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The Effect of Royalties on Political Competition, and Electoral Corruption in the Local Elections of Colombia in 2011 and 2015

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List of Acronyms

ANH   Hydrocarbons National Agency
ANM   Mining National Agency
CEDE   Centre for Studies of Economic Development
COP   Colombian Peso
Dane   National Statistics Office of Colombia
DNP   National Planning Department of Colombia
FNR   National Fund of Royalties
GDP   Gross Domestic Product
MOE   Mission of Observation of the Electoral Process
NRNR   Non-Renewable Natural Resource
PPP   Purchasing Power Parity
SGR   General System of Royalties
UPME   Mining and Energy Planning Office
USD   United States Dollar

Acknowledgements

Abstract

In the last three decades Colombia has experienced a change in its model of economic development from an economy based on agriculture and manufacturing to a predominant mining extractive industry. This paper analysed the effect of the rents from the extraction of on renewable Natural resources in electoral corruption and political competition, trough the analysis of the reform to the royalty system of payments introduced in the country in 2011. To do so, the paper uses an econometric approach of fixed effect and pool OLS models to a data set of 1101 municipalities of the country in the last two electoral elections of mayors in 2011 and 2015.

Relevance to Development Studies

This paper addresses one of the main concerns for the studies of development and economics; Why, despite the abundance of natural resources, and the existence of an active market for their trade, some countries/areas are so poor, unequal, and their inhabitants perceive lower standards of living. The paper took a local perspective of analysis, and discuss the interaction between economic rents derived from the exploitation of non-renewable natural resources, and undesirable outcomes for the society like the presence of corruption and the upcoming of rent-seeking behaviour among politicians.

Keywords

Royalties, electoral corruption, political competition, subnational panel, Colombia, resource curse theory.

Chapter 1 Introduction

As is the case in several developing countries, Colombia is a country with a high level of corruption. In 1995, when Transparency International released the Corruption Perception Index, the country scored 3.44 on a scale from 0 (highly corrupted) to 10 (very clean) (Transparency International. 2017a). More recently, in 2016, the same organisation scored Colombia 36 on a scale from zero (highly corrupted) to 100, (very clean). This perception of corruption corresponds with reports published by the Contraloria General de la Nacion (National institution for Control), which estimates the magnitude of the loss of public resources to more than 4% of the GDP in 2016 (Contraloria General de la Nacion. 2017).

In particular, corruption in elections at the subnational levels (municipalities and departments) has increased and spread across the country over the last four electoral cycles (MOE. 2017). For example, in 2007, 327 municipalities out of 1.101 reported incidents of corruption, such as buying votes and fraud in registration of voters, while in 2011 that number had increased to 544 municipalities. This spread is interesting because it occurs from the Andean/central region of Colombia, characterised as the most populated and the most economically active in the country, to the peripheral regions, traditionally less populated and poorer.

Coincidentally, since 2002, the national government has intensively promoted the exploration and exploitation of non-renewable natural resources (NRNR) across the country as a specific strategy of development in the territories, particularly the periphery. The government has invited international companies to invest, and it has eliminated bureaucratic procedures to facilitate the process. As a result, economic activity related to exploitation of hydrocarbons like oil and gas, and minerals like coal, nickel, and gold has increased, and also the budget of the subnational administrations due to the increase of transfers of rents for the exploitation in their territories.

Previous studies in Colombia during the 1990' and the 2000's point to two possible drivers of the increase and spread of corruption in the country. First, the decentralisation of public spending in the 1990's, that set a system of transfers of resources from the central level to the local level administration, plus autonomy to execute their budgets. By that time, decentralisation played as a stimulus of corruption because it gave resources and power to the local elites in a context of weak presence of the state. Apparently, not only the resources but also corrupt practices spread from the centre to the periphery following the decentralisation path (Gonzalez 2001).

Second, the abundance of rents from the exploitation of NRNR in a context of weak institutions appears to be associated with corruption at the subnational levels (Onapajo et al. 2015a, Sandbakken 2006). In addition to the transfer of resources due to the decentralisation arrangement, some territories started to receive large amounts of royalties from the exploitation of NRNR, due to a

boom in production and high prices of oil and coal in the 90's and other minerals later.

The law that determined the rules of the collection of royalties and its distribution had been settled in the 70's when the country was still more agriculture-oriented than extractive, and the production of oil and mineral was low and so were its revenues. This old arrangement determined that the local administrations of the territories involved in the production -the producers- must receive the majority of the royalties, around 80%.[1] Because in the origin of the law the territories were not big producers, that distribution seemed to be fair. However, with the boom in the 90's, and the decentralization process, the new rents from the royalties exacerbated corrupt practices and political competition for the control of the rents, which led to higher levels of corruption and political competition in producer territories in comparison with the non-producers (Gutiérrez Sanín and Zuluaga Borrero 2011).

Despite access to royalties, or perhaps due to rent-seeking possibilities, it is striking that by the end of the 2000's, more than 10 years after the intensive extraction of NRNR , while the producer territories were richer in terms of GDP per person they were substantially poorer according to any measure of poverty as compared to non-producer regions (Rojas 2014, Echeverry et al. 2011, Cárdenas and Reina 2008). According to Villoria (2002), in some cases, the local elites competed to capture the administration of the royalties for their own personal and political purposes.

In 2011, the government of the current president Juan Manuel Santos introduced a reform to the constitution to redesign the distribution of the royalties and create a system of distribution based on criteria of participation in the production, size of the population, and measures of poverty. According to the design, the new scheme of distribution must be gradually implemented between 2012 and 2015, and invert the old scheme by sending 20% of the royalties to the producer territories, and, the rest 80% percent to different funds of development to be redistributed later to the country following the new rules.

Motivated by the previous literature on Colombia which has shown that the process of decentralization spread corruption, and the international and Colombia-based literature which shows that access to rents from NRNR exacerbates corruption in producer areas/countries, this paper sets out to examine whether and to what extent a reform that is designed to spread resources more equitably and reduce the opportunity for corruption in producer regions may have a perverse effect and also spread corruption again. This paper focuses on the idea that pre-existing institutions matters. Thus, the influence of royalties will be treated as a driver that may enhance rent-seeking behaviour, reflected in greater political competition and corruption during elections, rather

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[1] It includes the territories were the resource was extracted and also the ports of storage and transportation.

than blame rents and royalties as the root of the negative differences between the producer territories and the non-producers. To rephrase, specifically, the paper examines whether the new system of royalty payments initiated in 2011 has affected political competition, and electoral corruption in the municipalities and departments of Colombia.

Related topics have been analyzed in the international literature of the resource curse about how countries have managed the potential negative impacts of the abundance of rents from the exploitation of NRNR (Rosser and IDS 2006). There is a large literature on the negative associations with the abundance of NRNR and its revenues. However, the literature does not agree whether it is the result of the sole exploitation rather than the institutional arrangement for their management (Deacon 2011)

The paper contributes to the existing literature in three aspects: First, this paper focuses on a specific form of revenues from the extraction of NRNR that are supposed to compensate for the negative externalities of this kind of activities, in contrast with the majority of the studies that focus on the perverse effect of the total revenues, and the costs of the activity. Second, analysis of the resource curse at subnational levels is scarce, usually, the empirical literature concentrates on cross-country analysis. This paper uses a panel of the total 1,101 municipalities in the 33 departments of Colombia which covers the total country including producer and non-producer territories. Third, this work is one of the first empirical analyses of the reform of the royalty system of payments in Colombia after its full implementation.

This paper is organised in seven chapters as follow: first, this introduction. Second, a background of corruption and electoral competition in Colombia that includes a general presentation of the Colombian socio-economic context, an explanation of the political division of the territory, a description of the electoral system, and an explanation of the reform in the royalty system of payments (SGR) and its implementation. Third a theoretical framework, starting with the definition of corruption, and political competition, and then, a discussion of the theoretical links with royalties from the perspective of the resource curse literature. Fourth, the methodology of estimation. Fifth, the data and the exploratory analysis of the descriptive statistics. Sixth, the estimations and results. And finally, the seventh chapter concludes with a summary of the findings and some policy recommendations.

Chapter 2 Background: Corruption, electoral competition, and royalties

2.1. Colombian socio-economic context

Colombia is a South American country with 49 million people. It is considered a middle-income country, and the fourth largest economy of Latin America, after Mexico, Brazil, and Argentina with a GDP of USD 282.4 Billion in 2016 (World Bank. 2017). Table 1 describes the main socio-economic indicators aggregated by decades since 1980 to 2016. By the end of the period Colombia shows an economy four times bigger than it was during the 80's. In terms of per capita income, Colombia has doubled its income from US PPP Dollar 7,361 in 1989 to US PPP Dollar 13,099 in 2016. Economic growth has been steady, between 3% and 4%, with the exception of a domestic economic crisis in 1998 when the GDP fell by 4%.

As in other countries in Latin America, during the 80's and 90's, Colombia experienced relatively low unemployment rates but high inflation (Kalmanovitz 2011). The constitution of 1991 gave autonomy to the central bank and the mission of controlling inflation. In the next decade inflation decreased from 23.4% to 3.7%, becoming stable around a target of 3% to 4%, while unemployment increased to above 10%. During the same period the country also introduced policies of trade openness and decentralisation of the public spending.

Table 1. Socioeconomic indicators of Colombia between 1980 and 2016

Socio-economic Indicators	1980-1989	1990-1999	2000-2009	2010-2016
GDP US Current Billion Dollars (end of period)	55.4	103.8	233.9	282.4
GDP per capita ppp dollar (end of period)	7,361	8,215	10,703	13,099
Growth GDP (average)	3.4	3	4	4.1
unemployment rate (average)	7.4	7.3	13.0	10.0
Inflation rate (average)	23.4	22.1	6.2	3.7
Poverty rate (average)	65.0	60.0	45.0	32.0
Gini (average)	0.53	0.57	0.54	0.52
Rurality (end of period)	32.2	28.2	25.2	23.2
Population (end of period)	33.6	39.8	45.4	49.4

Source: Dane (2017), DNP (2017)

The changes in terms of addressing poverty are also remarkable. Since the 80's Colombia reduced poverty rates from 65% of the national population to 32% in 2016. However, inequality has remained high, above 0.50 on the Gini scale. The country has also witnessed a reduction in its rural population, from 32.2% in 80's to 23.2% in 2016. This process of recomposition of the population from the rural areas to the urban centres started in the early 20th century. In fact,

in 1930 the rural population was 80%, and the biggest transitions occurred in the 50's and 60's with the emergence of the civil conflict that generated massive displacement (Kalmanovitz and Lopez 2006).

Another important transition has been the change in the composition of economic activity from agriculture and basic manufacturing to extraction of NRNR. During the 50's Colombia consolidated an industry of manufactured goods of consumption and agriculture, thanks to the model of import substitution industrialization (Bejarano 1998). Certainly, until the 70's, GDP was mainly driven by agriculture (30%) and manufacturing (17%), and reflected in the composition of the exports which was dominated by coffee with a share of 58% (Dane. 2017). Nevertheless, the economy rapidly migrated to mining and services activities, with the result that the primary exports are now oil (33%), coal (17%), and coffee (7%) (Dane. 2017).

Accordingly, since 2002 the national government has intensively promoted the exploration of the territory to exploit NRNR as a strategy for development. Indeed, between 2002 and 2012 the number of titles (licenses) for exploitation of mines and hydrocarbons increased by 240% from 2,100 titles in 2002 to 9,426 in 2012 (Ministy of Mines and Energy 2014). In the same line, the national development plan during the first term of the current president Juan Manuel Santos in 2010 was based on four main elements that his administration called the four engines of development (Las locomotoras del desarrollo), one of those engines was precisely the mining and energy sector, presented in the plan as the best opportunity to create economic activity in the peripheral regions of Colombia (DNP. 2017).

2.2. Political Division and regions

The Colombian territory and its political administration is divided in three main levels: national, departments and municipalities. The national level encompasses 33 departments, which in turn encompasses 1,123 municipalities. Universal vote chooses the head of the administration at every level in a popular election for a term of four years. This paper focusses on the analysis of the departments and municipalities, taking advantage of the exogenous distribution of natural resources in the territory.

Colombia has five natural regions; these regions have nothing to do with the political administration but with geography and natural resource availability. Map 1 presents the natural regions of Colombia. The Caribbean region is located in the north coast bordering the Caribbean Sea in the Atlantic Ocean, the Pacific region in the west coast bordering the Pacific Ocean, the Andean region in the centre of the country, the Orinoquia in the great plains in the east bordering Venezuela, and the Amazonia in the Amazonas forest.

Map 1. Natural regions of Colombia

Source: La Ruta Natural (2017)

The Andean region (central region) is the most populated and the most developed. It holds 75% of the total population in an area of 282,540 km², which is equivalent to 30% of the total territory and contains the three main cities of Bogota, Medellin, and Cali. The region concentrates the agriculture and the manufacturing industry and some exploitation of emeralds, mainly. The other regions are less populated, and their inhabitants are poorer despite the rich availability of natural resources. To illustrate, the departments of La Guajira and Cesar, in the Caribbean region, clustered 2 million people (equivalent to 4.1% of the total), and produce 90% of the national exports of coal, which is the country's second-largest export (Dane. 2017). Similarly, the department of Choco with 510 thousand people, in the Pacific region, is the first producer of gold (UPME. 2017), although it is known for its large history of poverty and inequality.

