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Incumbent Effects and Partisan Alignment in Local Elections: A Regression Discontinuity Analysis Using Italian Data

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Abstract

This paper provides a simple model to explain effect of political alignment between different tiers of government on policy choices and election outcomes. We derive precise predictions that, as long as voters attribute most of the credit for providing public goods to the local government: (i) aligned municipalities receive more grants, set lower taxes and provide more public goods, (ii) the probability that the local incumbent is re-elected is higher in aligned municipalities compared to not aligned ones. Our empirical strategy to identify the alignment effects is built upon the fact that being or not aligned changes discontinuously at 50% of the vote share of local parties. This allows us to use sharp regression discontinuity design. Our theoretical predictions are largely confirmed using a new dataset on Italian public finance and electoral data at the central and local level.

JEL-Code: H200, H770, H870, D700.

Keywords: fiscal federalism, political competition, accountability.

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1. Introduction

In most of the countries around the world tax revenue collection and public expenditures are shared among more tiers of *elected* governments. A common feature to most countries is that the degree of decentralization in expenditures (i.e. the proportion of public goods and services that are provided by lower levels of governments) is significantly higher than the degree of decentralization in tax revenue collection (i.e. the proportion of tax revenue collected at the local level over the total tax revenue). Using World Bank figures, for over a hundred countries and thirty years, expenditure decentralization is on average over 30% while revenue decentralization is just under 20%.

This vertical imbalance between fiscal capacity and fiscal needs faced by local governments is generally covered by transfers from the central government. In some countries the allocation of these transfers is calculated following a mathematical formula, while in others it is discretionally decided by the central government, leaving space to potential scope for using grants for political goals. There is a growing literature both in political sciences and economics pointing out the likelihood of a positive bias in the allocation of intergovernmental grants in favor to local jurisdictions which are more politically aligned with the central government; see for example Lindebeck and Weibull (1987, 1993), Cox and McCubbins (1986), Dixit and Londregan (1996).

However, as far as we know, there is no attempt in the literature to address the broader picture on how vertical political alignment shapes local public finance and election results when local governments have to rely on local tax revenues and on transfers from an upper government to meet their fiscal needs. For example, consider a central government decision on the allocation of funds to municipalities, some aligned with the central government party and some others unaligned. Once distributed, these transfers will be employed by local governments, together with locally collected tax revenues, to co-finance local public goods and services. It is reasonable to assume that voters, before making their voting decisions, will be able to observe quite accurately the provision of the public goods and local taxes in their jurisdiction but, at the same time, they will not be able to have a *full* understanding on how these public goods are funded.

Trivially, when central and local governments are ruled by the same party, voters will credit the ruling party for providing the public good. On the other hand, in case the central and local governments are ruled by different parties, voters may not be able to reward correctly the party ruling in each tier according to its contribution. As a result of these interactions the central government's grant allocation may have an impact not only

on the provision of local public goods but also on local governments decisions on taxes and on electoral outcomes.

The focus of this paper is to address how vertical fiscal interdependencies between local and central *elected* governments, generated by fiscal imbalances, affect grants' allocation, local taxation and electoral outcomes. To address these issues we develop a simple model which verifies and refines these intuitions. Following Dixit and Londregan (1998), Arulampalam et al (2008) and Solé-Ollé and Sorribas-Navarro (2008), we model the behavior of a central and N local governments in a nation, where each of the incumbent governments manipulate grants or taxes in order to be re-elected. Some local governments are politically aligned with the central government while others are not.

The local public good provided in each jurisdiction is funded through central government grants and local tax revenues. Voters make their voting decisions based both on economic grounds—i.e. looking retrospectively at the level of public good provision and taxation—and on ideology. Moreover, voters hold fully accountable the local governments for the taxes paid to them, but cannot observe or infer the amount of grants devolved to their jurisdiction.

The model predicts that, as long as voters mostly reward the local government for proving the public goods: (i) aligned municipalities receive more grants, set lower taxes and provide more public goods, (ii) the probability that the local incumbent is re-elected is higher in aligned municipalities compared to unaligned ones.

We then test these predictions using an original dataset on Italian mayoral elections and public finance for the period 1998-2007. It is important to underline how Italy constitutes a very good laboratory to test our hypotheses: our dataset includes over 600 municipalities between 1998 and 2007, ruled by elected local governments, and around 20% of local funding comes from block grants from the central government. There is no implicit or explicit formula which overlooks the whole system, and each Budget Bill intervenes deciding the amount resources to devote to municipalities as a whole, and the way to distribute it across them. This generally translates mostly in marginal changes to previous-year figures, but also leaves the door open for ad-hoc funding provisions.

Local taxes cover most of the remaining 80% of needs. Local revenues are highly dependent on a property tax, ICI, which voters pay directly to their municipality. Moreover in the period covered by our dataset there have been two rounds of elections both at the central and local level, and the incumbent party at the central level has changed twice. This allows us to control for party effects, and to explore our hypotheses on how local and

central government policies are affected by incumbency and political alignment between tiers of government.

Our empirical strategy to identify the alignment effects builds on the fact that being aligned with the party ruling at the central level changes discontinuously at 50% of the vote share of local parties; this allows us to use *sharp* regression discontinuity design. Following this approach, we compare municipalities where the elected mayor is *barely* aligned with central governments with ones where the mayor is *barely* unaligned, where "barely aligned" means that the mayor won the election with a tight margin and that the mayor and the central government belong to the same party. These municipalities are also classified in our theoretical model as electorally "swing", i.e. voters' behavior is very sensitive to policy choice, and the electoral outcome is more uncertain.

Our empirical results are broadly consistent with the hypothesis that voters mostly reward the party ruling at the local level for providing the public goods. In particular we find that if a municipality is politically aligned with the party in power at the central level it will be rewarded with an additional 26 Euros per resident in grants and, at the same time, local tax burden will be 22 Euros lower in per-capita terms. Local expenditures instead do not show statistically significant variation between aligned and unaligned municipalities. Finally, the probability that the aligned incumbent mayor (or his coalition) is re-elected in the next round of election is over 50% higher than in non aligned ones.

The paper is organized as follows. The next section discusses the related literature. Section three introduces the economic environment and the model. Section four presents some background information on Italy, data description and econometric strategy. Section five discusses the main results and some robustness checks. Conclusions are in the last part of the paper.

2. Related Literature

Our work relates to several paper on the political economy of resource allocation among socio-economic groups, electoral constituencies, or localities. In particular Lindbeck and Weibull (1987 and 1993) and Dixit and Londregan (1996) set up a model of political competition in which two competing parties propose how to redistribute resources across localities. They find that parties' equilibrium strategy is to target "swing" jurisdictions in order to maximize their chances of winning elections. An alternative theoretical explanation is provided by Cox and McCubbins (1986) who demonstrate that, when politicians are risk averse, each party allocates more funds to "solid" jurisdictions, i.e. localities in

which they are particularly strong. Our model is closest to Arulampalam et al (2008) and Solé-Ollé and Sorribas-Navarro (2008). They describe a federal system, in which voters are unable to disentangle the central and local incumbent respective contribution to the provision of a local public good. In such a scenario the central government prefers to target localities that are simultaneously electorally "swing" and politically aligned.

Several papers attempted to bring to the data these theoretical predictions. For example for the US, Levitt and Snyder (1995) find that the share of Democratic voters is a good predictor of the amount of federal dollars accruing to an electoral district, while Larcinese, Rizzo and Testa (2006) find that more federal funds accrue to states that are politically aligned with the President. Worthington and Dollery (1998)—using Australian data on federal grants to states—and Johansson (2003)—using data on grants to Swedish municipalities—find evidence that grants are used as a tool to enhance the central government's chances of re-election. Case (2001) for Albania, Rodden and Wilkinson (2004) for India, Brollo and Nannicini (2012) for Brasil, Migueis, (2010) for Portugal and the already cited Solé-Ollé and Sorribas-Navarro (2008) and Arulampalam et al. (2008) show evidence that political alignment is indeed a significant determinant of intergovernmental grants in each of these countries.

A common characteristics of the above papers is to take only a partial view at local governments' role, i.e. municipalities are seen merely as passive actors, whose role is limited to receiving funds. We attempt to model in a richer and more realistic way the strategic interactions between central and local governments in a set-up where local governments are active players, as they are able to respond to central government actions by setting their own taxes, affecting the level of provision of the local public goods. The only paper that to our knowledge considers simultaneously central-government grants and local taxes is Dahlberg et al. (2008). This empirical work focuses on the effect of grants on local expenditure and taxation, finding evidence that extra funding from the central government increases local spending and does not reduce taxation, but does not look into how these findings are affected by political and electoral variables.

Moreover, in order to overcome a fundamental identification problem—the potential correlation between fiscal choices and the ideological characteristics of its voters—we use regression discontinuity design to identify the alignment effect on tax setting, grant allocation and public spending. A similar approach, in the contest of grant allocation only, has been used in independent works by Brollo and Nannicini (2012) and Migueis (2010). By using this approach, we compare jurisdictions where the mayor won by a

very small margin and therefore the (un)alignment with central government represents a quasi-random variation in alignment status. This bring us to a second strand of the literature related to this work.

