Do Re-election Concerns Cause Coalition Governments to Spend Less: Methodology and Evidence from Spanish Municipalities

Georgi Boichev*

Preliminary and incomplete. Please do not cite.

October 21, 2013

Abstract

I study the effect of form of government on government policy in elections with a small margin of exceeding a threshold. I propose an identification strategy that is suitable for the implementation of a sharp regression discontinuity design for all possible types of pure and mixed proportional electoral systems. By exploiting exogenous variation in the d"Hondt method used to translate votes into parliamentary seats, I construct an assignment variable that achieves perfect compliance with respect to the treatment status, i.e. form of government, under very general conditions. I present causal evidence from Spanish municipalities suggesting that form of government induces a budget electoral cycle in components of per capita expenditure that are visible to the voters and classifiable as local public goods (e.g. road surfacing, water and sewage systems). Relative to coalition governments, single party governments increase the shares of capital outlays and tangible investment to the total budget by additional 14 % and 20 % respectively. These effects are more pronounced - 16 % and 31 % respectively - if causal evidence is drawn exclusively from ethnically mixed municipalities, in which each of the two main ethnic groups is represented by a separate set of political parties.

Key words: form of government, local public goods, electoral reform, regression discontinuity design

1 Introduction

The form of government in parliamentary democracies could have important implications on the size of government as well as in inducing variation in government spending over the span of the electoral cycle. Person, Rolland and Tabellini (2007) - hereafter PRT - argue that, relative to single party governments, coalition party governments engage in higher spending because they have to appeal to distinct groups of voters. At the same time, the electoral budget literature has been plagued with conflicting evidence whether electoral budget cycles, i.e. variation in government expenditure over the span of the electoral cycle, indeed exist (Schneider, 2010). This conflicting evidence points to the possibility that another factor such as the relative frequency of one form of government over another either observed or unobserved in a given dataset could be influencing the likelihood of detecting an effect. The importance of form of government on government policy is rooted in the (in)ability of a single political party to control the majority of the parliamentary seats, whose possession in parliamentary democracies is key to passing legislation and to exercising control over the executive

*Simon Fraser University, Canada, email: georgi_boichev@sfu.ca. I am grateful to Alexander Karaivanov, Anke Kessler, Chris Muris and Hitoshi Shigeoka for their support and advice throughout this project. All remaining errors are mine.

branch. The ability of a single party to command the majority of the parliamentary seats also determines whether we observe single party governments, i.e. requiring the support of a single political party, or coalition governments, requiring the parliamentary support of at least two political parties.

The objectives of this paper are both methodological and empirical in nature. The first methodological objective of this paper is to develop an identification strategy suitable for implementing a sharp regression discontinuity design - hereafter RD design - for all pure and mixed proportional electoral systems under very general conditions. Drawing causal inference from closely contested elections has the compelling advantage of exploiting the randomness around an observed threshold, which in my context would serve to grant a single party the majority of the parliamentary seats. By using exogenous variation in the d'Hondt method of translating vote shares into parliamentary seats, I construct an assignment variable that achieves perfect compliance with respect to the treatment status, i.e. form of government, which makes possible the implementation of a sharp RD resign. This property provides greater credibility to the causal estimates because no behavioural assumptions have to be made on how the assignment variable affects the treatment status. My method overcomes the limitations of observed in the data variables (e.g. share of the popular vote, share of seats) due to their inability to capture the institutional setup of proportional electoral systems or to satisfy the technical requirements of a RD design under general conditions. My method of constructing the assignment variable has the merit of being widely applicable to the pure and mixed proportional electoral systems used in 82 countries at the national and/or the subnational level (Source) making up by far the largest subgroup of parliamentary democracies.

The second methodological objective of this paper is to use the properties of the constructed assignment variable to indicate whether there is a switch in the form of government in response to a change in an electoral rule (e.g. legislature size, minimum legal requirement for representation, the number of bonus seats granted to the largest political party, and the number of seats allocated under non-proportional rules in mixed proportional electoral systems). I formally find conditions, indicating that only those observations in proximity to the threshold of the assignment variable can experience a switch in the form of government. Having this property in place, an RD design because of its predictive power at the threshold of the assignment variable can be used as a credible source to compute the economic effect of a change in an electoral rule through the form of government. The economic effect of an electoral reform equals the causal estimate of an RD design multiplied by the number of observations experiencing a switch in the form of government in response to a change in an electoral rule and also multiplied by the population size of these observations. Importantly, this property of the identification strategy could be applied not only to electoral rules specific to pure proportional systems (e.g. raising the minimum legal requirement required for representation) but also to study the change of an electoral system from relatively more majoritarian to relatively more proportional or vice versa (e.g. reducing the number of seats allocated under non-proportional electoral rules).

The empirical objectives of this paper are to provide causal evidence from the proposed identi-

fication strategy to two main research questions: How does the form of government affect - (i) the size of government and (ii) the variation in government spending - over the span of the electoral cycle under proportional electoral rules? The first question is based on the already noted theoretical prediction of PRT. In contrast, the second question is based on the idea that incumbent governments increase spending on visible to the voter items in the pre-election period in order to portray themselves as competent and thus increase their likelihood of being re-elected. One possibility is that the re-elections concerns of the incumbents propping up a coalition government but not in a single party government may clash and this difference may generate a different spending pattern between the two forms of government in pre-election years. To illustrate the implementation of the proposed identification strategy and to provide evidence to these two research questions, I use municipal-level panel data from the autonomous community of the Basque Country, one of the 17 regions of Spain. To compile this dataset, I use electoral data from four electoral cycles combined with census data and government finance data. A particular strength of the data is that there are fixed-term elections that take place simultaneously with no legal possibility for calling early elections. Importantly, this institutional setup rules out the possibility of endogenous electoral cycles. Another strength of the data is that the observations with closely contested elections arise in overwhelmingly ethnically mixed municipalities, in which each of the two main ethnic groups is represented by a separate set of political parties. In this context, form of government could point to the salience of the distribution of political power across ethnic groups. This is because single party governments are necessarily formed by a political party representing a single ethnic group, while coalition governments may be propped up by political parties representing both ethnic groups. I use an institutional constraint implied by the proposed methodology to include only those observations, in which both ethnic groups can feasibly be politically represented.

The first major finding of this paper is that form of government generates an electoral budget cycle that is captured by the higher increases in government expenditure of single party governments relative to coalition governments in pre-election years. This effect is detected in the differences between the two forms of government in the annual percentage changes to government spending and two of its components, capital outlays and tangible investment, in pre-election years. The estimated gap in the increases to per capita total expenditure between single party governments and coalition governments measured at the threshold of the assignment variable is 21 %. The corresponding figures for capital outlays and tangible investment are 56 % and 87 % respectively. As the findings on total expenditure and capital outlays are noisy under some specifications, I use an alternative measurement for the components of total expenditure, namely the percentage change in the share of a spending component to total expenditure over one fiscal year. The estimated effect at the threshold for the percentage change in the share of capital outlays (tangible investment) to total expenditure is 14 % (20 %), which is robust to any specifications. Consistent with the electoral budget cycle literature, incumbents target capital outlays and tangible investment due to the inclusion of items (e.g. the construction and maintenance of roads as well as the water supply and the sewage system) that are visible to

the voters and also classifiable as local public goods. In addition, a possible reason that an effect in per capita total expenditure is not detected under all specifications could have to do with the fiscal constraints a government faces. According to the argument put forward by Schneider (2010), an incumbent government would target the composition of some items as a second-best strategy when deficit spending is not feasible in the presence of fiscal rules as faced by member states of the European Union or limited fiscal autonomy as exhibited by subnational governments. Reporting results only from the subsample of ethnically mixed municipalities reveals a larger in magnitude effect corresponding to each of the five variables. This result could possibly shed light on the salience of the distribution of political power across ethnic groups that form of government may generate in the context of political representation along ethnic lines.

In contrast, I find no detectable effect in government spending between single party governments and coalition governments over the entire electoral cycle for the subset of elections with close margin of exceeding a threshold. In addition, the estimated coefficient, albeit noisy and unstable, would under various specifications measure that coalition governments spend less than single party governments. Together, these two pieces of evidence pose a serious challenge to the theoretical prediction of Person, Roland and Tabellini (2007) that coalition governments would engage in higher spending in order to be re-elected. The absence of a detectable effect is also at odds with the finding that coalition governments represent a larger constituency at the threshold of the assignment variable, a difference that is statistically significant.

The third result of this paper is that a larger set of municipalities would experience a more pronounced budget cycle in response to an electoral reform that would see the size of Spanish municipal councils reduced in 2015. This is because a reduction in the municipal size would result in the more frequent formation of single party governments (4 %) among the observations with closely contested outcomes. The overall economic effect of an electoral reform is measured as the obtained causal effect multiplied by the population size of those observations that experience a switch in the form of government.

The first methodological contribution of this paper is developing an identification strategy that is suitable for implementing a sharp RD design in studying questions related to form of government for all pure and mixed proportional electoral systems under very general conditions. My method differs notably in two respects from what has already been achieved in the literature on electoral competition drawn from closely contested elections. In my method, I extend the idea of drawing causal inference from closely contested elections to settings with an arbitrary number of political parties that markedly differs from the two-party/two-candidate majoritarian electoral systems primarily applied to US elections (Albouy, 2008 and 2009, Lee, 2001 and 2008, Lee, Moretti and Butler, 2004, McCrary, 2008), presidential-type systems with a legally set threshold for a winer to be declared (Brollo and Troiano, 2012) and two groupings with opposite interests on a single-dimensional issue (Petterson-Lidbom, 2008). In addition, my method could be applied to mixed electoral systems as opposed to pure electoral systems (e.g. pure majoritarian, pure presidential).

The second methodological contribution of this paper is providing identification conditions to study the economic effect of a change in an electoral rule through form of government. My identification strategy allows to directly test the prediction of PRT that electoral rules indeed affect government policy through form of government. The benefit of my approach relative to measuring the direct effect of an electoral rule, such as the legislature size, on government policy (Petterson-Lidbom, 2006) is that it links a change in the legislature size to the distribution of political power. This distinction is important because in parliamentary democracies, usually characterized by strong party discipline, legislature size could be argued to matter because of its effect on the (in)ability of a single political party to command the majority of the parliamentary seats.

This paper also makes an empirical contribution to the literature on electoral budget cycles by being the first to find that form of government induces an electoral budget cycle to the best of my knowledge. This finding may help resolve an existing debate why electoral budget cycles arise in some instances (Tufte 1978; Alesina and Roubini 1992; Franzese 2002b, Alesina et al. 1992 and 1997; Shi and Svensson 2006; Persson and Tabellini 2003a) but not in others (Brender and Drazen 2005; Jochimsen and Nuscheler 2005; De Haan and Sturm 1994; Drazen and Eslava 2005; Seitz 2000). A main limitation in the existing literature is that few if any studies have attempted to distinguish the institutional features faced by incumbents that could be driving their behaviour.

Last but not least, this paper also aims to contribute to the literature that studies the relationship between ethnic fractionalization and public good provision. It does so by emphasizing that coalition governments could serve as a power sharing institution across ethnic groups whose policy effect is a lower variation in government expenditure during the budget electoral cycle. These results, alongside the identification strategy used in this paper, are possibly applicable to at least 12 European countries that use proportional electoral rules and in which coalition governments are frequently made up of political parties representing minority ethnic groups. This niche has been previously unexplored as most empirical evidence has comes from settings in US cities and developing countries without noting the salience of the distribution of political power among ethnic groups (Alesina, Baqir and Hoxby, 2004, Alesina, Baqir and Easterly, 1999). In this respect, this paper is among the pioneers in policy evaluation that aims to shed light on the endogenous political institutions that shape the patterns of public good provision to ethnically mixed constituencies.

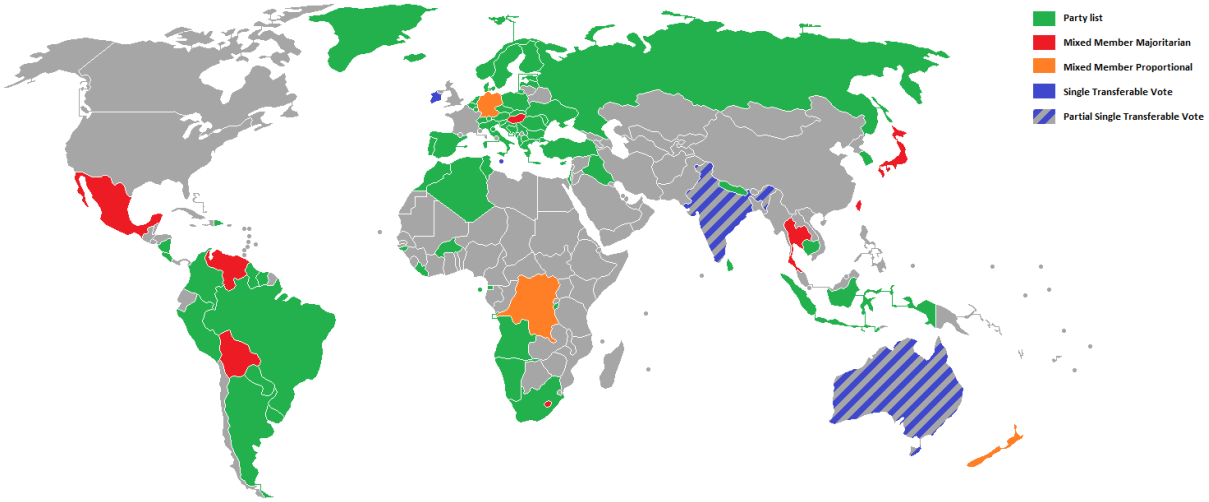
This paper is organized as follows. I provide a detailed institutional background of pure and mixed proportional electoral systems in Section 2. In section 3, I propose an identification suitable for the implementation of a RD design in questions related to form of government in these electoral systems. In section 4, I describe the data and the institutional setting of the Spanish electoral system and Spanish fiscal federalism. This is followed by a description of the empirical strategy in Section 5. In Sections 6 and 7 respectively, I present the main results and provide several robustness checks. In Section 8, I provide a methodological exposition of an electoral reform and estimate the economic affect of reducing municipal council size that would be implemented across Spanish municipalities in 2015. Finally, I offer some concluding remarks.

