



Risks of corruption in Colombian public procurement:  
does it relate to electoral re-election?

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## **Risks of corruption in Colombian public procurement: does it relate to electoral re-election?**

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### **Abstract**

The following dissertation aims to detect and estimate the causal impact of the re-election of political parties over corruption risks indicators derived from public procurement performance information, as one of the most vulnerable features over which politicians and officials can extract rents in governments, using as a case study the Colombian municipalities during the 2016-2019 term. This relationship unfolds under a retrospective accountability model, based on a principal-agent relationship in which voters hold political parties accountable in function of the performance of the politician in power, under the assumption that politicians can incur into rent-seeking behaviour as a response to special interests attached to the political party. Through the implementation of a sharp Regression Discontinuity Design that uses turnout differences between the incumbent political party and its principal challenger as a source of randomness near to the threshold, results suggest that re-electing a political party for an additional term in the current administration leads to the increase of price overruns on contracts awarded under public tender modality in those municipalities in which the political party was re-elected. Although it should be interpreted in terms of internal validity, this outcome gives evidence of the existence of rent-seeking behaviour associated to an objective measure of corruption risk. Moreover, this outcome should be interpreted as a warning sign for Colombian watchdogs in which increased rent extraction from public procurement stopped being an isolated phenomenon to become a systematic one.

JEL codes: P48, D72, D73

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## Risks of corruption in Colombian public procurement: does it relate to electoral re-election?

### Introduction

In most countries, the production and delivery of public goods and services to citizens depends on how the government allocates public contracts to the most competent suppliers. From this perspective, public procurement is a mechanism for elected politicians to carry out their campaign promises and the additional needs that may emerge once in office. But even without assuming commitment to a promised platform, public procurement is still the mechanism through which an elected politician will implement his most preferred policy.

However, a potential distortion in public management is the existence of conflicts of interest, defined as a situation in which a public official “has a private or other interest which is such as to influence, or appear to influence, the impartial and objective performance of his or her official duties” (Martini, 2013, p. 1). Conflicts of interest in public procurement “can arise in various stages of the procurement process whenever public officials’ decisions or actions are influenced by their private interests” (Martini, 2013, p. 2), and it can benefit them directly or third-parties closely related to them. If badly managed, conflicts of interest can trigger corruption.

Public procurement is particularly prone to the existence of conflicts of interest in Colombia, because at least one third of the national budget is spent on contracts yearly (Zuleta et al., 2018, p. 1). In the case of municipalities, elected mayors delegate the allocation of public contracts to officials, as a measure to avoid potential conflicts of interest arisen from the groups that supported him on the electoral race. But some of the most sounded corruption scandals in Colombia involving public procurement reveals the existence of collusive behaviour between elected mayors and public officials in favour of specific contractors<sup>2</sup>.

On the other hand, Colombia has a multiparty system composed by several mid-sized political parties. There is high mobility of politicians between the political parties, and the amount of political parties and movements is very dynamic over time (Taylor & Shugart, 2018, p. 8). Political parties are not necessarily attached to an ideology, even if they are electorally successful at a country level. During the electoral competition to reach the Mayor’s Office, candidates can: i) have the endorsement of a unique political party or movement; or ii) the endorsement of a coalition of two or more political parties that are not necessarily akin on their ideological beliefs. As a third way, they can also iii) be representatives of a significant group of citizens (with no ideology in particular) previously legalised before the electoral

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<sup>2</sup> That was the case of the Nule Group corruption scandal (*carrusel de la contratación*) in Bogotá, in which a former city mayor was prosecuted and sentenced to several years in prison for colluding with public officials, businessmen, members of the city council and watchdog agencies to manipulate the allocation of infrastructure contracts in exchange of bribes (Hernández, 2017).

authorities. Mayors only can run for office again once an entire term has passed, meaning that only political parties can opt for re-election.

The accountability theory suggests that the re-election of a politician is an electoral reward for good performance during his term in office in the case that he is a good-type politician, or a cost-efficiency outcome derived from the expected utility of being re-elected while he signals himself as a good politician, when he is in reality a bad-type politician (Besley, 2007). In this context, public procurement performance can be a potential indicator of the type of the politician. However, politicians' behaviour has direct effects on the reputation of the political party that endorsed him: the re-election of a political party in a municipality should be a consequence of voters rewarding a good public procurement performance of its representative.

The aim of the following dissertation is to shed light on the relationship between re-election of political parties and public procurement outcomes in Colombian municipalities, using as a case study the municipal elections held in October 2015, whose elected mayors were in office during the 2016-2019 term. The underlying assumption is that political parties in Colombia seek re-election motivated by the influence that they can have on the allocation of contracts once they are in power. So, the two main hypotheses to test are that i) Public procurement performs better for municipalities with re-elected political parties if voters are able to punish "bad-type" politicians, and ii) Public procurement performs worse in municipalities with re-elected parties if voters are unable to hold "bad-type" politicians accountable, under the assumption that politicians' behaviour has a direct effect on the probability of re-election of the political party.

This study follows a Regression Discontinuity Design, using closely contested electoral races in municipalities where political parties in office sought for re-election as a source of discontinuity. Although this methodology allows to infer causality for the observations close to the threshold set by this variable, a potential concern is that electoral outcomes are prone to manipulation by observed and unobserved factors related to the characteristics of the municipality. To account for them, balance tests are performed on several socioeconomic variables measured at the electoral year at a municipal level.

Understanding the dynamics on the relationship between political parties' behaviour and public procurement outcomes is of the highest relevance for Colombian government. The presence of corruption in public procurement implies monetary losses and gaps on public spending that affects the quantity and quality of public service delivery. But corruption also weakens the trust of citizens on politicians, political parties and government institutions. In the long run, the lack of trust caused by corruption can imply a loss of trust in democracy.

The document is organized as follows. The first section summarizes the main literature related to corruption and the relationship between electoral outcomes and public procurement. Section two depicts the theoretical framework of retrospective accountability, adapted to the case in which voters hold political parties accountable based on the behaviour of the

politicians they endorse and win office. The third section exposes the detailed conceptualization and description of the outcome and treatment variables, as well as the sample and sources of information. Section four explains the methodology used to measure the causal impact of re-election of political parties in public procurement outcomes. Section five shows the main results of the estimation and robustness checks. Finally, section six discuss the results and concludes, pointing out the potential limitations that this analysis may have.

## **1. Literature review**

The political economy of corruption related to public procurement has been a topic of broad study at a theoretical and empirical level. At a formal level, one of these views is provided by Tullock (1967), whose model explains the potential gains that rent-seekers (under the assumption that they are risk-neutral) get from bribing government officials, in the context of the allocation of a public contract, while Rose-Ackerman (1975) focuses on private individual attempts to bribe government officials in order to obtain a public contract in different market situations. She argues that the amount of corruption discovered depends on the amount of resources aimed to surveillance and law enforcement, and also on the market structure: there will be higher risks of corruption if the government is the unique purchaser of the demanded type of good, or if there is vagueness on the specifications of the product requested by the government. Burguet & Che (2004) also explore the role of bribes on the allocation of contracts in government, while Burguet (2015) focuses on procurement design that avoids bribing in exchange of misrepresenting the quality of the delivered good.

However, the empirical research on the impact of corruption in public procurement has recently become an area of growing interest. In general, the secret nature of corruption poses several challenges on its measurement. Corrupt transactions such as bribes and cost overruns can only be reasonably tracked in case-specific studies. For instance, McMillan & Zoido (2004) sum the total cost of bribing media, politicians and the judiciary power during Alberto Fujimori's presidency in Peru, while Olken (2007) estimates the difference between the expenditures of constructing a road in Indonesia and a third-party independent estimation of the costs of the same project. But overall, the most widely known measures of corruption are based in subjective information<sup>3</sup>. While informative, perception data should be used with caution in empirical analysis, since they may lead to biased estimates when compared to outcomes using objectives measures (Olken, 2009). In this context, the availability, reliability and accessibility to public procurement data is an opportunity to study corruption in governments based on objective information. Some international organizations such as the OECD, Transparency International and Open Contracting Partnership advocate for governments to implement good practices that make this type of information as transparent as possible. However, one challenge to overcome in this field relates on how to formulate

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<sup>3</sup> Some examples are the Corruption Perception Index elaborated by Transparency International and the World Bank Governance Indicators.

indices able to distinguish between corruption and administrative malpractice in public procurement (David-Barrett & Fazekas, 2016).

Among the empirical studies that unfold the relationship between office tenure and corruption risks in public procurement, Coviello & Gagliarducci (2017) study the impact of re-election of local mayors on the nature and the level of competition in public procurement for Italian municipalities between 2000 and 2005. They find that one additional term in office reduces the number of bidders participating in auctions in 11,48% and the winning rebate in 5,7%, while increases the probability that the contract is awarded to a local firm in 5% and to the same firm within the term in 25,6%. According to these results, “when politicians stay in power for a longer period of time, there is a systematic deterioration in the functioning of the auction mechanism” (Coviello & Gagliarducci, 2017, p. 88). More recently, Broms et al. (2019) found that a single-party rule since the decade of 1970s increases the single-bidding ratio in 29% in Swedish municipalities’ public procurement. Accordingly, the re-election of the same political party for the first time also increases the single-bidding ratio in 17%, concluding that low electoral competition leads to a higher probability of public procurement manipulation.

Public procurement can also be affected by reasons different than tenure. Klašnja (2015) shows that public procurement faces more corruption risks in Romanian local municipalities where incumbents earn less salary, and that this misbehaviour contributes to the existence of incumbency disadvantage<sup>4</sup>. Alternatively, David-Barrett & Fazekas (2016) compare the effect of partisan favouritism in public procurement outcomes in UK and Hungary. They find that, between 2009 and 2012, 10% of UK’s public procurement was controlled by companies who benefitted by some degree of partisan favouritism, while this percentage in Hungary was between 50%-60%. The authors argue that public procurement outcomes in the Hungarian case could be due to a systemic partisan favouritism, whereas in the case of UK it could have been due to the existence of isolated opportunism.

In Colombia, the literature related to corruption in public procurement and electoral outcomes is incipient, and mostly developed at a qualitative level. There is no relevant literature on the effects of office tenure at a local level, but there is a growing interest on the study of public procurement performance and the potential corruption risks attached to it. For instance, the Electoral Oversight Mission (2018) identified 60 modalities in which elected politicians can be corrupt and, from those, approximately 60% are directly associated to public procurement manipulation. On the other side, Zuleta et al. (2018) make an extensive descriptive analysis of SECOP<sup>5</sup>, in which they depict the main patterns of Colombian public procurement between 2011 and 2016. However, Ruiz (2018) elaborated one of the pioneer

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<sup>4</sup> An incumbency advantage is a situation under which the politician seeking re-election faces an electoral advantage compared to the challenger, given that challengers are not able to signal their congruence to voters beforehand (Besley, 2007). However, under a situation of incumbency disadvantage, “voters systematically rate incumbents less favourably than nonincumbents, despite, or perhaps because of, efforts made while in office” (Klašnja, 2015, p. 929).

<sup>5</sup> The Colombian Public Procurement Register System (SECOP by its initials in Spanish). Some features about this platform are explained at Section 3.

studies intended to use Colombian public procurement information for causal inference in political economy. He measures the impact of electing donor-funded politicians on public procurement performance in Colombian municipalities, finding that electing a donor-funded politician increases in 9,6% the probability of donors receiving contracts. He also shows that the average value of contracts awarded to donors is higher than similar contracts awarded to non-donors, and they are mostly awarded under modalities with less screening mechanisms. The present document is also aimed to be part of the pioneer efforts to use public procurement data for causal inference on political economy studies in Colombia.