Several recent papers focused on the incumbent effect using regression discontinuity design in order to estimate the advantage of incumbency in elections**,** relying on the fact that when the electoral race is very tight, the identity of the winning party is likely to be determined by pure chance. Main contributions include Lee (2001, 2008), Lee, Moretti and Buther (2004) and Ferreira and Gyourko (2009). The common findings are that an incumbent policy maker enjoys a considerable advantage in winning elections. For example Ferreira and Gyourko (2009) find that, in the US, Democratic mayors who barely win an election have about a 66% chance of winning the next election. Our approach differs from the above because we are not attempting to estimate the incumbent effect as such, but we estimate the effect of alignment on incumbency, i.e. we estimate whether among incumbent mayors being just aligned with the central governments increases the chances of being re-elected compared with a just unaligned mayors. In our setup, the treatment variable is the alignment with the central government, while the assignment variable is the margin of victory interacted with the alignment position. It is important to stress that our dataset allows us to control for party effect because the central government has been ruled both by left- and right-wing coalitions in our sample period.

Finally our paper is related to Bracco (2011) and Cioffi, Messina and Tommasino (2012); they both analyze Italian local public finance data to investigate the effect of political competition on policies. Bracco (2011) focuses on the effect mayoral electoral system on grant allocation and finds that plurality elected mayors received less grants than colleagues elected under dual ballot system. Cioffi, Messina and Tommasino (2012) find evidence of a political cycle for local capital expenditures in those municipalities where the mayors are not politically aligned with the central government coalition.

3. The Theoretical Framework

3.1. The Economic Environment

In a country there are two tiers of government: a central government, denoted CG, and N local jurisdictions, indexed by the letter i, also referred to as municipalities. Within each local jurisdiction i there is a continuum of voters of mass 1. Voters are homogeneous with respect to their preferences over the public policy, but differ in their ideology.

There are two parties L and R, which operate both at the central and local level. For simplicity and without loss of generality, we assume that party L is ruling at the central level and in a subset M^L of local authorities, while the complementary subset of municipalities M^R is ruled by party R.

Voters' ideologies are distributed within each local jurisdictions according to a uniform distribution defined over the interval $\left[m - \frac{1}{2\psi_i}, m + \frac{1}{2\psi_i}\right]$. These distributions are locality–specific and have a density equal to ψ_i. Voters in the positive part of the ideology spectrum prefer party R over party L, and this preference is stronger the more distant is the voter's ideology from the origin 0.

The voting process is subject to uncertainty. Voters' distribution on the ideology line is hit by an idiosyncratic shock, which is uniformly distributed as follows: $m \sim U\left[-\frac{1}{2\zeta}, \frac{1}{2\zeta}\right]$. Thus voters are ex-ante and on average centrists, or—in other words—in each jurisdiction the median voter is on average indifferent between party L and party R. Voters' distributions are common knowledge, but the realization of the idiosyncratic shock $\tilde{m}$ remains unknown to players.

Citizens condition their voting behavior on the ideology of the candidates and on the public policies implemented by the local and central governments. More specifically, voters' utility is negatively affected by local taxes, as they reduce private consumption, and positively affected by the consumption of a local public good g_i. We ignore instead the effect of national taxes as we assume they would affect homogeneously all voters in each jurisdiction, and therefore have a neutral effect on the equilibrium.

The public good g_i has a price p_g, it is provided by the local government and it is funded by two sources: firstly, by the aforementioned tax t_i levied by the local government on its residents and, secondly, by a grant (transfer) Tr_i devolved by the central government. For simplicity and without loss of generality we normalize the price of the public good p_g to 1.

As already mentioned, voters also care about the identity of the ruling party. In particular, if party L is in power in jurisdiction i and citizens j is located at point X_j on the ideology spectrum his utility is:

$$U_{ji} = u(g_i) - t_i - X_j$$

where $u(g_i)$ is a strictly increasing, and concave function. Our assumption is that voters are fully aware of the taxes they are paying to the local government. These taxes are generally paid separately, directly to the municipality, and are officially labelled as "mu-

nicipal taxes". This is the case for the municipal real-estate tax *ICI* in Italy, which is going to be the subject of our empirical analysis, but also for the Council Tax in the UK, and for the most common property taxes in the U.S.

In our model voters are able to assess correctly the amount of public good being provided to them, but are not aware of the "true" price of the public good p_g. For this reason, voters are not able to infer the amount of grants Tr_i accruing to their jurisdiction from the central government just observing the taxes they pay, and the public good provided to them. This is equivalent to state that voters perfectly know how much they are paying in taxes, and how "good" are the public services in their municipality (roads, nursery schools, local transport), but are not at all aware of how much funds accrue to the City Hall from the central government's coffers to fund these public goods. This seems a reasonable assumption to make, considering how intergovernmental grants are often obscure and non-transparent also to people who study them directly.

For this reasons, voters are not able to assess the relative merit (or demerit) of each tier of government for what concerns the public good provision. Voters may instead have a prior belief on "who's to blame" (or reward) for the local public good they are consuming. We assume, therefore, that voters attribute a share $\theta \in [0, 1]$ of the reward for providing the public good to the central government.

Electoral competition occurs between the two parties L and R, at the local level. The ruling governments at both tiers simultaneously set the level of taxation and grants. Voters will then vote retrospectively and sincerely on whether to re-elect the local incumbents.

Following Arulampalam et al. (2008) and Solé-Ollé and Sorribas-Navarro (2009), we assume that governments care simultaneously about the electoral prospects of their own parties, and about the public good produced. This implies that governments share with voters the preference for public good, but are also office-motivated.

Let us now focus on two representative jurisdictions, one—indexed by the letter a as in "aligned"—ruled by party L at both tiers, and another—indexed by letter u as in "unaligned"—ruled by party R at the local level and by party L at the central level. The utility of the local government can be written in each case as:

$$U_a^{LG} = f(g_a) + p_a \tag{3.1}$$

$$U_u^{LG} = f(g_u) + 1 - p_u \tag{3.2}$$

where $g_s = Tr_s + t_s$, $s \in \{a, u\}$, f is a strictly increasing and concave function, and p_s is the probability of winning of party L. Moreover, we assume that U_s^{LG} is twice

continuously differentiable and concave in t_s. The central government shares a similar utility function, as it maximizes the sum of the probability of winning of each locality, and has a preference for public good provision. The central government is also limited in raising its grants to local government by a cost function C, representing the opportunity cost of devolving monies to municipalities:

$$U^{CG} = \sum_i [f(g_i) + p_i - C(Tr_i)] \tag{3.3}$$

Each jurisdiction's component of the central government's objective function

$$f(g_i) + p_i - C(Tr_i)$$

is twice continuously differentiable and strictly concave in the grants Tr_i. The cost function $C(Tr_i)$ is strictly convex, does not depend on the identity of the municipality, and is independent of the grants accruing to other municipalities $i \neq l$. The cost function wants to capture the resource constraint that the central government faces in distributing grants across jurisdictions, considering also that the total amount of grants to be distributed need not to be determined ex-ante, as the central government may decide to devolve a larger share of its budget to local governments.

3.2. Theoretical Results

In the case of aligned jurisdictions, a voter j will vote for party L if

$$u(g_a) - t_a - X_j \geq 0, \quad i.e.\ X_j \leq u(g_a) - t_a$$

In the case of unaligned jurisdictions, she will vote for L if

$$\theta u(g_u) - X_j \geq (1-\theta)u(g_u) - t_u, \quad i.e.\ X_j \leq (2\theta - 1)u(g_u) + t_u$$

i.e. if the share of utility attributed to the left-wing central government (on the left-hand side) is larger than the share attributed to the right-wing local government. As the distribution of voters in each jurisdiction is known, we can calculate the vote share for party L in both the aligned and the unaligned jurisdiction. Proofs are relegated to the Appendix.

Lemma 1. *The probability of winning p_a for party L in an aligned locality is:*

$$p_a = \frac{1}{2} + \zeta[u(g_a) - t_a]$$

The probability of winning p_u for party L in an unaligned locality is:

$$p_u = \frac{1}{2} + \zeta[(2\theta - 1)u(g_u) + t_u]$$

It can be observed how an increase in public good provision helps the electoral prospects of the ruling party of the aligned jurisdiction, while it helps the local incumbent of an unaligned jurisdiction only if $\theta < 1/2$, i.e. if voters reward mostly the local government for providing the public good. The net effect of taxes on votes may be positive or negative, as taxes jointly raise public spending g, and decrease disposable income. Surely, if most of the reward accrues to the central government ($\theta > 1/2$), an increase in taxes is univocally detrimental for the unaligned mayor.

From this model, we can derive a number of testable predictions, which are exposed in the following 4 propositions.

Proposition 1. ***Alignment effect on public good provision.*** *Public good provision is higher in aligned jurisdictions.*

In unaligned municipalities mayors do not fully internalize the positive effects stemming from increasing taxes, as the credit for the increased public good provision accrues to them only partially. For this reason, local unaligned governments will be willing to increase taxes up to a point that corresponds to a lower level of public good provision than the one provided by aligned jurisdictions.

