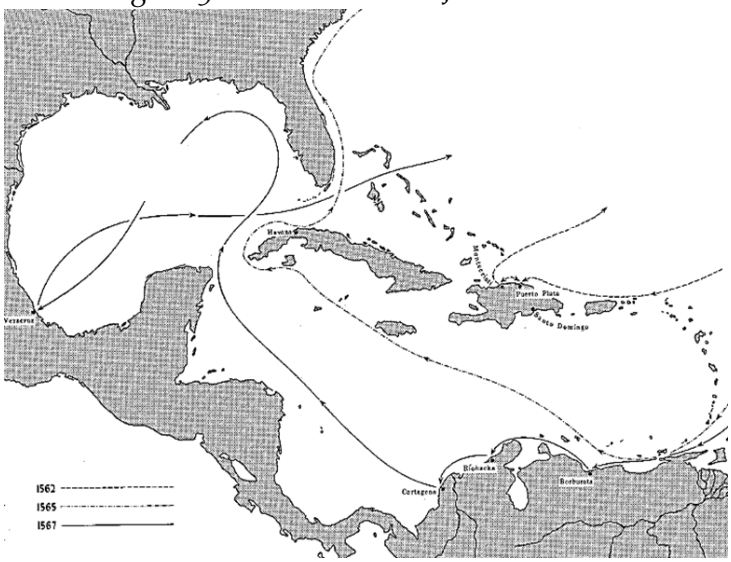
3.2.3 New Spain

Veracruz in the Gulf of Mexico, Acapulco in the Pacific and Campeche close to the Yucatan peninsula were New Spain's major ports. They were the only fortified ports in that colony built to withstand multiple pirate attacks to the city or defend merchant boats stationed there. Other coastal places not protected by forts were subject to raids; nevertheless, the likelihood that raids were a main piracy activity should have diminished over time. Settlements and towns were increasingly built in, or even moved to places at a considerable distance inland. "[This was] perhaps a result of repeated orders to leave the coast uninhabited and thus reduce the incentive for piratical incursions" (Gerhard, 1993, p.81). Yet, this early depopulation policy in the coastal areas did not put an end to piracy, since deserted coasts were left exposed to contraband activity (Gerhard, 1993).

The most important colonial port was that of Veracruz, which held the monopoly of shipments going to and from Spain during three hundred years. To illustrate the magnitude of its importance, between 1540 to 1650, Veracruz controlled 85% of the volume of exports from the Americas (including Peru) (Chaunu, 1960). The municipality of Veracruz was the first one founded in continental America (circa 1519), even before the conquest of Mexico was completed in 1521. This port, together with that of Campeche, was one of the most exposed to pirate activity due to its direct access for ships coming from Europe as well as to the numerous islands of the Caribbean, where a number of pirates were sheltered.[9] Figure 3.1 below shows the routes used by John Hawkins, British naval commander, to smuggle goods to the colonies and traffic with African slaves while in the Caribbean-Veracruz area in the 17th century.

[9]Despite the presence of pirates, Spanish colonial institutions were predominant in Veracruz, Campeche and Acapulco and trade was developed due to them. These ports will be thus only considered Spanish-treated in our empirical analysis.

Figure 3.1: Pirate Routes: John Hawkins

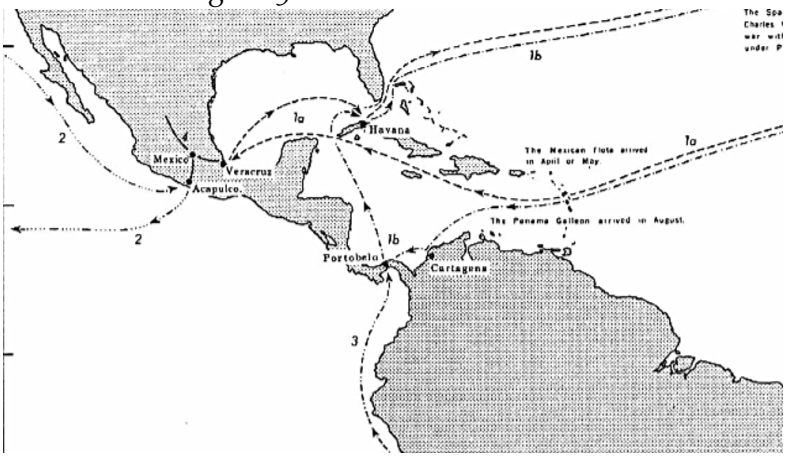


Source: Lombardi (1983:42).

The second most important port, Acapulco, was designated the exclusive point of exchange from the Americas to the Spanish colonies in Asia (Gerhard, 1993), principally due to its privileged geography (Yuste, 1992; Miranda, 1994). Such assignment occurred around the mid 16th century and remained in place until the end of the colonial period.[10] Figure 3.2 below shows the two officially sanctioned trade routes from Spain to Veracruz and further to Acapulco, which would then leave to the Philippines in Asia.

[10]Guatulco, on the Pacific, was a main Spanish port in the early colonization period, however, Acapulco took its place in 1573. The Guatulco bay, as many others, continued to be used for smuggling activities (Gerhard, 1993).

Figure 3.2: Official Trade Routes



Source: Lombardi (1983: 35).

Finally, Campeche was the third colonial port, mainly devoted to the export of goods from the Yucatan Peninsula abroad. Due to its location, it was also frequently "visited" by pirates, although contraband trade specially blossomed in the mid 18th century just prior to independence.

After independence in 1821, the country lived a period of high political instability, during which colonial ports were recurrently seized by one insurgent group or another as a way to collect taxes on incoming merchandise and finance war activities (Miranda, 1994). Undoubtedly, these events severely hampered their functioning throughout much of the 19th century, thus undermining the commercial monopoly and importance of Acapulco in the Pacific and Veracruz in the Gulf of Mexico. A number of other ports would gain prominence during this period.