## **2. Theoretical framework: political agency and retrospective accountability**

It is useful to frame the discussion that unfolds the relationship between the re-election of political parties and public procurement outcomes in Colombian municipalities from the perspective of electoral accountability theory. This approach is based on the principal-agent model, which describes the implications of the presence of information asymmetries on the delegation relationship between voters (as principals) and elected politicians (as agents). The interest in this section is to explore the moral hazard problem associated to accountability, when regarded as a punishment/reward mechanism of voters towards elected politicians as representatives of political parties.

For the following adapted framework, it must be noted beforehand that Colombia does not allow for re-election of mayors for the immediate next term but does allow for re-election of political parties. Besides, one necessary additional assumption to specify in order to be able to interpret the accountability model to the Colombian case, is that politicians collude with officials on the allocation of public contracts. This can happen through shared bribes between elected mayors and officials, hidden partisan affiliations from the officials' side, or even by coercion from the politician to the official. Under collusion, officials lose their autonomy on the design, evaluation and allocation of contracts, and politicians are able to manipulate public procurement to benefit their interests.

This adapted version of the model proposed by Besley (2007) assumes two periods of time, and two states of nature with an equal probability of occurrence, which is only observable to the incumbent. Payoffs for principals and agents are also contingent on the state of nature. Politicians (as representants of political parties) can have "good behaviour" or "bad behaviour", and they earn an "ego rent" from holding office. In the first case, elected politicians will behave according to the interests of the citizens who voted for them. In the second case, they will "want something whose pursuit is injurious to citizens" (Manin et al., 1999, p. 40), but that brings them a dissonance rent<sup>6</sup>. On the first period, elected mayors can choose a policy as desired by voters, or a different policy not desired by them. In the second period, voters can re-elect the political party already in office or they can choose a candidate from a challenger political party. Given that voters cannot distinguish which type was the

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<sup>6</sup> A dissonance rent can be understood, very broadly, as the potential gains for an elected politician or political party of implementing a policy against voters' mandate (Besley, 2007).



elected mayor, they cast their vote based on their performance during the first term. As voters prefer politicians whose performance was aligned with their desired policies and interests, a political party will be re-elected if his elected representative behaved well. But in the case of a bad-type politician, the political party will be re-elected if the politician seeking for re-election has the incentive to mimic the behaviour of a good-type politician in the first period, and this will happen if the rents from misbehaving are sufficiently small. Otherwise, the politician will misbehave in the first period and consequently the political party will not be re-elected.

Note that electoral outcomes of political parties seeking for re-election under this setting are strictly dependant on the behaviour of the politician in office. However, when analysing the role of electoral accountability and the existence of term limits, Besley remarks that “politicians behave differently when they can and cannot run for re-election” (Besley, 2007, p. 16). When they cannot run for re-election, bad-type politicians will not have incentives to mimic good behaviour and will incur in rent-seeking activities, because he will not remain in office regardless of how voters evaluate his performance. In this context, under the consideration of accountability on a personal basis, the implication is that bad-type politicians will extract all possible rents during his term in office. However, as political parties are held accountable through the performance of their partisan elected mayors, the individual disposition of politicians to misbehave will reduce, because they will care about the reputation of the party and will also be committed to the long-term partisan goals. In other words, if the elected politician has a strong attachment to the political party, he will only incur in rent-seeking behaviour in behalf of partisan interests. As Manin et al. (1999) justify: “to get elected, politicians may have to make special promises to special interests (...) politicians can sell to interest groups policies that inflict only a small cost on each individual voter but which concentrate benefits on the particular interest groups” (Manin et al., 1999, p. 34). In terms of potential rent-seeking behaviour of elected mayors facing only one term in power, the relevant consideration is that interest groups can be attached to political party affiliations, and elected mayors are responsive to these interests once in power.

### **3. Empirical implications of re-election: the case of Colombian public procurement performance**

#### **3.1 Public procurement outcomes in Colombia: outcome variables**

The starting point to unfold the implications of rent-seeking behaviour of political parties is to conceptualize corruption as one of the forms that rent-seeking behaviour can take. Although there is a considerable debate on how to conceptualize corruption and its associated concepts<sup>7</sup>, the definition to follow in this document defines corruption as the misuse of public office for private gain (Rose-Ackerman & Palifka, 2016, p. 9). In the specific

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<sup>7</sup> Some of them are clientelism, nepotism, revolving door, embezzlement and cronyism, among others (Rose-Ackerman & Palifka, 2016, pp. 8-9).

case of public sector, corruption concerns to a “small number of powerful players and large sums of money. The corrupt seek government contracts, privatized firms, and concessions (...)” (p. 11). However, once in the context of public procurement, “institutionalised grand corruption refers to the allocation and performance of public contracts by bending universalistic rules of open and fair access to government contracts in order to benefit a closed network while denying access to all others” (Fazekas et al., 2016, p. 3). Specifically, the premise for the identification of corruption rents in public procurement is that they “can be earned if and only if the winning contractor is a pre-selected company which earns extra profit due to higher than market price for the delivered quantity and/or quality” (Fazekas et al., 2013, p. 6).

The approach to follow for the detection of rent-seeking patterns in public procurement in Colombia is given by Fazekas et al. (2016), who propose three main indicator groups to analyse corruption risks in public procurement: i) Contracting Body Risk Indicators, ii) Political Connections Indicators, and iii) Supplier Risk Indicators. While Ruiz (2018) approach can be catalogued under the second group, this document aims to assess multiple criteria from the perspective of the Contracting Body Risks, based on the individual characteristics of contracts and the phases of the contractual process. Table 1 summarizes the indicators to evaluate.

**Table 1. Dependant variables - public procurement outcomes by municipality**

Aspect	Measure
Predilection for fast-track modalities	Proportion of contracts awarded by fast-track modalities (minimum value, direct contracting).
Value of contracts	Average daily value of contracts by modality (Direct contracting, minimum value, reverse auction, abbreviated selection, public tender and merit contest).
Cost overruns	Average daily value of monetary additions made to contracts by modality (Direct contracting, minimum value, reverse auction, abbreviated selection, public tender and merit contest)
Public Procurement concentration	Average amount of contracts by contractor.

*Note.* Own elaboration, based on SECOP information and Fazekas et al. (2016).

The first aspect relates to the preference for fast-track modalities for awarding contracts. For instance, under the minimum value modality, “it is only required to publish the call for bidders only for 24 hours or more, it is not required to publish the call in the national on-line system, the sole criteria for awarding contracts is the lowest bidder, and there is no need of a committee to evaluate proposals” (Ruiz, 2018, p. 3). At the same time, the 1150 Act of 2007

establishes that direct contracting modality should be used mostly under exceptional circumstances, because it gives officials a high degree of autonomy on the awarding procedure. A mayor who might be looking to extract rents from municipal public procurement would prefer to award more contracts under these modalities, since they face less public scrutiny when compared with other contracting modalities, and consequently making the awarding process more vulnerable to corruption.

The second criterion is the average value of contracts. The underlying intuition is that it is more possible to find partisan rent-seeking behaviour if the average value of public procurement by modality is higher in municipalities where the political party was re-elected. This trend could be higher on high-value contracts, which are normally awarded by public tenders.

A third measure of corruption risks in public procurement are cost overruns. Although the existence of monetary additions to contracts can also be interpreted as planning and budgeting failures, re-elected rent-seeking mayors can also potentially deviate resources for private gain through this channel: it might take less transaction costs to approve a monetary addition for a contract that is already being executed, than to award a new contract.

The final criterion measures the average number of contracts awarded by contractor. Opportunities for rent-seeking may emerge from highly concentrated public procurement when an official, by himself or by instructions of the mayor, decide to favour specific contractors by awarding them as many contracts as possible. This measure also indicates lack of competition to award public contracts in the municipality. The higher the concentration index, the higher the corruption risk.

Despite the availability of objective public procurement data that allows to detect patterns of potentially corrupt behaviour, it is worth noting that there are still aspects of corruption in public procurement that are not observable, and hence cannot be accounted for. For instance, it is still very complicated to detect the existence and value of bribes, except for case-specific situations of detected and prosecuted corruption. It is also the case of the detection of corrupt behaviour through the evaluation of the quality of the delivered goods and services, which remain mostly unobservable at an aggregated level, but that can be potentially detected on exhaustive audits to delivered products. It is also important to remark that, as Fazekas et al. (2016) suggest, none of these criteria is conclusive on the existence of corrupt behaviour if it is analysed independently and outside of a social context. Instead, these outcomes should be interpreted in the framework of Colombian public management and, for the specific case of this document, in the context of electoral politics at a municipal level.

### 3.2 The Colombian political party system and municipal elections: treatment variable

Although Colombia is recognized for having “a long history of democratic elections” (Acemoglu & Robinson, 2012, p. 377), local authorities are popularly elected only since 1986<sup>8</sup>. By that year, the dominant political parties were the Liberal and Conservative parties, which represented the left-wing and right-wing ideologies respectively. But the political party system in Colombia changed after the electoral reform of 1986 and the enactment of the new Political Constitution in 1991. New political parties emerged, while the two historically relevant political parties lost relevance. Overall, these reforms led to an increased fragmentation of the Colombian party system. This phenomenon reached a maximum in 2002, when 56 and 47 political parties earned at least a seat in the Chamber of Representatives and Senate, respectively (Taylor & Shugart, 2018, p. 8).

After the implementation of another electoral reform in 2003, the Colombian political party system converged to a multiparty system composed of mid-sized political parties. Despite the existence of some political parties with a clear ideological position, “there are several parties that have been created by existing political elites who calculated that unique party identities would be in their political interests” (Taylor & Shugart, 2018, p. 13). These parties cannot be clearly catalogued into an ideological position, since most of them were constituted mainly by defectors from both traditional political parties.

Under this scenario, candidates who want to postulate for office have the possibility to register as a candidate of a unique political party, as a candidate of a coalition of political parties, or as a candidate of a civic initiative endorsed by a significant number of citizens and no need for partisan attachments. Once in office, mayors cannot run for re-election for an immediate second term, but they have the possibility to run for office again once a term out of office has passed. The celebration of elections of municipal authorities are every four years.

Political parties want to keep office motivated by the desire to keep holding the power delegated by citizens, which includes the power to allocate resources in the municipality. As political parties are organized groups that represent the political interests of specific sectors of society, they would also want to remain in office to watch over the interests of the citizens who supported them, including their economic interests. For instance, company owners and citizens who want to offer their services to the State can have partisan attachments, as a form to increase their probability to have a contract awarded once the political party they support gets elected. At the same time, this type of potential contractors would also expect to get paid more money for a specific service than the money than they otherwise would receive if they were not supporting a political party.

In this context, the treatment variable compares office tenure of political parties in municipalities between 2012-2015 and 2016-2019 periods. The treatment variable

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<sup>8</sup> This category includes municipal mayors, department governors, and the members of municipal councils and department assemblies (Legislative Act 1, 1986).

distinguishes between municipalities whose citizens re-elected the political party that held office in 2012-2015 term for an additional term, from the municipalities where the political party was seeking again for office but was not elected for an additional term. A political party is considered as “re-elected” under the following four cases:

- Party-Party: When only one political party held office during 2012-2015 term and the same unique party was re-elected for the next term.
- Party-coalition: When there was only one political party in office during 2012-2015 term but a coalition of parties that includes the political party in office was elected for the next term.
- Coalition-party: When there was a coalition holding power during 2012-2015 term, but only one of the parties of the former coalition was elected for the next term.
- Coalition-coalition: When a coalition held office during 2012-2015 term, and another coalition that includes at least one of the political parties of the former coalition was elected for the next term.

Table 2 shows some descriptive information about the number of municipalities in which political parties were re-elected. Overall, political parties in office during 2012-2015 term sought for re-election in 73% of the total of municipalities considered in the sample. From this subgroup, 287 municipalities re-elected the political party in office, which is equivalent to a re-election rate of 35%. From the subgroup of municipalities that re-elected the political party, they were re-elected on a party-party basis on 60% of the cases, while 30% of the times they were re-elected under a party-coalition criterion, and the remaining 10% of the times they were re-elected under the remaining two modalities.