The region of Orinoquia in the eastern plains at the border with Venezuela is even less populated, but includes three of the main producer departments of oil, the departments of Casanare, Meta, and Arauca. These departments produce together 75% of the country's total oil exports in 2016 (Dane. 2017). Finally, the Amazonian region, which encompasses 42% of the territory, holds 4% of the population, and has some exploitation of oil in the department of Putumayo, and, in less scale in Caquetá. The region also exploits gold and coltan, however most of that production is illegal (Sinchi. 2017).

2.3. Electoral System

Colombia has a representative presidential democracy with separation of powers into three branches: the executive branch, the legislative branch, and the judicial branch. At the top of the legislative branch there is a Bicameral Congress

which consists of a senate and a chamber of representatives elected by popular vote for a term of four years. The judiciary is autonomous and comprises four high courts. Finally, the executive branch is in charge of the political administration with the president as its head.

The president is the head of the state and the national government. Consequently, governors are the head of the departments with a deputy assembly while mayors head municipalities with the help of a council. All of them, are elected by popular vote for a term of four years. The election for president and congress coincides in the same year, while governors, deputy assembly of departments, mayors, and councils are elected the year after the presidential elections also for a four years period. Additionally, reelection is possible for governors and mayors in non-continuous terms, but it is no longer possible for president since 2015.[2]

Colombia has a multiparty system that evolved in the 90's from a two-party system. Traditionally, the conservative party and the liberal party ruled since their creation in 1848 (Buitrago 1996). However, the constitution of 1991 supports a multiparty system and allows the creation of new parties, political movements, or significant political groups that prove a significant representation by showing a percentage of signatures out of the potential voters and then getting votes above a threshold in the congressional elections. Currently, the congress has a representation of 13 parties (National Register Office. 2017a). Nevertheless, in the case of local elections, a candidate can participate with the support of an existing party or by collecting a significant percentage of signatures. Thus, in the last local elections of 2015, the number of parties, and movements supporting a candidate were at least 283, some of the candidates were supported by a coalition of two or six parties (MOE 2016)

From the voter's side, any citizen older than 18 can vote, although voting is not compulsory. Historically, the country has had low voter turnout rates (Beleño Pitalua and Vásquez Tilvez 2017). Presidential elections that are usually extensively covered by the media, have registered a voter turnout rate of 49% on average in the last four electoral cycles (16 years). The current president, Juan Manuel Santos, was elected in 2014, for a second term, with a voter turnout of 44%. Moreover, in some departments, voter abstention was 65%, as in the case of peripheral departments like la Guajira, Choco, Bolivar, and Amazonas, which also exhibit high poverty rates and limited public infrastructures (National Register Office. 2017a)

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[2] The national constitution of 1991 prohibited reelection for president in any circumstance, yet in 2004 the former president Alvaro Uribe introduced a modification to the constitution to allow immediate reelection. Recently, in 2015, the current president Juan Manuel Santos re-stablished the original prohibition.

2.4. Patterns of electoral corruption

This research focuses on corruption in public elections of local administrators: mayors. Electoral corruption will be treated in this analysis as crimes against electoral transparency, defined by the Colombian law, and classified in 11 types that can be summarised in terms of fraud, buying votes, withholding of identity cards, fraudulent voting, intervention from sitting politicians, and fraud in registration of voters (MOE 2011)

According to the Mission for Observation of Electoral Process -MOE- (2016) the most frequent reports of corruption in local elections are buying votes, and fraud in registration of voters. Citizens are supposed to vote in one polling place in a municipality, usually the same place of the last election, yet a voter can ask for a change of the polling place when he/she moved from the original location. Fraud in the registration of voters occurs when a person registers his/her identity card in a polling place different to the place where he/she truly lives with the intention of influencing the election.

The phenomenon of fraud in registration can be massive, moving voters from one municipality to another. Once the voter changes their registration, the next step is to vote for the option in which the buyer is interested, these are two different crimes according to Colombian law. The first one is responsibility of the person who lies to the authorities to change the polling place, the second one is responsibility of both the person who buys the vote and the voter who sells it. (MOE 2011).

Map 1[3] shows the presence of fraud in the registration of voters in local elections which took place in 2003, 2007, and 2011 in the municipalities of Colombia. The map is shaded to show municipalities that reported at least one case of fraud in the registration of voters. As the graphs show, this type of corruption has increased across time and space. In 2003, a few municipalities in the Andean region (centre) reported the presence of this kind of corruption. To remember the Andean region is the most populated of the country, and includes the main cities of Bogota, Medellin, and Cali, and traditionally has been the economic centre of the agriculture and manufacturing industry.

By 2007, this kind of corruption was present in the entire Andean region (center), and in the Caribbean (north), in the main producer departments of coal (La Guajira, and Sucre), while in 2011, the map also highlighted municipalities in the plains (Orinoqia region), located in the three main producer departments of oil (Arauca, Casanare, and Meta), and shows a spread to the Amazonas region, usually the least populated of the country. Other forms of corruption in the electoral process follow the same pattern of spread (MOE. 2017).

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[3] The MOE has not released the maps of corruption for the local elections of 2015

2003　　　　**2007**　　　　**2011**
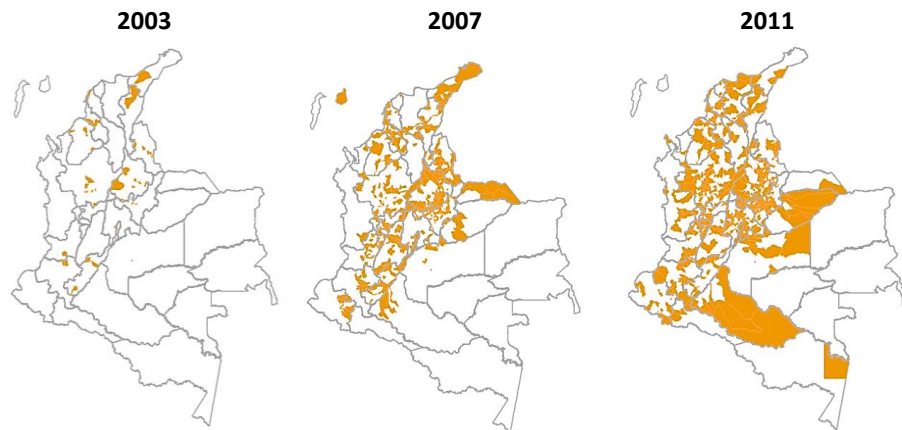
Source: MOE (2017)

2.5. The royalty system of payments in Colombia

In 2011, Colombia introduced a constitutional modification to refine the distribution of the royalty's system of payments, called now the General System of Royalties (Sistema General de Regalias SGR), for the exploitation of NRNR across the subnational and national governments. Until then, royalties were distributed 80% to the producer territories, (municipalities and departments) and 20% to a national development fund. The main impulse for the reform was that the producer territories only hold 17% of the total population which led to an unequal use of large resources. In addition, scandals of corruption and misuse of the royalties in the subnational territories precipitated the claim for a redesign of the old scheme. The reform intended to invert the shares between the producer territories and the rest of the country in a transition period of four years between 2012 and 2015.

2.5.1. Generalities of the royalties in Colombia

A royalty is the price for the right to exploit a resource under the property of a public or private body, usually a natural resource. The current national constitution of Colombia of 1991 declares that the Colombian State is the owner of the underground soil and the non-renewable natural resources (art. 332), and complements later that the exploitation of any of those must generate a compensation, called royalty, in favor of the Colombian state (art. 360.). The details about the collection, administration and distribution of the royalties has

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been specified in subsequent laws, subject to revision and modification by the competent authorities.

In the case of Colombia, the royalties come from different kind of non-renewable resources across the country, mainly, hydrocarbons[4] like oil and gas, and minerals like coal, nickel, and gold. The amount of royalties depends on the value of the production, according to an internal price that the government set for a unity of the NRNR, and a tax that has different rules for every kind of commodity. Then, the scale of royalties can range between 5% and 25% of the internal value of the production (DNP 2007).

In 2015, the amount of royalties received by the Colombian State was approximately USD 2.5 Billion (Colombian Peso -COP- 7.0 billion), equivalent to 1% of the GDP and 9.5% of the territorial budget (Ministry of Treasury. 2015). 75% of the royalties were generated from oil, 16% from coal and 10% from other mining activities, which made those industries the biggest producers of royalties in the country (DNP. 2017). The royalties are not big as compared with the GDP or the national budget, however at the subnational level, royalties are sometimes the main financial source of the local governments (DNP. 2017)

Because the size of the revenues generated in the productive activity itself, the sector of hydrocarbons and minerals have a significant role not only in the incomes of the local governments but in the general economy as well. The big producers of oil and coal are localised in few departments and municipalities of Colombia. Coal production, for instance, is very concentrated. In 2015, around 90% of the total production was localised in 7 municipalities of two departments (Cesar y la Guajira), whereas the rest of the production was distributed along 400 municipalities (UPME. 2017).

Before the 70´s, the main economic activity in the country was the export of coffee, agriculture commodities, and some industrial goods. In fact, during some discontinuous periods of the second half of the 20th century, Colombia had to import oil (Kalmanovitz 2011). Likewise, the production of coal was relatively modest until the end of the 80's when it starts to grow until it become the first exporter of coal in Latin America and the tenth in the world.(Ministy of Mines and Energy 2014).

During the late 80's, Colombia started to experience a boom of oil and coal production. First, during the 80s and early 90s new oilfields were discovered in the Departments of Arauca and Casanare in the eastern of the country. That increased the production and export capacity, at the time that stimulated new exploration (López et al. 2012). Second, the exploitation of coal also increased in the 90s and early 2000's with the opening of the two biggest projects of coal

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[4] This category includes crude oil, petroleum products, and natural gas.

exploitation in the country, initially in the Department of La Guajira and later in the department of Cesar, both in the north of Colombia (Bayona Velasquez 2016). Figure 1 presents the evolution of the exports of oil and coal between 1970 and 2015.

Figure 1. Exports of oil and coal 1970-2015
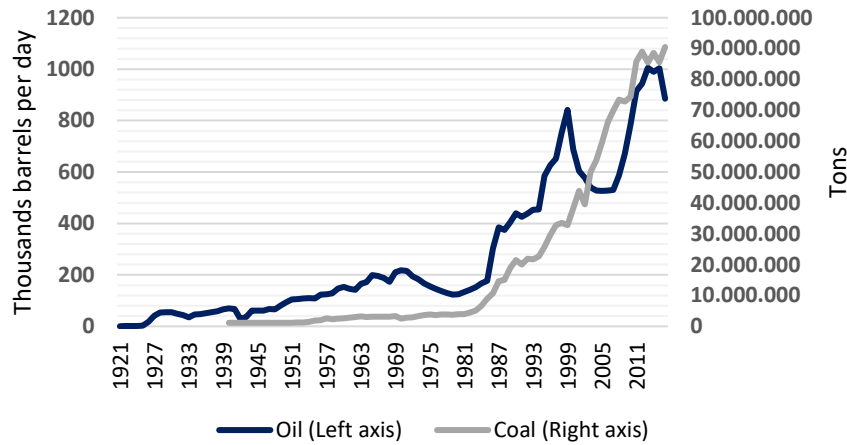
Source: Central Bank (2017), UPME(2017)

Historically, the main beneficiaries of the royalties have been the municipalities and departments where the exploitation is made. Regulation about the property of the underground soil and the royalties can be tracked to the first laws after the independence of the colonial government of Spain around 1829. However, a more specific framework for the administration and distribution of royalties was settled in 1919 with law 120 of oil regulation, which established that 30% of the revenues from royalties should remain in the producer department with an extra 5% in the specific producer municipality (Duarte 2012).

The portion of the royalties going to the producer's territories has been modified several times, and extended to other kind of commodities, reaching a maximum of 80%, with decree 1246 of 1974. Since the middle of the 70s the departments received 65% of the royalties and the municipalities an extra 15%, the remaining 20% was sent to a national fund under the administration of the central government (Hernadez and Herrera 2015), until the last reform of the SGR in 2011.

2.5.2. The previous system

Before 2011, the distribution of the royalties was very simple, in part because the production of hydrocarbons and minerals was not high as compared to agricultural production and manufacturing. Thus, the quantity of the royalties was relatively small, and according to the law, it must compensate the producer territories, promote exploration, and finance innovation.

Figure 2 shows the scheme of the distribution of the royalties, making a distinction between direct royalties, -the royalties of the territories where the production takes place including the ports where the production is transported- and the National Fund of Royalties (FNR), a fund used to promote development projects under the discretion of the national government. Therefore, 80% of the royalties were assigned directly between the producer department (65%) and the producer municipality (15%) and the rest 20% was sent to the FNR.