2 Institutional Setting

2.1 Electoral Systems of Proportional Representation: Overview

Electoral systems of proportional representation are used in 82 countries at the national and/or the subnational level, including 23 of the 28 member states of the European Union. The geographical distribution of proportional electoral rules is illustrated in Figure 1, where the pure proportional electoral systems are being referred to as 'Party list'.

Figure 1: **Electoral Systems: World Distribution**



The party list is emblematic to proportional electoral systems as running several candidates, as opposed to one, in a multi-seat constituency helps achieve the relatively proportional translation of votes into parliamentary seats, at least when compared to majoritarian (first-past-the-post) electoral systems. The proportionality of these electoral systems stems from the ability of a political party to earn a share of seats from a multi-seat constituency on the basis on its vote share. In electoral systems of proportional representation, each political party runs an ordered list of candidates, known as a party list, in a multi-seat constituency. If a political party based on its electoral performance receives x number of parliamentary seats, the first x number of candidates in the party list are considered elected. The ability (inability) of voters to alter the order of candidates in the party lists gives rise to open (closed) party lists. In closed party lists, the order of candidates is determined by the leadership of the respective political party. In open party lists, voters can influence the ordering of the candidates in the party list.

Proportional electoral systems use an allocational method to translate the political parties votes shares into parliamentary seats from two classes of methods, commonly referred to as highest average (HA) methods and largest remainder (LR) methods. In this section, I describe the allocation process of parliament seats for the highest average methods and leave the corresponding description for the largest remainder methods to Appendix A.

The highest average methods use scores, which are derived from dividing the vote share of each

political party, measured as a percentage of the popular vote, by a sequence of divisors. The total number of divisors in the sequence is equal to the total number of seats, N, in the legislature. In a constituency with P number of participating political parties, the total number of scores equals NP. The highest ranked N scores would grant the corresponding political parties seats in the legislature, while the remaining $N(1-P)$ scores would not. By far, the most widely used highest average methods are the d'Hondt method and the St. Lague method. Other highest average methods include the methods of the Modified St. Lague, the Hungarian St. Lague, and the Imperiali divisors as well as the Danish method. The single distinction between these methods is the use of a different sequence of numbers as divisors, which is illustrated in Table 1. To illustrate the allocation process of votes into parliamentary seats for highest average methods, I provide a numerical example.

Table 1: **Highest Average (HA) and Largest Remainder (LR) Methods: Summary**

HA Method	n^{th} divisor	Sequence (first 5 divisors)	LR Method	Quota
d'Hondt	n	1, 2, 3, 4, 5	Hare	$\frac{v}{N}$
St. Lague	$2n-1$	1, 3, 5, 7, 9	Hagenbach-Bischoff	$\frac{v}{N+1}$
Modified St. Lague[1]	$2n-1$	1.4, 3, 5, 7, 9	Droop	$\frac{v}{N+1}+1$
Hungarian St. Lague[1]	$2n-1$	1.5, 3, 5, 7, 9	Imperiali	$\frac{v}{N+2}$
Danish method	$3n-2$	1, 4, 7, 10, 13	Reinforced Imperiali	$\frac{v}{N+3}$
Imperiali divisors	$\frac{n}{2}-\frac{1}{2}$	$\frac{1}{2}, \frac{3}{2}, \frac{5}{2}, \frac{7}{2}, \frac{9}{2}$		

Notes: 1. First term in the sequence is excepted.

Example 1: Suppose that there are 4 political parties named (A, B, C, D) that have received a positive number of voters in a multi-seat constituency of 5 seats. The electoral system uses the d'Hondt method to translate votes into parliamentary seats.

Table 2: **d'Hondt Method: Allocation of Vote Shares into Parliamentary Seats**

Party name	**Vote share**	Divisor $n=1$	Divisor $n=2$	Divisor $n=3$	Divisor $n=4$	Divisor $n=5$	**Seats**
A	**42 %**	42	21	14	10.5	8.4	**2**
B	**32 %**	32	16	10.67	8	6.6	**2**
C	**15 %**	15	7.5	5	3.75	3	**1**
D	**11 %**	11	5.5	3.67	2.75	2.2	**0**

Party name	**Vote share**	Rank $n=1$	Rank $n=2$	Rank $n=3$	Rank $n=4$	Rank $n=5$	**Seats**
A	**42%**	1	3	6	9	10	**2**
B	**32%**	2	4	8	11	13	**2**
C	**15%**	5	12	15	16	18	**1**
D	**11%**	7	14	17	19	20	**0**

Notes: The scores in blue (red) colour in the upper table win (do not win) seats for their respective parties. The respective ranks of these scores are given in lower table with the corresponding colour.

There are several institutional factors that are commonly observed in the electoral systems of

proportional representation that could distort the pure proportional translation of votes into parliamentary seats. These institutional factors include the size of the legislature, a minimum legal threshold required for representation and a legally determined number of bonus seats awarded to the largest political party. The size of the legislature could lead to distortions in the translation of a vote share into a seats share because the share of parliamentary seats is a discrete variable, while the share of the popular vote is a continuous variable. As the size of the legislature becomes smaller, the seat share becomes more crudely measured. Thus, the potential for a distortion in the pure proportional translation of votes into seats increases.

A minimum legal threshold required for representation is the norm rather than the exception in the proportional electoral systems. It ranges from 0.67 % in the Netherlands to 10 % in Turkey. (Source) Most, if not all, electoral systems based on proportional representation are characterized by a minimum legal threshold required for representation. The role of such legal threshold is to leave political parties that obtain too small share of the popular vote ineligible for parliamentary seats. In the d'Hondt method, those political parties that obtain a share of the popular vote below a minimum legal threshold are being disqualified from the competition for parliamentary seats by not being assigned scores. This property of the d'Hondt method is being illustrated in the example below.

Example 1 (revisited): Consider again the same example with 4 political parties (A, B, C, D) that have won a positive number of voters in a riding with 5 seats. In addition, suppose that the minimum legal threshold for representation is 20 %. This legal threshold implies that Party C and Party D are not eligible for parliamentary seats. To disqualify these party from the allocation of parliamentary seats, the d'Hondt method does not assign scores to Party C and Party D derived from their vote share. This implies that only the scores of Party A and Party B, which meet the legal threshold requirement of 20 % are being ranked in determining the parliamentary seat allocation. This property of the d'Hondt method is illustrated in Table 3.

Table 3: **d'Hondt Method: Allocation of Vote Shares into Parliamentary Seats**

Party name	**Vote share**	Divisor $n = 1$	Divisor $n = 2$	Divisor $n = 3$	Divisor $n = 4$	Divisor $n = 5$	**Seats**
A	**42 %**	42	21	14	10.5	8.4	**2**
B	**32 %**	32	16	10.67	8	6.6	**2**
C	**15 %**						**0**
D	**11 %**						**0**

Another institutional peculiarity of some electoral systems of proportional representation, such as those used in Italy and Greece, is awarding the largest political party a legally set number of bonus seats. The main rationale for the use of bonus number of seats is to increase the likelihood for the formation of a single party government without leaving smaller political parties without representation in the legislature. This rule achieves this objective by decreasing to less than a half the share of seats

that the largest party needs to earn from the pools of seats allocated based on a highest average or a largest remainder method.

3 Methodology

3.1 Pure Proportional Electoral Systems

In this section, I formally propose an identification strategy suitable for implementing a sharp RD design in studying questions related to form of government for all possible types of pure and mixed proportional electoral systems. The critical part to coming up with a suitable identification strategy is the construction of an assignment variable that achieves perfect compliance with respect to the treatment status, i.e. form of government, under very general conditions. The proposed in this section identification strategy exploits exogenous variation in the d'Hondt method whose properties have already been described in section 2. To satisfy the technical requirements of a sharp RD design, I construct an assignment variable that measures the minimum transfer of the popular vote is necessary to bring the largest political party to just command the majority of the parliamentary seats. Importantly, this transfer is initiated between the largest political party and another political party that is uniquely determined for a given size of the legislature and distribution of vote shares. In this section, I show that this method is easily extendable to all other highest average methods and to mixed proportional electoral rules. The identification strategy corresponding to the largest remainder methods is relegated to Appendix A.

Exploiting exogenous variation in the d'Hondt method is necessitated because if an observable in the data (e.g. share of the popular vote, number of parliamentary seats held by the largest political party) is used as an assignment variable would not satisfy the technical requirements of a valid sharp RDD. For instance, the number of parliamentary seats is not an appropriate candidate for an assignment variable because it would not satisfy the technical requirements of positive density at the threshold for small-sized legislatures and in addition its values would not be comparable for different-sized legislatures. Using instead the share of the popular vote could be even more problematic as there does not exist a unique threshold of the popular vote that would grant a single party the majority of the parliamentary seats in the legislature. This issue is partly driven by the presence of a legal threshold required for representation or a small-sized legislature that could lead to the distortion of the proportional translation of votes into parliamentary seats. Furthermore, the chosen sequence of divisors in a highest average method may also favour granting more seats to larger political parties relaive to their vote share or vice versa.

Next, I proceed to formally constructing an assignment variable suitable for the implementation of a shard RD design. A valid sharp RD design requires that the treatment status is a deterministic "step-function" of an observed assignment variable X. That is, $D = 1$ if and only if X crosses the discontinuity threshold. Such a discontinuous rule can be described as:

D1: (Discontinuous rule) $D = 1$ iff $X \leq 0$: This implies that the equation governing the latent

propensity of treatment is becomes $P^* = p^*(Z,U) = Pr[X \leq 0|Z,U]$, where Z is a vector of observed characteristics and U is a vector of unobserved characteristics.

D2: The assignment variable X is observed.

In the context of this paper, an assignment variable X is such that it leaves all instances, in which a single party commands the majority of seats in the legislatures above a threshold value, and all instances, in which a single party does not command the majority of seats in the legislature below the same threshold value. I show that this property of the assignment variable is not violated due to the presence of any of the following institutional factors - size of the legislature, minimum legal threshold required for representation, bonus number of seats awarded to the largest party. In addition, the assignment variable is constructed such that its values are comparable if obtained from legislatures of different size.

Let $(v_1, v_2, ..., v_P | \sum_p v_p = 100, 0 \leq v_p \leq 100)$ be the distribution of vote shares of political parties $(\alpha_1, \alpha_2, ..., \alpha_P)$ in a multi-seat constituency of size N, where N is a positive integer. W.l.o.g., I assume that $v_1 \geq v_2 \geq ... \geq v_P$ and in addition that N is odd. For the notational convenience in this section, the symbol Ω will be used to denote the information contained in $(v_1, v_2, ..., v_P | \sum_p v_p = 100, 0 \leq v_p \leq 100)$. In addition, suppose that there is a legal threshold required for representation, denoted by $\underline{v} \in [0, 100]$, that must be met by party α_p $\forall p$, i.e $v_p \geq \underline{v}$,

The size N of the constituency implies that d'Hondt method uses the sequence of divisors $n \in \{1, 2, ..., N\}$ to derive the scores that are used to determine the allocation of parliamentary seats. From the total number of political parties P and the size of the constituency N, it is immediately deduced that there are a total of NP scores. Each of these scores $\frac{v_p}{n} \in [0, 100]$ receives a rank $r \in \{1, 2, ..., NP\}$ based on its magnitude relative to all other scores. The N-highest ranked scores $r \in \{1, 2, ..., N\}$ earn seats for their respective political parties as it has been described in section 2. The remaining scores $r \in \{N+1, N+2, ..., NP\}$ do not earn seats for their respective political parties.

For the methodological exposition of the argument in this section, the distribution of the vote shares of the political parties could be conveniently subdivided into two subgroups: $(v_1, v_{\text{-}1}; \alpha_1, \alpha_{\text{-}1} | N, \Omega, \underline{v})$. These two subgroups are associated with the largest political party α_1 and its complement, i.e. all political parties other than the largest political party $\alpha_{\text{-}1}$, respectively. Similarly, the seat allocation generated by the d'Hondt method from the vote distribution $(v_1, v_{\text{-}1}; \alpha_1, \alpha_{\text{-}1} | N, \Omega, \underline{v})$ is given by $(w, N-w; \alpha_1, \alpha_{\text{-}1} | N, \Omega, \underline{v})$. In addition, scores are being ranked within each subgroup. Let $r_1(\frac{v_1}{n})$ denote the rank of score $\frac{v_1}{n}$ within the subset of scores belonging to α_1. and also let $r_{\text{-}1}(\frac{v_{\text{-}1}}{n})$ denote for the rank of score $\frac{v_{\text{-}1}}{n}$ within the subset of scores belonging to $\alpha_{\text{-}1}$.

Definition An assignment variable X measures the minimum transfer in vote share to the largest party α_1, from a party drawn from $\alpha_{\text{-}1}$ and denoted by $\tilde{\alpha}_{\text{-}1}$, such that the following three conditions are being met:

- For a given allocation of seats $(w, N-w; \alpha_1, \alpha_{\text{-}1} | N, \Omega, \underline{v})$, there must be a transfer of seats $k \in \{-\frac{N-1}{2}, ..., 0, ..., \frac{N-1}{2}\}$ from α_1 to $\tilde{\alpha}_{\text{-}1}$ such that $w + k = \frac{N+1}{2}$ and $(N-w) - k = \frac{N-1}{2}$, i.e.

α_1 *just* command the majority of the parliamentary seats $\frac{N+1}{2}$.