**Table 2. Political party re-election trends by municipality (2016-2019)**

Re-election trends	Number of municipalities
Party-party	174
Party-coalition	88
Coalition-party	10
Coalition-coalition	15
Number of municipalities where the political party was re-elected	287
Number of municipalities seeking for re-election	807
Total number of municipalities	1094

*Note.* Own elaboration, based on MOE & CEDE information on electoral outcomes.

### 3.3 Sample and sources of information

Public procurement information comes from SECOP I, which is the official platform for the registry of contracts performed with public money in Colombia<sup>9</sup> (1150 Act, 2007). The sample used consists on all celebrated contracts awarded to individuals identified under natural and legal person and performed under the rules of the General Statute of Public Contracting (80 Act, 1993), by every municipal Mayor's Office in Colombia between 2016 and June 30<sup>th</sup>, 2019. The sample excludes Bogotá's Mayor Office, because the complexity of public procurement of the capital city deserves to be studied separately. The sample also excludes all contracts awarded by direct contracting modality aimed to hire professional services<sup>10</sup>. The total size of the sample consisted on 315.014 contracts.

Electoral information comes from the Electoral Oversight Mission, and the electoral datasets provided by CEDE (Universidad de los Andes). Note that these two datasets are processed versions of the information delivered by the Colombian National Registry Office, the national institution in charge of electoral procedures and citizen registry. These sources provide information on candidates, political parties and turnout for every Colombian municipality for local elections performed in October 2011 and October 2015. However, it is important to remark that, although the political party composition of coalitions is clear for some observations for the electoral race of 2011, in some other cases the coalitions adopted non-partisan slogans, from which it is not possible to infer their party composition. This feature can lead to confusion, since candidates endorsed by a significant group of citizens adopt similar slogans at the ballot box. To account for these cases, it was necessary to perform a press revision, in order to look for evidence if the winning candidate was endorsed by a significant group of citizens or by a coalition, and if the latter was true, to unfold which were the political parties that composed the coalitions. Municipalities with three specific electoral outcomes were also excluded from the sample: the cases in which only one candidate sought for office, the cases in which the only winner of the electoral race was a significant group of citizens (given that they don't have political endorsement nor continuity as a political movement, it is not possible to infer rent-seeking behaviour on a partisan basis), and the cases in which the political party did not postulate for an additional term in the municipality.

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<sup>9</sup> Although there is a parallel public procurement platform under implementation (SECOP II), it still has very low rates of registry. While the average number of contracts by municipality on the used sample is 287, SECOP II only registers a total amount of 115 contracts applicable to the study, which is less than 0,001% of the total size of the sample. These registers were not included on the final sample.

<sup>10</sup> 80% of contracts awarded by direct contracting modality were aimed to hire professional services between 2011 and 2016 (Zuleta et al., 2018, p. 19). This practice compensates the lack of human talent in Colombian Civil Service, and an important proportion of them are contracted several times (and often at several public institutions at the same time) without necessarily incurring on rent-seeking behaviour. The amount of contracts awarded under this category is approximately 2.5 times bigger than the size of the sample used in this study, and its inclusion could potentially lead to wrong generalizations about public procurement in Colombia.

To evaluate for balance between the treatment and control groups, some additional covariates measured at the electoral year<sup>11</sup> such as total population, the proportion of the municipal budget allocated to investment projects (channel through which most of the public procurement is executed), natural resources premiums (*regalías*)<sup>12</sup>, number of companies that generate formal work, occupation rate, and rural electricity and internet coverage (as proxies for public service delivery) were included. The source of this information is the Colombian National Planning Department.

#### 4. Methodology

The methodology used in this study is a sharp Regression Discontinuity Design (RDD), which assumes that conditions of randomness can be resembled for individuals that are close enough to a threshold given by a cut-off variable that assign observations between treatment and control groups. For those observations that barely belong to the treatment group and those that barely belong to the control group, it is possible to estimate a Local Average Treatment Effect (LATE) over the outcome variable, only if the continuity assumption for the cut-off variable holds. The outcomes from this methodology have strong internal validity<sup>13</sup>.

The main equation to estimate is:

$$Public\ Procurement_i = \alpha + \beta_1 * Reelection_i + \beta_2 f(x_i) + \beta_3 * Reelection_i * f(x_i) + \varepsilon$$

Where *Public Procurement<sub>i</sub>* are public procurement outcomes measured for each municipality, *Reelection<sub>i</sub>* indicates the treatment variable, and *f(x<sub>i</sub>)* indicates the order degree of the polynomial used for the estimation. The assignment rule behind the cut-off variable is the turnout difference between the candidate from the political party seeking for re-election and the closest challenger. Given that most electoral races involve more than three candidates, the assignment rule inputs a value of 1 to the cases in which the political party is re-elected, and 0 when the political party is not re-elected, as follows:

$$Turnout\ difference_i = \begin{cases} 1 & \text{if } Turnout_A > 0 \\ 0 & \text{if } Turnout_B < 0 \end{cases}$$

Where *Turnout<sub>A</sub>* measures the votes difference between the re-elected political party and the runner-up, and *Turnout<sub>B</sub>* measures the votes difference between the winning political party and the political party which sought for re-election.

Previous literature such as Lee, Moretti and Butler (2004), Brollo & Nannicini (2012), Klašnja (2015), and Coviello & Gagliarducci (2017) has used electoral margins as the assignment rule behind the cut-off variable. However, it should not be assumed beforehand that this rule is

<sup>11</sup> From the perspective of retrospective accountability, covariates measured at the last year of the term can be considered as proxies of the overall performance of the political party during the term.

<sup>12</sup> *Regalías* are the payments that oil and mining companies make to the Colombian government as a compensation for the exploitation of non-renewable natural resources, which are distributed to territorial entities, according to the guidelines established by the National Planning Department.

<sup>13</sup> Given its local feature, LATE estimators may lack external validity.

suitable for all cases. To address for it, Appendix 1 shows the outcomes of the manipulation tests using the Local Polynomial Density Estimators proposed in Cattaneo et al. (2019). None of the cases show enough evidence to reject the null hypothesis of no manipulation around the threshold, confirming that the assignation rule established by the cut-off variable is valid to predict a local causal effect around the threshold.

## 5. Results

### 5.1 Parametric vs. non-parametric approach

Given the amount of dependant variables to evaluate, the first set of outcomes show the estimated causal effect of re-electing political parties on public procurement outcomes following the parametric approach suggested by Cattaneo et al. (2017, p. 652), considering a bandwidth size  $[-31, 31]$  estimated through balance tests for regression discontinuity under local randomization (presented in Appendix 2) and controlling for municipality-related covariates.

Table 3 shows a summary of the values of  $\widehat{\beta}_1$  with statistical significance inferior to 0,1%, while Appendix 3 presents the detailed statistical information for the six cases in which the evaluated dependant variable was statistically significant. The white spaces denote the absence of statistical significance of the re-election of political parties over the public procurement outcome evaluated. Each column indicates the polynomial degree used for the estimation. Findings suggest that the re-election of political parties on the last local elections led to a decrease on the daily value of contracts awarded under direct contracting, inverse auction and public tender modalities in the current administration, as well to a decrease on the proportion of contracts awarded under a minimum value modality. On the other side, findings also suggest that re-electing the political party increased the daily value of cost overruns for public tenders in \$4.7 million COP. In addition, re-electing the political party may also increase the average number of contracts awarded by contractor: on average, contractors are awarded 1,1 more contracts in municipalities where the political party was re-elected, compared to the average number of contracts awarded by contractor in municipalities where there was a change of hands in power.

Similarly, Table 4 shows the summary of the estimated values of  $\widehat{\beta}_1$  evaluated only for the variables that held statistical significance under the parametric approach, and once adjusted by robust bias-corrected confidence intervals and data-driven bandwidth estimations, as specified by Calonico et al. (2014), while Appendix 4 reports the detailed outcomes for each of the estimated regressions. Overall, the only variables that hold statistical significance under this non-parametric approach are the average daily value of cost overruns for public tenders, and the bias-corrected estimate associated to the daily value of contracts by direct contracting modality.



**Table 3. Summary of statistical significance for evaluated public procurement indicators**

Category	Dependant variable	p(1)	p(2)	p(3)	p(4)
Predilection for fast-track modalities	Proportion of contracts awarded by minimum value modality			-0.06 (1.84)*	
	Proportion of contracts awarded by direct contracting modality				
Value of contracts	Average daily value of contracts (all modalities)				
	Average daily value of contracts awarded by minimum value modality				
	Average daily value of contracts awarded by public tender modality		-2,308,401 (1.75)*		
	Average daily value of contracts awarded by direct contracting modality	-2,334,415 (1.81)*			
	Average daily value of contracts awarded by merit contest modality				
	Average daily value of contracts awarded by abbreviated selection modality				
	Average daily value of contracts awarded by reverse auction modality	-1,979,136 (1.68)*			
Cost overruns	Average daily value of additions to contracts (all modalities)				
	Average daily value of additions to contracts awarded by minimum value modality				
	Average daily value of additions to contracts awarded by public tender modality				4,742,106 (2.09)**
	Average daily value of additions to contracts awarded by direct contracting modality				
	Average daily value of additions to contracts awarded by merit contest modality				
	Average daily value of additions to contracts awarded by abbreviated selection modality				
	Average daily value of additions to contracts awarded by reverse auction modality				
Public procurement concentration	Average number of contracts by contractor	1.10 (1.73)*			

Note. Own calculations. T statistic in parenthesis.

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

In the first case, re-electing a political party led to an increase on the average daily value of additions to contracts awarded by public tenders in \$4.38 million COP, compared to those

municipalities in which the political party was not re-elected. This corrected estimated coefficient does not strongly differ in magnitude from the coefficient estimated under the parametric approach. One potential concern is that outlier values on the average daily value of cost overruns may affect the local effect, as shown at Graph 5-A from Appendix 5. However, outliers are outside the bandwidth used for the estimation of the local effect (the turnout difference that applies to the outlier is of 20.3%, which is higher than the used bandwidth size of 19.2%). Although the statistical significance of this result only holds under the estimation through an uniform kernel and the uses a third-polynomial interaction, its importance must not be diminished by any means: this finding gives stronger support to the existence of systematic partisan rent-seeking behaviour in Colombian municipalities through the overprice of value additions made to contracts awarded by public tenders.

**Table 4. Summary of statistical significance for evaluated public procurement indicators under non-parametric approach**

Category	Variables	Estimation	p(1)	p(2)	p(3)	p(4)
Predilection for fast-track modalities	Proportion of contracts awarded by minimum value modality	Bias-corrected				
		Robust				
Value of contracts	Average daily value of contracts awarded by reverse auction	Bias-corrected				
		Robust				
	Average daily value of contracts awarded by direct contracting modality	Bias-corrected	-5.037e+06*			
		Robust				
Average daily value of contracts awarded by public tender modality	Bias-corrected					
	Robust					
Cost overruns	Average daily value of cost overruns by public tender modality	Bias-corrected	2.563e+06*		4.389e+06*	
		Robust			4.389e+06*	
Public procurement concentration	Average number of contracts by contractor	Bias-corrected				
		Robust				

*Note.* Only uniform kernel considered.