Proposition 2. ***Alignment effect on grants****. As long as the majority of the reward θ is attributed to the local government ($\theta < 1/2$), ceteris paribus, aligned jurisdictions are assigned more grants by the central government. If most of the reward θ is attributed to the central government ($\theta > 1/2$), the opposite happens.*

In other words, when the local government is the one being rewarded the most for public good provision ($\theta < 1/2$), the central government's incentives for granting monies to unaligned municipalities is very small. The opposite is true if instead the central government were able to fully recuperate the "electoral investment". This happens if the two governments are aligned or if voters reward the central government more than the local government for providing public goods ($\theta > 1/2$).

From these first two propositions, we can derive a Lemma.

Lemma 2. *There exist a $\bar{\theta} \in (0, 1/2)$ such that $t_a = t_u$.*

Proposition 3. ***Alignment effect on local taxes.*** *When voters give most of the credit for providing public goods to local governments, i.e. for $\theta \in [0, \bar{\theta}]$, ceteris paribus, aligned jurisdictions impose lower taxes than unaligned ones.*

Tax setting behavior can be easily explained looking at mayors' electoral incentives. When voters mostly reward local governments, these have a very strong incentive to deliver more public good; at the same time, the central government—as seen in Proposition 3—prefers to limit its contributions to public good provision in unaligned jurisdictions. The result of these two forces is that the local government tries to "make up" for the lost grants levying higher taxes than their aligned counterparts. The opposite incentive is at work instead when the central government is rewarded enough for public good provision ($\theta > \bar{\theta}$). In this latter case, unaligned mayors have little scope for increasing taxes, as voters would punish them for their decreased disposable income, and would also substantially reward the opposing party—i.e. the central government's party—for providing the public good.

Finally, the probability of winning of incumbent mayors is also affected by political alignment.

Proposition 4. ***Alignment effect on re-election probability.*** *Aligned mayors enjoy higher probability of re-election than their unaligned counterparts as long as the following sufficient condition holds: $\theta \in \left[0, \bar{\theta}\right]$.*

As we chose to keep this model as general as possible, we can not demonstrate that aligned mayors always have higher probability of re-election with respect to their unaligned counterparts in every circumstance. We can instead say that this circumstance can be demonstrated for a range of values of θ, which includes situations in which local (unaligned) mayors are given most of the credit for providing public goods. This is evident, as for lower values of θ aligned municipalities enjoy lower level of taxation and higher levels of public good provisions, which of course is going to be rewarded by voters.

4. Empirical Analysis

4.1. Background Information on Italy

In this section we present some relevant background information on the Italian electoral system and local public finance. In particular we describe the electoral system at the local level of government and its major reforms during the last decades. Moreover we discuss

the basic structure of local taxes and transfers system from the central level towards the local level on which our paper is based.

4.1.1. Tiers of governments, elections and parties

Italy is a unitary democratic parliamentary republic ruled by a central government with three sub-national levels: 20 regions *(regioni*), 111 provinces (*province*), and 8101 municipalities (*comuni*), the latter are the subject of our analysis. *Comuni* are ruled by a city council (*consiglio comunale*), and an executive committee (*giunta*), headed by an elected mayor (*sindaco*). Mayors are in charge of appointing the members of the executive committee (*giunta),* to which tasks are delegated, including powers on land management and environment (water, sewage, public hygiene), local transport, local police, culture and recreation, education (nursery schools, training programs). Mayors also have some discretionary powers on how much fiscal revenue to raise.

The city council is considered to be very weak *vis-à-vis* the mayor. Mayors nominate and dismiss at will the members of the executive committee (*assessori*). Moreover, if the council casts a no-confidence vote against the mayor, this not only triggers the mayor's resignation, but also the city council is automatically disbanded and new elections are called. This is a strong disincentive for city councillors to exercising this option.

Following a political reform that took place in 1992, mayors are directly elected for five-year terms[1] and are subject to a two-term limit. Mayors and city council are elected together, with different rules applying to municipalities below or above the 15,000-inhabitant threshold (from now on referred to as *small* and *large* municipalities), according to the latest available census data. Mayors of small municipalities are elected by first-past-the-post, while mayors of large municipalities are elected by runoff. This means that if no mayoral candidate obtains 50%+1 vote, voters are called a second time to the booths to choose between the winner and the runner-up of the first round.

The two-tier system of election according to the size of the population have generated also different political incentives: in smaller municipalities, the incentives is for parties to join together in a single list that supports a single mayoral candidate, while in larger municipalities, the incentive is for each party to join together with other parties in supporting a single mayoral candidate, but run as separate (albeit coalized) lists for the city council. This has also implied that in smaller municipalities the occurrence of *ad-hoc* voters' associations (*lista civica*), independent from political parties, supporting a mayor

[1] Four years if elected before year 2000.

is much more frequent than in larger municipalities, where instead one usually finds the national parties running under their names. This of course does not imply that party politics is less lively in municipalities just below the 15,000-inhabitant threshold. It does nevertheless make it very difficult for us to code correctly a mayor as left- or right-wing, as the name of the list under which was elected is more likely to disguise his or her partisan belonging.

Table 4.1. Distribution of local government winning coalitions by large and small municipalities (1998-2007).

Year	All municipalities		Only < 15000		Only > 15000	
	No.	%	No.	%	No.	%
Center-left	19,314	23.84	15,613	21.40	3,701	58.94
Center-right	12,556	15.50	10,329	14.16	2,227	35.47
Independents	47,353	58.46	47,002	64.44	351	5.59
Missing	1,777	2.19	-	-	-	-
Total	81,000	100	72,944	100	6,279	100

Table 4.1 shows the distribution of winning coalitions in large and small municipalities and shows clearly this pattern. In our sample period, while 64 % of small municipalities are ruled by mayors supported by independent (or civic) lists, in only 5% of the cases this occurs for large municipalities.

Generally speaking, in our sample period both at the local and at the national level, the political system was dominated by two large electoral cartels that alternated in governments in every tier: a center right coalition and a center left one. At the national level, the center-right coalition chaired by Silvio Berlusconi and his party Forza Italia ruled Italy from 2001 to 2006. The center-left coalition, going from Communist parties to left-leaning Christian Democrats, ruled instead from 1996 to 2001, and then again from 2006 until 2008. The same coalitions generally run for local elections as such, supporting joint mayoral candidates, such that the local and the national political debate appeared quite coherent with each other. From official data on mayors published by the Interior Ministry we are able to see each mayor's political allegiance (i.e. under which party-label he or she ran for elections), a detailed list of parties for each coalition in provided in table 8.1. in the Appendix.

4.1.2. Local Public Finance

The degree of fiscal decentralization in expenditures in Italy (calculated as the ratio of subnational public expenditures over total public expenditures) has been roughly constant and just over 30% for the past 15 years. *Regioni* and *comuni* account for most of subnational public expenditures (20% and 10 % respectively) while only 2% is allocated to *province.* In particular for *comuni*, which are the subject of this study, expenditures are primarily in the areas of land management and environment (water, sewage, public hygiene), local transport, local police, culture and recreation, education (nursery schools, training programs).

The degree of tax autonomy for *comuni* (i.e. the percentage of own fiscal revenues as a percentage of total current revenues) increased sharply during the early Nineties, when a considerable part of intergovernmental grants was replaced by new local taxes, and it is now stable at around 30%. In particular fiscal autonomy increased substantially in 1993 through the introduction of the municipal property tax (*ICI*), which accounts for over 35% of *comuni* own tax revenues. The tax base is represented by the cadastral income and mayors are free to set the property tax rate within a given boundary (0.4 and 0.7% of cadastral income). Another important source of own tax revenue for municipalities is the Waste Disposal Tax (TARSU), which is, similarly to ICI, calculated on land-registry values, and for which municipalities enjoy total freedom in tax rate setting. Finally additional tax revenue comes from the taxation of personal income, through the national income tax surcharge and electricity surcharge.

Most of the remaining fiscal needs are covered by intergovernmental grants (mainly unconditional) from the central government. The intergovernmental relations between the central government and the municipalities has been the subject to various reforms, partial reforms or short lived reforms in the Nineties; before that, municipalities received grants according the their expenditures, generating obvious moral hazard incentives. From the early Nineties onwards, in successive rounds, the system has been changed, but the historical expenditures of municipalities remained the reference point for each reform. Generally speaking, the system lacks a clear regulatory framework, be it through an explicit formula or through publicly available guidelines. Moreover, each Budget Bill intervenes deciding how many resources to devote to municipalities as a whole, and the way to distribute it across municipalities. This generally translates mostly in marginal changes to previous-year figures, but also leaves space for ad-hoc funding provisions, which may be more likely to follow political, rather than efficiency and equity criteria. The final

outcome is a system with little internal coherence and fruit of successive sedimentation of different interventions. For all these reasons Italy constitutes a very good laboratory to test our hypotheses.