- For a given corresponding distribution of votes, $(v_1, v_{\text{-}1}; \alpha_1, \alpha_{\text{-}1}|N, \Omega, \underline{\text{v}})$, there must be a transfer of vote share $X \in (-50, 50)$ from α_1 to $\tilde{\alpha}_{\text{-}1}$ that brings α_1 to just *just* command the majority of the parliamentary seats $\frac{N+1}{2}$. For this transfer to be minimum,

$$\frac{(v_1 + X)}{(N+1)/2} = \frac{(\tilde{v}_{\text{-}1} - X)}{\tilde{n}}, \tag{1}$$

where $r_1(\frac{v_1+X}{(N+1)/2}) = \frac{N+1}{2}$ and $r_{\text{-}1}(\frac{\tilde{v}_{\text{-}1}-X}{\tilde{n}}) = \frac{N+1}{2}$; $\tilde{n}$ is the corresponding divisor that generates such rank. The above condition implies that the $N+1$ highest-ranked scores of α_1 are among the N highest-ranked scores and, furthermore, $r(\frac{v_1+X}{(N+1)/2}) = N$, i.e. $\frac{v_1+X}{(N+1)/2}$ is the lowest-ranked score that grants any political party a parliamentary seat.

- Let the vote distribution at the pivotal allocation be $(v_1 + X, \hat{v}_{\text{-}1} - X, \bullet | \sum v_p = 100, 0 \leq v_p \leq 100)$ and for notation convenience be denoted by $\hat{\Omega}$ such that the resulting seat allocation is $(\frac{N+1}{2}, \frac{N-1}{2}; \alpha_1, \alpha_{\text{-}1}|N, \hat{\Omega}, \underline{\text{v}})$.

Proposition 1. The treatment assignment indicating that a single political party commands the majority of the seats in the legislature/council occurs through a known and deterministic decision rule: $D = \mathbf{1}[X > 0]$, i.e.

$$X = \begin{cases} \text{non-positive} & : \quad \text{iff } w \geq \frac{N+1}{2} \\ \text{positive} & : \quad \text{iff } w < \frac{N+1}{2}, \end{cases}$$

where X is the solution to equation 1 given by:

$$X = \frac{\tilde{n}(N+1)/2}{\tilde{n} + (N+1)/2}(\frac{\tilde{v}_{\text{-}1}}{\tilde{n}} - \frac{v_1}{(N+1)/2}). \tag{2}$$

Proof:

Suppose that $w \geq \frac{N+1}{2}$. I will show by construction that $S \leq 0$. The starting condition implies that $\frac{v_1}{(N+1)/2} \geq \frac{v_1}{w} \geq \frac{(\tilde{v}_{\text{-}1}-X)}{\tilde{n}}$. The first non-strict inequality $\frac{v_1}{(N+1)/2} \geq \frac{v_1}{w}$ follows directly from the assumption $w \geq \frac{N+1}{2}$. The second non-strict inequality $\frac{v_1}{w} \geq \frac{(\tilde{v}_{\text{-}1}-X)}{\tilde{n}}$ follows from $r(\frac{v_1}{w}) \leq N$ and $r(\frac{(\tilde{v}_{\text{-}1})}{\tilde{n}}) > N$, which are together implied by the assumed allocation of seats $(w, N-w; \alpha_1, \alpha_{\text{-}1}|N, \Omega, \underline{\text{v}})$ and $w \geq \frac{N+1}{2}$. For the first and third term in the double inequality to be equalized, i.e. $\frac{v_1+X}{(N+1)/2} = \frac{(\tilde{v}_{\text{-}1}-X)}{\tilde{n}}$, it must be true that $X \leq 0$.

Suppose that $X \leq 0$, i.e. the required transfer to move from the original seat distribution $(w, N-w; \alpha_1, \alpha_{\text{-}1}|N, \Omega, \underline{\text{v}})$ to $(\frac{N+1}{2}, \frac{N-1}{2}; \alpha_1, \alpha_{\text{-}1}|N, \hat{\Omega}, \underline{\text{v}})$ is non-positive. I will show by contradiction that $w \geq \frac{N+1}{2}$.

Suppose not, i.e. $X > 0$. A transfer $X > 0$ increases the vote share of α_1 and correspondingly raises in value each of α_1 scores $\frac{v_1}{1}, ..., \frac{v_1}{N}$. Similarly, $X \leq 0$ decreases the vote share of $\alpha_{\text{-}1}$ and correspondingly lowers each of $\alpha_{\text{-}1}$'s scores $r(\frac{v_1}{1}), ..., r(\frac{v_1}{N})$. The scores of the remaining political

parties remain unchanged. As a result, $r(\frac{v_{\_1}}{n})\ \forall n$ weakly decreases and $r(\frac{v_1}{n})\ \forall n$ weakly increases, i.e. the only possible reversal in the score ranking runs in favour of α_1 at the expense of the other political parties $\alpha_{\_1}$. As a result, the seat count of α_1 weakly increases relative to w and the seat count of all other political parties weakly increases relative to $N-w$. This implies that $w \leq \frac{N+1}{2}$. To rule out the possibility that $w = \frac{N+1}{2}$, I use the fact that v_1 strictly increases for $X > 0$. This implies that if $w = \frac{N+1}{2}$, after the transfer X were implemented the vote distribution is not at the tipping point of α_1 losing the $\frac{N+1}{2}$ seat. This establishes the contradiction.

The proof of the case $w < \frac{N+1}{2}$ is analogous.

QED.

To illustrate how X is computed, I provide a numerical example.

Example 1 (revisited):

We know that $N = 5$, and $w = 2$. This implies that $(N-w) = 3$, i.e all parties other than Party A command 3 seats in the legislature. Therefore, the pivotal seat allocation is $(3, 2; A; B + C + D)$. This implies that there must be initiated a transfer of one seat to Party A from one of Party B, Party C or Party D. To determine from which party the score is initiated, we must use the score from the subset of parties B, C, and D that generates a rank $r_{\_1}(\frac{v_{\_1}}{\hat{n}}) = 3$, where $\frac{N+1}{2} = 3$. This score must be just exceeded by the score of the largest party that yields rank $r_1(\frac{v_1}{3}) = 3$.

Table 4: **Example 1: Construction of the Assignment Variable**

Party name	**Vote share**	Divisor $n=1$	Divisor $n=2$	Divisor $n=3$	Divisor $n=4$	Divisor $n=5$	**Seats**
A	**42 + X%**	42 + X	21 + $\frac{X}{2}$	**14 + $\frac{X}{3}$**	10.5 + $\frac{X}{4}$	8.4 + $\frac{X}{5}$	**2 + 1 = 3**
B	**32 %**	32	16	10.67	8	6.6	**2**
C	**15 − X%**	**15 - X**	7.5 - $\frac{X}{2}$	5 - $\frac{X}{3}$	3.75 - $\frac{X}{4}$	3 - $\frac{X}{5}$	**1 − 1 = 0**
D	**11 %**	11	5.5	3.67	2.75	2.2	**0**

$$\frac{42+X}{3} = \frac{15-X}{1} \tag{3}$$

This implies that:

$$X = 0.75, \tag{4}$$

i.e if 0.75 % of the popular vote were transferred from Party C to Party A, Party A be just sufficient to acquire the pivotal seat in the legislature.

Proposition 1 has the advantage to be easily extendable to all other highest average methods. This is the case because by changing the sequence of divisors we only affect the numerical value of each of the scores. All the remaining ingredients necessary to carry out the construction of the assignment variable remain intact.

Proposition 1 also suggests why the alternative method proposed by Freier and Odendahl (2012),

which measures 'how often' the seat allocations in response to a perturbation of the vote shares, could generate a bias in the inclusion of observations close to the threshold of the assignment variable. This bias stems from the lack of structure in generating these perturbations that is consistent with the seat allocation process dictated by the highest average methods because these perturbations could affect all political parties simultaneously. For instance, the inclusion of observations whose distribution of vote shares generates more (less) frequent seat allocation arises due to the proximity of many (few) political parties other than the largest party to losing or gaining a seat to the largest political party. Furthermore, their approach is sensitive to distributions, in which some political parties are close to the legal threshold required for representation. This is particularly problematic because the perturbation of the distribution of vote shares could result in the vote share of a political party to cross this legal threshold. If such event occurs, there is a discontinuous gain or loss of seats for the political party whose vote share cross the legal threshold required for representation. In turn, there is a corresponding change in the seat allocation for multiple political parties with a potentially significant implication on the inclusion of observations that lie far from the true threshold. This problem with the method of Freier and Odendahl (2012) would be vivid even if parliamentary seats were to be used as an assignment variable.

3.2 Mixed Proportional Electoral Systems

The result from Proposition 1 could also be extended to mixed proportional electoral systems under some behavioural assumptions. Suppose that of the total N parliamentary seats, $N - B$ are electoral under proportional electoral rules and the remaining B seats are allocated under majoritarian or other non-proportional electoral rules. In addition, suppose that the allocation of these B seats among political parties is: $(\alpha_1, \alpha_2, ..., \alpha_P) = (B_1, B_2, ..., B_P)$ such that $B = \sum_p B_p$ and $0 \leq B_p \leq B \ \forall p$.

Assumption 1. The distribution of seats B elected under majoritarian rules remains unchanged when the vote share under proportional rules is transformed from Ω to $\hat{\Omega}$.

Assumption 1 is plausible because in mixed proportional systems, voters cast two ballots - one for a party list and another for majoritarian candidate.

Assumption 2. $B_p < \frac{N+1}{2}, \ \forall p$.

Assumption 2 is merely a technical condition that must satisfied. Otherwise, a single party commands the majority of the parliamentary seats regardless of the allocation of seats under proportional rules.

Proposition 2. For any highest average method, the treatment assignment that indicates that a single party commands the majority of the seats in the legislature occurs through a known and deterministic decision rule: $D = \mathbf{1}[X \leq 0]$.

Proof:

The proof is analogous to the pure proportional case except that the pivotal seat distribution is defined as $(\frac{N+1}{2} - B_1, \frac{N+1}{2} - B + B_1; \alpha_1, \alpha_{\_1} | N, \hat{\Omega}, \underline{v}, B, B_1)$ instead of $(\frac{N+1}{2}, \frac{N+1}{2}; \alpha_1, \alpha_{\_1} | N, \hat{\Omega})$ as in the pure proportional case.

QED.

It can be concluded that a seat allocation under mixed proportional rules $(w, N-w; \alpha_1, \alpha_{-1}|N, \Omega, \underline{v}, B, B_1)$ is fully determined by the set of parameters $(N, \Omega, \underline{v}, B, B_1)$. In this framework, pure proportional rules could then be viewed as a special case when $B = 0$ (also implying that $B_1 = 0$).

4 Data and Descriptive Statistics

Spain uses a proportional electoral system, in which each party runs a closed party list of candidates. That is, as noted in Section 2, the party list of candidates is predetermined by the respective political party and cannot be altered by the voters, who cast a ballot for this political party. Spain uses this electoral system at all levels of government: national, regional (autonomous communities), provincial and municipal. The number of candidates from each party list who are elected in the legislature is determined by the d'Hondt method, which also has been described in Section 2. In Spanish municipal elections, each party list must receive at least 3 % of the cast ballots in order to be eligible to receive seats in the municipal council, the legislative body at the municipal level. At the same time, it must be noted that a party list is not guaranteed to receive at least one seat if it receives a vote share above the minimum legal threshold required for representation. For small-sized municipal councils, the effective threshold to obtain a seat may exceed its legal counterpart.

Legislation passed at the national level determines the political framework of local government in two additional main respects: tenure in office and the size of municipal councils. Municipal council have a fixed term of four years in office that may not be legally terminated. In this respect, the municipal councils differ from the national and regional legislatures whose term may be terminated before the 4th year in office by a vote of non-confidence in the respective legislature. This institutional feature prevents the formation of endogenous electoral cycles. This is an important consideration as the ability to call early elections may generate differences in tenure between the two forms of government. In addition, coalition governments relying on the legislative support of more than one political party may face of persistent threat of a non-confidence vote. In addition, all municipal elections within a single autonomous community take place simultaneously, ruling out the possibility of different aggregate shocks affecting municipalities. In addition, upper level governments could not exploit differences in the timing of the elections to pander to different groups of municipalities with equalization transfers to municipalities.

Municipal councils also differ in size based on nationally-established thresholds of population size, ranging from 5 councillor seats in municipalities with population between 100 and 200 residents to 57 councillor seats in Madrid, the largest city of Spain.[1] In the autonomous community of the Basque Country, municipal councils range from 5 to 29 seats in the largest city of Bilbao.

Municipal governments have a considerable degree of autonomy over fiscal matters. The present-day system of fiscal federalism is rooted in the provisions of the Spanish Constitution of 1978, which

[1] Municipalities with less than 100 residents directly elect a mayor and have no municipal council.

lays down two main principles - financial autonomy and financial self-sufficiency - of municipal jurisdictions. The principle of financial autonomy means that municipalities can make their own decisions on raising revenue and how to spend it. The principle of financial self-sufficiency is aimed at guaranteeing that all municipalities have the necessary resources to exercise their competencies.

The fiscal responsibilities of Spanish municipalities include: public lighting, cemeteries, waste collection, cleaning of public areas, drinking water supply, sewer system, access to urban areas, road surfacing, food and drink control. In addition, municipalities with larger population have jurisdiction over additional areas. The inclusion of jurisdiction over additional areas is based on a municipality meeting a population thresholds at 5,000, 20,000 and 50,000 residents. The inclusion of fiscal responsibilities progressively builds on the fiscal responsibility as each population threshold is exceeded. Those municipalities with population larger than 5,000 residents have additional responsibilities over public parks, public libraries, market, and waste management. Similarly, those municipalities with population in excess of 20,000 residents have additional responsibilities over civil defense, social work, fire safety, and sports facilities for public use. Finally, the municipalities larger than 50,000 residents are also responsible for public transit and environmental protection.

To fulfill these fiscal responsibilities, municipalities rely on a range of revenue tools that include income from self-owned assets, local taxes, surcharges on taxes collected by autonomous communities and provinces, shares of tax revenue collected by the national government or those of the autonomous communities, subsidies (transfers) from upper-level governments, public fares, credit transactions, fines and revenue from other sanctions.