\*p<0.1; \*\* p<0.05; \*\*\* p<0.01

## 5.2 Robustness checks

The first robustness check on the estimated effect of re-election over price overruns in public tenders, is to discuss this result at the light of other associated specifications. Appendix 4 shows the results of the estimations for four different polynomial degree interactions using two different types of kernels. Given that the only estimated significant result uses a third-

polynomial interaction, it is worth noting that the addition of more flexibility<sup>14</sup> to the specification reduces the associated bias, but also leads to less efficiency to the estimator. It should also be noted that three of the bias-corrected estimates over this same index are also statistically significant at a 10% of significance level: the estimation through a lineal relation for both uniform and triangular kernels<sup>15</sup>, and the quadratic estimation using a triangular kernel. An additional specification test to perform consists on checking if the significance of results holds on smaller thresholds. Appendix 6 shows the outcomes of this robust, bias-corrected and statistically significant specification using two smaller bandwidths, showing that the estimated local effect loses its significance when the closest observations to the threshold are considered. To sum up, robustness checks outcomes associated to alternative specifications of the effect of re-election on price overruns of public tenders give an initial hint of weak robustness.

A second falsification test consists in verifying if the continuity assumption holds for the associated covariates. Appendix 6 also show the plots associated to the evaluation of the continuity assumption for the same covariates considered on the window estimation of the parametric approach. Despite that Graphs 6-C and 6-E from Appendix 6 visually reveals discontinuities around the threshold, Table 6-B from the same Appendix shows the results of the bias-corrected and robust impact of the treatment variable using the covariates as dependant variables, suggesting that there is no statistical evidence to conclude that covariates are not continuous around the threshold.

## **6. Discussion and concluding remarks**

### **6.1 Discussion**

The theory of electoral accountability suggested in Section 2 predicts that the permanence of a political party in office can be the product of: i) good performance of the partisan politician in office during the previous term, or ii) the product of simulating good behaviour during the previous term with the only purpose to get re-elected, in the case of a politician whose rent-seeking behaviour is given by partisan interests. How does this rent-seeker politician please the partisan interests that supported his candidature and re-election? The approach that suggest this document is that one way to do this is through the collusion of politicians and officials to manipulate public procurement outcomes, in a way such that it benefits the partisan interests of the re-elected politician, and it does not threat his probability of re-election. In particular, the hypotheses to corroborate empirically were that i) public procurement performs better in municipalities with re-elected parties if voters are able to punish “bad-type” politicians, and ii) Public procurement performs worse in municipalities

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<sup>14</sup> Higher level polynomials.

<sup>15</sup> The difference between both uniform and triangular kernels is that, while the uniform kernel gives the same weight to all observations to the estimation of the local effect, the triangular kernel weights them in a way such that it gives more value to the observations closer to the threshold.

with re-elected parties if voters are unable to hold “bad-type” politicians accountable, under the assumption that politicians’ behaviour has direct effects on the probability of re-election of the political party.

Using the outcomes from the last electoral race held for local authorities in October 2015, and the individual contracts awarded by Colombian municipal Mayors’ Offices during the current term, the main conclusion derived after the implementation of a RDD which used turnout differentials as a source of discontinuity over several public procurement indices, is that there is weakly robust evidence of systematic rent-seeking behaviour of re-elected political parties through the increased daily value of additions made to contracts awarded by public tender modality. This outcome goes in line with the second proposed hypothesis, and it reveals that politicians with rent-seeking interests target the sources of highest value for rent extraction. Public tenders in Colombia are mostly associated to infrastructure and big-sized projects and, as such, are also the contracts with the highest value from the entire public procurement spectrum. It also reveals that, despite that awarding a contract through public tender modality is the longest and most oversighted process of all contracting modalities, it may have institutional supervision weaknesses on the delivery phase which has opened windows of opportunity for rent-seeking behaviour from political actors.

It is worthy to analyse some possible reasons why these outcomes are weakly robust at the light of the structure of the Colombian political party system. One of the main characteristics of the political party system in Colombia is its high instability, which can be interpreted from two standpoints. The first one relates to the possibility that an elected mayor dissuades from the political party label and decides to act under personal motivations. In this case, the dissuaded elected mayor signal the political party as “bad-type” regardless of the intentions of the political party, affecting the reputation of the political party, and consequently its probability of re-election<sup>16</sup>. The other standpoint relates to the existence of strong political networks that are usually headed by familiar clans, who may or may not belong to a political party. Under this situation, elected mayors may not follow the political party mandate, but will rather follow the mandate of the clan’s head to which he belongs, also affecting negatively the reputation of the political party and his probability of re-election based on retrospective accountability<sup>17</sup>. Both phenomena can potentially underscore the robustness of the effect of re-election of political parties on public procurement corruption risks, since rent-seeking behaviour would be motivated for reasons different than partisan interests: in the first case, it would be motivated for personal gain, and in the latter case, it would be

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<sup>16</sup> This phenomenon is relatively frequent in Colombia: after the Nule Group corruption scandal, the reputation of the political party that supported the elected (and prosecuted) Bogota’s City Mayor involved in the scandal was severely damaged, to the extent that it has never been re-elected on the same position. Moreover, the next elected City Mayor after the scandal was a former member of the same damaged political party who quitted just before the corruption scandal exploded (Vivierscas, 2011)

<sup>17</sup> The most powerful familiar clan in Colombia is affiliated to a political party, but as shown by Ardila & Perez (2019), the clan has power by itself and endorses politicians in opposition to the official supported candidate of the political party.

motivated by the interests of the clan. However, to address these features empirically would be challenging, since they rely on highly unobservable factors.

A final point of discussion relates to the retrospective accountability approach. Although it is rational to assume that people update their beliefs on politicians and political parties based on their previous performance, Achen and Bartels (2017) suggest that, in practice, people may not be entirely rational when it comes to hold political actors accountable. Factors such as the occurrence of random events, blind retrospection, extreme partisanship and external factors that does not depend of the performance of the politician may bias the electoral choices of voters, causing failures on retrospective accountability mechanisms. However, to assume that retrospective accountability is highly random would not allow to model the mechanisms through which rent-seekers may want to remain in office. At the same time, it would enable the possibility that disclosed rent-seekers get re-elected without being punished at the ballot box. Even when both implications are not useful to frame the theoretical accountability framework around the re-election of political parties and corruption risks, they should not be entirely disregarded either: at the end of the day, human nature is unpredictable.

## **6.2 Concluding remarks and limitations**

This dissertation explored the existent agency relationship between voters and elected politicians in behalf of their political parties, and the incidence it has on objective criteria to assess corruption risks in public procurement, using Colombian municipalities as a case study. Despite the weakness of the robustness of the main findings, they hold the highest relevance for Colombian government, and it is a call of alert to watchdog authorities: there is evidence of misappropriation of public resources through an increased value of cost overruns in public tenders in municipalities motivated by partisan permanence in office that, if not addressed, can potentially be more robust over time. In general, the presence of corruption risks in public procurement leads to a less efficient budget spending, which leads to worse public service delivery, worsening the quality of life of residents of Colombian municipalities. But the presence of corruption risks also contributes to a loss of trust on public institutions, which is detrimental for the quality of democracy in the long run. Although the results from this document lack of external validity to extrapolate this outcome to similar electoral races, the use and analysis of public procurement data to evaluate corruption risks based on objective information is a promising area for further research. At the same time, this set of outcomes can also be useful to citizens as a potential source of information to hold current political parties in office accountable at the following municipal elections.

It must also be noted that this analysis did not focus on the significant outcome related to the bias-corrected estimate of the average daily value of contracts under direct contracting modality. Although the sign of the coefficient is not as theoretically expected, it is necessary that further research on Colombian public procurement has a special focus on the behaviour of direct contracting. From a normative standpoint, this modality should only be used under

cases of exceptionality, because it is the one that assigns the most discretionary authority over its awarding process to officials. Given that, this type of contracts are the most vulnerable to manipulation and discretionary allocation. Understanding the logic why public institutions allocate an important percentage of contracts under this exceptional modality may also help to improve the administrative efficiency of Colombian public institutions.

However, it is important to remark that the most serious limitation of this analysis (and the potential research agenda that may emerge from it) is the severe data registry failure at SECOP I. An important amount of observations that should have been identified by a legal person NIT<sup>18</sup> are in practice identified by a natural person NIT, which is equivalent to the National Registry Number of the legal representative of the contracted company plus a final digit. This is an important setback, since it complicates the accurate identification of contracts performed by legal and natural persons. While this problem does not affect the evaluated measures related to the average value of contracts (and consequently does not affect the main results of the dissertation), it reduced the scope of the corruption risks indicators to evaluate. Specifically, it is possible that the estimated local effect of the average amount of contracts by contractor is biased because of this failure, despite the intense data cleaning efforts around the ID variable. A properly tabulated ID allows to quantify the accurate number of contracts by contractor, but it is important that the Colombian government supervises how officials register information at SECOP, because it is the input to keep diagnosing the possibility of rent-seeking behaviour from objective data.

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<sup>18</sup> NIT is the code assigned by the Colombian Tax Office in order to identify companies and individuals allowed to perform economic activities.

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## Appendix 1. Falsification test outcomes for the cut-off variable

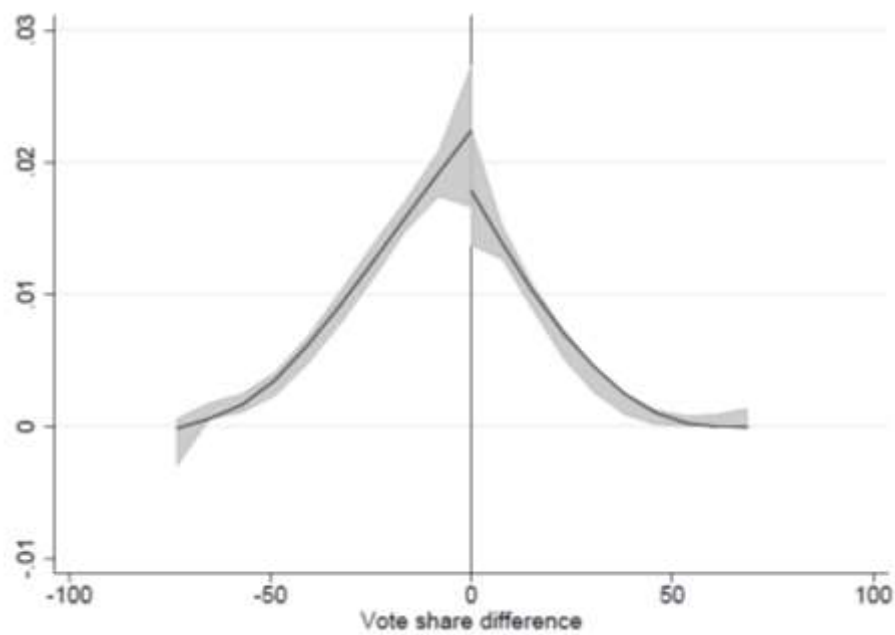
**Table 1-A. RD manipulation test outcomes**

*Difference of densities, one common bandwidth*

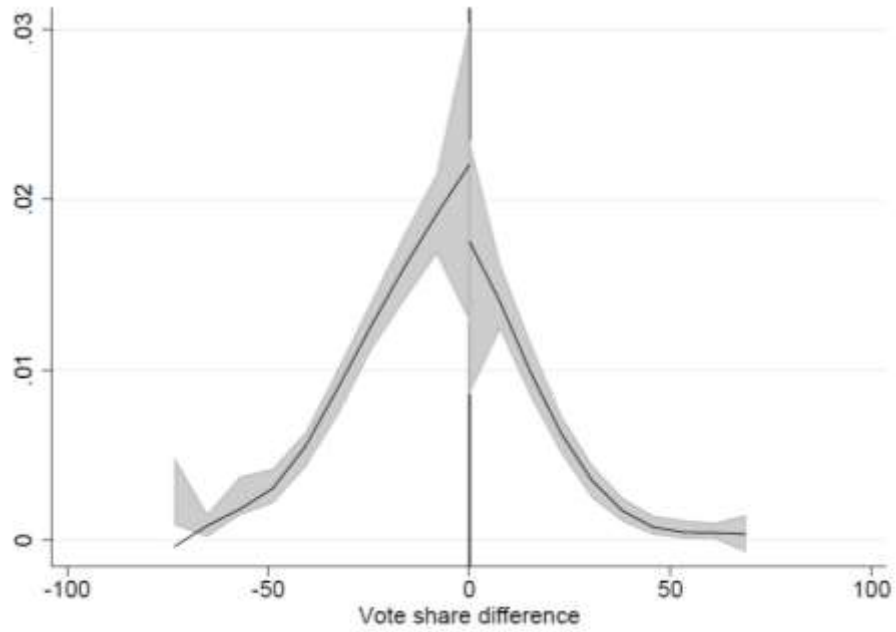
*Triangular kernel, unrestricted model*

Polynomial used	Effective number of observations (left)	Effective number of observations (right)	T	p-value
p(2)	462	271	-0.9906	0.3219
p(3)	411	254	-0.9228	0.3561
p(4)	453	271	-0.7533	0.4513