4.2. Data Description

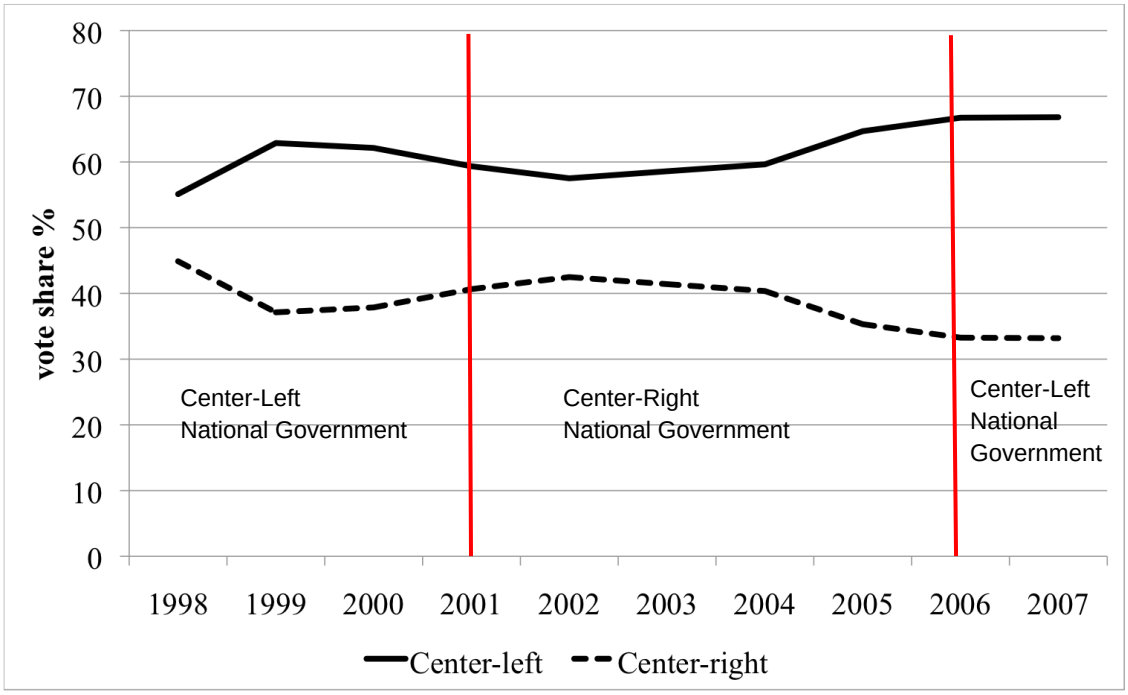
Our dataset includes municipal financial data, census data, and ballot data of the municipal elections and of the national parliament elections from 1998 to 2007; all data are disaggregated at the municipal level. In this study we restrict the analysis to large *comuni*. The reasons for this choice has been motivated in the previous section and can be summarized as follows: firstly, smaller polities are subject to different coalition-formation dynamics; secondly, in small municipalities electoral competition is often dominated by local parties (*liste civiche*) that cannot be considered neither related to the center-left nor to the center-right coalition. We also restrict the analysis to municipalities for which the winning mayor and the runner up are supported either by a center-left or a center-right coalition. This leaves us with a sample of 595 local councils and 4086 observations[2].

Local elections take place in each municipality every five years, but not all at the same time. The large number of municipalities implies that every year local elections can be observed (table 4.2); national elections instead have been held in 2001 and 2006, where in both cases there has been a change in the ruling government coalition (from left to right in 2001 and from right to left in 2006).

Figure 4.1 visualizes the distribution of local governments by winning coalition for each year of the sample period. The figure is divided into three panels, the first and the last ones correspond to periods when the center-left coalition was in power at the national level, and the panel in the middle corresponds to the years dominated by a center-right national government. In general, over the sample period, the majority of municipalities are ruled by center-left mayors, however the picture clearly exhibits an oscillating trend. Moreover, the central government's power shift, from center-left to center-right and to center-left again, is captured in our regressions by the fact that we include not only election years but all available years.

[2]This is the number of observations for which we observe no missing values for all variables of our dataset

Figure 4.1. Distribution of local governments by major's coalition (regression sample).



Our treatment is the political alignment with the central government. For this purpose we define the alignment variable, AL, equal to 1 if the mayor's party-coalition is the same as the coalition in power at the central level. Table 4.2 presents information on the number of elections by year and by winning coalition for aligned and non-aligned governments. It interesting to note that the sample is equally split between aligned and non-aligned municipalities.

Table 4.2. Distribution of elections by aligned and not aligned municipalities (regression sample).

year	Aligned			Not Aligned			Total election
	Center-right	Center-left	Total	Center-right	Center-left	Total	
1998	0	49	49	42	0	42	91
1999	0	135	135	60	0	60	195
2000	0	34	34	28	0	28	62
2001	41	0	41	0	43	43	84
2002	53	0	53	0	55	55	108
2003	21	0	21	0	32	32	53
2004	43	0	43	0	117	117	160
2005	20	0	20	0	39	39	59
2006	0	45	45	37	0	37	82
2007	0	40	40	42	0	42	82
Total	178	303	481	209	286	495	976

Next, for the sake of our empirical analysis we construct the margin of alignment, MA, as the difference between the percentage votes obtained by the winning mayor and the percentage votes obtained by the runner-up. If the mayor is elected in the first round (because he or she got 50%+1 votes), the first-round results are used, if a second round is held, then second-round results are used instead, (table *8.2* the Appendix reports detailed information on first and second round elections). The sign of the margin of alignment is constructed in a way such that mayors who are (not) aligned with the central government have a positive (negative) margin of victory. These political indicators have been collected from the Statistical Office of the Italian Ministry of Internal Affairs.

Table 4.3 shows the distributions of observations between aligned and non aligned local governments and breaks down the figures by the margin of alignment. Overall we have 4086 observations, but, if we consider only elections close to the treatment threshold, namely with a MA within the 5% and 2% boundaries, the number of observations reduces drastically to 1070 and 364 respectively; however the proportion of aligned and non aligned municipalities remains virtually unchanged.

Table 4.3. Descriptive statistics, observations in the regression sample.

	Observations		
	All sample	MA<5%	MA<2%
Aligned	2072	522	193
Not Aligned	2014	548	171
Total	4086	1070	364

Our main output variables are: (i) current transfers from the central government to municipalities, (ii) local taxes and (iii) current public expenditures. We focus on current expenditures and transfers entries because they are more likely to track the yearly decisions of central governments at any point in time, unlike investment expenditures, which tend to be set for longer periods of time. All these variables are expressed in real per capita values and data are taken from the Italian Ministry of Internal Affairs.

Moreover we employ a set of other controls which are generally thought to affect local public finance outcomes, these comprise.

1. *Socio-demographic* and *geographical characteristics*; which include resident population, proportion of population less than 14 and over 65 years old, proportion of residents with a university degree and illiterate, altimetric zone. These variables are collected from the Statistical Atlas of Municipalities, yearly issued by the Italian National Statistical Institute (ISTAT).

2. *Economic variables*. Variables in this group are income per capita, proportion of unemployed, proportion of self-employed, proportion of residents working for the service sector. The sources for these variables are ISTAT and the Ministry of Finance.

3. *Political variables*: second round dummy, incumbent major dummy.

Descriptive statistics for the variables employed in the regressions are given in Table 4.4, separate statistics are reported for aligned and non aligned local governments. Figures refer to statistics for the full sample as well as for restricted samples, i.e. for local governments that are close to the treatment threshold, namely within a MA of five and two percentage points.

With respect to our output variables (namely current public expenditures, current transfers from the central government and local taxes), looking at average *per capita* data for the full sample we can see that *comuni*'s current public expenditures amount to 813 Euros, 51% coming from local taxes (415 Euros), 22% from grants from the central governments, and the remaining 27% from other sources (grants form other levels of government, fees, borrowing etc.). Figures for the restricted versions of the dataset (MA<5% and MA<2%) are similar. Looking at our main controls, the values of the standard deviations suggest that there is a lot variation within each variable included in the dataset but not much difference between the three samples.

Table 4.4. Descriptive statistics, means and standard deviations by margin of alignment (regression sample).

Variable	Mean			Std. Dev.		
	All sample	MV<5%	MV<2%	All sample	MV<5%	MV<2%
Alignment dummy (aligned=1)	0.51	0.49	0.53	0.5	0.5	0.5
Margin of victory (%)	18.32	2.64	1.01	15.76	1.39	0.56
Second round dummy (yes =1)	0.48	0.97	0.96	0.5	0.18	0.19
Current grants from central gov. (real euro per capita)	166.95	174.3	173.35	106.88	110.74	111.26
Local taxes (real euro per capita)	438.32	414.61	437.72	160.17	166.93	167.85
Current local expenditure (real euro per capita)	813.77	795.77	810.78	217.2	218.03	221.62
Incumbent major dummy	0.38	0.23	0.16	0.48	0.42	0.37
Population (no.)	53304	61886	49516	143169	197234	93206
Population below 15 (%)	14.4	14.96	14.7	2.76	2.96	2.93
Population over 65 (%)	18.43	17.54	17.82	4.25	4.33	4.31
Total declared income (real euro per capita)	17832	17635	18029	3440	3657	3315
Altimetirc zone (1=low, 5=high)	1.91	1.88	1.93	1.11	1.18	1.21
Self-employed workers (%)	23.1	22.59	22.77	3.88	3.53	3.87
Illiterate people (%)	1.46	1.63	1.45	1.28	1.45	1.17
Graduates (%)	7.19	7.08	7.07	2.99	3.03	2.85
Unemployed (%)	13.06	14.75	13.51	9.91	10.62	10.2
Service sector workers (%)	33.35	32.8	33.83	6.13	6.35	6.46

As a further description of the data, Table 4.5 presents summary statistics for aligned and non-aligned local governments. We can observe that, municipalities aligned with the

central government coalition *significantly* enjoy more grants from the central government (174.93 and 158.73 Euros per capita) and levy less taxes (426.38 vs 450.6 Euros per capita). Finally, note that our samples are almost equally split between aligned and unaligned municipalities, which is the treatment variable we are interested in for the purposes of our analysis.