The dataset I use is compiled from three sources. I use electoral data for 4 municipal electoral cycles (1995, 1999, 2003, 2007) for 251 Spanish municipalities in the autonomous community of the Basque Country, obtained from the Department of Security of the Basque Country. In addition, I use public sector municipal data (1997 - 2010) in the autonomous community of the Basque country. These data include detailed information on revenue and spending and their components. The public sector data and the census data are publicly available from the website of the Statistics Institute of the Basque Country. In addition, in this data I have access to other economic variable such as municipal GDP and unemployment. The third source of data is census data also obtained from the Statistics Institute of the Basque Country, which includes a range of socioeconomic characterisitcs on population, ethnicity, and educational attainment. I use data collected from the censuses in 1991, 1996, 2001, and 2006. The data in each census year is matched to the corresponding electoral cycles, with the census year preceding or concurrent with the first year of each electoral cycle.

I restrict the empirical analysis to municipalities whose population lies between 100 and 5,000 residents. The lower bound is necessitated because municipal councils are elected only in those municipalities with at least 100 residents.[2] The upper bound is warranted on the grounds that the municipalities with fewer than 5,000 residents have identical fiscal responsibilities. The corresponding

[2]The residents of municipalities with fewer than 100 residents directly elect a mayor. In the municipalities with more than 100 residents, residents elect a municipal council and, in turn, the municipal council elects a mayor.

council size that corresponds to this subsample ranges from 5 to 13 seats, increasing at steps of 2 seats. All municipal councils in the Basque Country have an odd number of seats.

The municipal data from the Basque Country over the electoral cycles (1995 - 2011) reveals two desirable features for conducting RD design.These two features are the frequent occurrence of both coalition governments and single party governments and the presence of a fragmented legislature. Together, these two features suggest that I could anticipate a significant number of the observations to lie on both sides of and in proximity to the threshold of the assignment variable X constructed in Section 3. This is an important consideration for satisfying the technical requirement of RD design for a positive density at the threshold. In my data, 71 % of the observations have municipal councils, in which a single party commands the majority of seats in the legislature. The remaining 29 % of the observations, no single party commands the majority of seats in the legislature. The selection of windows of varying size, expanded by 1 % on each side of the assignment variable X, also reveals that there is enough data on each side of the threshold with no detectable breaks in the density as shown in Table 5 .[3]

Table 5: **Observations from Closely Contested Elections**

	Number of observations		
Minimum Transfer of the Popular Vote (%)	Coalition Governments	Single Party Governments	All Governments
±1%	48	34	82
±2%	73	72	145
±3%	97	99	196
±4%	108	131	239
±5%	119	168	287

The size of municipal governments, measured by their spending, makes up 9.32 % of GDP based on data from 1996, 2000, 2004, and 2008, the years for which municipal level GDP data is available. The three main components of municipal spending for municipalities with population of less than 5,000 residents are spending on the provision of goods and services (48 %), investment in capital outlays and tangible investment (34 %) and employment (10 %) based on data from 2000, 2004 and 2008 - the first full-year during each electoral cycle as vivid from Table 6.

Table 6: **Electoral Cycles in the Basque Country**

	Year 1	Year 2	Year 3 (Pre-election Year)	Year 4 (Election Year)
Electoral Cycle 1	No data[1]	1997	1998	1999
Electoral Cycle 2	2000	2001	2002	2003
Electoral Cycle 3	2004	2005	2006	2007
Electoral Cycle 4	2008	2009	2010	No data[1]

Notes: 1. The absence of data refers only to municipal government expenditure and revenue as well as their components.

[3]More refined expansions of the window also reveal no breaks in the density of the assignment variable.

The descriptive statistics reveal that coalition governments and single party governments in the subset of closely contested elections exhibit statistically significant differences in spending patterns in pre-election years (1998, 2002, 2006, 2010), measured in the annual percentage changes from year 2 relative to year 3 of the electoral cycle. Statistical differences are being observed for per capita (total) expenditure and two of its components, capital outlays and tangible investment, which are reported in the first three rows of Table 7. In addition, there are statistically significant differences in the annual percentage changes to the shares of capital outlays and tangible investment to total spending, reported in the last two rows of Table 7.

Table 7: **Descriptive Statistics: Government Expenditure**

Annual %△ over One Fiscal Year (Year 3 relative to Year 2 of Electoral Cycle)	Coalition Governments	Single Party Governments	Difference
%△ Expenditure (per capita)	6.61	21.82	-15.22*
%△ Capital Outlays (per capita)	42.17	105.84	-63.67**
%△ Tangible Investment (per capita)	43.25	98.49	-55.24**
%△ share of Capital Outlays to Expenditure	-2.30	2.76	-5.06**
%△ share of Tangible Investment to Expenditure	-3.27	3.13	-6.40**

Notes: *** denotes significance at the 1 % level, ** denotes significances at the 5 % level and * denotes significance at the 10 % level. The included observations have a population size between 100 and 5,000 residents and lie within ±5% of the threshold of the assignment variable X.

The changes in the five reported variable in Table 7 reveal the same qualitative pattern between the two forms of government. Relative to single party governments, coalition governments engage in smaller annual percentages increases in per capita expenditure, capital outlays and tangible investment as well as in the shares of capital outlays and tangible investment to total spending.

Is is worth noting that the differences in these expenditure variables are observed in Year 3 instead of in Year 4. The first reason for this observations could do with the fact that elections are scheduled during the first half of the election year (usually in the month of May) and the Spanish fiscal year runs from January to December. Secondly, the items for which we observe differences are investment local public goods, whose completion frequently requires several months or longer for completion.

The municipalities of the Basque country are inhabited by two main ethnic groups, the Basques and the Spaniards who make up 41.5 % and 48.8 % of the population respectively in the rural municipalities with less than 5,000 inhabitants. Taking into account that 9.2 % consider themselves both Spaniard and Basque, there are virtually no other ethnic groups in these municipalities. What is notable is that each of these two main ethnic groups is represented by a separate set of political parties. For the purpose of this paper, it is an important feature that ethnically mixed municipalities constitute a significant proportional of the closely contested elections as measured by the assignment variable. If one is to draw causal inference from the subset of ethnically mixed municipalities, it is

Table 8: **Descriptive Statistics: Municipal Council Size and Relative Frequency of Form of Government**

Number of Observations	Municipal Council Size	Value of a Full Seat[1]	Coalition Governments (Percentage of Total)
73	5	20.00 %	4.20 %
297	7	14.29 %	10.80 %
153	9	11.11 %	30.70 %
123	11	9.09 %	40.60 %
89	13	7.69 %	52.70 %
82	17	5.88 %	62.20 %
37	21	4.76 %	78.40 %
12	25	4.00 %	100.00 %
9	27	3.70 %	100.00 %

Notes: The value of a full seat provides the vote share that guarantees any political party municipal council representation under the d'Hondt method.

crucial that each ethnic group can feasibly be politically represented in a municipal council. Relying on a measure such as the Herfindahl Index of ethnic fractionalization may be inappropriate as it would not account for the variation in the requirements to elect at least one municipal councillor in different-sized municipal councils under pure proportional electoral rules. I overcome this issue by requiring that the population share of each ethnic group is at least as large as the numerical value of a full seat, defined as $\frac{100}{N}$. In Table 9, I report the value of a full seat for each municipal council size observed in the sample. The attractive of a full seat stems from the fact that a political party that receives a vote share $v_p \geq \frac{100}{N}$, it guaranteed at least one councillor regardless of the distribution of vote shares Ω. In this sense, if the population share of an ethnic group exceeds the value of a full seat, it is feasible (although not guaranteed) for it to be politically represented. The feasibility is based on the assumptions that the vote of an ethnic groups does not split across multiple political parties and that the turnout across ethnic groups does not differ systematically. One last remark is necessary regarding the political weight of having elected even a single councillor. Given the small size of the municipal councils in the sample (5 - 13), there is a high likelihood that even a single councillor could hold the balance of power if no single party commands the majority of seats in the legislature.

5 Empirical Strategy

In the sharp regression-discontinuity design, treatment status is a deterministic function of an underlying continuous variable, that is, $D = D(X) = \mathbf{1}[X > 0]$, where $\mathbf{1}[.]$ is an indicator function and X is the continuous assignment variable measuring the minimum transfer of the popular vote. $X = \bar{X} = 0$ is the treatment threshold separating the observations into two mutually exclusive groups: those observations receiving treatment, i.e. coalition governments, and those that do not, i.e. single party governments. The idea is to compare the outcomes for observations whose value of the underlying targeting variable is "just below" and "just above" the threshold $\bar{X}$ since they on average will have similar characteristics except for the treatment. In other words, those units slightly below the

threshold will provide the counterfactual outcome for those units slightly above since the treatment status will be randomized in a neighborhood of $\bar{X} = 0$. Hence, the causal inference from a regression discontinuity analysis can be as internally valid as those drawn from a randomized experiment.

The regression discontinuity design can be implemented by estimating the model

$$Y_{it} = \beta_0 + \beta_1 D_{it} + k(X_{it}) + \varepsilon_{it}, \tag{5}$$

where Y_{it} is the dependent variable, indicating a percentage change over one fiscal year in total public spending per capita, or some of its components such as tangible investment per capita, in pre-election years. $D_{it} = D_{it}(X_{it}) = \mathbf{1}[X_{it} > 0]$ is a binary variable taking a value of 1 if the assignment variable X_{it} is non-positive and 0 otherwise. The coefficient β_1 measures the effect of switching from a single party government to a coalition government at the threshold $\bar{X}_{it} = 0$. To reduce a potential bias due to the choice of functional form, the model allows for a flexible fit of the data by the polynomial $k(X_{it})$. I use heteroskedastic robust standard errors ε_{it}.

6 Results

The first major finding reported in column 1 of Table 10 in Appendix B is that, relative to single party governments, coalition governments have lower increases in the shares of capital outlays single party governments engage in higher increases (21 %) in per capita government expenditure in pre-election years. Higher increases are also observed for per capita government spending on visible to voter items that can be classified as local public goods - capital outlays (58 %) and tangible investment (87 %), which are also reported in columns 2 and 3 respectively of Table 10. The main items included in capital outlays and tangible investment are the construction and maintenance of roads as well as the water supply and the sewage system. These effects, which are measured at the threshold of the assignment variable, are also illustrated in Figures 2, Figure 3, Figure 4 in Appendix B respectively. What is immediately noticeable is that the results on Total Expenditure is large in magnitude but noisy. At the same time, an alternative measurement of capital outlays and tangible investment provides more compelling evidence that form of government induces an electoral budget cycle in the composition of spending. I also report a second set of results in columns 4 and 5 of Table 10, which detect an effect in the percentage changes in the shares of capital outlays and tangible investment to total expenditure. I find that, relative to single party governments, coalition governments increase the shares of the total municipal budget allocated to tangible investment (20 %) and capital outlays (14 %). These effects are illustrated in Figure 5, Figure 6 respectively.

Overall, these result could be consistent with the presence of institutional constraints that may limit some municipalities' ability to finance government spending by running larger deficits. Such explanation is plausible due to the relatively limited fiscal autonomy of Spanish municipalities, at least when compared to national governments, and also the presence of fiscal rules imposed by the European Union that place a cap on deficit financing of government expenditure. As a result, some

municipalities may resort to manipulating the electorate by targeting the composition of spending as a second-best strategy. This is a formal argument advanced by Drazen and Slava (2005, 2010), which they support with empirical evidence. The possible reasons incumbent governments would target capital outlays and tangible investment could be associated with the inclusion of visible to the voters items classifiable as local public goods (e.g. construction and maintenance of roads and of the sewage and water supply systems).

Why does form of government generate an electoral budget cycle? There are no theoretical models to the best of my knowledge that address this question. Empirical evidence is also scant (Geys, 2006) providing only non-causal evidence of the effect of fragmented legislatures encompassing both divided governments and form of government on pre-election government policy. My paper could possibly shed light on this issue by using the fact that RD design draws causal inference from closely contested elections, where the incentives to influence the electoral outcome associated with the form of government are the strongest *ceteris paribus*. In a coalition government, unlike a single party government, the re-election concerns of the incumbent political parties may clash. For instance, a junior coalition partner in a coalition government faces a potential trade-off of using government policy to influence the formation of a hung parliament in the following electoral cycle at the expense of losing votes due to perceived incompetence of the incumbent political parties. What makes such trade-off plausible in closely contested elections is first the proximity of a senior partner' electoral support to the threshold of the assignment variable and secondly the potential electoral support of a junior partner, which may dictate that a junior partner's only route to power is through the formation of a hung parliament.[4]

The results reported in Table 11 draw causal evidence only from the subset of ethnically-mixed municipalities and reveal that the estimated coefficients for each of the five reported spending variables is larger in magnitude. In the baseline results, I find that, relative to single party governments, coalition governments increase the shares of the total municipal budget allocated to tangible investment (31 %) and capital outlays (16 %). The restriction of the sample is based on the argument advanced in Section 4 that each ethnic group must be large enough in size so that it can feasibly be politically represented. In this context, form of government may have implications on the distribution of political power across ethnic groups. As already noted in Section 4, each ethnic group is represented by a separate set of political parties. This type of political representation necessarily implies that a single party government is propped up by the representative of a single ethnic group. In contrast, a coalition government might be propped up political parties that represent both ethnic groups. At a minimum, the presence of a potential coalition partner representing another ethnic group could influence the value of the junior partner that is cheapest to buy in a legislative bargaining sense. This could be particularly important if more fluid coalitions on an issue-by-issue basis are commonplace.

The finding of larger magnitudes for the reported in Table 11 coefficients relative to their counterparts reported in Table 10 also requires some interpretation. The increase in magnitudes of these

[4]In a hung parliament, no single party commands the majority of the parliamentary seats.

results is particularly interesting because if a coalition government is made up of the representatives of two ethnic groups that live in separate areas, one would anticipate spending on the construction and maintenance of roads and of the sewage and the water supply system to increase. But this is not the case and could be consistent with the hypothesis of the trade-off faced by an office-oriented junior coalition partner. It is also the case that the support of a small budget, relative to a large budget, in ethnically mixed communities is a common finding in the literature on ethnic fractionalization and public good provision (Alesina, et al. 1999). The contribution of my paper is that it points to the endogenous political institution that generates these results.