3.3 The data

Data in this paper comes from several sources. In terms of the outcome of interest, we use different measures of public goods provision, tax collection and poverty at the municipal level in Mexico. Mexican municipalities amount to 2456 and they are distributed along 32 states; 17 of them are coastal states, which comprise 1535 municipalities. Measures of municipal poverty and percentage of the population lacking basic utilities in 2010 come from CONEVAL (*Consejo Nacional de Evaluación de la*

Política de Desarrollo Social)[11], which tracks the performance of social policies across Mexico. In addition, measures on average tax collection (municipal tax income) per capita in 1995-2010, the length of roads as a share of municipal surface, and the number of agents at the Public Prosecution Office per 100 thousand inhabitants in 2010 are provided by INEGI (*Instituto Nacional de Estadística y Geografía*)[12].

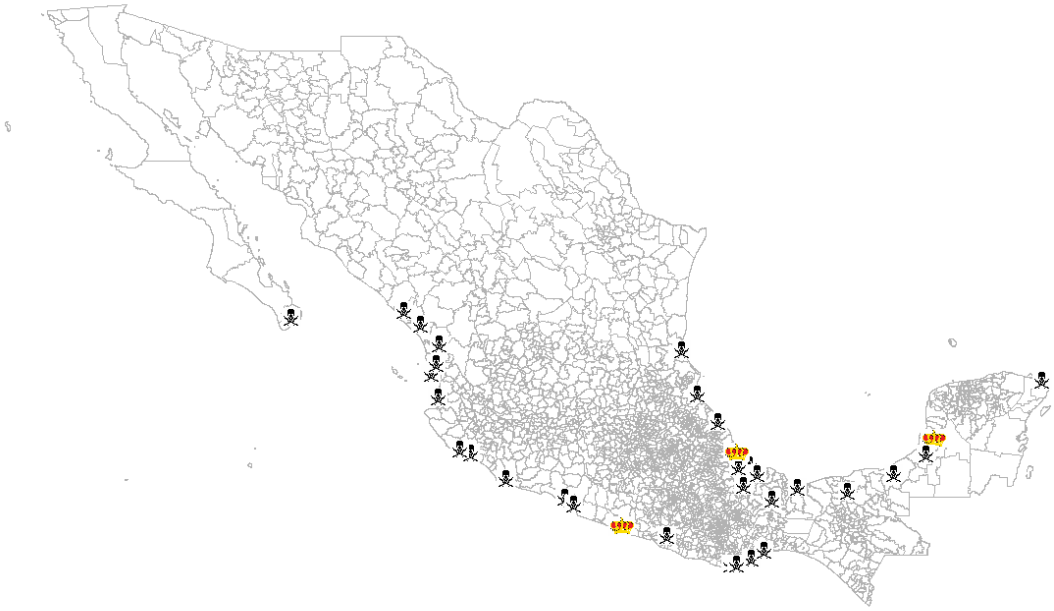
The key explanatory variables are indicators capturing whether trade in a given place was conducted under Spanish institutions or rather based on informal smuggling arrangements. Spanish presence is coded from historical sources of maritime ports in colonial Mexico. These locations are reported by Gerhardt (1993), from which we also code Spanish colonial towns in general (whether used as ports or not). In addition, we identify those places in which contraband trade was rampant due to the presence of professional smugglers or pirates. The location of these ports is coded from historical accounts on the presence of pirates on both coasts of Mexico. On the Pacific side, detailed accounts on the presence of piracy are provided by Gerhardt (1990) starting in the 16th until the 18th century, while in the Caribbean -Gulf of Mexico- side the main sources come from regional histories (Alsedo y Herrera (1883); Muñoz (2007, 2004)).

As a result, we identify 34 main ports or areas in which goods where exchanged during colonial times either legally, as in the royal ports of Acapulco, Campeche and Veracruz, or illegally via non-official ports (e.g. Banderas Bay or Bahia de Banderas, now close to Puerto Vallarta). Although there is also evidence of contraband trade filtering royal ports due to corruption, royal ports will be considered Spanish-treated (and not treated by pirates), given the clear dominance of Spanish state institutions on trade in these places. A visual representation of the main treated areas is provided below in Figure 3.3, which portrays the regional distribution of all known points of entry of merchant goods (legal or not).

[11] http://www.coneval.gob.mx

[12] http://www.inegi.org.mx/

Figure 3.3: Points of Trade (Legal and Illegal)



Note: Identified points of trade belong to the former New Spain. Points inland indicate that they were accessed through rivers from the sea.

It is of great importance in our empirical strategy to compare treated ports with places that are most similar in a number of observed and unobserved covariates. To do so, we identify municipalities in the vicinity, namely, that fall within a radius of 100, 50 or 20 kilometers from each treated port. These neighboring regions, as well as their comprised municipalities are shown in figures 3.4 and 3.5.

Figure 3.4: Vicinities around treated

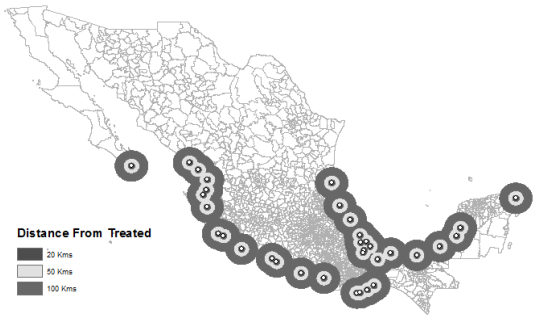
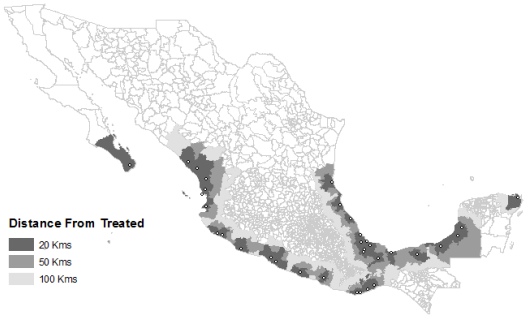


Figure 3.5: Neighboring municipalities



Aside from historical sources on pirate activity and official colonial ports, we separately identify the universe of natural harbors along Mexican coastlines as an exogenous measure of the possibility to trade. We determine the location of natural harbors by the presence of water inlets, bays, estuaries or river mouths on the coastline. Following this approach, which goes in line with Jha (2013),[13] we identify 226 natural harbors for all of Mexico (not just New Spain), which could have plausibly provided natural protection to mercantile activities. These harbors are distributed along 82 municipalities (out of 152 coastal municipalities), and they constitute our set of 'all natural harbors'.