Table 4.5. Descriptive statistics, means and differences in means between aligned and non-aligned.(regression sample)

Variable	Aligned	Not Aligned	Difference	p-value
Margin of victory (%)	18.86	17.76	1.10	0.025
Second round dummy (yes =1)	0.47	0.49	-0.02	0.289
Grants from central gov. (real euro per capita)	174.93	158.73	16.19	0.000
Local taxes (real euro per capita)	426.38	450.6	-24.22	0.000
Current local expenditure (real euro per capita)	805.74	822.03	-16.29	0.016
Incumbent major dummy	0.37	0.39	-0.02	0.141
Population (no.)	53097	53516	-419.64	0.925
Population below 15 (%)	14.52	14.28	0.24	0.000
Population over 65 (%)	18.31	18.57	-0.26	0.051
Total declared income (real euro per capita)	17722	17946	-224.44	0.037
Altimetirc zone (1=low, 5=high)	1.91	1.91	0.00	0.034
Self-employed workers (%)	23.21	23.01	0.20	0.093
Illiterate people (%)	1.51	1.41	0.10	0.014
Graduates (%)	7.19	7.19	0.01	0.954
Unemployed (%)	13.61	12.49	1.11	0.000
Service sector workers (%)	33.19	33.51	-0.32	0.099

4.3. Empirical strategy

In this section we discuss our estimation strategy based on the predictions of the effect of political alignment on fiscal choices (Propositions 1-3) and local election results (Proposition 4).

We use regression discontinuity design (RDD) to address the identification problem in generating unbiased estimates of a pure alignment effect on fiscal policies and elections.

The problem originates from the likelihood that political alignment is determined by local characteristics that are unknown or unobservable by the researcher (like income, historical reasons, geographical location etc.). To deal with this, we exploit the fact that being or not aligned with the party ruling at the central government changes discontinuously at 50% of the vote share of local parties. This allows us to use *sharp* regression discontinuity design (RDD).

Following this approach, we compare municipalities where the elected mayor is *barely* aligned with central governments with those where the mayor is *barely* unaligned, where "barely aligned" means that the mayor won the election with a tight margin and that the mayor and the central government belong to the same party. These municipalities are also classified in our theoretical model as electorally "swing", i.e. voters' behavior is very sensitive to policy choice, and the electoral outcome is more uncertain. Lee (2001, 2008) shows that this approach represents quasi-random variation in party winners, because—as long as there are some unpredictability in voting behavior—when the race is very tight, the identity of the winning party is likely to be determined by pure chance.

There are various ways in which RDD can be implemented using both parametric and non parametric analyses; see Lee and Lemieux (2010) for an excellent survey. The simplest approach is to compare policy outcomes just around the treatment threshold, however this method can produce imprecise estimates and has to rely on a very large sample size.

Given the number of observations available to us around the treatment threshold, our preferred strategy is to use an alternative approach which is based on the use of all available data together with a control function. This approach consists on regressing the dependent variable on a p*th*-order polynomial in the control function, in addition to the binary treatment indicator.

As we are interested in the effect of political alignment on fiscal choices, our dependent variable Y_{it} will be, in turn, *per capita* grants, local taxes and local public expenditures in municipality i at time t. The model we estimate takes the following form:

$$Y_{i,t} = \gamma_0 AL_{i,t-1} + f(MA_{i,t-1})\varphi + \beta' X_{i,t} + \tau_t + \mu_i + v_{i,t} \tag{4.1}$$

where $AL_{i,t-1}$ is our alignment dummy that takes value of one if the ruling party at the local level in municipality i is the same as the party in power at the central level, this is our treatment variable. $MA_{i,t-1}$, the margin of alignment, is our assignment variable and is calculated as the difference between the vote share obtained by the mayoral candidate

who is aligned with the central government, and the mayoral candidate which belongs to the party which is at the opposition at the central level. Constructing in this way the variable MA implies that all observations with a positive (negative) MA are municipalities which are aligned (unaligned) with the central government, and observations with a small MA in absolute value refer to mayors who won the elections with a very small margin. The alignment effect is estimated controlling for the margin of victory under different hypotheses on its functional form $f(MA)$[3] as well as the interaction of all of these terms with AL. Finally X is a vector of control variables, τ_t is a year dummy, and μ_i is the unobserved heterogeneity. We treat μ_i as a council fixed effect.

It is important to emphasize that both the alignment dummy and the assignment variable are lagged by one period. This is due to the fact that, in the sample, local and central elections have been held always between April and June, while the allocation of grants is decided by the central government by the end of December and the local fiscal policy is decided by local councils usually not later than March.

The coefficient of interest is γ_0, which is our alignment effect. Following Propositions 1-3, its expected sign depends on the value assumed by the parameter θ, which indicates the share of the credit for providing public goods that voters attribute to the central government. Low (high) values of θ indicate that voters attribute most of the utility from the public goods to the local (central) government. The model predicts three possible scenarios with respect to grants, local taxes and public expenditures: (i) if most of the credit for providing public goods is attributed to the local government (i.e. $0 < \theta < \overline{\theta}$), a jurisdiction aligned with the central government will be allocated more grants (Tr), set lower taxes (t) and provide more public goods (g) than an unaligned one; (ii) if $\overline{\theta} < \theta < \frac{1}{2}$, then an aligned municipality will still be rewarded with more grants, will provide more public goods and set higher taxes compared to an unaligned one; (iii) if voters attribute most of the credit for providing public goods to the central government (i.e. $\frac{1}{2} < \theta < 1$), then an aligned municipality will receive less grants, set higher taxes and provide more public goods than an unaligned one.

So, if our data fit the predictions of the first scenario, γ_0 is expected to be positive for grants, negative for taxes and positive for public expenditures. If the closest scenario corresponds to the second one, γ_0 is expected to be positive for grants, taxes and public expenditure. Finally, in the last scenario, γ_0 should be negative for grants, positive for

[3]Our control function is: $f(MA_{it}) = \beta_{01}MA_{it} + \beta_{02}MA_{it}^2 + ... + \beta_{0p}MA_{it}^p + \beta_1 AL_{it}MA_{it} + \beta_2 AL_{it}MA_{it}^2 + ... + \beta_p AL_{it}MA^p$.

taxes and public goods. Note that θ cannot be observed directly, our strategy is to estimate central and local governments' fiscal policy setting behavior and indirectly make inferences on θ. Direct study on θ is left to future studies.

We use the same methodology to investigate citizens' voting behavior. From Proposition 4, the model predicts that, if $0 < \theta < \overline{\theta}$, we should unambiguously observe that the probability of the incumbent mayor re-election is positively correlated with being aligned with the central government, which is our alignment effect on incumbents. Similarly as before we estimate the following model:

$$I_{i,e+1} = \gamma_1 AL_{i,e} + f(MA_{i,e})\varphi + \beta' X_{i,e} + \tau_e + \mu_i + v_{i,e} \tag{4.2}$$

the dependent variable is now $I_{i,e+1}$, which is equal to one if the winner of local elections at time $e+1$ is the same (or at least belong to the same party, see more below) as the winner in the previous elections (held at time e) and zero otherwise. This gives a random effect probit model estimated using the unconditional MLE estimator.[4]

The coefficient of interest is now γ_1, which is our alignment effect on the probability of incumbent re-election: if voters attribute most of the credit for providing public goods to the local government, we expect γ_1 to be positive.

5. Regression Results

In this section we present the main empirical evidences of the alignment effect on fiscal policies (grants, local taxes, and local current expenditures) and on incumbent re-election probability. The results are displayed in Tables 5.1 and 5.2, both tables have the same format and are divided into three panels. In the first panel the regression results are run without controls and up to 6th polynomial in the control function, in the second panel we add our set of controls variables (see Table 4.4) as a way of checking whether alignment status is as good as randomly assigned. The inclusion of these additional covariates should not significantly affect the estimate of the alignment effect because alignment status should be as good as randomly assigned conditional on $f(MA)$, see Pettersson-Lidbom (2008) for more on this. In the third panel we report some standard information on the specification, like the number of observations and municipalities and R-squared.

[4]It is important to note that in this case, when possible, the Mundlak (1978) approach will be followed in order to tackle the possibility that the unobserved heterogeneity and the regressors may not be orthogonal.