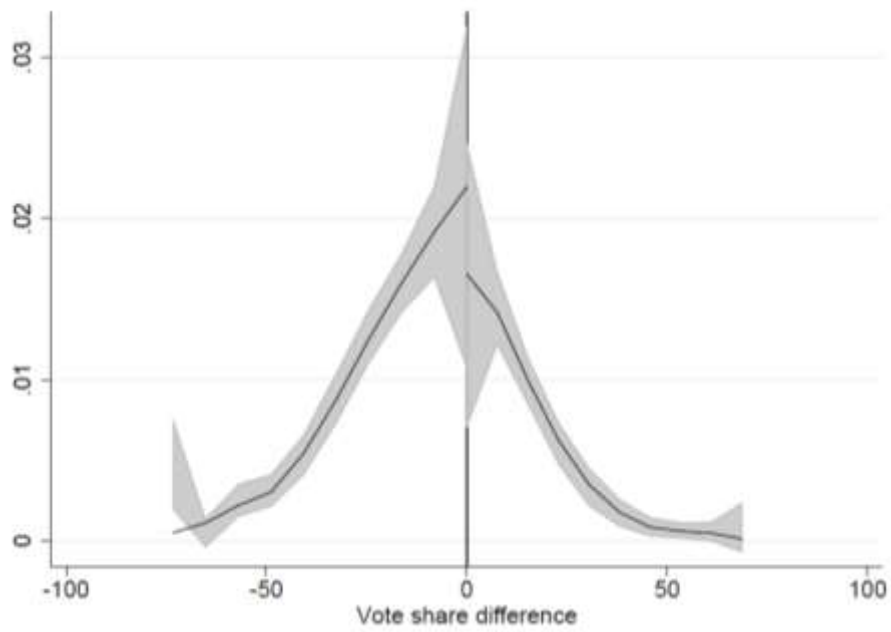
**Graph 1-A. RD manipulation test, p(2)**



**Graph 1-B. RD manipulation test, p(3)**



**Graph 1-C. RD manipulation test, p(4)**



## Appendix 2. Window selection for the parametric approach outcomes

**Table 2-A. Window selection for RD under local randomization**

*Uniform kernel*

*Balance test: difference of means*

Window length	Balance test p-value	Variable name with minimum p-value	Effective number of observations (left)	Effective number of observations (right)
1	0.276	Total population 2015	18	19
4	0.161	Rural electric coverage 2015	68	56
7	0.267	Companies/formal work 2015	119	89
10	0.214	Rural electric coverage 2015	164	128
13	0.203	Companies/formal work 2015	203	159
16	0.221	Companies/formal work 2015	252	184
19	0.294	Nat. Res. Premium 2015	286	200
22	0.394	Total population 2015	320	217
25	0.202	Total population 2015	359	236
28	0.213	Total population 2015	382	247
31	0.16	Total population 2015	409	252
34	0.134	Total population 2015	427	263
37	0.169	Total population 2015	449	269
40	0.176	Total population 2015	464	272
43	0.156	Total population 2015	473	273
46	0.118	Total population 2015	478	277
49	0.128	Total population 2015	488	279
52	0.183	Total population 2015	495	281
55	0.162	Total population 2015	505	282
58	0.079	Total population 2015	515	284

*Recommended window: [-31, 31]*

### Appendix 3. RD design outcomes (parametric approach)<sup>19</sup>

**Table 3-A. Proportion of contracts awarded by minimum value modality**

	p(1)	p(2)	p(3)	p(4)
Re-elected	-0.01 (0.59)	-0.03 (1.00)	-0.06 (1.84)*	-0.02 (0.60)
Votes Difference	0.003 (3.15)***	0.004 (2.19)**	0.004 (2.22)**	0.001 (0.34)
Re-elected*Votes Difference	-0.00 (2.64)***	-0.00 (0.82)	0.01 (1.14)	-0.01 (0.30)
Votes Difference(2)		0.00 (0.89)	-0.00 (0.10)	-0.00 (0.41)
Re-elected*Votes Difference(2)		-0.00 (0.81)	-0.00 (1.74)*	0.00 (0.67)
Votes Difference(3)			-0.00 (0.62)	0.00 (0.55)
Re-elected*Votes Difference(3)			0.00 (1.87)*	-0.00 (1.07)
Votes Difference(4)				0.00 (0.76)
Re-elected*Votes Difference(4)				0.00 (1.16)
Constant	0.73 (54.94)***	0.73 (52.72)***	0.74 (46.56)***	0.73 (35.54)***
R2	0.02	0.02	0.02	0.03
N	662	662	662	662

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

<sup>19</sup> The following tables correspond to the outcomes whose coefficient associated to the treatment is statistically significant. The bandwidth used was [-31, +31], selected as shown in Appendix 2. The title of tables points out the evaluated dependant variable. Each column shows the outcome according to the polynomial used.



**Table 3-B. Average daily value of contracts awarded by direct contracting modality**

	p(1)	p(2)	p(3)	p(4)
Re-elected	-2,334,415.94 (1.81)*	-2,514,969.70 (1.47)	-2,513,837.35 (1.32)	-2,402,441.90 (0.85)
Votes Difference	58,154.149 (1.16)	-19,804.726 (0.14)	-20,317.414 (0.15)	253,430.135 (0.69)
Re-elected*Votes Difference	-5,926.14 (0.07)	191,493.22 (0.74)	182,015.33 (0.64)	-994,514.33 (1.12)
Votes Difference(2)		-2,834.75 (0.89)	-3,235.22 (0.70)	1,800.61 (0.42)
Re-elected* Votes Difference(2)		-1,671.87 (0.21)	-330.51 (0.01)	143,097.03 (1.05)
Votes Difference(3)			-13.64 (0.06)	-955.86 (0.91)
Re-elected* Votes Difference(3)			-9.13 (0.01)	-7,244.05 (1.02)
Votes Difference(4)				-29.31 (1.09)
Re-elected* Votes Difference(4)				171.65 (1.47)
Constant	4,089,127.09 (5.01)***	3,784,771.35 (2.48)**	3,804,425.06 (2.07)**	4,837,538.36 (1.80)*
R2	0.01	0.01	0.01	0.01
N	636	636	636	636

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Table 3-C. Average daily value of contracts awarded by reverse auction modality**

	p(1)	p(2)	p(3)	p(4)
Re-elected	-1,979,136.72 (1.68)*	-211,069.93 (0.12)	-1,024,321.94 (0.45)	-595,594.02 (0.19)
Votes Difference	13,621.142 (0.31)	52,847.973 (0.63)	52,700.034 (0.65)	-73,396.711 (0.29)
Re-elected*Votes Difference	132,228.43 (1.67)*	-368,599.18 (1.08)	-141,274.58 (0.20)	15,079.66 (0.01)
Votes Difference(2)		1,432.16 (0.50)	-3,988.70 (1.09)	-6,430.96 (1.11)
Re-elected* Votes Difference(2)		15,820.43 (1.05)	135.29 (0.00)	-2,324.84 (0.01)
Votes Difference(3)			-190.56 (1.08)	234.98 (0.33)
Re-elected* Votes Difference(3)			696.76 (0.40)	541.78 (0.05)
Votes Difference(4)				13.35 (0.61)
Re-elected* Votes Difference(4)				-18.10 (0.10)
Constant	6,856,242.55 (9.20)***	7,004,835.71 (8.72)***	7,338,180.72 (7.32)***	6,868,950.05 (4.84)***
R2	0.01	0.02	0.02	0.02
N	532	532	532	532

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Table 3-D. Average daily value of contracts awarded by public tender modality**

	p(1)	p(2)	p(3)	p(4)
Re-elected	-1,348,871.86 (1.26)	-2,308,401.26 (1.75)*	-2,440,260.62 (1.60)	-1,574,537.41 (0.85)
Votes Difference	65,931.555 (1.58)	109,692.835 (0.99)	118,207.089 (1.35)	-1,160.561 (0.01)
Re-elected*Votes Difference	-50,549.89 (0.69)	94,691.46 (0.44)	174,196.78 (0.45)	-31,824.94 (0.05)
Votes Difference(2)		1,538.38 (0.49)	3,485.36 (0.92)	1,235.47 (0.26)
Re-elected*Votes Difference(2)		-8,627.55 (1.16)	-18,806.75 (0.58)	36,685.26 (0.34)
Votes Difference(3)			59.37 (0.34)	465.49 (0.83)
Re-elected*Votes Difference(3)			138.13 (0.18)	-3,190.74 (0.52)
Votes Difference(4)				12.67 (0.81)
Re-elected*Votes Difference(4)				38.03 (0.34)
Constant	9,090,059.40 (13.25)***	9,277,498.66 (8.55)***	9,225,646.16 (7.69)***	8,775,673.67 (5.76)***
R2	0.00	0.01	0.01	0.01
N	609	609	609	609

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Table 3-E. Average daily value of cost overruns by public tender modality**

	p(1)	p(2)	p(3)	p(4)
Re-elected	-1,396,712.21 (1.08)	37,849.84 (0.02)	2,299,838.26 (1.35)	4,742,106.98 (2.09)**
Votes Difference	38,943.717 (0.80)	-221,030.547 (1.94)*	-774,397.086 (2.06)**	-1,867,498.198 (1.76)*
Re-elected*Votes Difference	70,951.52 (0.85)	302,001.64 (1.18)	473,903.74 (0.69)	1,040,903.91 (0.74)
Votes Difference(2)		-8,521.80 (2.35)**	-53,655.86 (1.67)*	-212,171.57 (1.51)
Re-elected*Votes Difference(2)		9,563.31 (1.19)	88,681.70 (1.39)	329,354.76 (1.70)*
Votes Difference(3)			-975.95 (1.42)	-8,948.28 (1.39)
Re-elected*Votes Difference(3)			188.07 (0.12)	3,792.58 (0.40)
Votes Difference(4)				-128.86 (1.33)
Re-elected*Votes Difference(4)				202.74 (1.28)
Constant	5,228,403.51 (6.25)***	3,923,554.22 (3.97)***	2,523,196.49 (3.21)***	805,197.72 (0.56)
R2	0.01	0.02	0.03	0.04
N	274	274	274	274

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Table 3-F. Average number of contracts by contractor**

	p(1)	p(2)	p(3)	p(4)
Re-elected	1.10 (1.73)*	-0.01 (0.01)	-0.31 (0.32)	-0.65 (0.53)
Votes Difference	-0.029 (1.17)	0.015 (0.36)	0.011 (0.27)	-0.028 (0.29)
Re-elected*Votes Difference	0.05 (1.06)	0.23 (1.61)	0.32 (0.95)	0.74 (1.14)
Votes Difference(2)		0.00 (1.02)	-0.00 (0.30)	-0.00 (0.46)
Re-elected*Votes Difference(2)		-0.01 (2.02)**	-0.02 (0.56)	-0.08 (0.85)
Votes Difference(3)			-0.00 (0.95)	0.00 (0.18)
Re-elected*Votes Difference(3)			0.00 (0.44)	0.00 (0.78)
Votes Difference(4)				0.00 (0.46)
Re-elected*Votes Difference(4)				-0.00 (0.84)
Constant	5.17 (12.85)***	5.34 (17.38)***	5.45 (15.84)***	5.31 (12.70)***
R2	0.01	0.02	0.02	0.02
N	662	662	662	662

\* p<0.1; \*\* p<0.05; \*\*\* p<0.01

**Appendix 4. RD estimates using local polynomial regression (bias-corrected, robust)**

**Table 4-A. Proportion of contracts awarded by minimum value modality (uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-0.0361 (0.0267)	-0.0217 (0.0351)	-0.0374 (0.0388)	0.0174 (0.0510)
Bias-corrected	-0.0406 (0.0267)	-0.0238 (0.0351)	-0.0366 (0.0388)	0.0254 (0.0510)
Robust	-0.0406 (0.0312)	-0.0238 (0.0389)	-0.0366 (0.0414)	0.0254 (0.0539)
Observations	812	812	812	812
Bandwidth	[-16.2, 16.2]	[-18, 18]	[-26.6, 26.6]	[-21.6, 21.6]

Standard errors in parentheses.