Additionally, following Gaikwad (2015), we place restrictions on the suitability of harbors based on the relative elevation of the surrounding territory. Mountainous topography around harbors, more than any other feature necessary in modern times to safely navigate harbors (e.g. water depth), was crucial for storing ships as it furnished shelter from winds and bad weather (Gaikwad, 2015). Hence, we define a subset of 'protected natural harbors' as follows: for each detected natural harbor we calculate the mean terrain elevation within 10 kilometers radial distance from the coastline. If elevation is above the 30th percentile of elevation among all natural harbors, this place is considered a 'protected natural harbor' in our main analyses. We further consider harbors with elevation above the median in the Appendix in order to verify our results. Figures 3.6 and 3.7 show the distribution of our sets of protected natural harbors, which are present along 51 municipalities considering those above the 30th percentile of elevation, and along 26 municipalities regarding those with surrounding elevation above the median.

[13] Our procedure is slightly different since Jha (2013) relies on all natural indentations or water bodies within 10 kilometers of the coastline as potential medieval harbors, whereas we require that water bodies are connected with the sea.

Figure 3.6: Harbors above 30th pct elevation

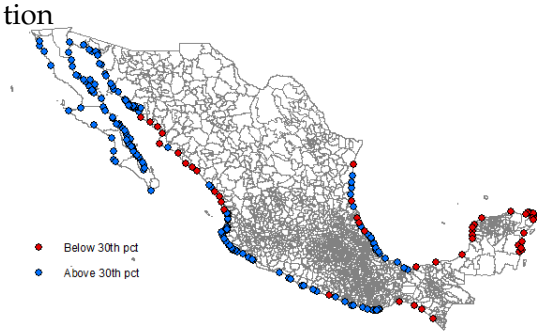
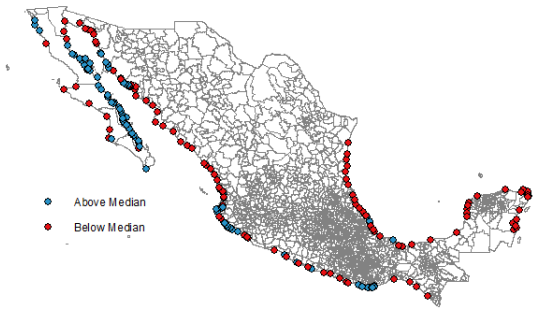


Figure 3.7: Harbors above median elevation



Finally, we also observe current maritime ports in Mexico. This information is obtained from the Mexican state office for communications and transport –SCT (*Secretaría de Comunicaciones y Transportes*). Present ports are distributed along 71 municipalities, 22 of which were treated in the colonial period.

Table 3.1 presents descriptive statistics of the different variables mentioned in this section for municipalities in coastal states and considering treatment status.[14]

[Table 3.1 here]

3.4 Empirical strategy

Overseas trade in colonial Mexico was either legally performed under colonial rule, or obtained via extra-legal means under the presence of pirates. The underlying institutions established under these two scenarios implied markedly different degrees of state capacity, compliance of the law, and thus a different market structure and social organization around trade. Because of the importance of this economic activity during the colonial period in places used as maritime ports, and the length of the presence of these institutions, we put forward the following hypotheses: 1) Spanish colonial rule on trade and piracy had important long run effects on development; 2) these effects should differ according to the initial levels of state capacity established by these institutions.

[14] Table 3.8 in the Appendix reports descriptive statistics for municipalities directly on the coastline (panel A) and for all Mexican municipalities (panel B).

We identify municipalities in Mexico that became Spanish or pirate ports, and define two treatments, respectively. The estimation of the treatment effects is not straightforward, since it is likely that these ports were not chosen at random. Several pre-conquest or pre-treatment characteristics that can affect future development might have explained the selection of these places as trade ports. Proximity to native labor force and natural resources may have been such driving forces. As a result, randomization of the treatment is only possible among places that shared pre-treatment characteristics.

3.4.1 Linear model with vicinity fixed effects

Our first strategy to allow for this quasi-experimental setting is to control for common observed and unobserved characteristics at the vicinity level. For each treated municipality we find its close neighbors within different radii of geodetic distances, namely 20, 50 and 100 km.[15] We then introduce vicinity fixed effects at a given distance, being able to compare each treated municipality with its neighbors.[16] Neighboring municipalities in Mexico do not only share pre-treatment conditions as population and geographic features, but they still share today cultural traits, federal laws and institutions, labor markets, among other factors. The idea for having several distances is to observe the sensitivity of our estimates to neighboring areas of different sizes, where smaller vicinities comprise arguably more homogeneous municipalities.

Our baseline model is given by:

$$Y_{ij} = \eta_j + \beta\ Spanish\ port_{ij} + \gamma\ Pirate\ port_{ij} + \theta\ colonial\ town_{ij} + \epsilon_{ij} \tag{3.1}$$

where Y_{ij} is an outcome variable for municipality i in vicinity j, η_j is a fixed effect for vicinity j, and *colonial town* takes the value of 1 if municipality i was a town in the colonial period. Whether a place was a colonial town captures municipality-specific features related to the size of settlements, development potential and the early presence of a local state. As outcome variables we consider the mean municipality tax income per capita in 1995-2010, and for year 2010, the share of poor individuals, share of people with lack of basic utilities, ratio of the length of roads network over

[15] Our procedure provides at least one closest neighbor for each treated municipality regardless of its radius of distance.

[16] Treated municipalities that are neighbors within 20 km distance have perfectly or almost perfectly overlapping vicinities; in these cases, a single fixed effect is defined.

municipal surface and number of agents at the Public Prosecution Office for each 100 thousand inhabitants.

3.4.2 Natural harbors approach

Even after controlling for common features at the vicinity level and the presence of a colonial town, being pirate or Spanish treated could be related with municipality-specific unobservables that might explain later outcomes. Our second strategy deals with this concern by using a source of exogenous variation in the possibility to trade, namely, the presence of a natural harbor.