Robust standard errors, clustered at municipal level, are reported in all specifications.

Let us begin with table 5.1, which reports regression results for the alignment effect on fiscal policies estimated considering a Fixed Effect model. Starting from grants, as common denominator to all this specifications, the coefficient of interest , γ_0 in (4.1), is always positive and significant in all our specifications, which means that aligned municipalities enjoy a more grants compared to non aligned ones. The value of γ_0 varies between 13.41 to 27.77. For example using, the specification with controls and first-order polynomial in the control function, being aligned with the party in power at the central level brings and additional 13.41 Euro per capita in grants to that *comune*. The specification with and without controls produces very similar results and it is consistent with the hypothesis that the use of the control function makes redundant the inclusion of further controls.

Let us now turn to the results for local tax revenues reported in the next column. Again, the direction of the results and its significance are similar in all our specifications: in particular the coefficients of interest are always negative and significant, varying between -16.29 in the case without controls and no lags polynomial to -23.02 in the case with controls and 4th order lag polynomial in the control function.

Finally in the last columns the results for municipality expenditures are reported. Here, the picture is much less clear and the results less robust to different specifications. There is a weak positive expenditure effect (a part from in the first two rows) suggesting that municipalities aligned with the central governments may be able to spend more than unaligned. The effect, however is always not statistically significant and goes from -7.63 to 8.12.[5]

[5] The impact of the alignment effect on local fees, for simplicity not reported in the table 5.1, is always not statistically significant.

Table 5.1. The effect of alignment on fiscal policies, model with municipal fixed effects, estimated by Within-the-Group.

Polynomial order	Controls	Grants		Taxes		Expenditure	
no polyn.	no	13.95	(2.12)	-16.29	(2.41)	-1.54	(3.75)
1st	no	13.90	(3.13)	-19.04	(3.66)	-7.63	(6.01)
2nd	no	16.79	(3.76)	-18.11	(4.48)	3.72	(7.35)
3rd	no	25.18	(4.33)	-20.57	(5.41)	2.79	(8.38)
4th	no	26.42	(4.27)	-22.45	(5.72)	5.11	(8.03)
5th	no	27.77	(4.63)	-22.95	(6.35)	8.12	(8.70)
6th	no	25.86	(4.99)	-21.45	(7.03)	7.34	(9.83)
no polyn.	yes	13.41	(2.09)	-16.66	(2.42)	-3.80	(3.70)
1st	yes	13.79	(3.14)	-18.96	(3.75)	-6.94	(6.04)
2nd	yes	16.57	(3.80)	-18.08	(4.58)	4.09	(7.33)
3rd	yes	24.87	(4.38)	-21.17	(5.51)	0.53	(8.36)
4th	yes	26.06	(4.33)	-23.02	(5.84)	2.55	(8.01)
5th	yes	27.56	(4.67)	-23.71	(6.49)	4.75	(8.88)
6th	yes	25.84	(5.03)	-22.20	(7.19)	3.94	(10.27)
Observations		3705		3705		3705	
Number of councils		595		595		595	
R-squared (1)		0.724		0.504		0.081	
Year dummies		yes		yes		yes	

Clustered standard errors in brackets.

(1) Average across regressions with control variables.

Combining the results presented in table 5.1 together, i.e. that aligned municipalities are rewarded with more grants from the central government, put lower fiscal pressure on residents and *may* enjoy higher spending compared with unaligned ones, the emerging picture is consistent with the hypothesis that voters attribute most of the credit for providing public goods to local governments.

If this hypothesis is correct, we should also expect mayors in aligned municipalities having higher probability of re-elections than in unaligned ones. In table 5.2, we report results for different specifications of model (4.2); i.e. with and without controls and different order polynomials in the control function.

The variable incumbent is calculated in two ways: (i) we exclude the cases where the mayor cannot run for the office because of term limits (there is a limit of two consecutive terms for Italian mayors), (ii) we use a broad definition of incumbent, where the incumbent is the candidate sharing the same political coalitions as the current mayor (it may or may not be the mayor himself).

The main results are as follows: no matter the definition of incumbent, in aligned jurisdictions the probability that the incumbent mayor (or his coalition) is re elected in the next round of election is consistently higher, over 50%, than in non aligned ones.

Table 5.2. The effect of alignment on mayor's probability of re-election, random effect probit model estimated using the unconditional MLE estimator (Point estimates are expressed as average partial effects).

Polynomial order	Controls	Incumbents at their first mandate		Incumbents in terms of political parties	
no polyn.	no	0.30	(0.03)	0.24	(0.03)
1st	no	0.51	(0.05)	0.43	(0.04)
2nd	no	0.58	(0.05)	0.50	(0.05)
3rd	no	0.63	(0.06)	0.39	(0.11)
4th	no	0.73	(0.06)	0.50	(0.07)
5th	no	0.75	(0.06)	0.60	(0.16)
6th	no	0.81	(0.06)	0.60	(0.16)
no polyn.	yes	0.24	(0.04)	0.33	(0.06)
1st	yes	0.60	(0.17)	0.55	(0.12)
2nd	yes	0.55	(0.20)	0.64	(0.13)
3rd	yes	0.54	(0.25)	0.68	(0.14)
4th	yes	0.35	(0.21)	0.64	(0.15)
5th	yes	0.39	(0.25)	0.65	(0.15)
6th	yes	0.35	(0.26)	0.66	(0.15)
Observations		333		497	
R-squared (1)		0.631		0.363	

Standard errors in brackets.

(1) Average across regressions with control variables (linear model).

Although the specifications reported in table 5.1 and 5.2 illustrate the robustness of the results with respect to the choice of the polynomial order, it is also useful to recognize which is the best polynomial approximation in order to be more precise about the magnitude of the alignment effect. To that end a formal guidance is provided by Akaike's criterion (AIC) reported in table 5.3. According to this criterion the best polynomial order for grants and local taxes is the forth, for local expenditure is the second, instead for the probability incumbent reelection is the fifth when we consider only incumbents at their first mandate, the second when we consider the incumbents in terms of political parties. Table 5.3 also reports the p-values from the goodness-of-fit test (F-test) obtained by jointly testing the significance of a set of bin dummies included as additional regressors in the model. The bin width used to construct the bin dummies is 0.02[6]. In all cases the Akaike's criterion (AIC) and the goodness-of-fit test (F-test) provide different answers, therefore we decided to chose in all cases the highest polynomial order.

Following the choice of the best polynomial order, we can conclude that local governments that are politically aligned with the central government receive, on average for each inhabitant, more grants for 26 euros and at the same time reduce local taxes for 22 euros. As a result aligned incumbent party has, on average, more than 50% extra chances of being reelected (this figures goes up to 73% if we consider only mayors at their first mandate).

Table 5.3. Akaike's criterion (AIC) and p-values from the goodness-of-fit test (F-test).

Polynomial order	Grants		Taxes		Expenditure		Only incumbents at their first mandate		Incumbents in terms of political parties	
	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F
1	37293	0.0643	43902	0.2136*	44219	0.0512	-	-	439	0.4870*
2	37296	0.0898	43900	0.1629	44214*	0.0611	384	0.8865*	435*	0.5451
3	37271	0.2175*	43902	0.1880	44214	0.0692	388	0.8961	443	0.6729
4	37269*	0.2537	43899*	0.2972	44217	0.0903	382	0.7896	445	0.6666
5	37272	0.2581	43901	0.3861	44220	0.1390*	301*	0.9953	450	0.7297
6	37274	0.2573	43902	0.3665	44216	0.0817	-	-	441	0.4691

[6] A bin width of 0.01 has not been used because was generating to much collinearity in relation to the size of the sample.

6. Robustness Checks

6.1. Graphical Analysis

As a first robustness check, Figures 6.1 - 5 show the graphs for the percentage of votes won by the incumbent local government in the latest election (reported on the horizontal axis) and the dependent variables used in the regression discontinuity analysis (reported on the vertical axis).

In all cases, the percentage of votes is normalized as the difference between aligned (positive values) and not aligned (negative values) local governments. This means that the incumbent is aligned when the assignment variable exceeds zero. Moreover, all figures report also the fitted values from a regression model estimated separately on each side of the cutoff point, using the polynomial of the assignment variable that best fits the data (see the caption of each figure) in relation to the AIC criterion and the goodness-of-fit test shown in table 5.3.

The visual analysis of the data and the cross-validation procedure (proposed by Lee, Lemieux (2010)) always suggests using a bandwidth of 0.02 or more, therefore, in order to make the graphical representation more effective, 50 bins are reported in all figures. All graphs show clear evidence of a discontinuity at the cutoff point.

Figure 6.1. Level of intergovernmental grants, bandwidth of 0.02 (50 bins), 4th polynomial.