Figure 2. Scheme of the System of royalties before 2011
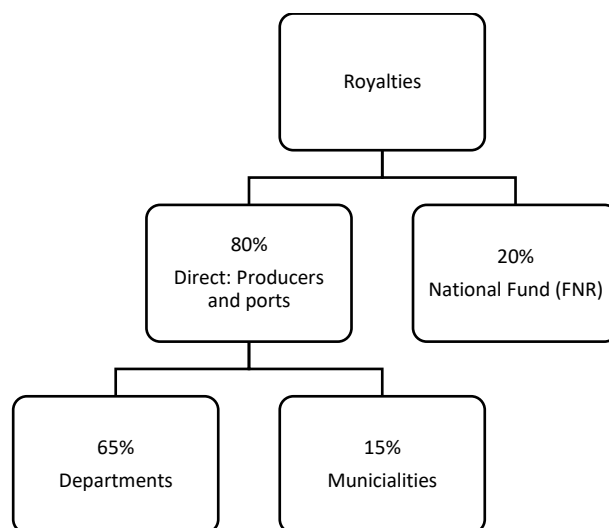
Source: DNP (2012)

Most of the producer departments are situated in the peripheral regions of Colombia, Caribbean in the north and the Orinoquia in the eastern plains, with big portions of land and relatively low population in comparison with the Andean region that concentrates most of the total population. As Figure 3 illustrates, in 2010, 8 of the 33 departments concentrated 80% of the royalties. The department of Casanare, as an example, had less than 1% of the total population of the country, and retained 80% of the royalties generated in the same territory. As a result the royalties per person were high COP 700,000 (USD 388) per capita annually, with some specific municipalities like 'Aguazul' with COP 2 million (USD 1,100) per capita annually.

Figure 3. Royalties per capita and population share by departments in 2010
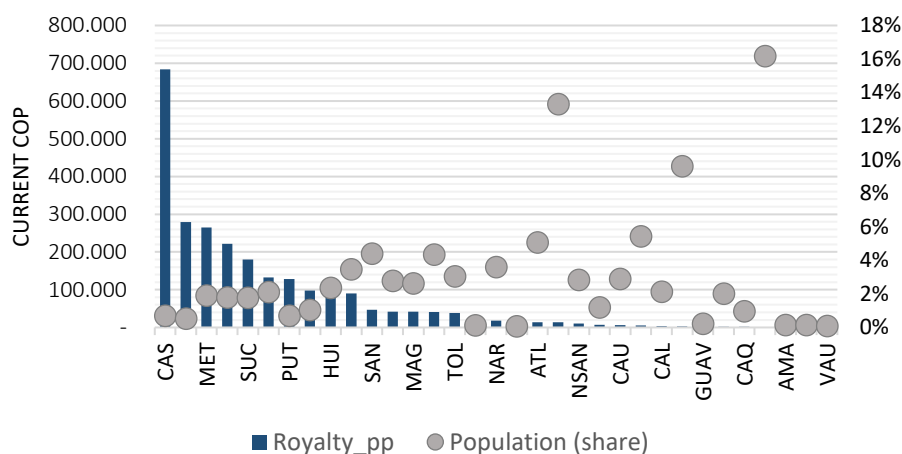
Source: DNP(2017)

By 2010, being aware of the growing importance of the industry for the national economy, the government argued that the royalty system was not pertinent to the reality and necessities of the Colombian economy (DNP 2016). To start, the old system never considered a scenario of high exploitation of NRNR. The rents and in consequence the royalties were very procyclical, due to the close relation between production and international prices, which led to potential macroeconomic instability. Additionally, the distribution to the territories was based on the volume of production and not the value. So, by the end of the 90's small municipalities were receiving transfers of royalties for more than three times their original budgets without royalties (Hernadez 2011).

Moreover, the royalties were distributed to producer territories independently of the rest of national transfers they were receiving from the decentralised scheme implemented in the 90's. Putting aside the negative externalities of the exploitation of NRNR, such scheme caused inefficiency and inequality in the distribution of the national resources across the country (Bonet and Urrego 2014). Also, within the producer territories, the portion of royalties going to the department was later distributed equally between the non-producer municipalities, independent of the necessities and the size of the population, generating inequality within the producer departments again.

Finally, the central government had evidence of misuse, wastefulness, and corruption in the management of royalties. In several cases, long run expenditures of the local administrations were being paid by the short run royalty revenue. Existing research suggests that the high royalties did not contribute to better living conditions for the people in the producer territories but may have

boosted corrupt and criminal practices. As an example of misuse and corruption in the management of royalties, Viloria (2002) audited two municipalities producer of coal, Tolu in the department of Sucre, and Barrancas in the department of La Guajira, to identify the impacts of big transfers of royalties received during the 90's. To start, they found a lack of consistency between the report of transfers of the central government and those reported by the local governments.

But independently of the report, Tolu and Barrancas received at least three times more budget than its neighbours, even more than intermediate cities with three or four times more its population. However, these transfers didn't seem to have much impact on the welfare of citizens. The two municipalities were poorer, and with less offer of social services than its neighbours. Competition for rents between the local elites appeared to have promoted corrupt practices and strategies, like the division of the original municipalities into three smaller municipalities to evade controls. After ten years of receiving large royalties, the municipalities were poorer, and the local administrations were paradoxically over in debt with commercial banks (Viloria De la Hoz, Joaquín 2002).

2.5.3. The new system

In 2010, the current president Juan Manuel Santos presented to the Congress a project to modify constitutional articles 360 and 361 and create a new system of royalty payments, called the general system of royalties (SGR). The law was approved in 2011 and it started to be implemented in 2012. The reform had four main objectives: i) Generate savings for the future, ii) Achieve more social equity across regions and generations iii) Improve regional competitiveness, and iv) Strengthen good governance and institutionality (DNP 2016).

The new system determined that the royalties must be used to finance projects of economic, social and environmental development, finance basic investment in education, science, technology and innovation, contribute to the pension liabilities fund in the territories, sponsor oversight and promote exploration, exploitation and cartographic knowledge of the sub ground, and improve competitiveness to generate better living conditions of the general population (Hernadez and Herrera 2015).

To accomplish the new objectives, the SGR divided the administration of the royalties in different funds according to their objectives and destination. Figure 4 shows a scheme of the SGR. As fixed portions of the royalties, 10% must go to the territorial pensions funds (already created), another 10% to a new fund for science, technology, and innovation, and 2% to supervise the fields, promote exploration and exploitation in the rest of territory. Once the fixed amounts are assigned, up to 30% must go to a fund for saving and stabilisation.

The residual amount must be distributed between the municipalities and the regions to finance investment projects through three channels, first, up to 20% must go to producers (direct royalties), out of the rest 80%, up to 60% must go to a regional development fund to finance projects in agreement between the regions and the central level, and finally up to 40% to a compensation regional fund to promote development projects in the poorest and more populated municipalities of the whole country.

Figure 4. General System of Royalties (SGR)
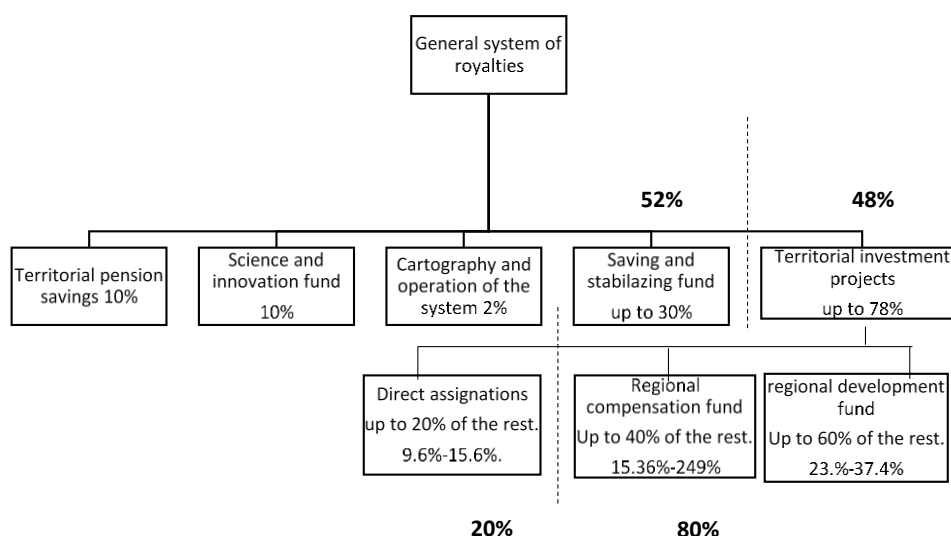
Source: Author's elaboration based on DNP(2016)

The new scheme was expected to be implemented gradually, between 2012 and 2015. So, from the 50% of the royalties going to the departments and municipalities, the first year (2012), the direct assignments would be 50% and the two other funds 50%. The next year (2013), it would be 35% for direct assignments and 65% to the other two funds. The third year (2014), 25% should have ho to direct assignments and 75% to the other two funds. Finally, in 2015, 20% should have been assigned directly while 80% should go to the regional, and compensation fund (Hernadez and Herrera 2015).

Each fund has a different set of rules to the distribution to the municipalities and departments (see General Comptroller (2014)). For example, the Regional Compensation Fund has the follow criteria: i) 30% of the resources to departments with an Unmeet Basic Need Index over 30%. ii) 30% to the departments with municipalities with an Unmeet Basic Need Index over 35%. iii) 30% to local

projects in the poorest municipalities of the country. And finally, 10% for municipalities with a big population[5] that don't meet one of the previous criteria. Once the distribution is calculated, municipalities and departments must present a qualified project of development to get the resources (DNP 2016).

The changes introduced with the reform affect particularly the main producers of NRNR, where in most cases the incomes from royalties decreased. Table 2 displays the distribution of royalties of the main producer departments of NRNR in the country for the period between 1999-2009 and then for the first year of the full implementation of the reform. Particularly, the main producers of oil, Casanare, Arauca, and Meta experienced dramatic reductions in their share of royalties. For instance, Casanare dropped from an average of 23.5% of the total royalties of the country between 1999-2009 to 2.9% in 2015-2016.

Table 2. Distribution of the total royalties between the main producers departments of NRNR.

DEPARTAMENT	1999-2009	2015-2016
Casanare	23.5	2.9
Arauca	10.4	1.9
Meta	12.1	7.4
La Guajira	9.7	4.5
Huila	8.9	3.8
Santander	5.6	3.6
Cesar	5.4	4.7
Córdoba	4.9	5.9
Antioquia	3.4	6.4
Tolima	3.3	2.8
Subtotal	87.2	43.9
The Rest Departmnets	12.8	56.1
Total	**100**	**100**

Source: (Hernadez and Herrera 2015)

In contrast, some departments like Cordoba and Antioquia, producers of nickel and gold, where production was not as high as the oil-producing regions, but with more population and higher poverty rates, increased their incomes from royalties. Similarly, table 2 shows, that the rest of departments (non-producers and less intense producers) are receiving now 56.1% of the total royalties in contrast with the 12,8% that they perceived before the reform.

Although the reform is still young, it has generated controversy in the country since the beginning. Politicians in the producer territories claim there is not enough compensation for the negative externalities associated with the extraction of NRNR in the new SGR. Consequently, in a lot of potential producer municipalities, different groups of interests are now promoting social consultations to oppose the exploitation of NRNR due to environmental, economic, and social reasons; they said the experience of other producer

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[5] Municipalities with category 4, 5, and 6 according to the classification of the Colombia government for size of population

municipalities in the past has been deterioration of the environment, increase of violence and corruption, and deterioration of other economic activities.

In fact, in the last four years, five new mining projects have been delayed because communities voted 'No' to the extraction of NRNR in the so called "consultas populares" (popular consultations) (El Tiempo. 2017, Semana. 2017, El Espectador. 2017), which for one side has opened a political and academic debate around the advantage and disadvantage of the model of local development that the national level has proposed in the las decade. And for other side, has put pressure on the national government to reverse the reform in order to send a bigger portion of the royalties to the producer territories.

Other critics to the reform argue that the current system is not efficient in the sense that after distributing to all the country, through the different funds that were created, the amounts are too atomized and have no possibility to generate big impact in terms of development in most of the municipalities. Also, every channel of distribution has its own rules to access resources, which makes that even if a non-producer municipality has an assignation of royalties, it can take too much time and institutional effort to finally get access to it, while the traditional producers have already developed the know-how to access and use the royalties (Montero. 2017).

Chapter 3 Theoretical Framework and Literature review

3.1. Corruption in theory

Following the recent literature, corruption is defined in general terms as the "abuse of an entrusted authority for illicit gain"(Transparency International. 2017b). It encompasses sort of different kind of behaviours and attitudes across different actors and arenas. Corruption could be private or public. In that sense, it could involve official members of the state using their positions to get a benefit for them, or for a particular group. But also it can be the result of an agreement between privates (or public and privates) to favour both parts.

Similarly, corruption is usually categorised in two broad kinds, petty and grand corruption (June et al. 2008). The first one refers to small, every day, acts of corruption, like bribing a police officer to get away of a speed limit ticket. The latter, also known as political corruption, encompasses big transactions of resources and power, having potential major implications for the community of influence. An example of political/grand corruption is the manipulation of a presidential election in favour of a particular candidate.

Independently of the size and arena, corruption is constituted by the combination of three main elements as follows: discretionary power, the presence of weak/perverse institutions, and economic/political rents (Aidt 2009). The first element stands for the real capacity or authority (formal or informal) to accomplish the corrupted act. The second pertains to the institutional framework that supports corruption, from weak institutionality to more complex arrangements like neo-patrimonial systems, patronage, systemic clientelism, among others (Disch et al. 2009). Finally, the third element, economic/political rents, plays as a motivation to engage in corruption.