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

**Table 4-B. Proportion of contracts awarded by minimum value modality (triangular kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-0.0242 (0.0294)	-0.0130 (0.0363)	0.00965 (0.0449)	0.0180 (0.0494)
Bias-corrected	-0.0231 (0.0294)	-0.00632 (0.0363)	0.0202 (0.0449)	0.0205 (0.0494)
Robust	-0.0231 (0.0348)	-0.00632 (0.0402)	0.0202 (0.0482)	0.0205 (0.0532)
Observations	812	812	812	812
Bandwidth	[-14.1, 14.1]	[-18.9, 18.9]	[-20, 20]	[-24.7, 24.7]

Standard errors in parentheses.

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

**Table 4-C. Average daily value of contracts awarded by reverse auction (uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-763,735 (1.891e+06)	-1.294e+06 (2.375e+06)	-1.908e+06 (3.388e+06)	-1.373e+06 (4.655e+06)
Bias-corrected	-323,415 (1.891e+06)	-1.168e+06 (2.375e+06)	-2.531e+06 (3.388e+06)	-520,882 (4.655e+06)
Robust	-323,415 (2.200e+06)	-1.168e+06 (2.758e+06)	-2.531e+06 (3.802e+06)	-520,882 (5.080e+06)
Observations	651	651	651	651
Bandwidth	[-11.3, 11.3]	[-18.2, 18.2]	[-19.7, 19.7]	[-19.5, 19.5]

Standard errors in parentheses.

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

**Table 4-D Average daily value of contracts awarded by reverse auction (triangular kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-1.019e+06 (1.756e+06)	-1.304e+06 (2.945e+06)	-1.807e+06 (3.504e+06)	-1.728e+06 (4.082e+06)
Bias-corrected	-762,914 (1.756e+06)	-1.727e+06 (2.945e+06)	-1.937e+06 (3.504e+06)	-1.661e+06 (4.082e+06)
Robust	-762,914 (2.135e+06)	-1.727e+06 (3.493e+06)	-1.937e+06 (3.987e+06)	-1.661e+06 (4.500e+06)
Observations	651	651	651	651
Bandwidth	[-17.4, 17.4]	[-16.8, 16.8]	[-23, 23]	[-28.4, 28.4]

Standard errors in parentheses.

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

**Table 4-E. Average daily value of contracts awarded by direct contracting modality  
(uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-4.081e+06 (2.941e+06)	-4.968e+06 (3.223e+06)	-4.148e+06 (3.268e+06)	-2.480e+06 (2.310e+06)
Bias-corrected	-5.037e+06* (2.941e+06)	-5.122e+06 (3.223e+06)	-4.103e+06 (3.268e+06)	-2.467e+06 (2.310e+06)
Robust	-5.037e+06 (3.327e+06)	-5.122e+06 (3.442e+06)	-4.103e+06 (3.331e+06)	-2.467e+06 (2.328e+06)
Observations	778	778	778	778
Bandwidth	[-9.5, 9.5]	[-15.4, 15.4]	[-19.7, 19.7]	[-18.6, 18.6]

Standard errors in parentheses.

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

**Table 4-F. Average daily value of contracts awarded by direct contracting modality  
(triangular kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-3.289e+06 (2.512e+06)	-3.784e+06 (2.982e+06)	-3.943e+06 (3.120e+06)	-2.316e+06 (1.950e+06)
Bias-corrected	-3.726e+06 (2.512e+06)	-3.964e+06 (2.982e+06)	-4.089e+06 (3.120e+06)	-2.172e+06 (1.950e+06)
Robust	-3.726e+06 (3.027e+06)	-3.964e+06 (3.122e+06)	-4.089e+06 (3.188e+06)	-2.172e+06 (1.911e+06)
Observations	778	778	778	778
Bandwidth	[-16.1, 16.1]	[-21.5, 21.5]	[-26.9, 26.9]	[-21.6, 21.6]

Standard errors in parentheses.

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



**Table 4-G. Average daily value of contracts awarded by public tender modality (uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-2.229e+06 (1.970e+06)	-1.883e+06 (1.783e+06)	-1.781e+06 (1.848e+06)	-1.448e+06 (2.257e+06)
Bias-corrected	-2.596e+06 (1.970e+06)	-2.025e+06 (1.783e+06)	-1.556e+06 (1.848e+06)	-1.205e+06 (2.257e+06)
Robust	-2.596e+06 (2.233e+06)	-2.025e+06 (1.855e+06)	-1.556e+06 (2.035e+06)	-1.205e+06 (2.515e+06)
Observations	745	745	745	745
Bandwidth	[-11.5, 11.5]	[-13.4, 13.4]	[-16.6, 16.6]	[-20.2, 20.2]

Standard errors in parentheses.

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

**Table 4-H. Average daily value of contracts awarded by public tender modality (triangular kernel)**

VARIABLES	(1)	(2)	(3)	(4)
Conventional	-1.825e+06 (1.570e+06)	-1.638e+06 (1.649e+06)	-1.551e+06 (1.648e+06)	-1.087e+06 (2.051e+06)
Bias-corrected	-1.882e+06 (1.570e+06)	-1.617e+06 (1.649e+06)	-1.585e+06 (1.648e+06)	-917,498 (2.051e+06)
Robust	-1.882e+06 (1.772e+06)	-1.617e+06 (1.697e+06)	-1.585e+06 (1.756e+06)	-917,498 (2.332e+06)
Observations	745	745	745	745
Bandwidth	[-18, 18]	[-18.4, 18.4]	[-22.5, 22.5]	[-24.2, 24.2]

Standard errors in parentheses.

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

**Table 4-I. Average daily value of cost overruns by public tender modality (uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	1.951e+06 (1.469e+06)	2.699e+06 (2.124e+06)	4.416e+06* (2.388e+06)	3.404e+06 (3.051e+06)
Bias-corrected	2.563e+06* (1.469e+06)	2.769e+06 (2.124e+06)	4.389e+06* (2.388e+06)	3.129e+06 (3.051e+06)
Robust	2.563e+06 (1.598e+06)	2.769e+06 (2.412e+06)	4.389e+06* (2.635e+06)	3.129e+06 (3.149e+06)
Observations	330	330	330	330
Bandwidth	[-9.69, 9.69]	[-12.7, 12.7]	[-19.2, 19.2]	[-20.8, 20.8]

Standard errors in parentheses.

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

**Table 4-J. Average daily value of cost overruns by public tender modality (triangular kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	1.978e+06 (1.479e+06)	3.138e+06 (1.952e+06)	3.273e+06 (2.352e+06)	2.968e+06 (2.698e+06)
Bias-corrected	2.627e+06* (1.479e+06)	3.468e+06* (1.952e+06)	3.126e+06 (2.352e+06)	2.517e+06 (2.698e+06)
Robust	2.627e+06 (1.674e+06)	3.468e+06 (2.245e+06)	3.126e+06 (2.648e+06)	2.517e+06 (2.849e+06)
Observations	330	330	330	330
Bandwidth	[-11.5, 11.5]	[-16.4, 16.4]	[-22, 22]	[-24.2, 24.2]

Standard errors in parentheses.

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

**Table 4-K. Average number of contracts by contractor (uniform kernel)**

VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-0.300 (0.884)	0.0204 (0.978)	-0.680 (1.192)	-0.534 (1.379)
Bias-corrected	-0.430 (0.884)	-0.161 (0.978)	-0.681 (1.192)	-0.485 (1.379)
Robust	-0.430 (1.041)	-0.161 (1.088)	-0.681 (1.313)	-0.485 (1.468)
Observations	812	812	812	812
Bandwidth	[-11.3, 11.3]	[-20.4, 20.4]	[-25.8, 25.8]	[-30.3, 30.3]

Standard errors in parentheses.

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

**Table 4-L. Average number of contracts by contractor (triangular kernel)**

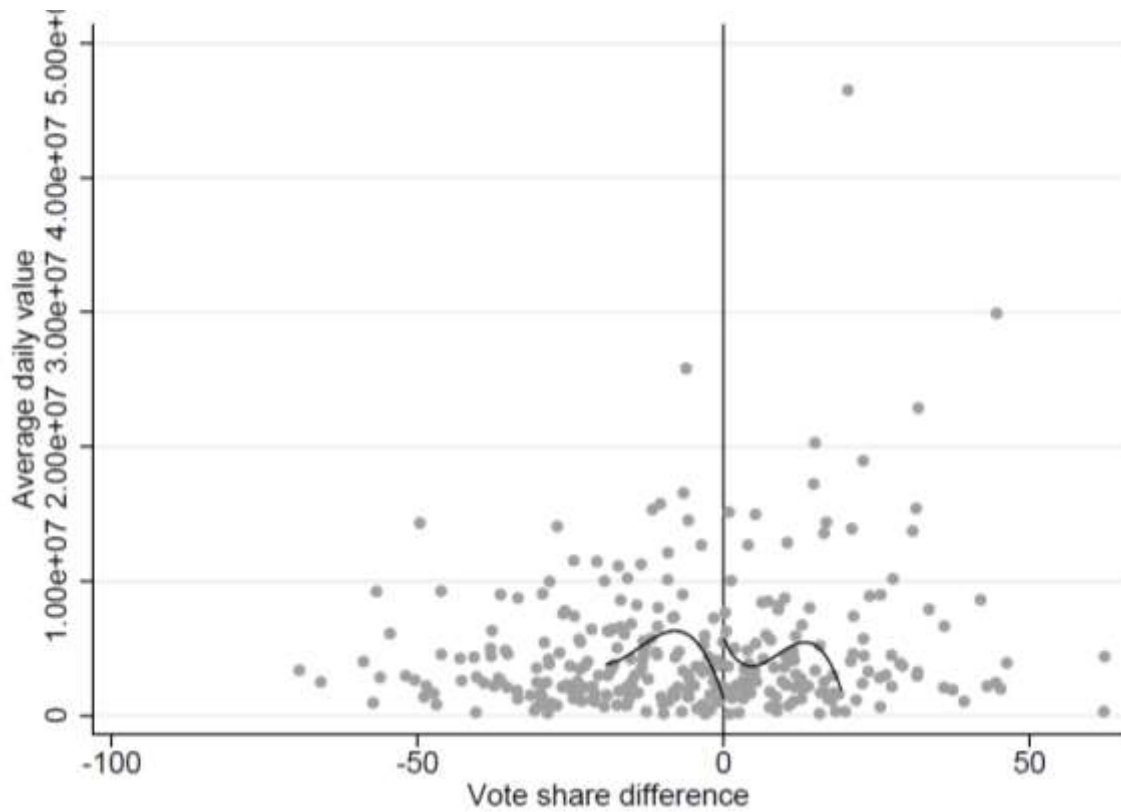
VARIABLES	p(1)	p(2)	p(3)	p(4)
Conventional	-0.0928 (0.846)	-0.293 (0.964)	-0.524 (1.281)	-0.613 (1.414)
Bias-corrected	-0.332 (0.846)	-0.437 (0.964)	-0.604 (1.281)	-0.636 (1.414)
Robust	-0.332 (0.986)	-0.437 (1.084)	-0.604 (1.411)	-0.636 (1.513)
Observations	812	812	812	812
Bandwidth	[-14.3, 14.3]	[-24.3, 24.3]	[-23.8, 23.8]	[-30, 30]

Standard errors in parentheses.