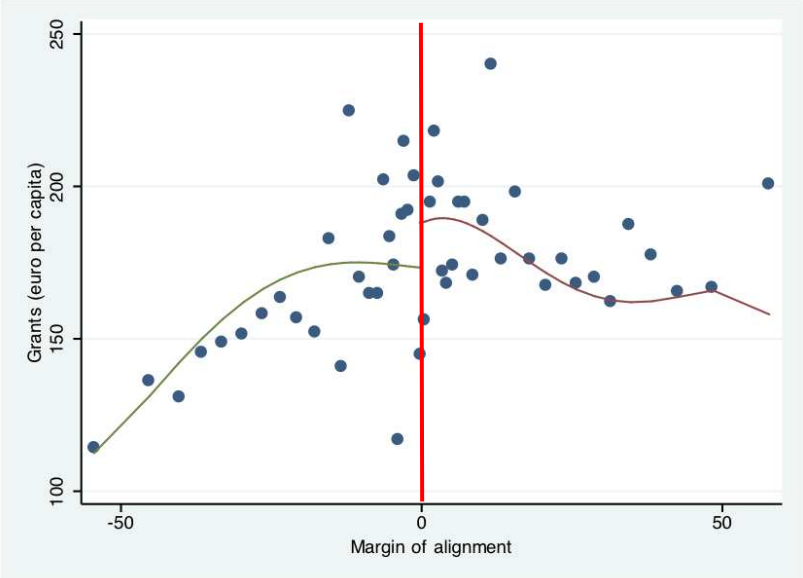


Figure 6.2. Level of local taxes and fees (per capita values), bandwidth of 0.02 (50 bins), 4th polynomial.

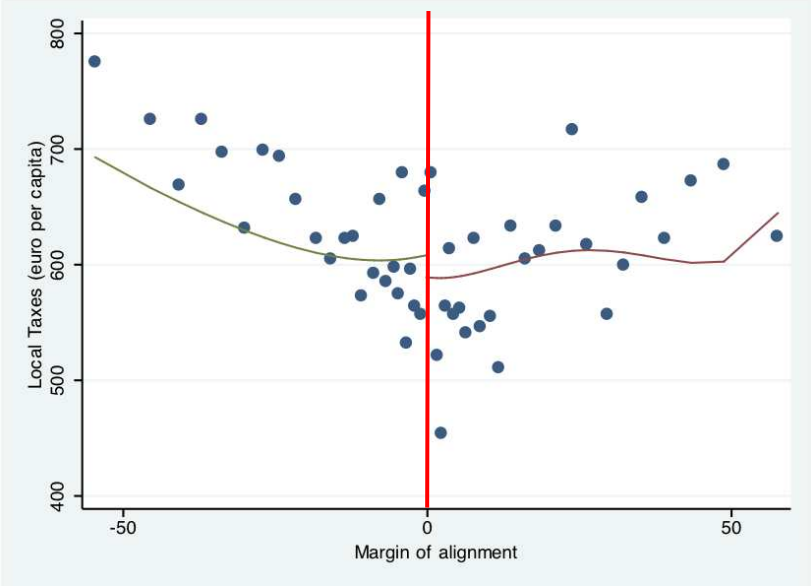


Figure 6.3. Level of current expenditure (per capita values), bandwidth of 0.02 (50 bins), 5th polynomial.

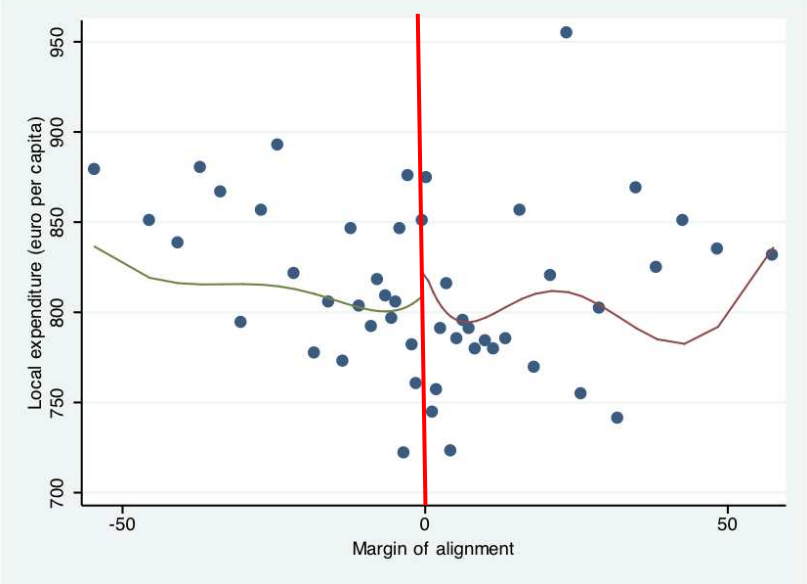


Figure 6.4 Incumbent probability of winning the next election (only incumbents at their first mandate) bandwidth of 0.02 (50 bins), 5th polynomial.

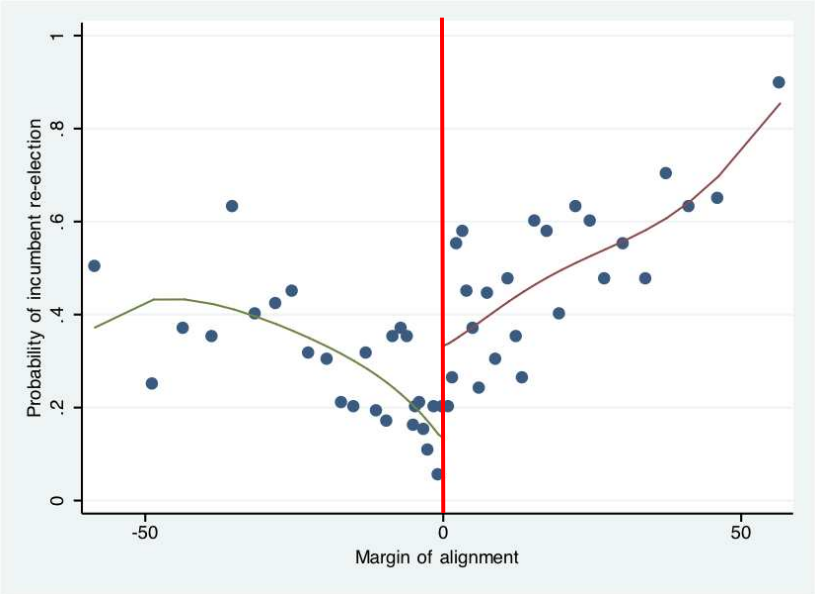
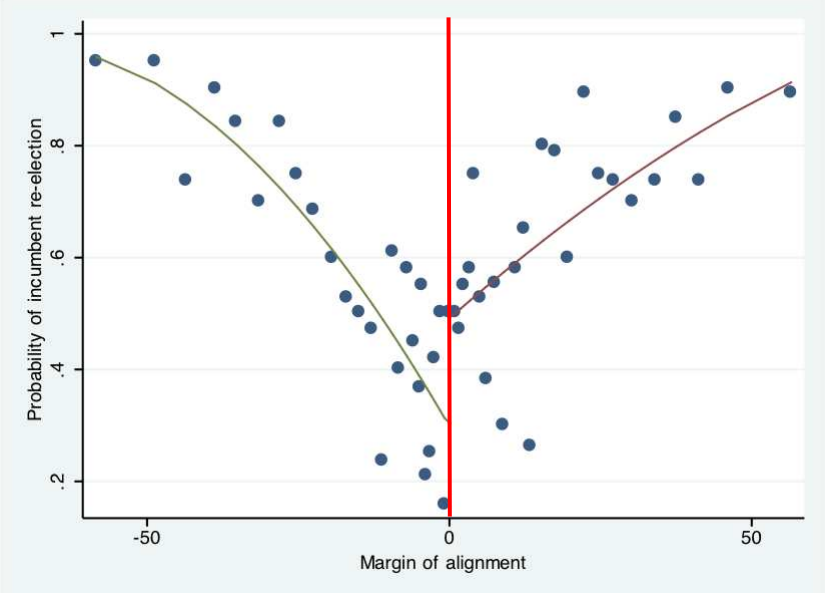


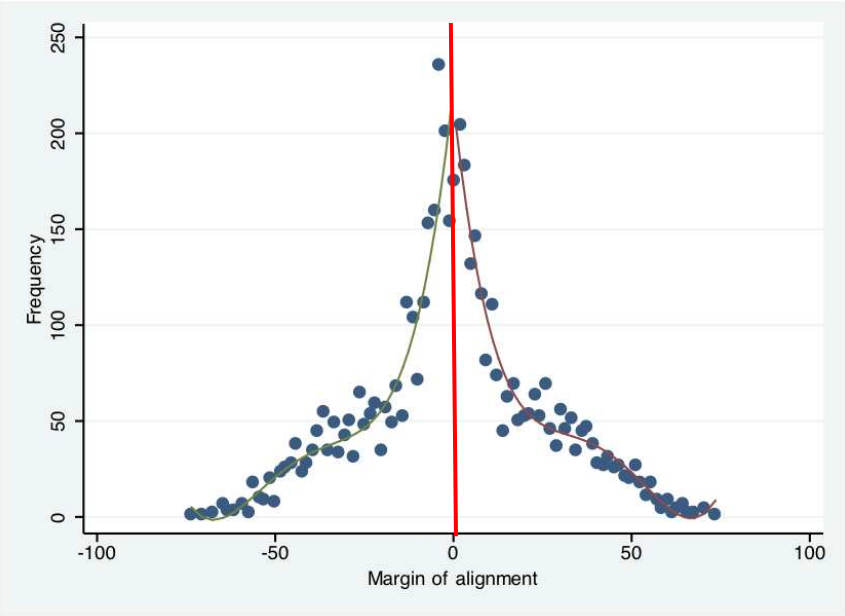
Figure 6.5. Incumbent party probability of winning the next election, bandwidth of 0.02 (50 bins), 2nd polynomial.