As already noted in the Introduction, increasing per capita spending, in particular, on items with the above characteristics is consistent with the re-elections concerns of an incumbent government, according to the predictions of the electoral budget cycle literature. This explanation, however, is insufficient to provide an adequate explanation for the observed differences between single party government on the one hand and coalition governments, on the other. This paper is the first to the best of my knowledge to find an effect that might be capturing the re-election concerns of a junior coalition partner. I also report a second set of results in columns 4 and 5 of Table 10, which detect an effect in the percentage changes in the shares of capital outlays and tangible investment to total expenditure. I find that, relative to coalition governments, single party governments increase the shares of the total municipal budget allocated to tangible investment (20 %) and capital outlays (14 %), which are in line with the first set of results. This approach in measuring the dependent variable has the advantage of isolating the effect of the priority items of an incumbent government ina pre-election year, without fearing that the results may be contaminated by sizable changes in total spending.

In contrast, I find no detectable effect in government spending between single party governments and coalition governments over the entire electoral cycle for the subset of elections with close margin of exceeding a threshold. In addition, the estimated coefficient, albeit noisy and unstable, would under various specifications measure that coalition governments spend more than single party government. Together, these two pieces of evidence pose a challenge to the theoretical prediction of Person, Roland and Tabellini (2007) that coalition governments would engage in higher spending because they have a larger constituency to appeal to in order to be re-elected.

7 Robustness Checks

I perform a series of robustness checks to provide credibility to the results reported in Section 6. The first set of test include falsifications tests, in which a placebo threshold is chosen. These placebo thresholds are chosen at intervals of 0.5% from the threshold of the assignment variable, i.e. $\pm 0.5\%$, $\pm 1\%$, $\pm 1.5\%$, $\pm 2\%$. In each of these instances, the baseline window is kept at $\pm 2\%$ from the placebo threshold of the assignment variable and none of the obtained estimates indicates statistical significance even at the 10 % level of confidence.

The set of tests includes expanding and narrowing the threshold around the window of the assignment variable. In addition, to the baseline results I use the following windows - ±1%, ±3%, ±4%, and ±5%. The reported results in Table remain qualitatively similar to the baseline results and in addition they become more precise with the inclusion of more data. I also use a a number of polynomials (linear, quadratic, cubic), to which the results demonstrate robustness.

I also perform tests that check whether there is a particular electoral cycle or municipal council size that could be driving the results. Due to the limited number of observations in the data, I exclude observations from one electoral cycle or one municipal council size at a time. The results reported in Table 14 and Table 14 are not indicative that a particular municipal council size or electoral cycle is driving the results.

Last but not least, I test for the possible presence of manipulation effects. I check whether the densities of relevant third variables are continuous at the threshold of the assignment variable. The failure of this test for any variable would be indicative of the failure of the assumption of no precise manipulation. Perhaps, from public economics standpoint, the most relevant variables are the size of GDP per capita, which is indicative of a municipality's fiscal capacity, as well as the main sources of revenue for municipalities - direct taxes, indirect taxes and capital transfers to municipalities from upper level governments. In addition, the size of municipalities, which is determined based on population thresholds, appears strongly correlated with the form of government as noted in Table 8. The densities of each of these variables, reported in Figure 7, do not exhibit a discontinuity at the threshold. The density of socio-economic characteristics such as population size and ethnolinguistic variables also do not exhibit a discontinuity either. The inclusion of the above as regressors do not appear to have the magnitudes of the coefficients as reported in Table 15. In addition to these variables, I include lagged variables of each of the main components of government revenue from the pre-election years of the preceding electoral cycle in Table 16. If the lagged variable were to demonstrate discontinuous effect, this would be suggestive that government policy exercises precise control over the realized form of government in the next electoral cycle.

8 Electoral Reform

8.1 Methodology

A main property of my identification strategy is that a seat allocation $(w, N-w; \alpha_1, \alpha_{-1}|N, \Omega, \underline{v}, B, B_1)$ is fully characterized by the set of parameters $(N, \Omega, \underline{v}, B, B_1)$. This implies that the seat allocations can be re-computed in response to a change in one of these parameters *ceteris paribus*. Furthermore, for the methodological reasons outlined in Propositions 1 and 2 once the new seat distribution is known, the assignment variable X corresponding to the new parameter value can be re-computed as well. A major implication of a change in the value of one of these five parameters is that an observation can experience a switch in the form of government. In addition, it is empirically likely that those observations experiencing a switch are in the proximity to the threshold of the assignment variable,

thus providing predictive power to the RDD estimates in computing the economic effect of the change in the value of one of these five parameters. The reason RD design is likely to have predictive power to estimate this effect is because any change in the parameters affects those scores at the margin of earning their respective political party a seat. From a policy perspective, this property of the identification strategy allows for estimating the economic effect of specific parameters of pure proportional systems such as the size of the legislature (N), the minimum legal threshold for representation ($\underline{v}$) as well as a legally determined number of bonus seats awarded to the largest party B_1. In addition, this property could be also used to estimate the economic effect of moving from a relatively more majoritarian to a relatively more proportional electoral system or vice versa by changing the value of the parameter B. Importantly, this effect is estimated through form of government and capture the theoretical prediction of Persson, Roland and Tabellini (2004) that electoral rules affect government policy only through form of government.

Motivated by an electoral reform that would see the size of Spanish municipal councils slashed in 2015, I will develop an argument and provide estimates of the economic effect of reducing N.

First, let me develop some new notation. Consider an initial seat distribution $(w, N-w; \alpha_1, \alpha_{\text{-}1}|N, \Omega, \underline{v}, B, B_1)$ with a corresponding pivotal seat distribution $(\frac{N+1}{2}, \frac{N-1}{2}; \alpha_1, \alpha_{\text{-}1}|N, \hat{\Omega}, \underline{v}, B, B_1)$. If the size of the legislature changes, there is a new seat distribution $(w', N'-w'; \alpha_1, \alpha_{\text{-}1}|N', \Omega, \underline{v}, B, B_1)$ with a corresponding pivotal seat distribution $(\frac{N'+1}{2}, \frac{N'-1}{2}; \alpha_1, \alpha_{\text{-}1}|N', \hat{\Omega}, \underline{v}, B, B_1)$. The corresponding values of the assignment variable are denoted by X for the initial seat distribution and by X' for the new seat distribution.

Proposition 3 A change in the legislature size from N to N' could lead to a change in the form of government *ceteris paribus* under certain conditions.

Proof:

Consider the case $N > N'$.

Suppose that the size of a legislature is decreased from N to N'. This implies that the scores with rank $N' < r \leq N$ that used to qualify for a seat for the initial legislature size N no longer do for the new legislature size N'.

An observation experiences a switch from a coalition government to a single party government if the following conditions are met: $w \in \{\frac{N'+1}{2}, ..., \frac{N-1}{2}\}$ and α_1 has at most $(w - \frac{N'+1}{2})$ number of scores with rank $N' < r \leq N$. If these two conditions are together satisfied, $w' \geq \frac{N'+1}{2}$.

An observation experiences a switch from a single party government to a coalition government if the following conditions are met: $w \in \{\frac{N+1}{2}, ..., N - \frac{N'+1}{2}\}$ and α_1 has at least $(w - \frac{N'-1}{2})$ number of scores with rank $N' < r \leq N$. If these two conditions are together satisfied, $w' < \frac{N'+1}{2}$.

The proof of the case $N < N'$ is analogous.

QED

Corrolary: For an observation to experience a switch in the form of government when $N > N'$, $w \in \{\frac{N'+1}{2}, ..., N - \frac{N'+1}{2}\}$.

Proposition 3 and its Corrolary have an important implication on the predictive power of RD design in estimating the economic effect of an electoral reform through the form of government as they place both a lower bound and an upper bound on the initial number of parliamentary seats w held by α_1. Although corresponding bounds for X can be computed when $N, \Omega, \underline{v}, B, B_1$ are known, they would not provide as sharp a prediction. However, due to the intimate relationship that exists between the minimum transfer of the popular vote, X, and the minimum transfer of parliamentary seats, $\frac{N+1}{2} - w$, as possible assignment variables, it is anticipated that only those observations that lie relatively close to the threshold of the assignment variable X are likely to experience a switch in the form of government.

At the same time, Proposition 3 leaves as an empirical question whether a reduction in the legislature size from N to N' would influence the more frequent formation of single party governments or coalition governments. This leaves my paper to its next objective to empirically address this question.

Example 1 (revisited) The following numerical example illustrates how a reduction in the size of the legislature from $N = 5$ to $N' = 3$ results in a switch in the form of government *ceteris paribus*. Table 9 demonstrates that if the two scores ranked in $N' < r \leq N$ belong to parties other than Party A, there is a switch from a coalition government to a single party government. Initially, Party A commands only 2 of the 5 seats in the legislature, leaving it short of a majority. However, after the reduction in the legislature size Party A commands 2 of the 3 seats, that is the majority of the parliamentary seats. If you recall, $X = 0.75\%$. After the size of the legislature is reduced,

$$\frac{42 + X'}{2} = \frac{15 - X'}{1} \tag{6}$$

The solution to this equation yields $X' = 4\%$.[5]

To estimate the economic effect, I need to impose the following behavioural assumption on voters and political parties.

Assumption 3. The distribution of vote shares $f(v_1, v_2, ..., v_P | \sum_p v_p = 100, 0 \leq v_p \leq 100)$ remains the same when the size of the legislature is reduced from N to N'.

Assumption 3 indicates that neither voters change their voting behaviour, nor entires and exits of political parties occur.

The economic effect of the electoral reform measures the average change in the pre-electoral spending adjusted for the population size for the subset of municipalities that would be affected by the electoral reform. Formally,

[5]If I follow the proposition 1, I would use $r_1 = 2$, which yields the score = 21, and $r_{\text{-}1} = 2$, which yields the score = 16. Using score = 16 would result in Party B gaining an extra seat at the expense of Party A. This, however, would represent an invalid counterfactual as it would not generate a coalition government but provide Party B with a majority government at the expense of Party A. For this reason, the next highest ranked score $r_{\text{-}1} = 3$ (score = 15) is being picked.

Table 9: **Reduction in the Legislature Size and a Switch in the Form of Government**

Party name	**Vote share**	Divisor $n=1$	Divisor $n=2$	Divisor $n=3$	Divisor $n=4$	Divisor $n=5$	**Seats**
A	**42 %**	42	21	14	10.5	8.4	**2**
B	**32 %**	32	16	10.67	8	6.6	**2**
C	**15 %**	15	7.5	5	3.75	3	**1**
D	**11 %**	11	5.5	3.67	2.75	2.2	**0**

Party name	**Vote share**	Divisor $n=1$	Divisor $n=2$	Divisor $n=3$			**Seats**
A	**42 %**	42	21	14			**2**
B	**32 %**	32	16	10.67			**1**
C	**15 %**	15	7.5	5			**0**
D	**11 %**	11	5.5	3.67			**0**

Notes: The scores in blue colour are the highest-ranked $N = 5$ in the top panel and also the highest-ranked $N' = 3$ in the bottom panel, earning seats for their respective political parties. The remaining scores, in red colour, do not earn seats for their respective political parties.

$$\text{Economic Effect}_{it} = \hat{\beta}_1 \sum_i \sum_t T_{it} \text{Population}_{it}, \tag{7}$$

where $\hat{\beta}_1$ is the estimated causal effect obtained from the baseline regression equation. T_{it} is an indicator variable that indicates whether a municipality would experience a hypothetical switch in the form of government as a result of a change in the size of its municipal council *ceteris paribus*. A value of 1 would indicate a switch from a coalition to a single party government; -1 - a switch from a single party government to a coalition government; 0 - no switch in the form of government. Such hypothetical switch in the form of government would occur if there is a change in the sign of the assignment variable in response to a change in the size of the municipal council. X_{it} stands for the value of the assignment variable of municipality i in electoral cycle t before the change and X'_{it} after the change. Formally,

$$T_{it} = \begin{cases} 1 & : \text{ iff } X_{it} > 0 \text{ and } X'_{it} \leq 0 \\ 0 & : \text{ iff } (X_{it} > 0 \text{ and } X'_{it} > 0) \text{ or } (X_{it} \leq 0 \text{ and } X'_{it} \leq 0) \\ -1 & : \text{ iff } X_{it} \leq 0 \text{ and } X'_{it} > 0 \end{cases}$$

8.2 Spanish Electoral Reform - Reducing Municipal Council Size for 2015 Elections

There is a particular interest in exploring the extent to which a reduction in the legislature size influences the more frequent formation of one form of government over another, in order to assess the economic effect of an electoral reform that would see municipal councils slashed to varying degrees across Spanish municipalities in 2015. As already noted, the d'Hondt method allows for the possibility of switches in either direction - from coalition governments to single party governments and vice versa. At the same time, the descriptive statistics reported in Table 8 the municipalities in the

Basque Country reveal that municipal council size is inversely associated with the frequency of coalition governments. It is worth noting that the Basque municipalities differ in both the distributions of the vote shares Ω and the municipal council size N, making it unclear which effect generates the association between municipal council size and the frequency of coaliion governments observed in Table 8. Importantly, the legislature size generates an effective threshold required for representation, which could significantly higher than the legal minimum for the small-sized municipal councils observed in the data. The value of a full seat provides the vote share that guarantees any political party municipal council representation for any distribution of the popular vote under the d'Hondt method. For instance, in Example 1 when $N = 5$, the effective threshold required for representation is 15 %, i.e. full 12 % higher than the legal threshold required for representation, while the value of a full seat is 20 %. For the outlined reasons above, it remains an empirical question whether we could attribute these differences in the frequency of coalition government either to the purely mechanical effect induced by the d'Hondt method or to behavioural responses observed in the distributions of the vote shares Ω. The proposed method in this section could help shed light on this issue by directly computing the purely mechanical effect induced by the d'Hondt method, which is of particular interest in assessing the economic effect of an electoral reform that would affect all Spanish municipalities.