The different theoretical analysis of corruption can differ in the weight that every author assigns to each of the three constitutive elements mentioned above. Starting from a simple model of principal-agent more focalised in the individual's capacity and motivations, to models of self-reinforced corruption, and systemic corruption that emphasises the role of the institutional framework, historical patterns and cultural beliefs (Aidt 2003). Current literature agrees on the importance of the three elements, but emphasises the role of the preexisting institutions (Lederman et al. 2005, Disch et al. 2009).

Consequently, this paper analyses corruption in the arena of democratic elections in Colombia in relationship with the abundance of rents in the forms of royalties, under a change in the institutional framework that defines the distribution of royalties across different regions of the country. The purpose is to bring the theoretical aspects of motivation and opportunity for corruption into an empirical analysis.

3.2. Political competition in theory

There are, at least, three different categories of analysis to define political competition: The degree of competition (Stigler 2013), the intensity of the competition(Adams et al. 2005), the dominance of the parties (Bogaards 2004), and the number of parties/candidates (Arvate 2013a, Laakso and Taagepera 1979). All of them are closely linked to the electoral system that can allow the presence of one, two, or more parties and competitors under a scheme of representation based on pluralistic majorities, or proportional representations (Norris 1997). According to Laryczower and Matozzi (2013), a system of proportional representation leads to less aggressive competition between the parties, while majoritarian systems[6], as the case of local mayor elections in Colombia, enable the presence of more polarised ideological positions.

As in this paper, a large part of the academic work on political competition focuses on its drivers: what explains political competition, or what is the motivation of a candidate to run for a public office. The more common answer from a theoretical perspective is a mix of altruism and solidarity, with personal interests in economic rents and power (Beniers and Dur 2007). So, the spectra of possibilities range from pure altruism to pure opportunistic behaviour.

Consequently, Political competition can have positive or negative effects on different outputs like the offer of public goods, the quality of the government, and corruption, depending on the institutional framework (Schleiter and Voznaya 2014). From an optimistic view, in majoritarian elections, political competition can increase the offer of public goods due to a tendency of the candidate/party to satisfy the preferences of the median voter to attract the majority of the voters and in that way retain/access to power and economic rents (Arvate 2013a, Lizzeri and Persico 2001, Alesina and Spear 1988). Additionally, it can increase accountability since the competitors can offer more information to the voters about the quality of the contenders (Della Porta 2004).

From the negative side, in a weak institutional framework, more political competition can be the result of rent-seeking and opportunistic behaviour, which can be enhanced if other candidates also exhibit the same attitude (Iaryczower and Mattozzi 2013, Osborne and Slivinski 1996). Considering that the institutional arrangement has a lot to explain, scholars don't agree in a particular direction on the effects and causes of political competition. However, there is agreement that in pluralistic systems of representations with the option of independent citizens running for public offices, as is the case of Colombia, the presence of extraordinary rents can play as a stimulus to rent-seeking behaviour and therefore corruption in the campaigns (Aidt et al. 2011).

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[6] In majoritarian system, the representation is based on the decision of the majority of the electors.

3.3. The resource curse and the rational actor perspective on political competition and corruption.

In many countries, the abundance and the dependency on rents from the exploitation of natural resources has been associated with the presence of negative outcomes in economic activity, social development, and political instability. Unexpectedly, it is a pattern that countries rich in natural resources, like minerals and fuels, are poorer in terms of per capita income (Badeeb et al. 2017, Arezki and van der Ploeg 2011, Dunning 2005, Sachs and Warner 2001), are more likely to exhibit internal conflict and war (Berman et al. 2017, Bell and Wolford 2015, Ross 2004), with low governance quality, and corruption (Onapajo et al. 2015a, Sandbakken 2006). The empirical evidence on negative associations is explained by the so-called theories of the resource curse.

Although the majority of rich natural resource countries manifest some degree of the resource curse, there are exceptions. For instance, some countries, like Norway, Botswana, and Chile, have handled well in all the aspects usually associated with the resource curse (Acar 2017). As an explanation of those different experiences, the literature points out that in the past, the analysis was oversimplified, leaving important aspects related to the institutional context and the historical patterns aside, when it should be a key element to understand the connection between natural resource abundance and negative or positive impacts (Dunning 2005). Notwithstanding, a revision of a set of empirical studies in the last decades shows that even after controlling for institutions, culture, and the rule of law there is a persistence of some degree of resource curse even in the developed countries (Badeeb et al. 2017, Listhaug 2005).

In that sense, the recent literature on the resource curse call to analyse the effect of an abundance of natural resources in interaction with institutional patterns and cultural beliefs (Olarinmoye 2008, Acemoglu 2005). Scholars highlight the abundance of rents as a driver that can enhance negative outcomes when there exists a predisposition from the weak or perverse institutions to allow it. For example, research on resource curse related to war and social conflict is divided between cases where the abundance/dependence is the reason of the war, to cases where the resource is a tool to prolong or intensify the war, originally generated in other social conflicts (Ross 2004).

In relation with corruption and political competition, the literature underlines how the abundance of rents, can exacerbate corruption and political competition through rent-seeking behaviour across different stakeholders, like politicians and citizens (Bjorvatn and Naghavi 2011, Bhattacharyya and Hodler 2010, Ades and Di Tella 1999). Rosser (2006) remarks that the main problem with the abundance of natural resources is not the economic dependency or limited diversification of the activities, but the rent-seeking behaviour that it incites between political elites and social actors.

One of the main branches of analysis of the theories of the resource curse is precisely the interaction of the abundance of rents and rent-seeking behaviour under the rational actor perspective (Rosser and IDS 2006). Other approaches of the analysis of the emergence of rent-seeking behaviour under a context of

an abundance of natural resources include the behaviourist perspective (Ross 1999), state-focus perspective (Auty and Gelb 2005), and the structuralist/historical perspective (Barbier 2015).

Based on the rational actor perspective, politicians in position of power seek to maximise their benefits by taking the opportunity of capturing rents from a natural resources boom in the context of weak institutions (Rosser and IDS 2006). As a result, politicians can directly take the rents, or use the allocation of rents to obtain direct and indirect benefits.

In general, when rents are perceived to be a short-term windfall, politicians will become more predatory and try to capture rents by any legal or illegal means, and even take recourse to coercion, crime, or corruption (Deacon 2011). On the contrary, when rents are perceived to be constant in the long term, the political elites will tend to be more benevolent and to coordinate instead of competing, to assure their position in power for more time (Rosser and IDS 2006). Robinson et al. (2006) argue that when corruption and weak institutions are already present, even in cases when the rents are projected in the long term, political elites will try to keep their power position by influencing the electoral process.

3.4. Empirical literature on resource curse, political competition, and corruption

Empirical studies on the relationship between the abundance of natural resources and corruption usually compare the size of the exports related to natural resources with a measure of corruption at a cross-country level. In general, the empirical evidence stresses that after controlling for the quality of institutions, the abundance of rents from the exploitation of natural resources exacerbates the incidence and the intensity of corruption (Okada and Samreth 2017, Bhattacharyya and Hodler 2010). Nevertheless, there is no total consensus in the sense that some scholars claim that natural resource is a broad category and different kind of natural resources can generate different outcomes (Petermann et al. 2007).

At a sub-national level, studies of this type are scarce. Still, the few exercises show a negative relationship between rents from natural resources and corruption, conflict, and economic performance. Zhan (2017) finds that resource rents from the extraction of oil and minerals in China seems to breed corruption across the territory, following the geographical pattern of exploitation. The author supports the claim that as rents increase in the regions that produce minerals and fuels, the propensity for corruption among the public employees also increases in the same regions.

Similarly, Libman (2013) analyses, at the sub-national level, in Russia, the effect of the abundance of resources on economic growth, and the quality of governance. He finds a stronger and negative effect on the oil and mineral producer regions in comparison with the others. In the same line, James and Aadland (2011) examine 3,092 counties in two states in U.S. finding that, after controlling for state-specific effects, social and demographic characteristics, and initial level of income, the resource-dependent counties display less economic growth. Regarding electoral corruption and the presence of abundant rents from

oil, Onapajo et al. (2015a) illustrates how oil rents in Nigeria have been used by the local elites to buy voters, hold political power, and assure continued access to its economic benefits.

In the case of political competition as an outcome, the empirical literature shows models that relate political competition and rents directly (Ades and Di Tella 1999). But also, political competition and corruption (Schleiter and Voznaya 2014). Carreri and Dube (2017) find that positive shocks in oil prices generate less political competition, higher margins of victory, and concentration of armed paramilitary groups in oil-producer municipalities in Colombia between 1997-2007.

For the side of competition and corruption, Bergh et al. (2017) run a model of the competition for local council seats and levels of corruption in the municipalities in Sweden, which report causality between the number of candidates competing and the measure of corruption. Similarly, Diaz-Roseco (2016) in Argentina, identifies that rents from oil have a negative impact on government quality and political outcomes at the level of provinces, when the rents are centralised in the provincial government, while rents have a positive impact on political competition when the rents are distributed in significant amounts between the municipalities.

All the above exercises at the level of subnational territories assume region/areas specific fixed effects (e,g. culture, history, quality of institutions), and time-specific effects (national policies of education, security, anti-corruption laws, electoral system). Similar cross-country analysis of the resource curse also tend to use a fixed effects specification (Smith 2015, Arezki and Brückner 2011).

Chapter 4 Methodology

4.1. Corruption and Royalties

As discussed in the theoretical chapter, the abundance, dependence, or presence of rents from the extraction of NRNR seems to be one of the main drivers of political corruption. Also, it was previously discussed that in Colombia, before 2012, only the group of municipalities directly involved in the activities of extraction of the NRNR received royalties. Thus, this paper examines if the reform of the SGR may have spread corruption related to extractive rents, to the rest of the country by breeding the royalties after the reform of the SGR.

If royalties, as a form of rents from abundance of NRNR, were fueling corruption and rent-seeking behavior before the reform of the SGR, it would be expected that a change in the amount and distribution of them affect differently the levels of corruption in the municipalities that reduce their royalties, by decreasing it, but also in those that become recipients after the reform because the rents play as a perverse incentive.

Following that theoretical assumption, this paper starts for testing the effect of the royalties on the levels and presence of electoral corruption across the municipalities of Colombia, and then, it introduces a model for the big-producers against the rest of municipalities.

To estimate the general effect of royalties on corruption and electoral competition, the paper starts from a basic form of the levels of corruption explained by two types of economic incomes: the royalties, and the total incomes of the municipalities. The first one as a type of rent derived from the exploitation of NRNR, and the second as a different kind of economic income from a different source. As in the literature mentioned in the previous chapter, this paper uses fixed effects to account for the specific-constant effects associated to each municipality, like cultural patterns, and institutions. It includes other controls like the population, the potential voters, parties, among others:

$$CR_{m,t} = \alpha + \beta R_{m,t} + \gamma I_{m,t} + \delta Year_{t=2015} + \varphi X_{m,t} + a_m + \epsilon_{m,t}, t = 2011, 2015 \quad (1)$$

Where CR denotes the number of cases of corruption in the municipality *m* in the period *t*, $R_{m,t}$ is the constant value of the royalties in the municipality *m* in the period *t*, $Year_{t=2015}$ is a dummy indicator of the year 2015, $X_{m,t}$ is a vector of the controls mentioned above, a_m is a fixed municipality effect, and $\epsilon_{m,t}$ is the usual error of the model. According to the literature of the resource curse, it is expected a positive sign of the rents coming from the royalties ($\beta > 0$) (Zhan 2017, Onapajo et al. 2015b), which means that more royalties generate more cases of corruption. In contrast, if it is true that the rents from NRNR suffer a kind of "curse" related to the economic activity, it would be expected a negative sign of the incomes from other sources different to NRNR ($\gamma < 0$). For comparative purposes, the same equation was estimated through random

effects, and a pooled OLS which includes dummies for the effects of the natural regions.

The paper also examines whether the reform changed the levels and presence of corruption between producers (direct recipients of royalties) and the rest of the municipalities (non-producers). The introduction of the two groups account for the qualitative evidence presented in the background, that indicates that it was bigger issues of corruption in some producer municipalities. So, this paper proposes two general models, one for the presence of corruption, and another for the levels. For the presence of corruption, it is presented a binary outcome model as follow:

$$CR_{m,s} = \alpha + \beta(DR_{m,s} = 1) + \delta(Year_{2015}) + \gamma(DR_{m,s} \times Year_{2015}) + \varphi(X_{m,s}) + \omega(v_s) + \epsilon_{m,s} \ , \ (2)$$

Where $CR_{m,s}$ is a binary outcome variable equal to one if municipality m in region s has at least one report of corruption, $DR_{m,s}$ is a dummy variable equal to one if the municipality m in the region s is a producer (direct recipient of royalties), $Year_{2015}$ is a dummy variable that indicates if the year is 2015 (after the reform), $DR_{m,s} \times Year_{2015}$ is the interaction of being a direct recipients of royalties and the year 2015, $X_{m,s}$ is a vector of electoral and general characteristics, v_s is a vector of dummies for the natural regions and $\epsilon_{m,s}$ is the usual error of the model. The expected signs for the general effect of the royalties as a form of rents from NRNR on corruption is positive (β>0) (Okada and Samreth 2017, Bhattacharyya and Hodler 2010), while the coefficient of the interaction between royalties and the year of full implementation of the reform should be negative ($\gamma < 0$), which would indicate that the reform make more similar the two groups of municipalities by spreading corruption.