Navigation relied in its origins on geographic characteristics in order to protect and store ships and vessels. Shelter and safe anchorage were provided by natural harbors and they were necessary features in order to access places on the coastline, stop at these places, and load goods into (or unload goods from) vessels. This exogenous condition for trade has been already used in other studies. Jha (2013) relies on natural indentations or water bodies along the coastline, whereas Gaikwad (2015) focuses on natural indentations protected by mountainous topography in their surroundings. We use these two approaches in order to define our set of natural harbors, as well as one subset of protected natural harbors.[17]

Being a natural harbor is thus now a condition for treatment, which significantly restricts the number of treated municipalities.[18] We argue that the presence of a natural harbor induced the selection of a given place by its clear geographical advantages, which are either unrelated to future development, or common to all natural harbors (e.g. the possibility of maritime trade in the colonial period).[19] Therefore, we compare the restricted set of treated municipalities with all other natural-harbor municipalities along Mexican coastlines that had the same likelihood to be chosen. That is: Among natural harbors in the vicinity, the choice of any given one can be considered random.

In a baseline exercise, we estimate the following model among municipalities with the presence of a natural harbor:

[17] See definition criteria in the previous section of the data.

[18] Treated municipalities are now 19, or 14 with the presence of a protected natural harbor, out of 34 in the original sample.

[19] It can be safely claimed that natural harbors influenced trade since the colonial period, and not just thereafter. In particular, the introduction of steamships in the 19th century increased the size of vessels, which required port structures and greater depth in already active harbors. This infrastructure was also increasingly built at other coastal places (not natural harbors), which made them suitable for trade.

$$Y_h = \alpha + \beta\ Spanish\ port_h + \gamma\ Pirate\ port_h + \theta\ colonial\ town_h + \epsilon_h \tag{3.2}$$

Finally, as mentioned above, we consider the sample of natural-harbor (or protected-natural-harbor) municipalities under our initial approach. That is:

$$Y_{hj} = \eta_j + \beta\ Spanish\ port_{hj} + \gamma\ Pirate\ port_{hj} + \theta\ colonial\ town_{hj} + \epsilon_{hj} \tag{3.3}$$

where h denotes a natural-harbor (or protected-natural-harbor) municipality and j denotes its vicinity.

3.5 Results and robustness checks

Estimates of model (3.1) are shown in Table 3.2 including all Mexican municipalities, and in Table 3.3 including only municipalities in coastal states. The three panels in each table correspond to different sizes of vicinities around treated places, which determine vicinity fixed effects in each case (within 100 km, 50 km or 20 km distance). We find robust results that the presence of Spanish and pirate ports is related to better development outcomes in the long run (except for the lenght of roads when explained by the presence of piracy). In particular, coefficients for both treatments are statistically significant to explain less poverty, greater access to basic utilities and higher municipal tax income per capita across less and more restrictive vicinity sizes.

Estimates among municipalities in coastal states, considering variation among neighboring municipalities within a 100 km radius (Panel A in Table 3.3), indicate that being a Spanish colonial port (pirate port) is significantly related to a 23.17 (11.83) percentage points lower share of poor individuals, to a 21.34 (15.93) percentage points lower share of population lacking basic utilities and to a 0.17 (0.12) thousand mexican pesos higher tax income per capita. The magnitude of these effects is important, equivalent to 1.3 (0.66), 0.71 (0.53) and 1.45 (1.03) standard deviations of the respective dependent variables.

The Spanish treatment is in general associated with a greater number of agents at the Public Prosecution Office per 100 thousand inhabitants, although this relationship is not significant. On the other hand, the presence of a pirate port is associated with a lower availability of road infrastructure while a Spanish port has the opposite relation, and this is robust to the different vicinity sizes.

[Table 3.2 here]

[Table 3.3 here]

Results for the baseline exercise among natural harbors are reported in Table 3.4. The first panel in the table restricts our original sample to all indentified natural harbors along Mexican coasts, whereas the second panel only considers natural harbors protected by mountainous topography. Estimates for the treatments are similar across panels and to those in previous tables, although piracy is no longer significant to explain higher tax collection per capita. It is interesting to note that colonial towns among natural harbors, after controlling for the ports treatments, are on average significantly worse off in terms of poverty measures and tax income. Only road infrastructure seems to be positively related to the fact of being a town in the colonial period.

[Table 3.4 here]

Table 3.5 further includes vicinity fixed effects at a 100 km radius from each treated natural harbor.[20] Results lead to the same conclusions as before: Spanish and pirate harbors in the colonial period are today less poor, have better access to basic utilities and a larger municipal taxing capacity. Royal harbors display a greater presence of the state, whereas current road infrastructure is on average lower in former pirate harbors.[21]

One difference is worth noting here. Whereas significance of the coefficients is robust in almost all cases, magnitudes relating to poverty measures are now smaller, and this drop is particularly clear for the Spanish treatment effect. This suggests a possible upward bias in our initial estimates with all municipalities in coastal states (or all Mexican municipalities), which was corrected by limiting the comparison between treatment and control group to close-neighboring natural harbors that had arguably the same likelihood to be chosen.[22] This potential bias would be consistent with the intuition that Spanish colonizers, acting under the colonial state guarantee, could choose the best places for carrying out trade. On the other hand, pirates, who were perform-

[20] For some 50 km vicinities there is no variation or even no neighboring harbors. Estimates using this vicinity size support results explained here, and they are presented in the Appendix (Table 3.9, panels A and B), despite the fact that the presence of many treated harbors will be captured by the vicinity fixed effects.

[21] Table 3.10 in the Appendix uses elevation above the median of all harbors as criterion for defining protected natural harbors.

[22] Magnitudes of the Spanish treatment effect are still important. In the most conservative estimates, this effect is between 0.54 and 1.3 standard deviations of the dependent variables.

ing an illegal and hidden activity, were less able to choose, and their selection for trading ports was more likely random.

[Table 3.5 here]

In the following we seek to understand these findings by discussing relevant channels or direct consequences of the two treatments.