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

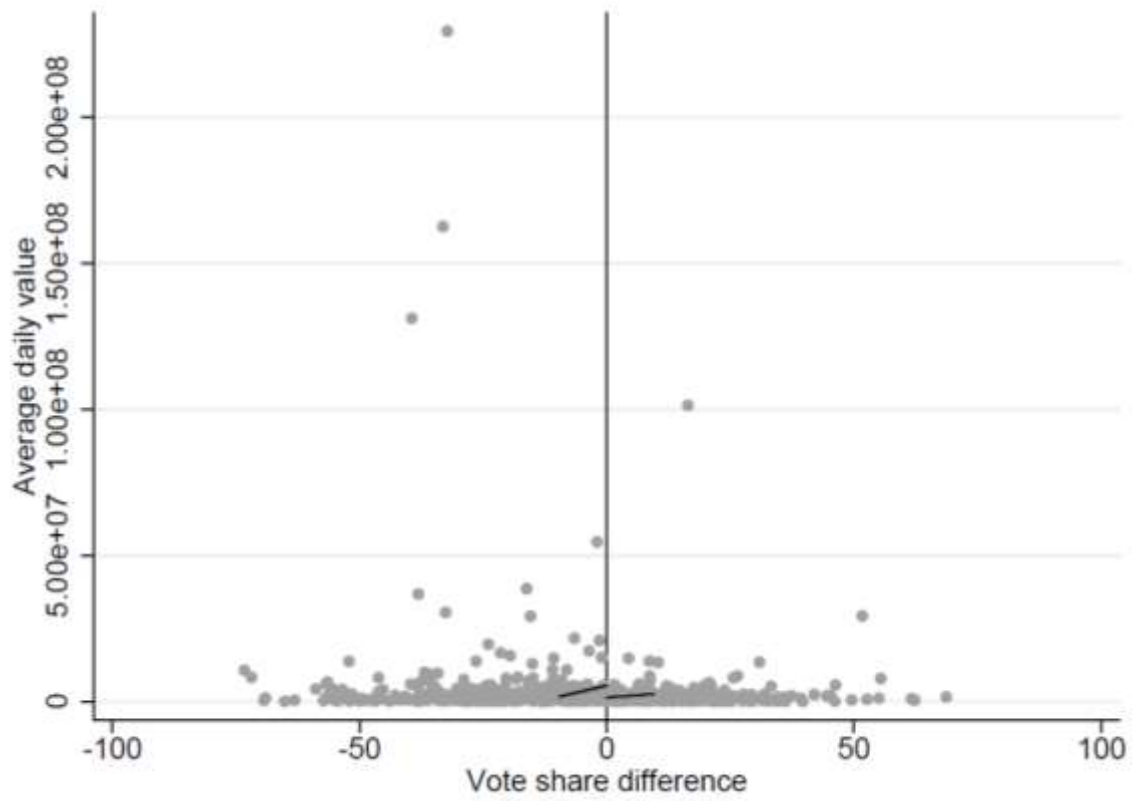
Appendix 5. Graphical visualization of bias-corrected, robust outcomes<sup>20</sup>

Graph 5-A Local effect on the average daily value of additions to contracts awarded by public tender modality



<sup>20</sup> The following plots use the optimal bandwidth calculated by rdrobust command on Appendix 4.

**Graph 5-B. Local effect on the average daily value of contracts awarded by direct contracting modality**



## Appendix 6. Falsification tests as robustness checks

### Specification tests

**Table 6-A. Average daily value of costs overruns in public tenders under smaller bandwidths**

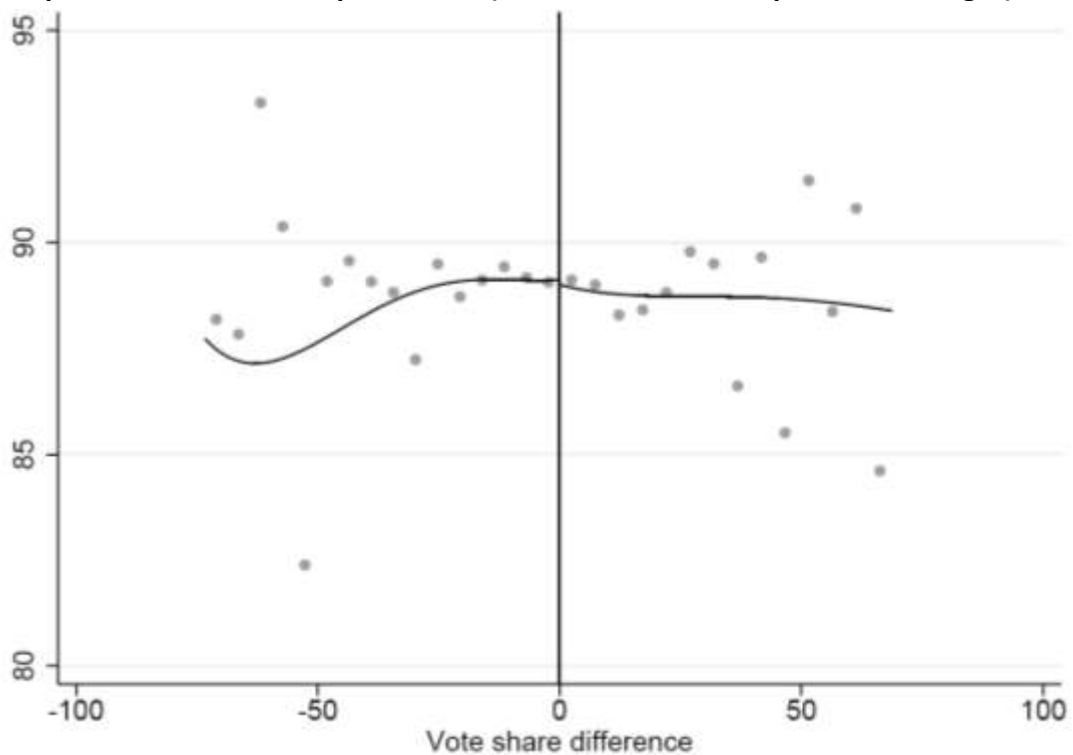
VARIABLES	p(3)	p(3)
Conventional	3.085e+06 (2.818e+06)	2.400e+06 (3.088e+06)
Bias-corrected	1.482e+06 (2.818e+06)	-2.126e+06 (3.088e+06)
Robust	1.482e+06 (3.329e+06)	-2.126e+06 (4.685e+06)
Observations	330	330
Bandwidth	[-12, 12]	[-6, 6]

Standard errors in parentheses

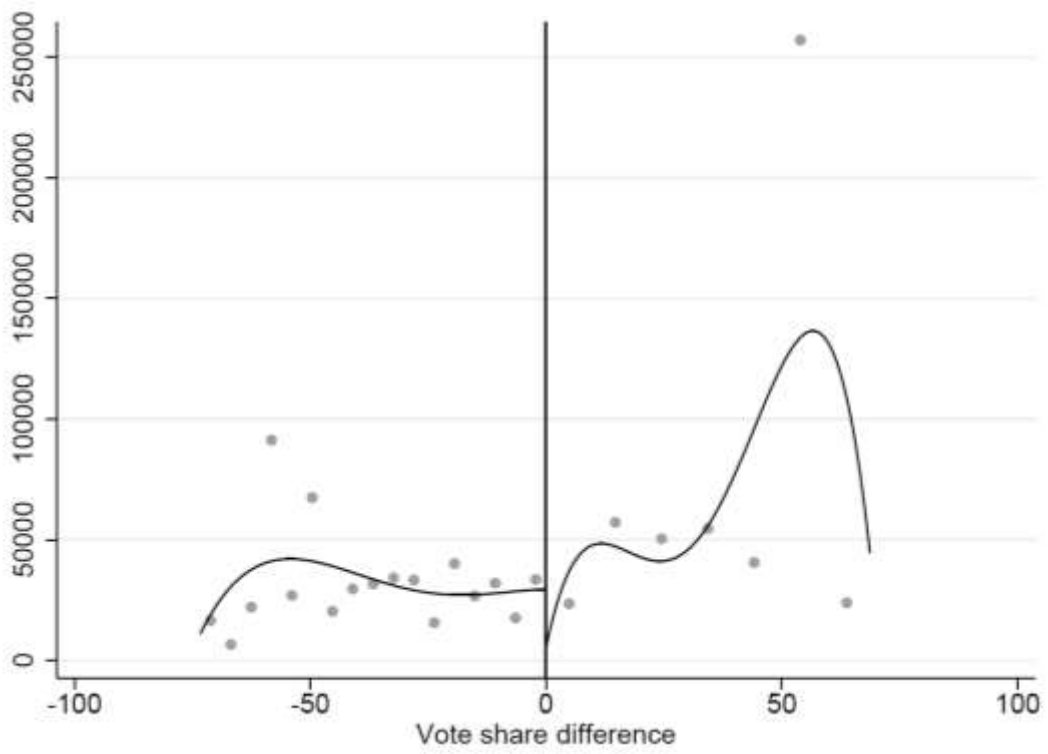
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### Continuity of covariates around the threshold by municipality

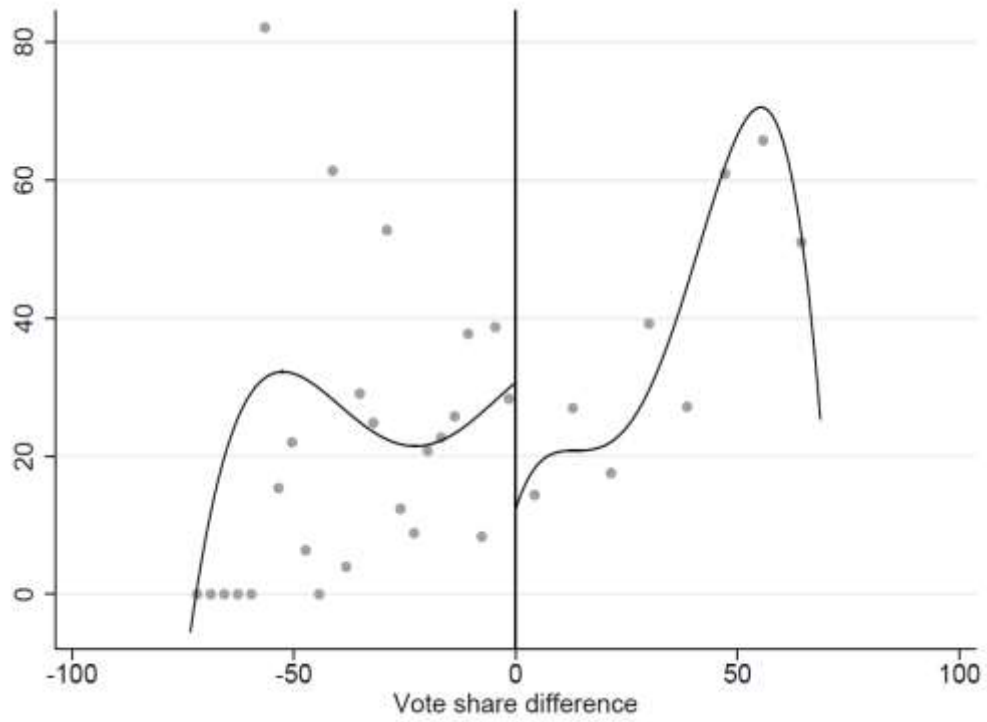
**Graph 6-A. Investment expenditures (as a share of total expenditure budget) - 2015**