The Spanish national government is planning to implement a major electoral reform for the 2015 municipal elections that would affect to varying degree the 8,084 Spanish municipalities in all 17 autonomous communities. The electoral reform includes two main aspects: the incorporation of the very small municipalities below a population threshold into larger municipalities and the reduction of the size of municipal councils by varying degrees. The first aspect of the reform would affect 3,725 municipalities with population less than 500 residents that will cease to exist as separate entities and will be amalgamated into larger municipalities. The second aspect of this reform, which is of particular to interest to this paper, would see the size of municipal councils reduced by varying degrees. The reform would also see the proportional reduction of the size of municipal councils of all municipalities. The overall reduction of municipal councillors would total 21,338, approximately a third of the present number of municipal councillors, 68,578 (Government of Spain, 2013). Based on my estimates, 17,815 of the councillor seats that would be slashed would be attributed to the elimination of the municipal councils in the municipalities with less than 500 residents.[6] This still leaves 3,523 councillor seats that would be slashed in the remaining 4,359 municipalities with a population larger than 500 residents. This reduction would constitute on average a 7 % decrease from the current levels if the population of these municipalities is held fixed. This reduction is likely to be even larger if one takes into account that the population of the municipalities with more than 500 residents will on average increase due to the incorporation of those municipalities with fewer than 500 residents into larger municipalities.

[6]My estimates rely on the perfect enforcement of the proposed 500 residents threshold.

8.3 Economic Effect of Electoral Reform (under construction)

To estimate the economic effect of an electoral reform, I perform the following simulations. I reduce the size of each municipal council by two seats such that the resulting size of the legislature is again odd.[7] Given the small size of these legislatures, even a reduction by two seats would constitute a large decrease that would exceed the average reduction of 7 %.

Re-computing the size of the assignment variable for the new size reveals that the number of switchers is surprisingly small - 22 and there are switches occurring in both directions. The simulations indicate that 13 observations experience a switch from hung council to majority councils and 9 observations experience a switch from majority councils to hung councils. This effect is consistent with the methodological argument put forward in Section 8.1. but surprising with respect to the descriptive statistics reported in Table 8 in Section 4. Although the estimated economic effect runs in favour of a more pronounced electoral reform on average, the effect is very small. What is more problematic is that there are switchers in both directions in qualitatively similar numbers.

This leaves the question how does the municipal council size influence form of government. What is notable is that in small-sized legislatures the effective threshold requirement for representation is significantly higher than its legal counterpart. The take-away message from these simulations is that council size per se is not effective tool in influencing the more frequent formation of one form of government over another. But it is important to note that if size influences the effective requirement for representation it may induce behavioural effects in voters and political parties that lead to less fragmented legislatures and in turn induce the more frequent formation of single party governments.

9 Conclusion

This paper proposes an identification strategy that makes suitable the implementation of a sharp RD design to studying questions related to form of government for all pure and mixed proportional electoral systems under very general conditions. My method differs notably in two respects from what has already been achieved in the literature on electoral competition drawn from closely contested elections. In my method, I extend the idea of drawing causal inference from closely contested elections to settings with an arbitrary number of political parties that markedly differs from the two-party/two-candidate majoritarian electoral systems primarily applied to US elections (Albouy, 2008 and 2009, Lee, 2001 and 2008, Lee, Moretti and Butler, 2004, McCrary, 2008), presidential-type systems with a legally set threshold for a winer to be declared (Brollo and Troiano, 2012) and two groupings with opposite interests on a single-dimensional issue (Petterson-Lidbom, 2008). In addition, my method could be applied to mixed electoral systems as opposed to pure electoral systems (e.g. pure majoritarian, pure presidential). The fact that my method is based on the proportional electoral rules translating vote shares into parliamentary seats helps overcome the limitations of observed in the data variables (e.g. share of the popular vote, share of seats), which fail to capture the

[7] All municipal councils have an odd number of municipal councillors.

institutional setup of proportional electoral systems or to satisfy the technical requirements of a RD design under general conditions. My method also has the merit of being widely applicable to the pure and mixed proportional electoral systems used in 82 countries at the national and/or the subnational level (Source) making up by far the largest subgroup of parliamentary democracies.

I also find conditions allowing for the proposed identification strategy to estimate the effect of an electoral rule on government policy through form of government. Those conditions indicate that only those observations in proximity to the threshold of the assignment variable can experience a switch in the form of government, allowing to exploit the predictive power of a RD design in estimating the effect of an electoral reform. From a policy perspective, this property of the identification strategy allows for estimating the economic effect of specific parameters of pure proportional systems such as the size of the legislature, the minimum legal threshold for representation as well as a legally determined number of bonus seats awarded to the largest party. What is particularly innovative in my approach is that this property of method could be also used to estimate the economic effect of moving from a relatively more majoritarian to a relatively more proportional electoral system or vice versa. Last but not least, the benefit of my approach relative to measuring the direct effect of an electoral rule, such as the legislature size, on government policy (Petterson-Lidbom, 2006) is that it links a change in the legislature size to the distribution of political power. This distinction is important because in parliamentary democracies, usually characterized by strong party discipline, legislature size could be argued to matter because of its effect on the (in)ability of a single political party to command the majority of the parliamentary seats.

On the empirical side, I present causal evidence strongly suggestive that form of government generates an electoral budget cycle in the composition of spending. My paper provides further evidence to recent studies that in the presence of institutional constraints (e.g. fiscal rules or limited fiscal autonomy of subnational governments), governments may resort to targeting composition of spending as a second-best strategy. Drawing causal evidence from closely contested elections, where the incentives to use government policy in influencing electoral outcomes are perhaps the strongest, could serve to fuel future research exploring the forces that generate such an outcome in pre-election years. At the same time, I find no evidence that form of government generates differences in the size of government, posing a challenge to the theoretical prediction of PRT.

My second empirical finding is that form of government could serve as an endogenous political institution associated with the presence (or absence) of power sharing across ethnic groups with potentially significant implications on government policy. To make this interpretation possible, I use an institutional constraint implied by the proposed methodology to include only observations in the sample such that each of the two main ethnic groups can feasibly be politically represented. In this respect, this paper is the first to the best of my knowledge to uncover how a formal political institution could influence the size of and the variation in public good provision in ethnically mixed communities.

Last but not least, I estimate the *ex ante* economic effect of an electoral reform that would see the size of municipal councils reduced in 2015. My finding suggests that a larger set of municipalities

will experience a more pronounced electoral budget cycle as a reduction in the council size leads to the more frequent formation of single party governments. In addition to this effect, I find that the reduction in council size increases the effective requirement for representation to levels substantially higher than the corresponding legal requirement. This effect could potentially lead to less fragmented legislatures and in turn greater frequency of single governments. Effect in this direction is plausible due to the possibility of strategic voting favouring larger parties, party mergers and exits as well as deterred party entries.

References

[1] Albouy, David, 2008. "Do Voters Affect or Elect Policies? A New Perspective With Evidence from the U.S. Senate.", Unpublished.

[2] Albouy, David, 2009. "Partisan Representation in Congress and the Geographic Distribution of Federal Funds.", National Bureau of Economic Research Working Paper 15224.

[3] Alesina, Alberto, Reza Baqir, and William Easterly, 1999. "Public Goods and Ethnic Devisions", *Quarterly Journal of Economics*, 114 (4): 1243-1284.

[4] Alesina, Alberto, Reza Baqir, and William Hoxby, 2004. "Political jurisdictions in heterogeneous communities", *Journal of Political Economy*, 112: 348–396.

[5] Alesina, Alberto, and Nouriel Roubini, 1992. "Macroeconomic policy and elections in OECD democracies." *Economics and Politics*, 4, 1–30.

[6] Alesina, Alberto, Gerald D. Cohen and Nouriel Roubini, 1997. "Political cycles and the macroeconomy." Cambridge: MIT Press.

[7] Angrist, Joshua D. and Jorn-Steffen Pischke, 2009. "Mostly Harmless Econometrics", Princeton University Press, Princeton and Oxford.

[8] Brender, Adi, and Allen Drazen. 2005. "Political budget cycles in new versus established democracies", *Journal of Monetary Economics*, 52, 1271–1295.

[9] Brollo, Fernanda and Ugo Troiano, 2012. "What Happens When a Woman Wins a Close Election? Evidence from Brazil", Working Paper

[10] De Haan, Jakob and Jan Egbert Strum, 1994. "Political and institutional determinants of fiscal policy in the European Community.", *Public Choice*, 80, 157–172.

[11] DiNardo, John and David S. Lee, 2011. "Program Evaluations and Research Designs", *Handbook of Labor Economics*, 48: 281–355.

[12] Directorate of the Electoral Processes and Documentation, Dept. of the Interior of the Basque Country, 1995 - 2007. Web.

[13] Drazen, Allen and Marcela Eslava. 2005. " Electoral manipulation via expenditure composition: theory and evidence.", NBER Working Paper No. W11085.

[14] Drazen, Allen and Marcela Eslava. 2005. " Electoral manipulation via expenditure composition: theory and evidence.", *Journal of Development Economics*, 92 (2010) 39–52

[15] Ferreira, Fernando, and Joseph Gyourko. 2009. ""Do Political Parties Matter? Evidence from U.S. Cities.", *Quarterly Journal of Economics*, 124(1): 399–422.

[16] Franzese, Robert J., 2002. "Macroeconomic policies of developed countries." Cambridge: Cambridge University Press.

[17] Freier, Ronny and Christian Odendahl, 2012. "Do absolute majorities spend less? Evidence from Germany", *Discussion Papers, German Institute for Economic Research, DIW Berlin, No. 1239*

[18] Geys, Benny, 2006. "Government weakness and electoral cycles in local public debt: evidence from Flemish municipalities", *Discussion Papers, German Institute for Economic Research, DIW Berlin, No. SP II 2006-06*

[19] Jochimsen, B. and R. Nuscheler, 2005. "The political economy of German Länder deficits." Unpublished Working Paper.'

[20] Lee, David S., 2001. "The Electoral Advantage to Incumbency and Voters' Valuation of Politicians' Experience: A Regression Discontinuity Analysis of Close Elections.", University of California Berkeley Center for Labor Economics Working Paper 31.

[21] Lee, David S., 2008. "Randomized Experiments from Non-random Selection in U.S. House Elections.", *Journal of Econometrics*, 142(2): 675–97.

[22] Lee, David S. and Thomas Lemieux, 2010. "Regression Discontinuity Designs in Economics", *Journal of Economic Literature*, 48: 281–355.

[23] Persson, Torsten, Gerard Roland, and Guido Tabellini, 2007. "Electoral Rules and Government Spending in Parliamentary Democracies", *Quarterly Journal of Political Science*, xx: 1–34.

[24] Persson, Torsten and Guido Tabellini, 2007. " The economic effects of constitutions." Cambridge: MIT Press..

[25] Petterson-Lidbom, Per, 2008a. "Does the Size of the Legislature Affect the Size of Government: Evidence from Two Natural Experiments", Unpublished.

[26] Petterson-Lidbom, Per, 2008b. "Do Parties Matter for Economic Outcomes? A Regression-Discontinuity Approach.", *Journal of the European Economic Association*, 6(5): 1037–56.

[27] Seitz, Helmut, 2000. "Fiscal policy, deficits, and politics of subnational government. The case of the German Länder.", *Public Choice*, , 102, 183–218.

[28] Shi, Min and Jakob Svensson, 2006. "Political business cycles: do they differ across countries and why?", *Journal of Public Economics*, 90(8–9), 1367–1389.

[29] Schneider, Christina, 2010. "Fighting with one hand tied behind the back: political budget cycles in the West German states", *Public Choice*, 142: 125–150.

[30] Statistics of the Basque Country, 1995 - 2010. Web.

[31] Tufte, E. R. , 1978. "Political control of the economy." Princeton: Princeton University Press.

Appendix A:
Construction of the Assignment Variable for the Largest Remainder Methods

The largest remainder methods, as noted in Section 2, use a quota as the main principle for the allocation of seats across political parties. The simplest quota is derived by dividing the vote share 100 by the size of the legislature N as shown Equation 8.

$$Q = \frac{100}{N}. \tag{8}$$

In most general terms, the class of largest remainder methods, illustrated in Table 1 in Section 2, differ with respect to the inclusion of two integer parameters k_1 and k_2 in computing the quota as show in Equation 9.

$$Q = \frac{100}{N + k_1} + k_2, \tag{9}$$

The Hare method uses the quota Equation 8. The other largest remainder methods, Hagenbach-Bischoff, the Imperiali and the Reinforced Imperiali use, as illustrated in Table 1, $k_1 = 1$, $k_1 = 2$, and $k_1 = 3$ respectively; for all three methods $k_2 = 0$. The Droop method uses $k_1 = 1$ and $k_2 = 1$.

To allocate seats across political parties, each largest remainder method computes the corresponding quota. Then, the vote share of each political party, v_p, of party α_p $\forall p$ is divided by Q.:

$$m_p = \frac{v_p}{Q} \quad \forall p \tag{10}$$

For the methodological exposition of this argument, the resulting number m_p can be separated into two components - an integer $b_p \in \{0, 1, ..., 100\}$ and a remainder $c_p \in [0, 1]$ such that $m_p = b_p + c_p$. A largest remainder method allocates b_p number of seats regardless of the distribution of the popular vote Ω. If there are unallocated seats, that is $\sum_p b_p < N$, the remaining seats $N - \sum_p b_p$ are allocated to those political parties with the largest remainders c_p. That is, the highest ranked $N - \sum_p b_p$ remainders c_p are awarded a seat each.

The assignment variable for the largest remainder methods would measure the number of quotas that the largest political party has to gain/lose to earn the pivotal seat in the legislature. Formally,

Definition The assignment variable X

$$X = (w - \frac{N+1}{2} - 1)Q + (c_1 - \tilde{c}_{\text{-}1})Q. \tag{11}$$

measures the minimum transfer of vote share to α_1 from has the smallest remainder earning a seat $\tilde{c}_{\text{-}1}$.

- a transfer of quotas Q of size $w - \frac{N+1}{2} - 1$.
- there is a transfer of remainders $c_1 - \tilde{c}_{\text{-}1}$.

With respect to the transfer of quotas, this assignment variable is identical to a transfer of parliamentary seats. What provides continuity to this assignment variable is the transfer of remainder, that is an arbitrary fraction of a quota.