The same form is estimated for the levels of corruption:

$$CR_{m,s} = \alpha + \beta(DR_{m,s} = 1) + \delta(Year_{2015}) + \gamma(DR_{m,s} \times Year_{2015}) + \varphi(X_{m,s}) + \omega(v_s) + \epsilon_{m,s} \ , \ (3)$$

Where $CR_{m,s}$ is the number of corruption cases, and the independent variables are the same that were described in equation 2.

4.2. Political Competition and Royalties

Under the perspective of rent-seeking behaviour, it is expected that in the presence of weak institutions and abundance of rents from the NRNR, political elites will compete to reach or hold access to the rents by influencing the electoral process (Robinson et al. 2006). To test the effect of royalties on political competition and the impact of the reform of the SGR, this paper proposes two

general models: The first one uses the values of the royalties and the value of the total incomes of the municipality administration as a key variable for explaining political competition. The second one focuses on the impact of the reform on the two groups of municipalities, producers (direct recipients of royalties) and non-producers. The first model can be described as follow:

$$Cand_{m,t} = \alpha + \beta R_{m,t} + \gamma I_{m,t} + \delta Year_{t=2015} + \varphi X_{m,t} + a_m + \epsilon_{m,t}, t = 2011, 2015 \quad (4)$$

Where $Cand_{m,t}$ is the number of candidates running for mayoror elections in the municipality m in the period t, $R_{m,t}$ is the constant value of the royalties perceived for the municipality m in the period t, $Year_{t=2015}$ is a dummy indicator of the year 2015, $X_{m,t}$ is a vector of controls -like the size of the population (potential voters, or polling places), the participation of voters, winning party, dummies for the natural regions and others-, a_m is the fixed municipality effect, and $\epsilon_{m,t}$ is the usual error of the model. The expected sign of the coefficient on royalties is positive ($\beta > 0$), which means that more royalties generate more candidates running for mayors (Carreri and Dube 2017, Bjorvatn and Naghavi 2011, Ades and Di Tella 1999). The other hand, the sign for incomes (γ) will indicate if this political competition reacts in the same way to any kind of income.

Finally, the paper examines the changes in the two group of municipalities, the producers (direct recipient of royalties) and non-producers (recipients after the implementation of the reform) using the next general form to explain the number of candidates:

$$Cand_{m,s} = \alpha + \beta(DR_{m,s} = 1) + \delta(Year_{2015}) + \gamma(DR_{m,s} \times Year_{2015}) + \varphi(X_{m,s}) + \omega(v_s) + \epsilon_{m,s}, \quad (6)$$

Where $Cand_{m,s}$ is the number of candidates in the municipality m in the region s, $DR_{m,s}$ is a dummy variable equal to one if the municipality m in the region s is a direct recipient of royalties (producer), $Year_{2015}$ is also a dummy variable that indicates if the year is 2015 (after the reform), $DR_{m,s} \times Year_{2015}$ is the interaction of being a direct recipient of royalties and the year 2015, $X_{m,s}$ is a vector of electoral and general characteristics, v_s is a vector of dummies for the natural regions and $\epsilon_{m,s}$ is the usual error of the model. The expected signs for the general effect of the royalties as a form of rents from NRNR on political competition is positive ($\beta > 0$), while the coefficient of the interaction between royalties and the year of full implantation of the reform should be negative ($\gamma < 0$), if indeed the competition come from a kind of resource curse effect (Arvate 2013b, James and Aadland 2011).

Chapter 5 Data and the exploratory analysis of the descriptive statistics

This study is based on panel data collected from different sources. The unit of analysis is the municipality and the data set has information on all[7] 1,101 municipalities in 33 departments of Colombia for the years 2011, 2015, and some information from the last official census in 2005. The main data sources are the Registraduria Nacional del Estado Civil (National Register Office), the Departamento Administrativo Nacional de Estadisticas (the National Statistics Office -Dane-), the Mision de Observacion Electoral (Mision de Observacion Electoral -MOE-), the Departamento Nacional de Planeacion (The National Planning Department -DNP-), and the Centro de Estudios de Desarrollo Economico de la Universidad de los Andes (the Center for Studies of Economic Development of the Andes University -CEDE-).

The main group of variables of the analysis are: the value of the royalties distributed to each municipality, taken from the DNP, the measures of corruption, taken from the MOE, electoral outcomes related to political competition, taken from the National Registered office, and the economic and socio-demographic characteristics of the municipalities and departments, taken from the Dane and the CEDE.

5.1. Royalties

The royalties, as a potential key explanatory variable of corruption and political competition in the local elections of 2011 and 2015, is represented by three measures: total value of the royalties distributed to every municipality, royalties per capita, and the share of the incomes of the local government coming from royalties (dependency). The values are taken from DNP (2017) and deflated to obtain constant values, using the GDP deflator with prices of 2005. The other hand, the per capita values and the dependency were calculated using information from Dane (2017), and the CEDE (2017) of the Andes University. Table 3 presents a summary of the royalties distributed to municipalities in 2011 and 2015.

Table 3. Summary of Royalties (constant values 2005) 2011 and 2015

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[7] Colombia has 1,127 municipalities, however some of them presented extemporaneous local elections or belong to a special circumscription with other rules of election.

Variable		Royalties (values*)	Royalties Percapita*	Dependency
	Obs	1101	1101	1085
2011	Mean	1,740	0.08	0.07
	Std. Dev.	6,600	0.32	0.15
	Min	-	0.0	0
	Max	81,300	5.0	0.82
	Obs	1099	1100	1099
2015	Mean	2,190	0.11	0.1
	Std. Dev.	7,260	0.36	0.1
	Min	-	0.0	0
	Max	152,000	8.2	0.7

*Million COP

Source: Author's calculations using (DNP. 2017) and (CEDE. 2017).

In 2011, the average of royalties distributed to the municipalities was COP 1,740 million (USD 580 thousand), which in per capita terms totalized COP 78 thousand (USD 26) and represent around 7% of the municipalities budget. The maximum amount of royalties reached COP 81300 million (USD 27.1 million), equivalent to COP 5 million (USD 1666) and a budget dependency of 0.82. After the reform, in 2015, most of the municipalities of the country receive a portion of the total royalties. On average, municipalities received COP 2190 million (USD 730 thousand), correspondent with COP 110 thousand (USD 36) and an average dependency of 0.10. Still, 110 municipalities did not receive royalties, while the maximum amount was COP 152000 million (USD 50.6 million).

Due to the heterogeneity of the group of recipients of direct royalties, where a big majority perceive insignificant amounts of royalties, before and after of the reform, this analysis includes a dummy variable for the big producers of oil and coal in 2011, from now 'the producers', which are the main source of resources from the extraction NRNR. Said information was taken from official reports of the Mining National Agency (Agencia Nacional De Mineria -ANM-) and the National Agency of Hydrocarbons (Agencia Nacional de Hidrocarburos -ANH-). Thus, Table 4 outlines a summary of statistics for the group of recipients and a selected group of bigger recipients for 2011.

Before the reform, only producer municipalities receive royalties. Overall, 661 municipalities out of 1,101 received royalties, from insignificant amounts like COP 2909 (USD 0.9) to more bigger values like COP 81,300 million (USD 27,1 Million), while the rest did not receive it because they were not involved in the production process. The reason for such small amount of royalties in some municipalities (less than one USD) is the small intensity of production as well as a relatively small importance for the economy of certain minerals. The other hand, in big producer municipalities of oil and coal, the royalties can represent up to 80% of the total municipality budget, and the extraction of the NRNR plays as the first economic activity and the first source of resources for the local government.

Table 4. Summary of Royalties by groups of Municipalities

	2011			2015
	Producers* (Receiver)	Big Producers**	Non-Producers	Receiver SGR***
Obs.	660	75	500	1,099
Mean.	2,909	17,986	0	2,194
Std. Dev.	8,332	16,666	0	7,256
Min.	0	1,111	0	0
Max.	81,294	81,294	0	151,803

Source: Author's calculations using (DNP. 2017) and (CEDE. 2017).

*Municipalities directly involved in the exploitation of NRNR, including ports of storage and transportation

**Big Producers of oil, coal, and ports.

***After the reform, still 105 municipalities did not receive royalties.

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5.2. Measures of Corruption

Originally, this study takes the number of reports of irregularities reported by the MOE in the local elections of 2011 and 2015. The MOE is a well-known civil organisation created in 2006 in Colombia that connects 400 different civil groups of work, under a single platform. It includes students organisations, religious groups, ethnic minorities, women associations among others, to watch all the electoral process in Colombia. The MOE is financed by private national and international donors.

The reports of corruption of the MOE are not taken as legal accusations. In fact, most of the reports are anonymous, or just a counting of the risks. The organisation usually collects information directly from observers before, during, and after the elections, and through different technological platforms like phone calls, internet, or direct reports from official authorities. With this information, they generate reports and papers in association with academics, usually with warnings and recommendations.

This study chooses two types of categories of corruption reported by the MOE. First, irregularities in free choice (voto libre), and second irregularities with the registration of voters (inscripcion de cedulas). These two categories encompass the most popular ways of electoral corruption in Colombia (MOE 2016). The first one, 'free choice', refers to any conduct that attempts to impede exercising the vote in complete freedom, through intimidation, or offering any kind of pay. The second is the fraudulent registration of voters in places where they don't belong.

'Free choice' was created as a category by the MOE in 2015. It is an aggregation of two crimes: constraint to voters (intimidation) and vote buying. Those two crimes used to be reported independently for the elections of 2011 and before, but in 2015, they were reported together under the new category. For that reason, in this paper, it was necessary to calculate the category of free choice for 2011 to have a consistent measure of corruption in both periods.

It is important to indicate that the MOE has published reports of corruption for all kind of public elections since 2006. However, the measures are not strictly comparable. Because the use of technology and communication has increased since 2006, this study only takes 2011 and 2015 as more comparable years, in the sense that technologies of communication have been more uniform since 2010. To illustrate, in 2010 the country presented a penetration of cell phones of 98% which reached 100% in the second semester of 2011 (Ministry of Technology and Telecommunications. 2017).

Table 5 shows the number of reports aggregated by departments in the categories of free choice, registration of voters, the total aggregated, and the change in the number of reports for the local elections of 2011 and 2015. Reports related to free choice totalled 546 in 2011, with a presence in 32 of the 33 departments of Colombia varying from zero reports in the Department of San Andres Island to 75 reports in the north-east department of Santander. For 2015, the same type of corruption increased in the number of reports by 530 reaching 1,076 cases. Nevertheless, the presence was reduced to 30 departments and ranged from zero in the Amazonian departments of Amazonas and Guania, and in San Andres Island, to 174 in the North-west department of Antioquia.

Table 5. Reports of Electoral Corruption Aggregated by Departments

Department	Corruption 1: Free Choice			Corruption 2: Registration of voters			Corruption 3: Total		
	2011	2015	Δ	2011	2015	Δ	2011	2015	Δ
Amazonas	1	0	▼ -1	0	0	▭ 0	1	0	▼ -1
Antioquia	51	174	▲ 123	113	139	▲ 26	164	313	▲ 149
Arauca	3	2	▼ -1	1	7	▲ 6	4	9	▲ 5
Atlantico	46	34	▼ -12	33	9	▼ -24	79	43	▼ -36
Bogota D.C.	15	68	▲ 53	10	22	▲ 12	25	90	▲ 65
Bolivar	21	77	▲ 56	16	32	▲ 16	37	109	▲ 72
Boyaca	28	33	▲ 5	92	38	▼ -54	120	71	▼ -49
Caldas	6	23	▲ 17	18	27	▲ 9	24	50	▲ 26
Caqueta	4	9	▲ 5	16	7	▼ -9	20	16	▼ -4
Casanare	1	12	▲ 11	15	8	▼ -7	16	20	▲ 4
Cauca	14	16	▲ 2	28	18	▼ -10	42	34	▼ -8
Cesar	6	44	▲ 38	15	17	▲ 2	21	61	▲ 40
Choco	11	13	▲ 2	36	7	▼ -29	47	20	▼ -27
Cordoba	8	19	▲ 11	29	27	▼ -2	37	46	▲ 9
Cundinamarca	35	75	▲ 40	85	78	▼ -7	120	153	▲ 33
Guainia	3	0	▼ -3	0	0	▭ 0	3	0	▼ -3
Guaviare	4	5	▲ 1	0	0	▭ 0	4	5	▲ 1
Huila	25	25	▭ 0	14	8	▼ -6	39	33	▼ -6
La Guajira	11	15	▲ 4	5	5	▭ 0	16	20	▲ 4
Magdalena	3	28	▲ 25	24	37	▲ 13	27	65	▲ 38
Meta	27	44	▲ 17	23	16	▼ -7	50	60	▲ 10
Narino	40	50	▲ 10	20	20	▭ 0	60	70	▲ 10
Norte De San	12	48	▲ 36	18	33	▲ 15	30	81	▲ 51
Putumayo	9	5	▼ -4	2	1	▼ -1	11	6	▼ -5
Quindio	8	7	▼ -1	11	9	▼ -2	19	16	▼ -3
Risaralda	10	26	▲ 16	10	8	▼ -2	20	34	▲ 14
San Andres	0		▭ 0	0		▭ 0	0	0	▭ 0
Santander	75	44	▼ -31	94	25	▼ -69	169	69	▼ -100
Sucre	21	13	▼ -8	13	8	▼ -5	34	21	▼ -13
Tolima	29	58	▲ 29	24	28	▲ 4	53	86	▲ 33
Valle	17	104	▲ 87	31	42	▲ 11	48	146	▲ 98
Vaupes	1	3	▲ 2	0	0	▭ 0	1	3	▲ 2
Vichada	1	2	▲ 1	0	3	▲ 3	1	5	▲ 4
Total	**546**	**1076**	▲ **530**	**796**	**679**	▼ **-117**	**1342**	**1755**	▲ **413**

Source: Author's calculations using MOE (2016).