State institutions, trade and market structure

Results above indicate a significant and positive effect of Spanish and pirate ports on current development outcomes. These results are rather surprising taking into account that piracy ports were characterized, under the best scenario, by the presence of an unruled activity around contraband trade. This is not only a sign of the weakness or absolute absence of the state, with its implications for public goods provision, but indeed, of the existence of a social organization against the law. It is important to note, however, several factors: First, the difference in the magnitude of the two treatment effects; second, the role of trade, which came as a consequence of the presence of both Spanish and pirates; and third, the differences in the way that this economic activity was developed as a consequence of having state institutions that enforced a trade monopoly vs. informal institutions seeking to overcome this monopolistic structure.

All tables mentioned above report p-values from a test of the equality in coefficients for both treatments. They indicate a significant lower magnitude of the piracy treatment effect relative to the Spanish effect in most cases if we are not limited to natural harbors. Among natural harbors this significant difference is not so clear, although point estimates are in general smaller for the piracy treatment. This lower effect, even though going in the same direction, is consistent with the idea that pirate ports should have established unfavorable conditions for the development of state institutions in comparison with Spanish ports. Well established state institutions, as those given by the Spanish treatment, should have induced a higher taxing capacity and thus a larger possibility for public goods provision, either during the colonial period or afterwards. On the other hand, state institutions can provide a legal framework and certainty to economic activity.

It is worth noting again that the presence of piracy is not significantly (if significant, negatively) related to some state presence outcomes as road infrastructure and number of agents at the Public Prosecution Office relative to population, for which the presence

of a Spanish port is positively associated. Thus, whereas the presence of piracy may have led to less poverty, state presence outcomes are not so clearly affected.

Piracy as a driver of higher long run development is still an interesting finding. This result gives a strong support to the long term impact of trade, indicating that the early development of this activity in the colonial period, either legally or not, had persistent positive consequences on economic growth. Even in the absence of a formal state and law enforcement, pirate ports were perhaps more thriving than places without direct access to trade. Thereby, the early prosperity given by trade, in the first place, may have brought pirate ports into a path of higher economic growth.

More important, however, is to observe the distinct way how trade was performed by Spanish and pirates. A key factor can help us understand the piracy effect: Piracy came along with the efficiency gains of free trade. Whereas Spanish colonial trade was characterized by a strict monopoly, which gave huge power to few merchants and limited consumption due to extreme high prices for goods (Hamilton, 1948), the presence of piracy in the colonies might have fostered a merchant middle class that was later important for economic growth. Therefore, free trade leading to a considerable volume of trade and consumption, as well as to a broader bourgeois class, may have offset the lack of state capacity, law and order.

3.5.1 Robustness checks

Current trade

It could be argued that current maritime ports share more common characteristics today than natural harbors. These characteristics, as well as the fact of being a current port, can be of course endogenous to the treatments; however, we can cross-check our results by restricting the sample to present port municipalities in Mexico. Results for model (3.1) among maritime ports today are shown in Table 3.6, and conclusions remain robust: Those ports with a colonial history of trade of any kind are significantly better off today, where the Spanish effect is larger.[23]

[Table 3.6 here]

This exercise provides further insights on the mechanisms operating in the long run. It can be then claimed that the positive effects of Spanish and pirates' ports are

[23] See Panel C in Table 3.9 for vicinity fixed effects within 50 km.

not driven by the mechanical fact that many of these places carry out trade today (as any other port in Mexico). Hence, there may be other important mechanisms at play, which emerged from the early development of trade, that can account for these differences in current outcomes, even among places where trade is the main economic activity.

Correcting for a potential measurement error in piracy

Although historical records are very detailed in the location of piracy in New Spain, we might be concerned that these records are not exhaustive, precisely because of the illegal and hidden character of this activity.

In order to correct for this potential measurement error, we employ an IV strategy relying on the presence of a protected natural harbor as an instrument. As previously discussed, geographical features of natural harbors provided necessary conditions for trade, allowing the entrance, shelter and store of ships. These features were of particular importance five centuries ago, when sophisticated port infrastructure was not available, and part of it was not even needed given the smaller size and tonnage of ships.

The particular combination of geographical features making a natural harbor is not related to any factor determining development, except for the possibility in the past to access continental places from the sea and thereby the possibility of exchange. Therefore, natural harbors should have affected current outcomes only through their effect on historical trade and on the arrival of vessels in an early period.[24]

In order to properly predict the piracy treatment with the presence of a protected natural harbor, we exclude Spanish royal ports from the first stage.[25] IV estimates are presented in Table 3.7. The first stage is reported for each sample size (which slightly varies across dependent variables) in columns (1), (4), (6) and (8), and we can verify that the presence of a protected natural harbor is a strong predictor of piracy ports. IV estimates lead to the same conclusions as before, except for the realtive magnitude of the piracy treatment effect. It is now larger than the effect of the presence of a Spanish port.

[24]We are not aware of any reported evidence of arrival of ships and vessels in Mexico before the colonial period.

[25]A protected natural harbor will then only predict the presence of trade in those harbors, for which the absence of royal ports is known; i.e. it will predict the presence of piratical commercial activities.

[Table 3.7 here]

These results further support the importance of having access to free trade in the past. The consequences of this trade are, according to these estimates, even bigger than those from trade under the control of state institutions, provided that these institutions fostered a monopolistic market structure.

3.6 Conclusion

Despite existing evidence for the long term impact of overseas trade, the role of state institutions accompanying commercial activities has not been extensively studied. This paper examines the long run effect on development of overseas trade in colonial Mexico conducted under two institutional arrangements, namely, Spanish rule and pirates. We use historical records on the location of piracy and Spanish ports in New Spain (now Mexico), identify natural harbors along Mexican coasts as a source of exogenous variation in the possibility to trade, and compare harbors in the close neighborhood.

We find that being a Spanish or pirate port in the colonial period significantly led to better development outcomes in terms of poverty measures and municipal taxing capacity today, which are not driven by the fact of carrying out trade in the present. The positive piracy effect, although in some cases lower than the Spanish, is interpreted as a strong support to the long term impact of trade, was it developed legally or not. We further argue that free trade underlying piracy activities, as opposed to a trade monopoly under Spanish rule, may have led to an important volume of traded goods and consumption, as well as to a broader merchant middle class.

State institutions provided by the presence of royal ports should have had an important long run effect, even though they were protecting a trade monopoly. They should have increased capacity for public goods provision, either during the colonial period or afterwards. On the other hand, state institutions supplied a legal framework as well as certainty to economic activity. This role is consistent with the finding that the presence of Spanish colonial ports is positively related with state capacity outcomes, for which a negative or not significant relationship can be established with piracy.