Figure 2: %△ **in Per Capita Total Spending (Pre-election Years)**

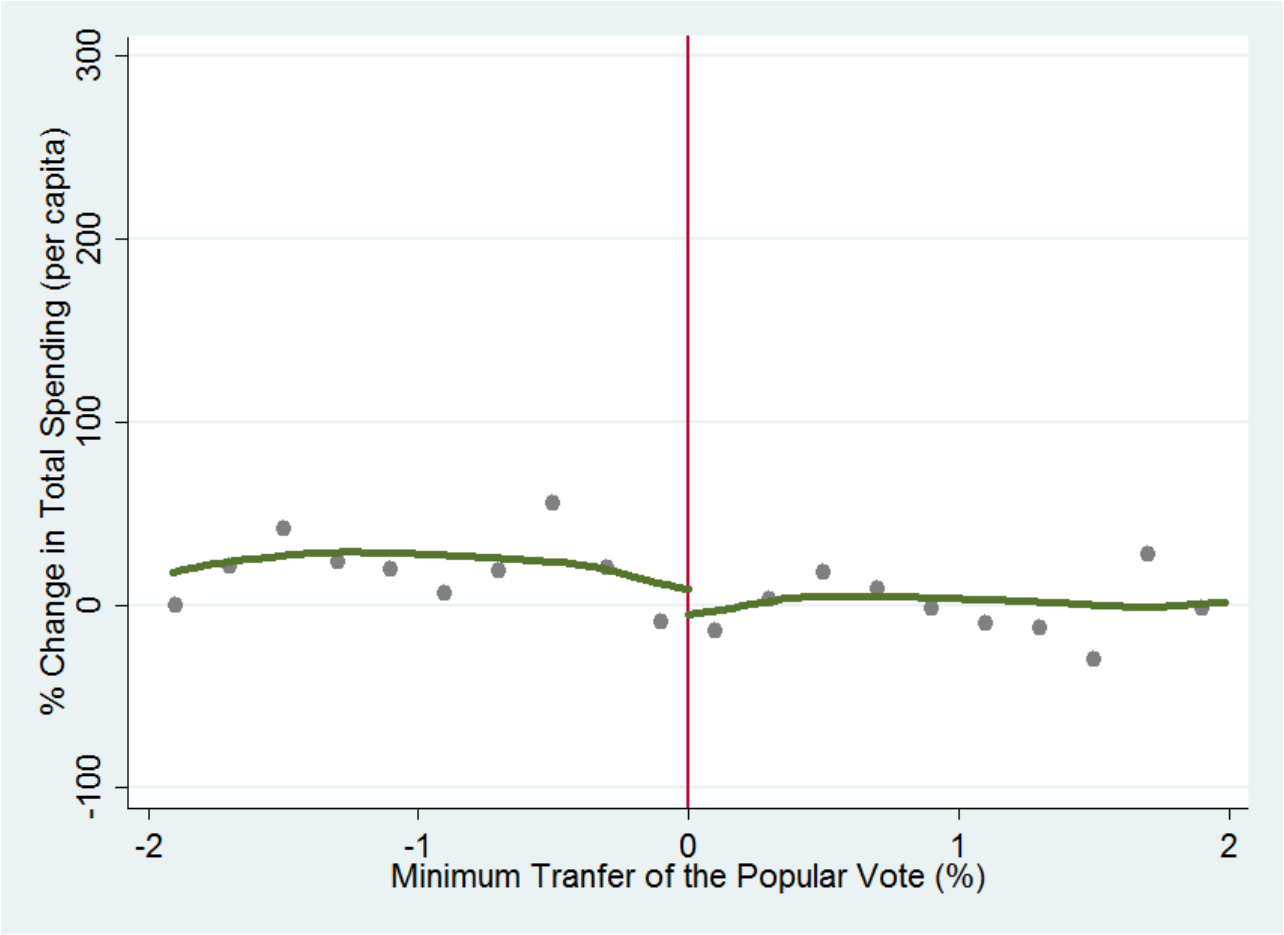


Figure 3: %△ **in Per Capita Capital Outlays (Pre-election Years)**

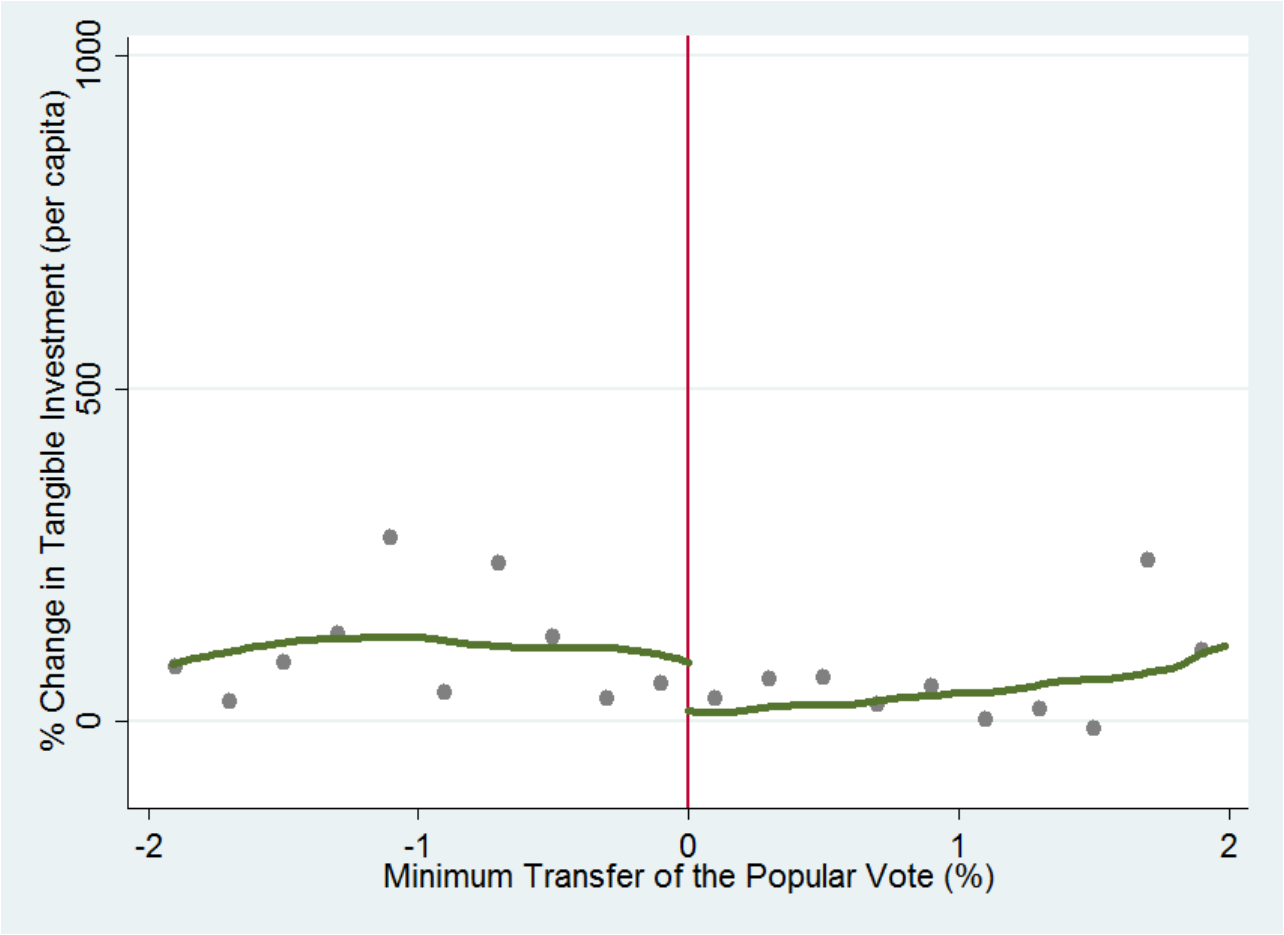


Figure 4: %△ **in Per Capita Tangible Investment (Pre-election Years)**

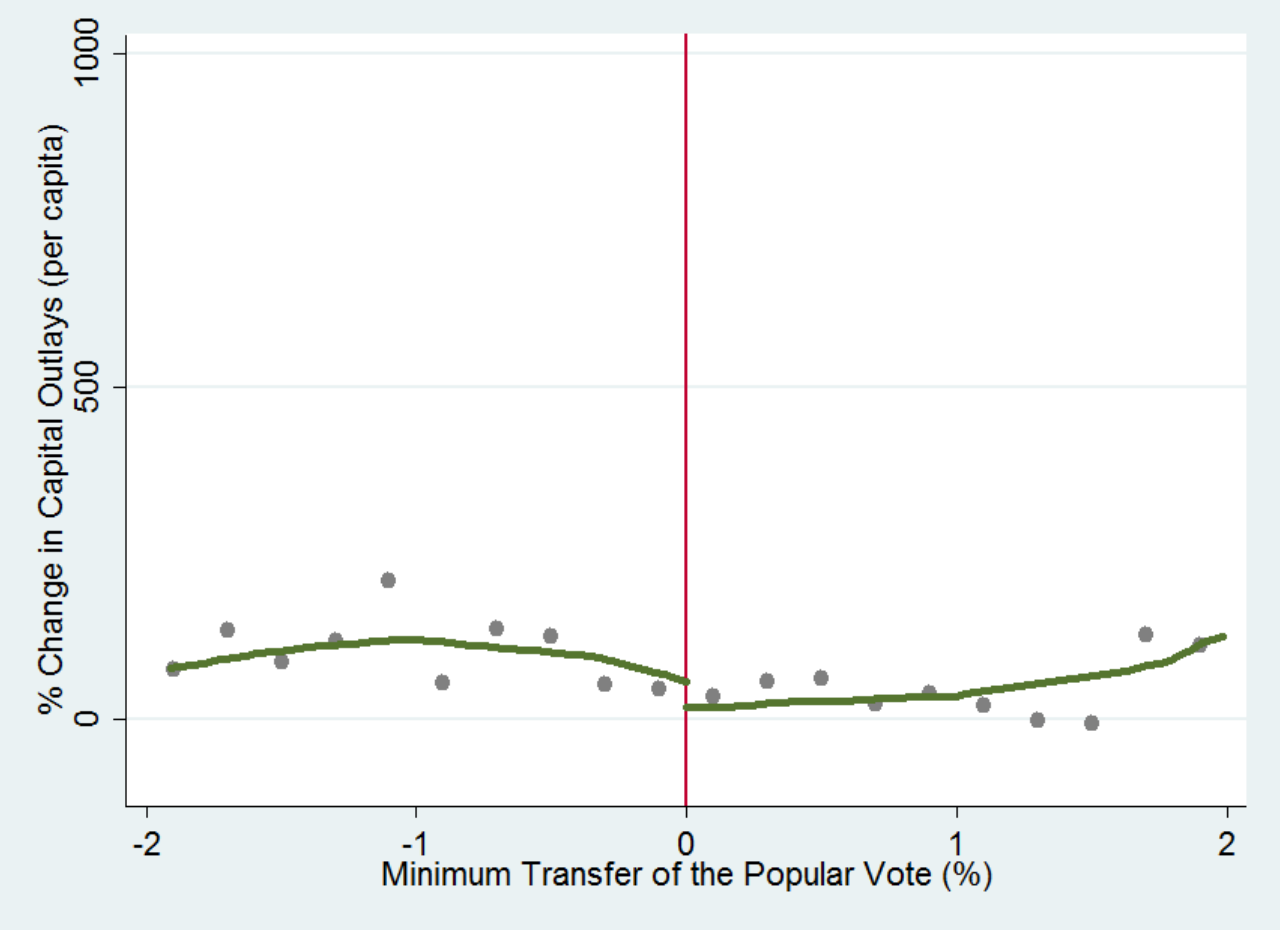


Figure 5: %△ **in the Share of Capital Outlays to Total Spending (Pre-election Years)**

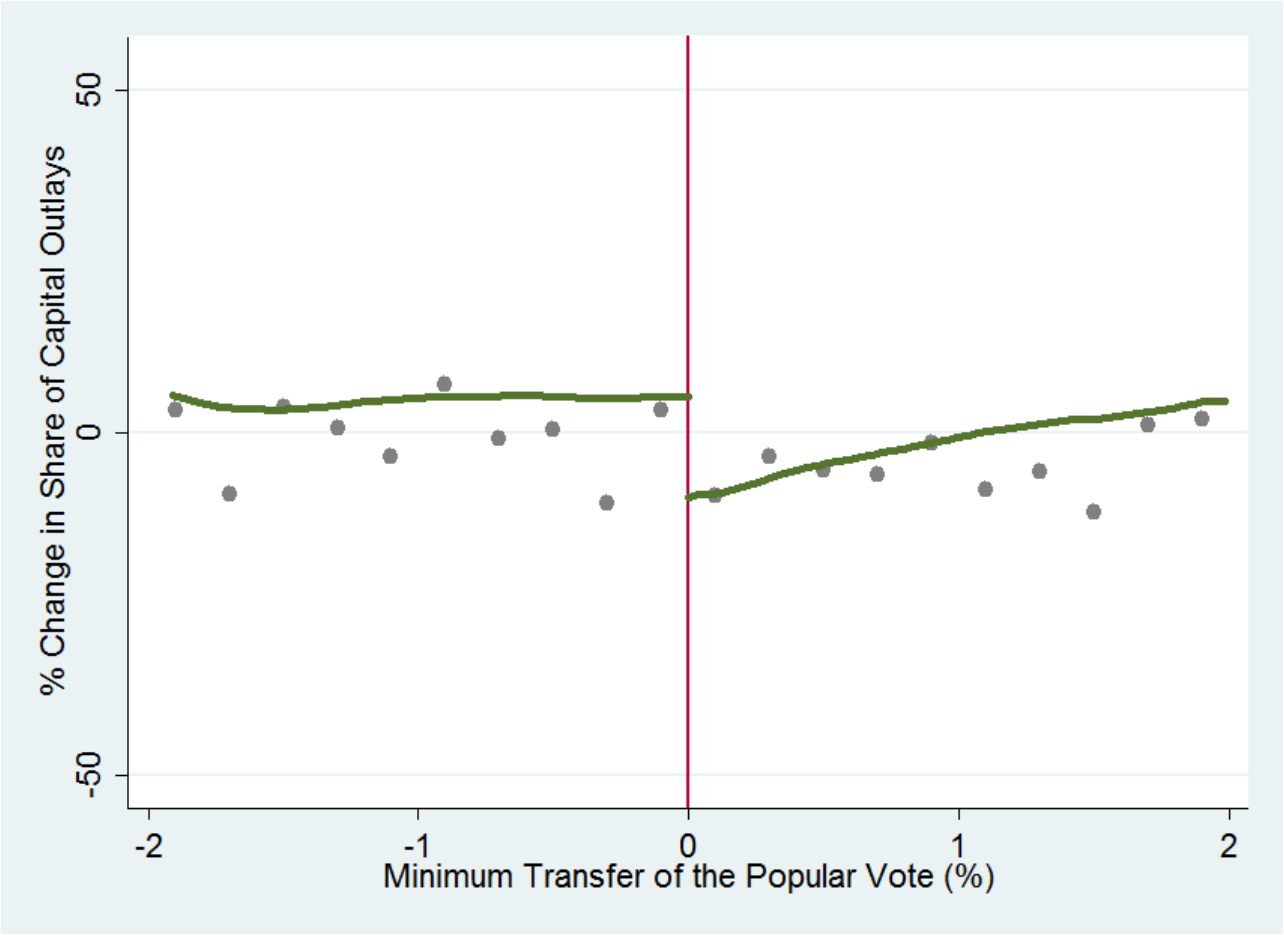


Figure 6: %△ **in the Share of Tangible Investment to Total Spending (Pre-election Years)**