Regarding registration of voters in 2011, the reports totalled 796 in 27 of the 33 departments of the country, varying from zero in six departments to 113 in the department of Antioquia, in the north-west of the country. Contrary to the first type of corruption, the reports of fraud in the registration of voters decreased by 117 to a total of 679 cases in 2015. Nevertheless, it increases its presence in 28 departments in a range of variation from zero cases in five departments to 139 in the department of Antioquia.

It is interesting that for one side the cases of corruption related to free choice increased while the cases related to fraud in the registration of voters decreased. Figure 5 shows the presence of every kind of corruption in the municipalities of the country. The graph settles that for one side, corruption related to free choice spread its presence from 286 municipalities to 383 municipalities between 2011 and 2015 but, fraud in the registration of voters reduced from 512 municipalities to 123.

Figure 5. Number of Municipalities with Reports of Electoral Corruption
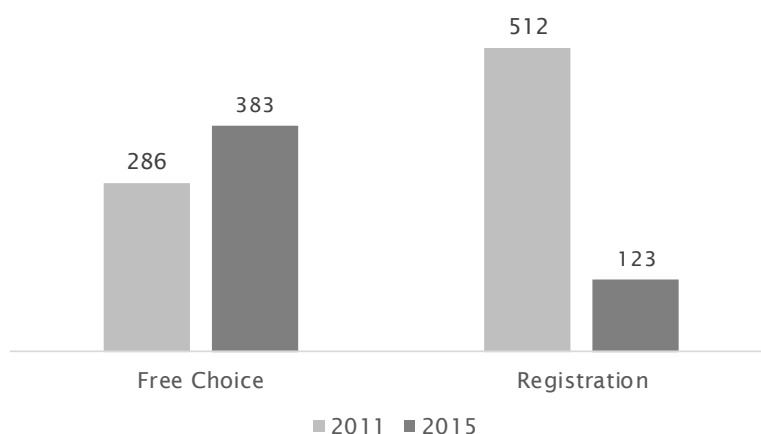
Source: Author's calculations using MOE (2016).

Comparing producer municipalities (recipients of direct royalties) with non-producers, corruption seems to decrease in producer municipalities, both in terms of the level and presence, between 2011 and 2015, while for non-producers, it looks steady. Figure 6 depicts the levels of the two measures of corruption and also the proportion of municipalities in every group with at least one report of corruption (presence) in four panels (a, b, c, d). Overall, in 2011 corruption was already widespread across the two groups of municipalities.

Corruption related to free choice (corruption 1), in panel a, was the most reported in both years. On average, in 2011, the producer municipalities reported 1.27 cases, whereas the non-producers reported 0.95. For 2015, the producers decrease the number of cases to 0.8, while the non-producers increase to 0.99. It means that contrary to 2011, for 2015, corruption related to free choice was higher in the non-producer municipalities, now also recipients of royalties. Panel b shows a decrease in the gap of presence of corruption 1 between producer and

non-producers in the two periods. In 2011, the difference was positive and significant around 0.13. Yet, in 2015 that difference drops to 0.10, still significant. The reduction of the gap is explicated exclusively by a decrease in the presence of corruption in the producer municipalities (panel b).

Figure 6. Electoral Corruption and Differences of Means Between Producers and Non-Producers of NRNR in 2011 and 2015

*** p<0.01, ** p<0.05, * p<0.1
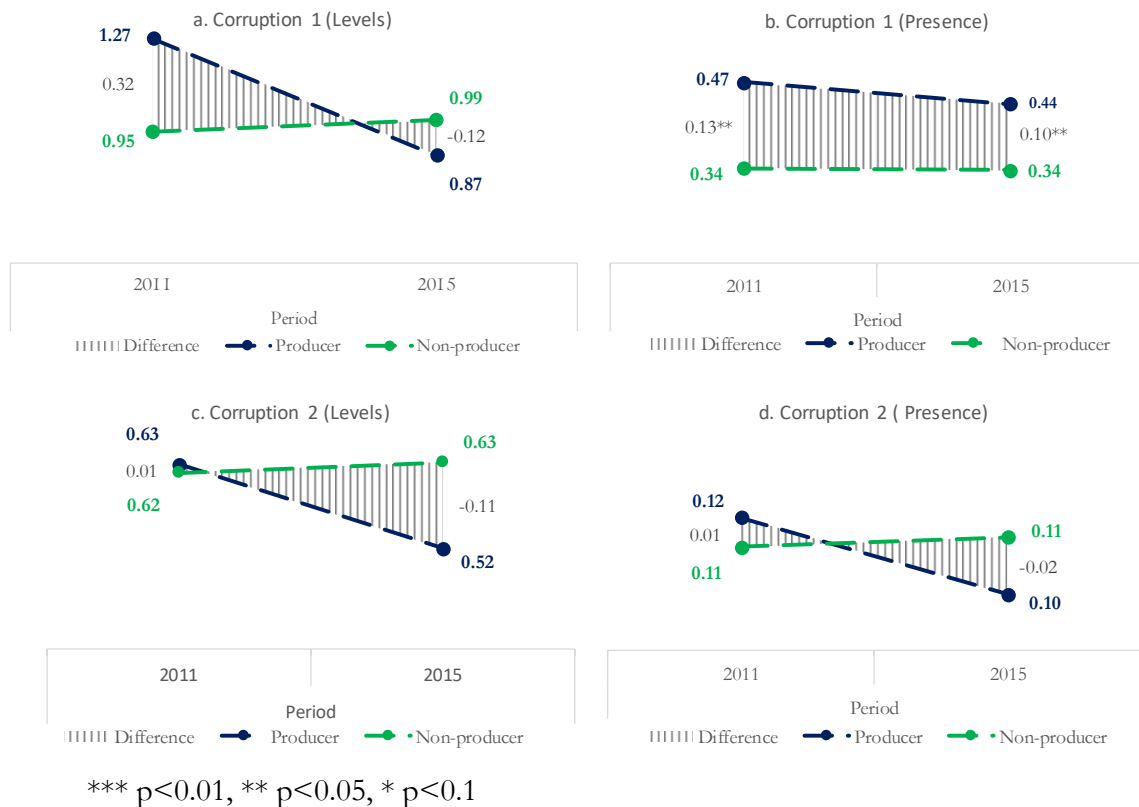
Source: Author's calculations using MOE (2016).

Although in 2011 the levels of corruption related to registration of voters (corruption 2) were similar in both groups (panel c), the producer municipalities display a decrease from 0.63 in 2011 to 0.52 in 2015, while the non-producers performs an increase from 0.62 to 0.63, which means that the gap became negative from 0.01 in 2011 to -0.11 in 2015. Similarly, the presence of 'corruption 2' decreased across time for producer municipalities, form 0.12 in 2011 to 0.10 in 2015, but remained steady for non-producers around 0.11.

5.3. Electoral outcomes: Political competition

About electoral competition and other political outcomes related to it, this paper uses the reports for the elections of mayors for every municipality, from the official web page of the national registered office. Table 6 introduces a summary of the main electoral outcomes in 2011, for all the municipalities, and

disaggregated between the producers (direct receiver of royalties) and the non-producers. Because it occurred before the implementation of the reform to the SGR, receiver of royalties are also the producers and ports directly involved in the extraction of NRNR.

Table 6. Electoral outcomes in municipalities of Colombia 2011

Variable	All Muncipalities	Producer	Non-Producer	Differences (P-NP)
Candidates	4.03	4.97	3.96	1.01***
Population 2011	41729	44073	41558	2515
Polling places reported	82.73	86.00	82.50	3.55
Potential Voters	27807	28479	27758	721
Total Voters	15934	18098	15776	2322
Number of votes for blank option	586	459	595	-137
Number of no marked votes	474	463	475	-12
Number of null votes	352	354	351	3
Number of votes	15934	18098	15776	2322
Number of valid votes	14522	16822	14354	2468
Number of votes for the winner	15120	17281	14962	2319
Number of votes for the winner	6662	7889	6572	1317
Number of votes second runner	4551	4899	4526	373
Number of votes third runner	2003	2393	1975	418
Difference of votes between first and second	2110	2990	2046	944
Participation	0.67	0.68	0.67	0.01
Blanks %	0.01	0.01	0.01	0.00
Nomarked %	0.02	0.02	0.02	0.00
Nulls %	0.02	0.02	0.02	0.00
Votes for candidates %	0.95	0.95	0.95	0.00
Votes winner %	0.47	0.45	0.47	-0.02
Votes for second runner %	0.33	0.31	0.33	-0.0224**
Margen 1st - 2nd %	0.14	0.14	0.14	0.01
Dummy winner from a well known (traditional) party	0.55	0.55	0.55	-0.01
Dummy winner from PUN party	0.24	0.29	0.24	0.06
Dummy winner from PLC party	0.17	0.16	0.17	-0.01
Dummy winner from PCC party	0.19	0.16	0.19	-0.03
Dummy winner from PCR party	0.15	0.13	0.15	-0.01
Dummy winner from PV party	0.05	0.09	0.04	0.0485**
Dummy winner from other party	0.21	0.16	0.22	-0.06
New registration of voters 2010	3447	3652	3432	219
New registration of voters 2011	2293	1975	2316	-342
Sum of new registration of 2010 and 2011	5740	5626	5748	-122
Total New Registrations out of Potential	0.18	0.234	0.186	0.047***

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations using National Register Office (2017b)

During the elections of 2011, 1101 municipalities chose their mayors and governors. On average, the municipalities of Colombia hold 41 thousand citizens and a potential of voters of 27 thousand, equivalent to 66% of the population being able to vote, and a participation rate close to 67%. Usually, in 55% of the municipalities, the winner belongs to one of the five well known political parties. Distinguish between the producers (direct receiver or royalties) and the rest of the municipalities, both of them seems similar, with more or less the same size of population, polling places to vote, potential of voters, participation, among others. However, the number of candidates is higher in the municipalities which are recipients of royalties by at least one candidate. Also, they present a lower percentage of votes for the second runner and higher new inscriptions of voters as a proportion of the potential of voters.

In 2015, the general average does not exhibit big changes in comparison with 2011 (Table 7). The exceptions are the percentage of winners from a well-known party that now increase to 75% and the percentage of new registrations that decrease to 6%. Between the two groups, the differences in the number of candidates running for mayor disappear and so does the other differences observed in 2011, like the percentage of votes for the second runner and the new registration of voters that decreases in the two groups.

Table 7. Electoral outcomes in municipalities of Colombia 2015

Variable	All Muncipalities	Producer	Non-Producer	Differences (P-NP)
Candidates	4.2	4.9	4.2	0.7
Population	43701	47231	43442	3788
Polling places reported	87	96	87	9
Potential Voters	30707	32590	30637	1953
Total Voters	17409	21334	18067	3268
Number of votes for blank option	680	427	698	-272
Number of no marked votes	520	485	522	-37
Number of null votes	402.2	403.0	402.0	0.4
Number of votes	18,389	21334	18174	3160
Number of votes for the winner	7682	10110	7504	2606
Number of votes second runner	5263	6179	5196	983
Difference of votes between first and second	2419	3932	2308	1624
Participation	0.680	0.695	0.68	0.01
Blanks %	0.02	0.01	0.02	0.00
Nomarked %	0.02	0.02	0.02	0.00
Nulls %	0.02	0.01	0.02	0.00
Votes for candidates %	0.979	0.96	0.95	0.01
Votes winner %	0.432	0.49	0.48	0.01
Votes for second runner %	0.330	0.32	0.34	-0.02
Margen 1st - 2nd %	0.140	0.17	0.14	0.03
Dummy winner from a well known (traditional) party	0.757	0.72	0.76	-0.04
Dummy winner from PUN party	0.215	0.19	0.22	-0.03
Dummy winner from PLC party	0.192	0.21	0.19	0.02
Dummy winner from PCC party	0.162	0.12	0.17	-0.04
Dummy winner from PCR party	0.160	0.12	0.16	-0.04
Dummy winner from PV party	0.029	0.08	0.03	0.05
Dummy winner from other party	0.060	0.21	0.18	0.03
New registration of 2014	1,336	1,350	1,334	16
Total New Registrations out of Potential	0.06	0.07	0.06	0.01

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations using National Register Office (2017b)

Figure 7 describes the difference in the number of candidates running for mayor, across the two years, 2011 and 2015, and across the two groups of municipalities. In 2011, the gap between producers and non-producers was one candidate, whereas in 2015 it reduces to 0.71. The reason was an increase in the number of candidates competing in the non-producer municipalities, from 3.9 candidates in 2011 to 4.2 candidates in 2015.