Our paper shows that overseas trade substantialy influenced Spanish colonies' later development. Piracy, although not classifiable as a formal colonial institution, was spread throughout Spanish America and emerged as a result of a rigid trade monopoly. Therefore, this study contributes not only to the understanding of hetero-

geneous legacies from colonial activities, but also to the knowledge of important long run effects of de facto institutions.

Tables

Table 3.1: **Descriptive statistics for municipalities in coastal states**

	No treated			Spanish port			Pirate port			All obs.		
	Obs	mean	sd	Obs	mean	sd	Obs	mean	sd	Obs	mean	sd
percentage of poor	1501	71.13	17.68	3	39.23	10.92	31	53.66	15.08	1535	70.71	17.84
percentage with lack of basic utilities	1501	57.68	30.06	3	19.87	14.80	31	31.39	20.99	1535	57.07	30.15
municipal tax income per capita	1474	0.05	0.11	3	0.19	0.10	31	0.20	0.34	1508	0.05	0.12
length roads/surface*	818	0.33	0.34	3	0.40	0.31	26	0.22	0.13	847	0.33	0.33
agents prosecution office per 100 thousand people	1498	3.77	36.15	3	12.34	6.93	31	8.16	5.36	1532	3.88	35.76
colonial town	1501	0.25	0.43	3	1.00	0.00	31	0.55	0.51	1535	0.26	0.44
presence natural harbor	1501	0.04	0.20	3	0.67	0.58	31	0.55	0.51	1535	0.05	0.22
presence harbor above 30th pct elevation	1501	0.02	0.16	3	0.67	0.58	31	0.39	0.50	1535	0.03	0.18
presence harbor above median elevation	1501	0.01	0.11	3	0.33	0.58	31	0.19	0.40	1535	0.02	0.13
presence current port	1501	0.03	0.18	3	1.00	0.00	31	0.61	0.50	1535	0.05	0.21

Notes: *Difference in means between Spanish and pirate ports is significant at the 10% level.

Table 3.2: **Linear model with vicinity fixed effects**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: Vicinities within 100 km					
spanish port	-22.955***	-20.685**	0.169***	0.043	5.351
	(5.147)	(10.449)	(0.051)	(0.094)	(3.722)
pirate port	-12.390***	-17.042***	0.124***	-0.055*	2.387*
	(2.714)	(3.751)	(0.032)	(0.028)	(1.365)
colonial town	0.881	-0.604	-0.011***	0.154***	2.807
	(0.715)	(1.208)	(0.004)	(0.027)	(2.133)
p-value test spanish=pirate	[0.06]	[0.74]	[0.44]	[0.31]	[0.41]
Panel B: Vicinities within 50 km					
spanish port	-28.310***	-30.679***	0.201***	0.154	6.256**
	(3.997)	(6.466)	(0.048)	(0.124)	(2.875)
pirate port	-10.477***	-13.261***	0.111***	-0.059**	2.085
	(2.356)	(3.891)	(0.028)	(0.030)	(1.376)
colonial town	0.564	-0.868	-0.011***	0.145***	2.731
	(0.750)	(1.291)	(0.004)	(0.025)	(2.024)
p-value test spanish=pirate	[0.00]	[0.02]	[0.09]	[0.08]	[0.13]
Panel C: Vicinities within 20 km					
spanish port	-21.545***	-23.922***	0.164**	0.084	4.804
	(4.475)	(7.834)	(0.070)	(0.101)	(3.182)
pirate port	-6.522***	-9.052***	0.117***	-0.088***	-0.578
	(2.293)	(3.448)	(0.034)	(0.027)	(1.614)
colonial town	0.876	-0.530	-0.011***	0.140***	2.675
	(0.759)	(1.317)	(0.004)	(0.025)	(2.008)
p-value test spanish=pirate	[0.00]	[0.07]	[0.52]	[0.08]	[0.07]
Observations	2456	2456	2412	1535	2415
Mean dependent variable	67.42	48.82	0.06	0.37	4.01

Notes: Robust standard errors in parentheses. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.3: **Linear model with vicinity fixed effects among municipalities in coastal states**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: Vicinities within 100 km					
spanish port	-23.171***	-21.339***	0.174***	0.180**	4.183
	(4.316)	(8.098)	(0.051)	(0.085)	(4.517)
pirate port	-11.826***	-15.930***	0.124***	-0.009	1.667
	(2.736)	(3.874)	(0.033)	(0.023)	(1.826)
colonial town	-0.412	-4.476***	-0.012***	-0.036*	4.807
	(0.918)	(1.638)	(0.004)	(0.020)	(4.339)
p-value test spanish=pirate	[0.02]	[0.53]	[0.38]	[0.03]	[0.51]
Panel B: Vicinities within 50 km					
spanish port	-26.535***	-25.886***	0.199***	0.269**	4.912
	(3.920)	(5.787)	(0.049)	(0.119)	(3.693)
pirate port	-10.124***	-12.233***	0.111***	-0.021	1.547
	(2.388)	(4.015)	(0.028)	(0.028)	(1.697)
colonial town	-0.764	-4.751***	-0.012***	-0.024	4.521
	(0.972)	(1.742)	(0.004)	(0.020)	(3.858)
p-value test spanish=pirate	[0.00]	[0.04]	[0.09]	[0.02]	[0.28]
Panel C: Vicinities within 20 km					
spanish port	-19.743***	-18.546***	0.163**	0.234***	3.123
	(4.220)	(6.735)	(0.070)	(0.090)	(4.208)
pirate port	-6.412***	-8.416**	0.118***	-0.034	-1.152
	(2.311)	(3.485)	(0.034)	(0.029)	(1.983)
colonial town	-0.242	-4.310**	-0.012***	-0.025	4.400
	(0.982)	(1.780)	(0.004)	(0.020)	(3.762)
p-value test spanish=pirate	[0.00]	[0.16]	[0.54]	[0.00]	[0.20]
Observations	1535	1535	1508	847	1532
Mean dependent variable	70.71	57.07	0.05	0.33	3.88