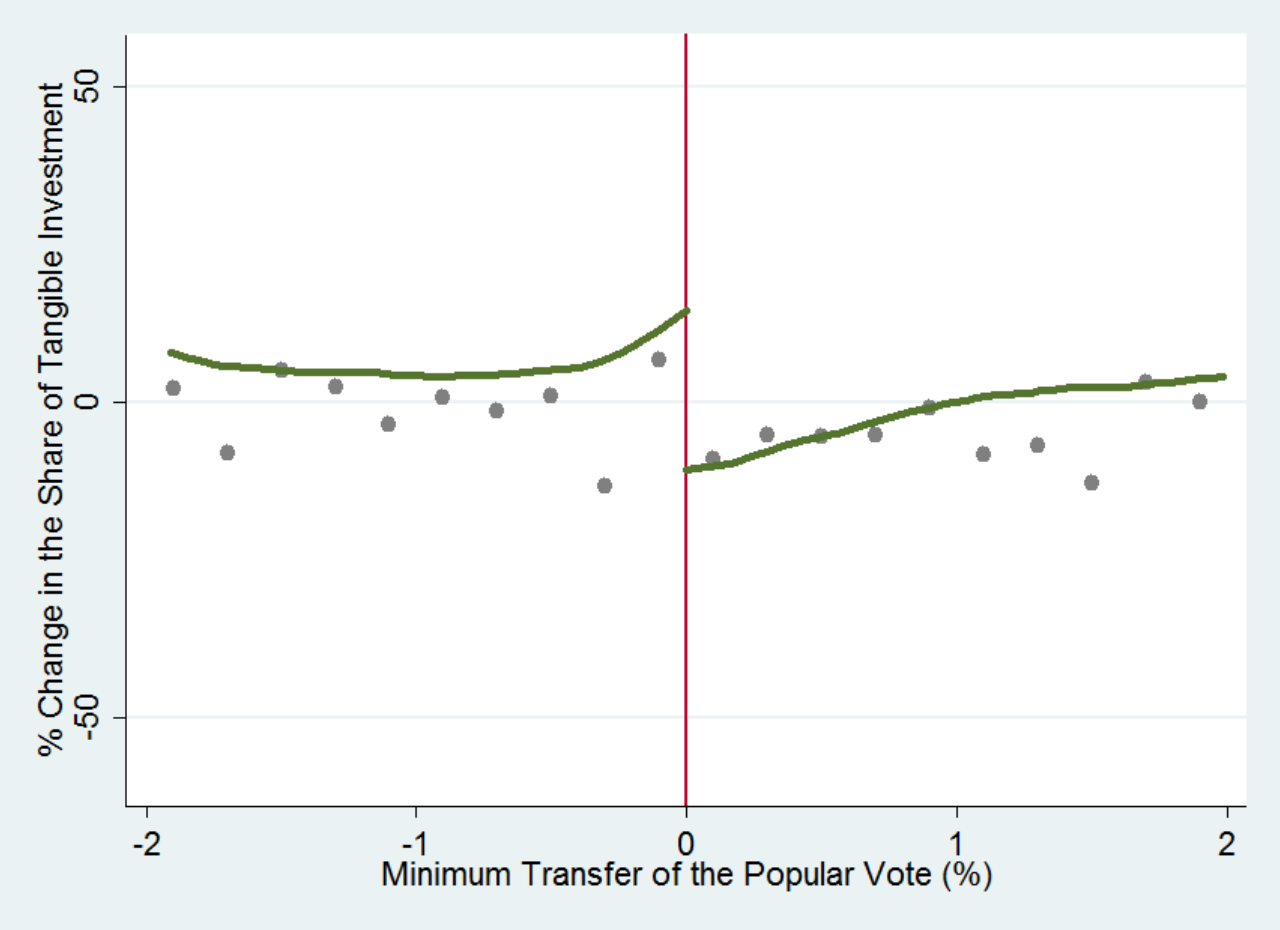


Figure 7: **Behaviour of Covariates**

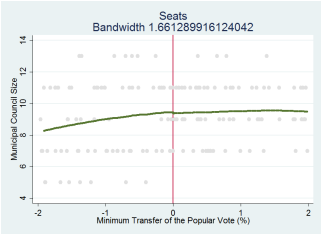


Figure 8: Council Size

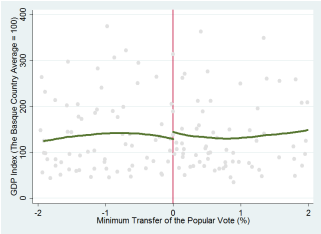


Figure 9: GDP per capita

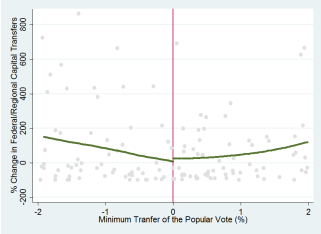


Figure 10: Federal/Regional Capital Transfers

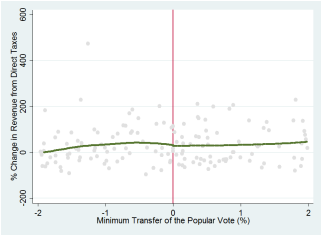


Figure 11: Direct Taxes Revenue

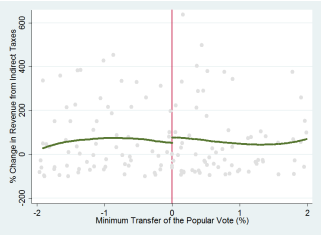


Figure 12: Indirect Taxes Revenue

Table 10: **Baseline Results: Pre-election Years**

	%△ **Total Expenditure**	%△ **Capital Outlays**	%△ **Tangible Investment**	%△ **Share of Capital Outlays**[3]	%△ **Share of Tangible Inv**[3]
Form of government	-20.84*	-57.94*	-87.37**	-14.22***	-19.57***
	(12.14)	(40.61)	(36.45)	(4.36)	(5.44)
N	145	145	145	145	145

Notes: 1. Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses. 2. The included observations lie within ±2% of the threshold of the assignment variable. 3. Each component - capital outlays or tangible investment - is measured as a share of total expenditure.

.

Table 11: **Results from Ethnically Mixed Municipalities: Pre-election Years**

	%△ **Total Expenditure**	%△ **Capital Outlays**	%△ **Tangible Investment**	%△ **Share of Capital Outlays**[3]	%△ **Share of Tangible Inv**[3]
Form of government	-25.34*	-136.32*	-175.55**	-17.56*	-32.61***
	(15.40)	(62.89)	(92.96)	(10.35)	(10.95)
N	72	72	72	72	72

Notes: 1. Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses. 2. The included observations lie within ±2% of the threshold of the assignment variable. 3. Each component - capital outlays or tangible investment - is measured as a share of total expenditure.

.

Table 12: **Annual Percentage Change in Per Capita Expenditure in Pre-Election Years: Varying the Window of the Assignment Variable**

Window	%△ Total Expenditure	%△ Capital Outlays	%△ Tangible Investment	%△ Share of Capital Outlays[3]	%△ Share of Tangible Investment
± 5 %	-30.13***	-83.03***	-93.52***	-13.65***	-13.65***
	(10.12)	(18.84)	(27.36)	(3.03)	(3.03)
± 4 %	-29.92***	-84.10***	-90.81***	-12.05***	-13.97***
	(10.70)	(15.13)	(34.90)	(2.42)	(2.87)
± 3 %	-26.27***	-78.26***	-96.13***	-12.49***	-14.78***
	(10.60)	(15.70)	(28.76)	(1.61)	(2.89)
± 2 %	-20.84*	-57.94*	-87.37**	-14.22***	-19.57***
	(12.14)	(40.61)	(36.45)	(4.36)	(5.44)
± 1 %	-13.49*	-44.12**	-94.22**	-14.51***	-22.86***
	(7.92)	(25.98)	(39.99)	(4.14)	(3.97)

Notes: 1. Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses. 2. The included observations lie within ±2% of the threshold of the assignment variable. 3. Each component - capital outlays or tangible investment - is measured as a share of total expenditure.

.

Table 13: **Annual Percentage Change in Per Capita Expenditure in Pre-Election Years: Varying the Council Size**

Council Size	%△ Total Spending	%△ Capital Outlays	%△ Tangible Investment	%△ Share of Capital Outlays	%△ Share of Tangible Investment
All Sizes	-26.27***	-78.26***	-96.13***	-12.49***	-14.78***
	(10.60)	(15.70)	(28.76)	(1.61)	(2.89)
All Sizes	-12.35**	-59.48***	-79.27***	-11.62***	-13.18***
Except 5	(5.81)	(18.55)	(30.59)	(2.24)	(4.07)
All Sizes	-28.57*	-90.01***	-103.38***	-16.89***	-18.53***
Except 7	(16.10)	(15.08)	(12.08)	(4.06)	(4.71)
All Sizes	-34.52*	-90.24**	-103.29*	-11.59***	-13.86***
Except 9	(19.87)	(40.03)	(53.66)	(3.60)	(7.07)
All Sizes	-29.02*	-39.93***	-72.77**	-6.58***	-9.56*
Except 11	(17.49)	(12.47)	(33.04)	(1.85)	(5.07)
All Sizes	-24.46***	-71.09***	-87.24***	-12.69***	-14.86***
Except 13	(7.91)	(9.64)	(21.23)	(2.65)	(2.36)

Notes: Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses.

Table 14: **Baseline Results: Varying the Number of Electoral Cycles**

Electoral Cycle	**%△ Total Spending**	**%△ Capital Outlays**	**%△ Tangible Investment**	**%△ Share of Capital Outlays**	**%△ Share of Tangible Investmer**
All	-26.27***	-78.26***	-96.13***	-12.49***	-14.78***
	(10.60)	(15.70)	(28.76)	(1.61)	(2.89)
All except 1998	-14.21**	-46.51***	-100.33***	-11.80***	-11.07***
	(6.63)	(16.35)	(32.94)	(2.62)	(2.73)
All except 2002	-32.90***	-80.78**	-113.29***	-12.34***	-16.11***
	(11.05)	(11.86)	(16.12)	(4.47)	(3.11)
All except 2006	-24.44	-69.40***	-97.68***	-12.30***	-15.16***
	(15.14)	(28.28)	(30.81)	(2.38)	(4.34)
All except 2010	-23.48*	-72.02***	-53.53***	-9.75***	-13.59***
	(14.11)	(17.04)	(17.04)	(0.81)	(3.92)

Notes: Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses.

Table 15: **Baseline Results: Inclusion of Covariates**

	%△ Share of Tangible Investnment						
	-19.57***	-19.17***	-19.37***	-19.40***	-19.05***	-19.76***	-19.91***
	(5.44)	(5.09)	(4.83)	(4.91)	(7.23)	(6.81)	(6.65)
GDP		0.03	-0.11	-0.33	0.59	0.65	0.65
		(0.05)	(0.13)	(0.46)	(0.29)	(0.82)	(0.86)
Lag(Tangible Investment)			-0.33	-0.11	-0.12	-0.14	-0.14
			(0.47)	(0.13)	(0.21)	(0.22)	(0.28)
Seats				7.29	-9.31	-9.08	-9.10
				(6.58)	(12.60)	(13.20)	(12.90)
Basque					0.02	0.00	0.00
					(0.02)	(0.01)	(0.01)
Heterogeneity						0.18	0.29
						(0.30)	(0.22)
Party Exits							-0.40
							(0.45)
N	145	145	145	145	145	145	145

Notes: Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses.

Table 16: **Baseline Results: Inclusion of Covariates from Preceding Electoral Cycle**

	%△ **Share of Tangible Investment**						
	-19.57***	-21.80***	-21.97***	-22.31***	-21.83***	-21.98***	-22.68***
	(5.44)	(4.74)	(5.00)	(4.43)	(4.73)	(4.95)	(5.31)
Lag(Tangible Investment)		-0.03					
		(0.02)					
Lag(Capital Outlays)			0.20				
			(0.18)				
Lag(Employment)				0.03			
				(0.05)			
Lag(Direct Taxes)					-0.06		
					(0.06)		
Lag(Indirect Taxes)						0.01	
						(0.03)	
Lag(Capital Transfers from Fed/Reg Govt)							-0.07
							(0.11)
N	104	104	104	104	104	104	104

Notes: Levels of significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors are reported in parentheses. The included observations are drawn from three consecutive electoral cycles.