Figure 7. Political Competition and Differences of Means Between Producers and Non-Producers of NRNR in 2011 and 2015
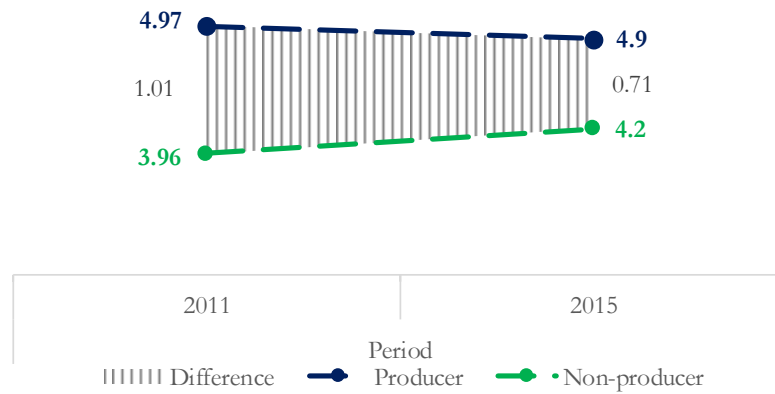
Source: Author's calculations using National Register Office (2017b)

5.4. General characteristics

This paper also examined a set of socio-economic and demographic characteristics of the municipalities. The last census of Colombia dates from 2005 being the latest official information about population, GDP, poverty, illiteracy rates and other variables at the level of municipalities. The Dane makes projections of population and follows some general characteristics in the main 13 capital cities quarterly. So, at least at the level of municipalities, the census is the most complete and in some cases the only source of information on the municipalities characteristics. Other variables of violence and conflict were taken from the CEDE for 2011; they are available yearly until 2015. Table 8 presents a summary of the main characteristics of the municipalities and the differences between big producers (direct receiver of royalties) and the rest of municipalities.

Beyond the size of the population above commented, the municipalities of Colombia are on average 81 kilometers away from the capital of the department, with 58% of the population living in rural areas, a GDP per capita of COP 7 millions (USD 2400), and a local government expenditure of COP 237 thousand per capita (USD 79) per year. According to the last census, in 2005, the average of the poverty rate in municipalities was about 50% while the illiteracy rates rounded 29%. By the year of the reform, 2011, terrorist attacks were close to one attack per year on average, with presence of coca crops on 18% of the territory and 38% of the municipalities having cases of kidnapping.

Table 8. General characteristics

	All	Producers	Non-Producers	Differences (P-NP)
Population	41,710	44,073	41,558	2,515
Distance to Capital of Dep	81	81	79	1
Distance to national capita	322	361	311	49.7**
High (msml)	1140	525	1,206	-680***
Area (KM2)	1018	1,704	811	893**
Rurality	0.58	0.48	0.67	-0.186***
GDP_pp	7,201,000	9,740,000	6,120,000	3.62***
Exp_pp	237,892	204,553	245,259	-40706***
Poverty Rate		0.61	0.49	0.12*
Illiteracy Rate	0.294	29.70	29.30	0.35
Terrorism	0.86	2.62	0.73	1.9***
Coca crops	0.188	0.19	0.18	0.01
kidnapping	0.388	0.78	0.35	0.424**

*** p<0.01, ** p<0.05, * p<0.1
Source: Author's calculations using DNP (2017), CEDE (2017).

Comparing Producers (royalty's recipients) with Non-producers (non-recipients), they perform strong differences in all the geographical, social, and economic aspects. To start, the producers are localised closer to the sea level, in bigger extensions of land and with less percentage of people living in rural areas. An introduction to geographical aspects was described in the second chapter. To remember, most of the total population are localised in the Andean region (Andes Mountains) in the centre of the country, while the extraction of the main NRNR is in the peripheric regions, mainly the Caribbean and the Easter Planes.

Correspondingly, the producer municipalities have higher GDP levels than the rest of municipalities. On average, producers had a per capita GDP of COP 9.7 million (USD 3200) in 2005 against COP 6.1 million (USD 2000), which is consistent, if it is considered that around 60% of the total exports are composed of NRNR. Remarkably, the per capita expenditure of the local government is lower in the producer municipalities, with an average of COP 204 thousand (USD 68). Furthermore, the population in the producer municipalities are poorer, with a poverty rate close to 61%, while it was 49% in the non-producers. The illiteracy rates are statistically equal in both groups in 29%.

Regarding violence and security, the producers have mayor presence of attacks of terrorism, higher numbers of kidnapping cases, but equal levels of illegal coca crops. On average, producers presented 2.6 attacks of terrorism per year while non-producers had 0.73. The cases of kidnapping got close to 0,78 in the first group, but 0.35 in the latter. And coca crops have a presence in 0.18 % of the municipal territory in all the municipalities of the country.

5.5. Highlights from the descriptive analysis

From the descriptive statistics, there are at least three insights. First, despite the big scale of exploitation, in 2005, municipalities intensively involved in the exploitation of NRNR presented higher poverty rates, less government expenditure per capita, and more intense conflict in comparison with the non-producers. Second, by 2011, corruption was already widespread across the country. Nonetheless, producers of NRNR, which were also the recipients of royalty rents, exhibited higher levels of corruption and political competition than the non-producers. Third, after the reform of the SGR, the gap in levels of corruption and political competition between producer and non-producer municipalities didn't show a statistical difference. However, in all cases, producers reduced corruption and political competition, while non-producer present an small increase.

Chapter 6 Econometric Estimations

6.1. Royalties on corruption

The first estimates in this section show that in general royalties increase the levels of corruption across the municipalities of Colombia, while the total incomes of the municipalities have the opposite effect. This result is aligned with the theoretical assumptions that claims that the rents originated in the exploitation of NRNR tend to increase corruption. Table 9 presents the estimation of equation 1, for two types of corruption, corruption related to free choice (corruption 1), in columns 1 to 3, and corruption in the registration of voters (corruption 2), in columns 1 to 6.

Table 9. Effect of Royalties on Electoral Corruption

VARIABLES	Corruption 1			Corruption 2		
	(1) OLS	(2) FE	(3) RE	(4) OLS	(5) FE	(6) RE
Royalties (Constant Values 2005)	0.06**	0.1***	0.06***	0.01	0.06***	0.01***
	(0.02)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
Income Total (Constant Values 2005)	-0.27**	-0.38***	-0.26***	-0.00	-0.28***	-0.28***
	(0.10)	(0.09)	(0.05)	(0.06)	(0.09)	(0.03)
Year=2015	0.60***	0.41***	0.65***	-0.14**	0.00	-0.13*
	(0.11)	(0.09)	(0.08)	(0.06)	(0.09)	(0.06)
Constant	0.77**	-2.71***	0.76**	1.15***	0.68	1.10***
	(0.38)	(0.78)	(0.33)	(0.27)	(0.74)	(0.24)
Observations	2,181	2,181	2,181	2,181	2,181	2,181
R-squared	0.53	0.49		0.16	0.04	
Number of Code_Mun	-	1,099	1,099	-	1,099	1,099

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

+ Controls: Population/potential voters/polling places, participation, winning party, regions, see in Appendices 1, table 9. Values in COP thousand million.

In the case of corruption related to free choice, the three estimates - OLS, fixed effects (FE), and random effects (RE), show that on average increasing royalties generates a significant increase in the level of corruption. Given that the denomination of the Colombian currency is too high, the variable of royalties and income were escalated to facilitate the interpretation. So, a more meaningful interpretation of the size of the coefficient would be: if a municipality receives 10 thousand million pesos (USD 3.4 million) additional in terms of royalties, it is expected that corruption increases in 1 case (Column 2 FE). In contrast, an increase in the total incomes of the municipality generates a significant decrease in the cases of corruption in 3.8 cases.

The estimation of corruption related to registration of voters (corruption 2) in columns 4 to 6 also exhibits the expected signs of the coefficients: positive for the value of the royalties and negative for total incomes, with significant

coefficients in the fixed effects model (column 5). On average, an increase of COP 10,000 million (USD 3.4 million) in the royalties, generates an increase of corruption of 0.6 cases, whereas the same increase in the incomes produce a reduction of corruption levels of 2.8 cases.

6.2. The reform of the royalty system of payments on electoral corruption

To assess whether the reform of the royalty system of payments distributed royalties and also corruption, the paper presents a specification of the presence and the levels of corruption as a function of being a producer of NRNR (recipient of direct royalties) against being non-producer (recipient of royalty after the reform). As the exploratory analysis of the variables showed, before the reform, corruption had a high presence in the group of producers. So, if the reform spread more corruption, it is expected that presence of corruption increases across the country, but the gap between the two groups reduces.

Table 10 illustrates the estimations of equation 2 and 3, for the presence (columns 1 to 4) and the levels of corruption related to free choice (column 5). Column 1 starts with the most basic model of the presence of corruption as a linear function of a dummy variable of being a producer, and the year 2015. There, the producers (recipient of direct royalties) present on average 0.11 more cases of corruption than the non-producers, which is a significant difference. The next model in column 2 adds an interaction term to capture the impact of the reform on the presence of corruption. The term for the year indicate that corruption increase and spread in both groups of municipalities. The interaction term is not significant which indicate that the reform to the SGR didn't change the distribution of corruption between the two groups.

Finally, column 3 and 4 add some controls like the size of the population, the potential voters, participation, winning party and natural regions. In column 5, the same last specification is used on the levels of corruption. The results indicate that exist a significant and positive difference in the presence and levels of corruption between the two groups of municipalities of at least 0.34 for the last one and 0.13 for the former. Additionally, the presence of corruption increases significantly in both groups between 2011 and 2015 in around 0.14. However, the interaction term is not significative. It means that, even that corruption growth with the royalties in both groups, after the reform, it is not possible to affirm that it spread with the reform.

Table 10. Effect of the reform on electoral Corruption (Free choice)

| | Corruption1 =1 | | | | Corruption (levels) |
VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) Probit	(5) OLS
Big Producer=1	0.11***	0.11*	0.17***	0.13*	0.353
	(0.04)	(0.05)	(0.06)	(0.07)	(0.23)
Year=2015	0.08***	0.08***	0.14***	0.14***	0.61***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.14)
BigP*2015 (Interaction Big Producer and 2015)	-	0.02	-0.02	-0.02	-0.06
		(0.08)	(0.08)	(0.09)	(0.32)
Constant	0.25***	0.25***	0.65***	-	0.92
	(0.02)	(0.02)	(0.10)	-	(0.61)
Observations	2,200	2,200	1,652	1,652	1,652
R-squared	0.01	0.01	0.07		0.5
P-seudo R2	-	-	-	0.107	

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

> *+ controls: Population/potential voters/polling places, participation, wining party, regions. see in Appendices 1, table 10.*

Table 11 introduces the same estimations for corruption related to the registration of voters in columns 1 to 4, for the presence of corruption, and in column 5 for the levels. The estimations confirm the findings of the exploration of the variables. This kind of corruption reduced significantly between 2011 and 2015. In fact, the coefficient of 2015 was -0.36 which mean that this form of electoral corruption decreased 36 percentage points (column 4). However, the groups have no different effects of royalties. It means that with the collected data and methodology used in this analysis is not possible to affirm that the reform breed corruption to the rest of municipalities of the country.

Table 11. Effect of the reform on electoral Corruption (Registration of voters)

| | Corruption2=1 | | | | Corruption (levels) |
VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) Probit	(5) OLS
Big Producer=1	0.04	0.07	0.1	0.08	0.1
	(0.03)	(0.05)	(0.06)	(0.06)	(0.16)
Year=2015	-0.35***	-0.34***	-0.34***	-0.36***	-0.10
	(0.02)	(0.02)	(0.02)	(0.02)	(0.09)
BigP*2015 (Interaction Big Producer and 2015)	-	-0.06	-0.06	-0.03	-0.12
	-	(0.07)	(0.07)	(0.07)	(0.19)
Constant	0.46***	0.46***	0.68***	-	1.4***
	(0.01)	(0.01)	(0.09)	-	(0.37)
Observations	2200	2200	1652	1652	1,652
R-squared	0.15	0.15	0.19		0.16
P-seudo R2	-	-	-	0.18	

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

> *+ controls: Population/potential voters/polling places, participation, wining party, regions. see in Appendices 1, table 11.*

6.3. Political competition and royalties

In agreement with the expectations of the perspective of the rational choice in rent-seeking behaviour, the estimations of the effect of royalties and other kind of incomes show that political competition increases as the royalty levels also does, but decrease with the total incomes of the municipalities (Deacon 2011). Table 12 displays the estimation of equation 4 through three models of the number of candidates running for local mayor in columns 1 to 3. The three models predict the same positive and significant effect of the amount royalties on the number of candidates. On average if royalties increase in 10 thousand million pesos (USD 3.4 million), candidates will increase between 0.4 (10% of the national average). Contrary, for the same increase in total incomes, the estimations show that the number of candidates decreases in 3.3 candidates (82% of the national average).