Notes: Robust standard errors in parentheses. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.4: **Baseline model restricting the sample to natural harbors**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: All natural harbors					
spanish port	-26.687***	-26.983**	0.201***	0.247	5.380
	(8.166)	(11.504)	(0.067)	(0.159)	(5.141)
pirate port	-9.357***	-15.602***	0.154	-0.016	1.721
	(3.449)	(4.785)	(0.109)	(0.043)	(1.238)
colonial town	15.130***	15.343**	-0.199***	0.084**	-0.345
	(3.552)	(6.308)	(0.068)	(0.037)	(1.364)
Observations	82	82	82	74	82
Mean dependent variable	54.83	35.93	0.20	0.23	7.10
p-value test spanish=pirate	[0.04]	[0.29]	[0.63]	[0.10]	[0.48]
Panel B: Protected natural harbors					
spanish port	-25.955***	-23.734*	0.195***	0.249	5.065
	(8.493)	(12.003)	(0.066)	(0.163)	(5.288)
pirate port	-8.500**	-12.940**	0.154	0.026	1.585
	(4.119)	(5.677)	(0.106)	(0.058)	(1.719)
colonial town	18.791***	21.206***	-0.204***	0.127***	-0.335
	(4.339)	(6.980)	(0.068)	(0.042)	(1.669)
Observations	51	51	51	45	51
Mean dependent variable	53.50	31.20	0.19	0.22	7.45
p-value test spanish=pirate	[0.04]	[0.33]	[0.67]	[0.19]	[0.52]

Notes: Robust standard errors in parentheses. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.5: **Among natural harbors with vicinity fixed effects**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: All natural harbors					
spanish port	-18.120***	-13.510	0.171**	0.205	7.295**
	(5.517)	(8.305)	(0.072)	(0.124)	(3.629)
pirate port	-9.790**	-13.094**	0.191**	-0.029	0.100
	(4.044)	(5.991)	(0.074)	(0.036)	(1.373)
colonial town	14.053***	18.054*	-0.180***	0.042	0.197
	(4.710)	(9.601)	(0.065)	(0.071)	(1.068)
Observations	82	82	82	74	82
Mean dependent variable	54.83	35.93	0.20	0.23	7.10
p-value test spanish=pirate	[0.26]	[0.97]	[0.83]	[0.08]	[0.06]
Panel B: Protected natural harbors					
spanish port	-16.032**	-13.442	0.137*	0.260**	6.182
	(6.686)	(10.994)	(0.080)	(0.098)	(3.775)
pirate port	-9.129*	-9.178	0.165**	-0.024	-0.516
	(5.166)	(8.148)	(0.072)	(0.048)	(2.026)
colonial town	18.750***	24.476*	-0.184***	0.115	0.029
	(6.276)	(13.039)	(0.064)	(0.094)	(1.404)
Observations	51	51	51	45	51
Mean dependent variable	53.50	31.20	0.19	0.22	7.45
p-value test spanish=pirate	[0.47]	[0.79]	[0.79]	[0.01]	[0.11]

Notes: Robust standard errors in parentheses. Vicinity fixed effects within 100 km radius. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.6: **Among current maritime ports with vicinity fixed effects**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
spanish port	-41.551***	-65.201***	0.585**	0.152*	10.684***
	(9.384)	(12.149)	(0.255)	(0.086)	(3.416)
pirate port	-10.762**	-19.931***	0.310**	-0.001	1.961
	(4.654)	(6.163)	(0.148)	(0.054)	(1.735)
colonial town	7.721	10.835*	-0.337**	-0.127*	0.196
	(6.374)	(6.334)	(0.144)	(0.072)	(1.584)
Observations	71	71	71	65	71
Mean dependent variable	48.18	28.67	0.27	0.30	7.57
p-value test spanish=pirate	[0.00]	[0.00]	[0.10]	[0.03]	[0.00]

Notes: Robust standard errors in parentheses. Vicinity fixed effects within 100 km radius. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.7: **IV estimates for piracy with vicinity fixed effects among municipalities in coastal states**

	(1) First stage	(2) % of poor	(3) % with lack of basic utilities	(4) First stage	(5) municipal tax income per capita	(6) First stage	(7) length roads/ surface	(8) First stage	(9) agents prosecution office per 100 thousand people
pirate port		-61.296***	-88.222***		0.593**		-0.568**		9.683
		(20.809)	(29.744)		(0.232)		(0.251)		(7.122)
protected natural harbor	0.195***			0.195***		0.177***		0.195***	
	(0.056)			(0.056)		(0.058)		(0.056)	
spanish port	-0.157	-31.337***	-33.272**	-0.157	0.251***	-0.163	0.081	-0.156	5.504
	(0.111)	(8.782)	(13.746)	(0.111)	(0.072)	(0.120)	(0.103)	(0.111)	(4.820)
colonial town	0.028***	1.125	-2.230	0.028***	-0.027***	0.042***	-0.012	0.028***	4.557
	(0.009)	(1.148)	(1.894)	(0.009)	(0.010)	(0.016)	(0.023)	(0.009)	(4.398)
Observations	1535	1535	1535	1508	1508	847	847	1532	1532
Mean dependent variable	0.02	70.71	57.07	0.02	0.05	0.03	0.33	0.02	3.88
p-value test spanish=pirate		[0.12]	[0.05]		[0.09]		[0.00]		[0.44]
F stat for instrument	11.90			11.89		9.33		11.90	

Notes: Robust standard errors in parentheses. Vicinity fixed effects within 100 km radius. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Appendix