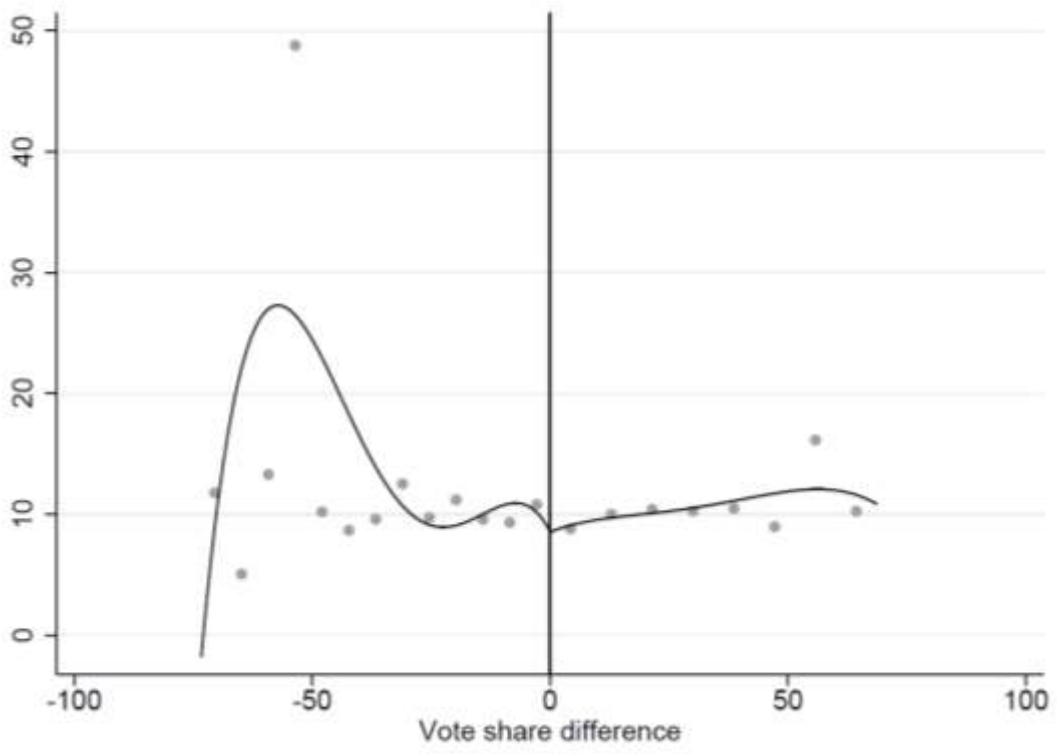
**Graph 6-B. Total population - 2015**



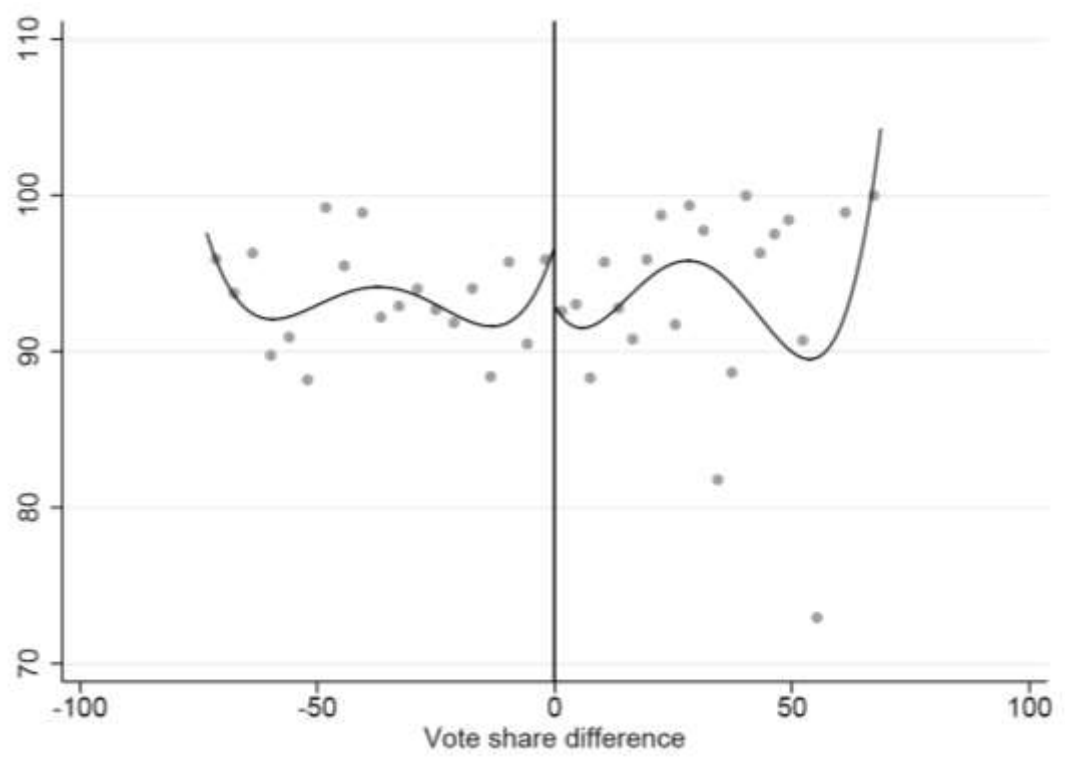
**Graph 6-C. Number of companies that generate formal jobs – 2015**



**Graph 6-D. Occupation rate - 2015**

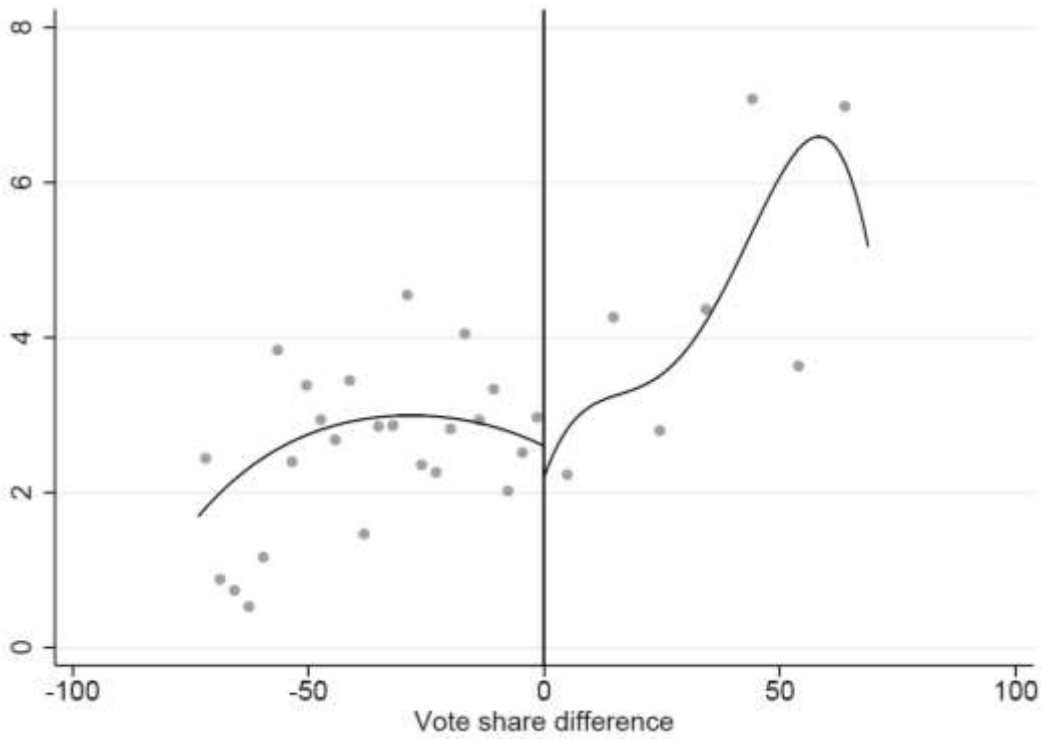


**Graph 6-E. Percentage of rural electrical coverage - 2015**

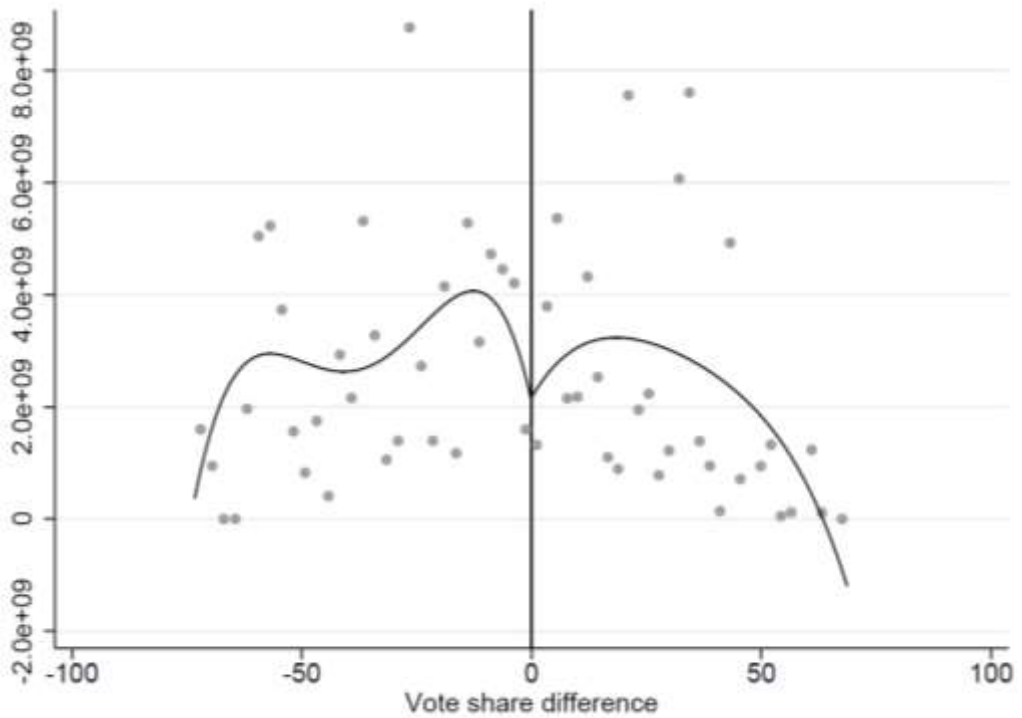




**Graph 6-F. Percentage of Internet coverage - 2015**



**Graph 6-G. Allocated value of natural resources premium (regalias) - 2015**



**Table 6-B. RD outcomes for covariates as dependant variables using p(4)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Investment expenditures	Total population	Companies/ formal work	Occupation rate	Rural electric coverage	Internet coverage	Natural Resources Premium
Conventional	0.221 (1.635)	17,403 (24,899)	0.466 (26.96)	1.211 (3.335)	-2.549 (5.772)	1.045 (1.729)	-1.964e+09 (2.053e+09)
Bias-corrected	0.123 (1.635)	20,576 (24,899)	3.104 (26.96)	1.396 (3.335)	-2.112 (5.772)	1.290 (1.729)	-1.832e+09 (2.053e+09)
Robust	0.123 (1.751)	20,576 (25,620)	3.104 (28.30)	1.396 (3.506)	-2.112 (6.524)	1.290 (1.817)	-1.832e+09 (2.160e+09)
Observations	814	814	814	814	813	814	814

Bandwidths estimated through data-drive procedure

Standard errors in parentheses

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