Table 12. Effect of Royalties on Political Competition

	Political Competition (Candidates)		
	(1)	(2)	(3)
VARIABLES	OLS	FE	RE
Royalties (Constant Values 2005)	0.04***	0.01	0.04***
	(0.00)	(0.01)	(0.00)
Income Total (Constant Values 2005)	-0.33***	-0.17*	-0.26***
	(0.05)	(0.09)	(0.04)
Year=2015	0.488***	0.345***	0.427***
	(0.08)	(0.09)	(0.07)
Constant	6.98***	5.77***	6.87***
	(0.337)	(0.766)	(0.311)
Observations	2,180	2,180	2,180
R-squared	0.143	0.01	
Number of Code_Mun		1,099	1,099

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

+ Controls: Population/potential voters/polling places, participation, winning party, regions, see in Appendices 12. Values in COP thousand million.

6.4. The effect of the reform on political competition

Table 13 reports the estimated effects of being a producer (direct recipient of royalties), the general increase of the number of candidates in 2015, and the change in the difference between the two groups after the reform, as it was formulated in equation 6. The first model (column 9) starts from a basic form of the dummy of being recipient and the year 2015. Then, in column 10, the interaction term is added to capture the effect of the reform on the difference between the two groups of municipalities. Finally, in column 11, other controls are added.

In general, the producer (recipient of direct royalties) have between 0.7 and 1 candidate more running for mayors than the rest of municipalities, which is a significant difference. Also, between 2011 and 2015, competition increases in all the municipalities by 0.19 candidates (5% of the national average). The estimation of the impact of the reform is negative, yet that impact is not statistically significant. It means, even when royalties stimulated competition in both groups, the reform cannot be accused of systematically distribute it.

Table 13. Effect of the reform on Political competition (Number of candidates)

VARIABLES	(9) OLS Candidates	(10) OLS Candidates	(11) OLS Candidates
Big Producer=1	0.859***	1.012***	0.739***
	(0.160)	(0.225)	(0.253)
Year=2015	0.178**	0.199**	0.196**
	(0.0764)	(0.0789)	(0.0996)
BigP*2015 (Interaction Big Producer and 2015)		-0.306	-0.109
		(0.318)	(0.340)
Constant	3.971***	3.961***	7.697***
	(0.0509)	(0.0516)	(0.413)
Observations	2,199	2,199	1,653
R-squared	0.017	0.017	0.118

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

+ *controls: Population/potential voters/polling places, participation, winning party, regions. See in Appendices 13. Values in COP thousand million.*

Chapter 7 **Conclusion**s

Historically, Colombia has presented high levels of corruption in the public sector. However, in the last years, the country has witnessed a spread and an increase of cases of corruption in the local democratic elections across the territory. Geographically, corruption seems to expand from the Andean region (central region) in the earliest 2000's to the peripheral regions of the country. The Andean region has been traditionally the most populated as well as the centre of the agricultural and manufacturing industry. In fact, before the 90's it concentrated the main economic activities and the production of the main exports. Nevertheless, since the 90's the country has shift its economic structure to the exploitation of NRNR, and today, the main exports of Colombia are oil, coal, and nickel, which are located in the peripheral and less populated regions.

In a relative short period, between the 80's and 90's, the local governments in small municipalities in peripheral regions started to receive significant amounts of royalties for being the producers of the main exports of the country. After a decade of the first boom of production, in the latest 2000's, scholars, and politicians argued that the system of distribution of royalties were inefficient and stimulate wastefulness, rent-seeking behaviour among the local elites, and corruption in the producer regions. As an answer, in 2011 the central government introduced a reform to the royalty system of payments (SGR) to redistribute the royalties to the whole territory based on criteria of size of the population and poverty.

The objective of this research was to examine whether and to what extent a reform that is designed to spread resources more equitably, between producer and non-producer municipalities, may have a perverse effect and spread corruption in the country. To do so, this paper analysed a panel of reports of electoral corruption, electoral outcomes, distribution of royalties, and general characteristics of 1100 municipalities in 2005, 2011 and 2015, using descriptive statistics and econometric techniques, with the support of literature based on resource curse theories.

From the descriptive analysis, it was stated in first place, that despite the big scale of exploitation of NRNR, in 2005, municipalities intensively involved in the exploitation of NRNR (the only receiver of royalties by then) presented on average significantly higher poverty rates, less local government expenditure per capita, and more intense conflict in comparison with the non-producers. These results conform with the classical findings of the resource curse analysis; it is correlation of abundance of NRNR with negative outcomes in economic, political and social aspects. However it does not allow to establish a causal relationship, because the producer territories were characterised from the beginning for a lack of presence of the state and a weak institutionality.

A second finding, also from the exploratory analysis of the data was that by 2011, corruption was already widespread across the two groups of municipalities. Nonetheless, producers municipalities presented one candidate more than non-producers as well as a higher percentage of municipalities with presence of corruption. Regarding of the comparison of means, corruption decreased in the

producer municipalities between 2011 and 2015, whereas the same tended to remain, or present a small increase in the non-producers, which generate at least a visual reduction of the gap between the two groups after the reform.

Results from the econometric estimations suggest that, in general, rents from royalties have a positive effect on the levels of corruption, and political competition across the municipalities of Colombia, while the total incomes of the municipalities have the opposite effect. Ceteris paribus, an average increase of COP 10,000 million (USD 3.4 million) of royalties generates an increase of 1 case of corruption. However, the same increase in the total income of the municipalities, (keeping royalties constant) generates a decrease o corruption of 2.7 cases.

Similarly, political competition, assumed in the literature as the result of rent-seeking behaviour, show the same pattern. It increases with royalties in 0,4 (10%) but decrease with total incomes in 3.3 (82%). Those result are aligned with the theoretical assumptions that claims that the rents originated in the exploitation of NRNR have a perverse effect on corruption, at the same time that encourage rent-seeking behaviour among political elites, in contrast with other kind of sources of incomes.

The reform did not significantly change the differences on corruption levels, and political competition between the producer and the non-producer municipalities. After the full implementation of the reform in 2015, corruption related to free choice and political competition was still significantly higher in producer municipalities. This means that with the collected data and methodology used in this analysis is not possible to affirm that the reform spread corruption between the two groups of municipalities.

Further research in this topic should be consider modelling the critics to the implementation of the reform that claim that it was not completely implemented, because the complexity of the new system. To remember, the distribution of the resources does not necessary mean execution. Also, since the descriptive statistics showed a pattern of differentiation between producer and non-producers in all the outcomes usually associated with the resource curse, it would be useful to observed at least other electoral cycle and add information from the next census to account for possible differences in other social and economic variables since the last census was in 2005.

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Appendix 1. Complete Models

Table 9. Effect of Royalties on Electoral Corruption

	Corruption 1				Corruption 2		
	(1)	(2)	(3)		(1)	(2)	(3)
VARIABLES	OLS	FE	RE	VARIABLES	OLS	FE	RE
Royalties (Constant Va	0.0564**	0.0980***	0.0613***	Royalties	0.0162	0.0666***	0.0157***
	(0.0279)	(0.0134)	(0.00684)		(0.0143)	(0.0127)	(0.00506)
Income Total (Constar	-0.271**	-0.385***	-0.262***	Income Tc	-0.000726	-0.280***	0.00626
	(0.106)	(0.0997)	(0.0531)		(0.0566)	(0.0948)	(0.0394)
Year=2015	0.606***	0.410***	0.655***	Year=201!	-0.143**	0.00734	-0.134*
	(0.115)	(0.0998)	(0.0862)		(0.0689)	(0.0949)	(0.0683)
Pop	-2.38e-05**			Pop	-6.97e-06		
	(1.17e-05)				(4.36e-06)		
PotentialV	4.50e-05***	0.000106***	9.71e-06***	PotentialV	1.36e-05**	1.34e-05***	3.24e-06***
	(1.63e-05)	(3.51e-06)	(2.44e-07)		(6.54e-06)	(3.34e-06)	(1.77e-07)
Part	-0.462	0.599	-0.513	Part	-0.818**	-0.433	-0.786**
	(0.535)	(1.142)	(0.496)		(0.405)	(1.086)	(0.365)
Winpartyk	-0.151*	-0.0193	-0.145*	Winpartyk	0.0478	0.132	0.0564
	(0.0868)	(0.101)	(0.0863)		(0.0624)	(0.0956)	(0.0661)
Caribbe	-0.0820			Caribbe	-0.0848		
	(0.0824)				(0.0764)		
Pacific	-0.0391			Pacific	-0.151*		
	(0.107)				(0.0821)		
Planes	0.105			Planes	-0.135		
	(0.229)				(0.101)		
Amazonia	0.0257			Amazonia	-0.376***		
	(0.153)				(0.0971)		
Constant	0.775**	-2.713***	0.764**	Constant	1.195***	0.686	1.101***
	(0.380)	(0.781)	(0.333)		(0.271)	(0.743)	(0.245)
Observations	2,181	2,181	2,181	Observatio	2,181	2,181	2,181
R-squared	0.531	0.498		R-squared	0.169	0.046	
Number of Code_Mun		1,099	1,099	Number of (		1,099	1,099
Robust standard errors in parentheses				Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1				*** p<0.01, ** p<0.05, * p<0.1			

Table 10. Effect of the reform on electoral Corruption (Free choice)

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) Probit	(5) OLS
	(0.0412)	(0.0571)	(0.0647)	(0.0765)	(0.084)
Year=2015	0.0887***	0.0874***	0.142***	0.143***	0.153***
	(0.0195)	(0.0201)	(0.0259)	(0.0303)	(0.032)
BigP*2015 (Interaction Big Producer and 2015)		0.0193	-0.0177	-0.0284	-0.034
		(0.0825)	(0.0845)	(0.0864)	(0.091)
Logroyal_pp			-0.0202***	-0.00781	-0.007
			(0.00532)	(0.00667)	(0.007)
PotentialV			2.32e-07**	4.45e-06***	0.000***
			(9.29e-08)	(1.04e-06)	(0.000)
Candidates			0.0226***	0.0148**	0.014**
			(0.00658)	(0.00714)	(0.007)
Part			-0.499***	-0.147	-0.118
			(0.132)	(0.157)	(0.163)
Winpartyk			-0.0367	-0.0352	-0.038
			(0.0244)	(0.0282)	(0.030)
Caribbe			0.0949***	0.0402	0.038
			(0.0314)	(0.0354)	(0.037)
Pacific			0.0358	0.00660	0.002
			(0.0314)	(0.0371)	(0.039)
Planes			-0.00440	-0.0201	-0.023
			(0.0482)	(0.0559)	(0.059)
Amazonia			0.0217	0.0527	0.055
			(0.0694)	(0.0736)	(0.076)
Constant	0.252***	0.252***	0.651***		
	(0.0134)	(0.0136)	(0.108)		
Observations	2,200	2,200	1,652	1,652	1,652
R-squared	0.013	0.013	0.074		

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

Table 11. Effect of the reform on electoral Corruption (Registration of voters)

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) Probit
Big Produ	0.0410	0.0733	0.104	0.0821
	(0.0357)	(0.0597)	(0.0679)	(0.0620)
Year=201	-0.353***	-0.349***	-0.340***	-0.361***
	(0.0178)	(0.0184)	(0.0259)	(0.0262)
BigP*201		-0.0646	-0.0629	-0.0377
		(0.0712)	(0.0760)	(0.0716)
Logroyal_p			-0.00855	-0.00371
			(0.00558)	(0.00504)
PotentialV			2.09e-07***	8.79e-07***
			(6.19e-08)	(2.82e-07)
Candidates			0.00368	0.00390
			(0.00575)	(0.00660)
Part			-0.174	-0.120
			(0.115)	(0.131)
Winpartyk			-0.0182	-0.0172
			(0.0222)	(0.0235)
Caribbe			-0.0395	-0.0497*
Pacific			-0.0696**	-0.0771***
			(0.0271)	(0.0275)
Planes			-0.0822**	-0.0875**
			(0.0417)	(0.0383)
Amazonia			-0.206***	-0.198***
			(0.0399)	(0.0296)
Constant	0.462***	0.460***	0.681***	
	(0.0152)	(0.0156)	(0.0952)	
Observatio	2,200	2,200	1,652	1,652
R-squared	0.152	0.153	0.199	

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

Table 12. Effect of Royalties on Political Competition

VARIABLES	Political Competition (Candidates)		
	(1) OLS Candidates	(2) FE Candidates	(3) RE Candidates
Royalties (Constant Values 2005)	0.0403***	0.00931	0.0448***
	(0.00699)	(0.0131)	(0.00636)
Income Total (Constant Values 200	-0.337***	-0.176*	-0.269***
	(0.0501)	(0.0978)	(0.0491)
Year=2015	0.488***	0.345***	0.427***
	(0.0840)	(0.0979)	(0.0741)
Pop	2.83e-06		
	(2.09e-06)		
PotentialV	-3.25e-06	5.33e-08	9.28e-07***
	(3.13e-06)	(3.44e-06)	(2.32e-07)
Part	-4.072***	-2.342**	-3.937***
	(0.498)	(1.120)	(0.463)
Winpartyk	-0.162**	-0.0789	-0.141*
	(0.0766)	(0.0986)	(0.0767)
Caribbe	0.368***		
	(0.111)		
Pacific	-0.402***		
	(0.0919)		
Planes	0.979***		
	(0.186)		
Amazonia	0.229		
	(0.212)		
Constant	6.980***	5.776***	6.872***
	(0.337)	(0.766)	(0.311)
Observations	2,180	2,180	2,180
R-squared	0.143	0.015	
Number of Code_Mun		1,099	1,099
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			