Table 3.8: **Descriptive statistics**

	No treated			Spanish port			Pirate port			All obs.		
	Obs	mean	sd	Obs	mean	sd	Obs	mean	sd	Obs	mean	sd
Panel A: Among municipalities on the coastline.												
percentage of poor	127	59.09	18.26	3	39.23	10.92	22	52.89	14.84	152	57.80	17.95
percentage with lack of basic utilities	127	42.72	27.31	3	19.87	14.80	22	29.40	18.11	152	40.34	26.49
municipal tax income per capita	127	0.14	0.32	3	0.19	0.10	22	0.26	0.39	152	0.16	0.33
length roads/surface*	107	0.30	0.56	3	0.40	0.31	17	0.22	0.12	127	0.29	0.52
agents prosecution office per 100 thousand people	127	5.49	5.23	3	12.34	6.93	22	7.53	4.68	152	5.92	5.28
colonial town	127	0.20	0.41	3	1.00	0.00	22	0.50	0.51	152	0.26	0.44
presence natural harbor	127	0.50	0.50	3	0.67	0.58	22	0.77	0.43	152	0.54	0.50
presence harbor above 30th pct elevation	127	0.29	0.46	3	0.67	0.58	22	0.55	0.51	152	0.34	0.47
presence harbor above median elevation	127	0.15	0.36	3	0.33	0.58	22	0.27	0.46	152	0.17	0.38
presence current port	127	0.38	0.49	3	1.00	0.00	22	0.73	0.46	152	0.44	0.50
Panel B: Including all Mexican municipalities.												
percentage of poor	2422	67.63	18.47	3	39.23	10.92	31	53.66	15.08	2456	67.42	18.52
percentage with lack of basic utilities	2422	49.08	30.69	3	19.87	14.80	31	31.39	20.99	2456	48.82	30.65
municipal tax income per capita	2378	0.06	0.12	3	0.19	0.10	31	0.20	0.34	2412	0.06	0.12
length roads/surface*	1506	0.37	0.40	3	0.40	0.31	26	0.22	0.13	1535	0.37	0.39
agents prosecution office per 100 thousand people	2381	3.94	29.32	3	12.34	6.93	31	8.16	5.36	2415	4.01	29.12
colonial town	2422	0.29	0.45	3	1	0	31	0.55	0.51	2456	0.29	0.46
presence natural harbor	2422	0.03	0.16	3	0.67	0.58	31	0.55	0.51	2456	0.03	0.18
presence harbor above 30th pct elevation	2422	0.02	0.12	3	0.67	0.58	31	0.39	0.50	2456	0.02	0.14
presence harbor above median elevation	2422	0.01	0.09	3	0.33	0.58	31	0.19	0.40	2456	0.01	0.10
presence current port	2422	0.02	0.14	3	1	0	31	0.61	0.50	2456	0.03	0.17

Notes: *Difference in means between Spanish and pirate ports is significant at the 10% level.

Table 3.9: **Restricted samples with vicinity fixed effects (50 km)**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: All natural harbors					
spanish port	-14.886***	-11.871**	0.177***	0.203***	6.195
	(4.031)	(5.574)	(0.054)	(0.061)	(3.857)
pirate port	-17.323***	-24.319***	0.296***	-0.060	1.133
	(5.429)	(5.986)	(0.090)	(0.039)	(1.917)
colonial town	15.003***	11.133	-0.208***	0.097**	1.054
	(3.972)	(8.976)	(0.074)	(0.047)	(2.146)
Observations	82	82	82	74	82
Mean dependent variable	54.83	35.93	0.20	0.23	7.10
p-value test spanish=pirate	[0.72]	[0.13]	[0.26]	[0.00]	[0.24]
Panel B: Protected natural harbors					
spanish port	-14.886***	-11.871*	0.177***	0.203***	6.195
	(4.265)	(5.898)	(0.057)	(0.065)	(4.081)
pirate port	-19.882***	-22.775***	0.299**	-0.094**	1.325
	(6.028)	(7.199)	(0.115)	(0.044)	(3.052)
colonial town	20.223***	20.532*	-0.224***	0.158***	1.233
	(4.788)	(11.388)	(0.063)	(0.054)	(2.676)
Observations	51	51	51	45	51
Mean dependent variable	53.50	31.20	0.19	0.22	7.45
p-value test spanish=pirate	[0.50]	[0.25]	[0.35]	[0.00]	[0.35]
Panel C: Current maritime ports					
spanish port	-72.514***	-101.630***	1.106***	0.482	3.625
	(9.841)	(14.621)	(0.264)	(0.346)	(5.522)
pirate port	-12.898**	-21.222**	0.421***	0.062	-1.356
	(5.801)	(8.786)	(0.118)	(0.047)	(2.093)
colonial town	15.342***	7.134	-0.304***	-0.122	7.988**
	(4.972)	(5.632)	(0.087)	(0.100)	(3.736)
Observations	71	71	71	65	71
Mean dependent variable	48.18	28.67	0.27	0.30	7.57
p-value test spanish=pirate	[0.00]	[0.00]	[0.00]	[0.19]	[0.24]

Notes: Robust standard errors in parentheses. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

Table 3.10: **Among protected natural harbors with elevation above median**

	(1) % of poor	(2) % with lack of basic utilities	(3) municipal tax income per capita	(4) length roads/ surface	(5) agents prosecution office per 100 thousand people
Panel A: Baseline model					
spanish port	-17.427***	-2.181	0.325***	0.088**	9.832**
	(4.344)	(10.193)	(0.085)	(0.036)	(3.574)
pirate port	-11.210***	-7.433	0.326*	0.035	1.338
	(3.713)	(8.309)	(0.189)	(0.055)	(3.299)
colonial town	26.750***	23.296**	-0.323**	0.108**	0.284
	(4.783)	(9.609)	(0.121)	(0.042)	(3.553)
p-value test spanish=pirate	[0.02]	[0.44]	[0.99]	[0.27]	[0.00]
Panel B: With vicinity fixed effects (100 km)					
spanish port	-9.748**	20.779***	0.270***	0.091*	14.693***
	(4.020)	(3.191)	(0.050)	(0.051)	(1.600)
pirate port	-9.921**	-11.772	0.322**	0.010	-0.482
	(4.712)	(8.982)	(0.143)	(0.052)	(4.455)
colonial town	17.765***	0.124	-0.247***	0.109*	-3.936*
	(4.968)	(3.802)	(0.080)	(0.058)	(2.028)
p-value test spanish=pirate	[0.98]	[0.00]	[0.72]	[0.21]	[0.00]
Observations	26	26	26	22	26
Mean dependent variable	49.31	22.95	0.26	0.16	9.29

Notes: Robust standard errors in parentheses. * $p-value < 0.10$; ** $p-value < 0.05$; *** $p-value < 0.01$.

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München, 24. Juni 2015

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