The underlying assumption that generates the local random assignment result is that each individual has imprecise control over the assignment variable. An intuitive test of this assumption is whether the aggregate distribution of the assignment variable is discontinuous, since a mixture of individual-level continuous densities is itself a continuous

density. Using McCrary (2008) procedure, figure 6.6 shows a graph of the raw densities computed over bins with a bandwidth of 0.01 (100 bins in the graph), along with a smooth 4th-order polynomial model. The graph shows no evidence of discontinuity at the cutoff confirmed also by a formal RD regression using the up to the 4th-order polynomial in the control function.

Figure 6.6. Density of the Forcing Variable (Margin of alignment).



Another important test for the validity of the RD design is to examine whether the covariates do not exhibit any discontinuity in relation to the margin of victory. As suggested by Lee and Lemieux (2010) we test the null of discontinuities in all covariates simultaneously estimating a Seemingly Unrelated Regression (SUR) where each equation represents a different baseline covariate, and then performing chi-square test for the discontinuity gaps in all equations being zero. As reported in table 6.1 we cannot reject the null hypothesis of zero discontinuity in all covariates in relation to all polynomial orders of the margin of victory.

Table 6.1. Covariates no-discontinuity test (SUR model).

Polynomial order	P-value
1	0.1624
2	0.7030
3	0.7751
4	0.6322
5	0.6146
6	0.2811

6.2. Further Robustness Checks: Second-Round Elections Only

In this section we address a possible concern originating from the fact that the MA is calculated in the same way (i.e. as the percentage difference in the votes between the winner and the runner up) for elections where the mayor is elected the first round and for those decided in a second round. Italian local elections' rules establish that in large municipalities, if no mayoral candidate get at least 50% +1 of the votes in the first round of elections, voters are called a second time to decide between the winner and the runner-up. However there are some differences between these two rounds of elections. First, second-round elections consist by default in elections with only two candidates, while in first round elections the number of candidates may vary. Second, the fact that a candidate obtains the majority of the votes in the first round can itself be interpreted as a sign of high popularity (or, in other words, low political competition in that municipality). This hypothesis is confirmed looking at the summary statistics reported in table 4.4., taking the full sample, 48% of elections are decided in the second round, but if we look only at close races (i.e. MA less than 5%), the proportion of second round elections goes up to 96%.

The results presented in tables 5.1-5.3 are generated by a sample where first and second round elections are pooled together, so as a robustness check we restrict our sample to only those elections decided in a second round, which leave us with 1674 observations (from 3705). From table 8.2 in the Appendix, we can see that of 976 elections recorded in our full sample, for 468 of those the outcome was decided in the second round, and 250 ended with a center-left winner and 218 with a center-right winner.

Similarly to table 5.1, table 6.2 reports results for different specifications of model (4.2) restricting the sample to second round elections only; i.e. with and without controls and

different order polynomials in the control function. Starting from grants, the coefficient of interest , γ_0 in (4.1) is always positive and significant in all our specifications, which means that aligned municipalities enjoy more grants compared to non aligned ones, the estimates suggest between 16 and 39 extra Euros per capita. Second, for local tax revenues, the estimated γ_0 are similar to those reported for the full sample, i.e between 15 and 35 Euros reduced tax burden for each resident. Finally, for municipality expenditures the picture is again not clear and the results less robust to different specifications.

Table 6.2. The effect of alignment on fiscal policies, model with municipal fixed effects, estimated by Within-the-Group, only second round elections.

Polynomial order	Controls	Grants		Taxes		Expenditure	
no polyn.	no	16.31	(3.80)	-15.55	(4.18)	2.65	(6.48)
1st	no	28.91	(5.61)	-22.57	(6.55)	10.88	(10.25)
2nd	no	33.55	(8.32)	-16.84	(9.78)	5.58	(15.28)
3rd	no	38.92	(11.65)	-27.19	(13.57)	11.49	(20.05)
4th	no	41.28	(12.31)	-33.07	(14.66)	-1.36	(18.03)
5th	no	30.25	(14.94)	-25.53	(17.14)	0.47	(19.97)
6th	no	29.27	(17.28)	-14.28	(19.51)	5.15	(24.03)
no polyn.	yes	15.69	(3.81)	-15.2	(4.12)	2.27	(6.65)
1st	yes	28.77	(5.65)	-22.90	(6.41)	9.07	(10.27)
2nd	yes	34.12	(8.44)	-18.14	(9.51)	2.85	(15.82)
3rd	yes	39.31	(11.74)	-29.46	(13.03)	5.84	(20.79)
4th	yes	41.84	(12.30)	-34.57	(14.37)	-3.66	(18.30)
5th	yes	30.19	(14.93)	-26.99	(16.98)	-0.61	(20.02)
6th	yes	27.48	(17.19)	-13.264	(19.5006)	5.2575	(23.8912)
Observations		1674		1674		1673	
Number of councils		384		384		384	
R squared (1)		0.675		0.544		0.063	
Year dummies		yes		yes		yes	

Clustered standard errors in brackets.

(1) Average across regressions with control variables.

Also we re-estimate (4.2), on the effect of alignment on mayor's probability of being re-elected, using only second round elections. As table 6.3 show the results are virtually unchanged compared with those presented in table 5.2.

Table 6.3. The effect of alignment on mayor's probability of re-election, random effect probit model estimated using the unconditional MLE estimator (Point estimates are expressed as average partial effects), only second round elections.

Polynomial order	Controls	Incumbents at their first mandate		Incumbents in terms of political parties	
no polyn.	no	0.27	(0.05)	0.24	(0.05)
1st	no	0.41	(0.09)	0.51	(0.07)
2nd	no	0.46	(0.10)	0.58	(0.08)
3rd	no	0.56	(0.10)	0.62	(0.08)
4th	no	0.64	(0.11)	0.68	(0.08)
5th	no	0.73	(0.12)	0.73	(0.12)
6th	no	0.76	(0.12)	0.71	(0.31)
no polyn.	yes	0.21	(0.05)	0.22	(0.05)
1st	yes	0.36	(0.10)	0.53	(0.10)
2nd	yes	0.41	(0.11)	0.61	(0.11)
3rd	yes	0.54	(0.12)	0.64	(0.12)
4th	yes	0.63	(0.13)	0.70	(0.13)
5th	yes	0.71	(0.14)	0.77	(0.14)
6th	yes	0.75	(0.14)	0.81	(0.45)
Observations		149		213	

Standard errors in brackets.

(1) Average across regressions with control variables (linear model).

The choice of the best polynomial approximation according to (AIC) for the regression results displayed in tables 6.2 and 6.3 are reported in table 6.4. According to this criterion the best polynomial order for grants, local taxes and expenditures is the first. Instead, for the probability of incumbent re-elections are the forth (only first mandate) and the fifth. The table also reports the p-values from the goodness-of-fit test (F-test) obtained by jointly testing the significance of a set of bin dummies included as additional regressors in the model.

Table 6.4. Akaike's criterion (AIC) and p-values from the goodness-of-fit test (F-test), only second round elections.

Polynomial order	Grants		Taxes		Expenditure		Only incumbents at their first mandate		Incumbents in terms of political parties	
	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F	AIC	Prob>F
1	16106*	0.194*	18653*	0	18921*	0.003	191.13	0.998	231.30	0.830
2	16107	0.128	18656	0.026	18924	0.043	194.11	0.999*	231.04	0.860
3	16110	0.127	18657	0.059	18926	0.091	196.65	0.999	231.50	0.896*
4	16111	0.152	18660	0.116*	18928	0.127*	124.94*	0.885	221.89	0.765
5	16109	0.083	18664	0.144	18930	0.040	150.86	0.978	176.66*	0.633
6	16107	0.023	18659	0.011	18933	0.052	126.30	0.984	-	-

7. Conclusions

This paper has explored both theoretically and empirically the effect of political alignment on local public finance and elections. Our model predicts that, as long as voters attribute most of the credit for providing public goods to local governments, being aligned with the central government reduces the tax burden on residents and increases the provision of the public goods through higher transfers from the central government and increases the probability of a mayor incumbent to be re-elected.

We test these predictions using a new dataset on Italian local public finance and elections and we employ RDD, exploiting the fact that being or not aligned with the central government changes discontinuously at 50% of the votes at local election.

Our empirical results are largely consistent with this hypothesis, i.e. that voters attribute most of the credit for providing public goods to local governments. In particular we found that, if a municipality is politically aligned with the party in power at the central level, it will be rewarded with extra 26 Euros per resident in grants and, at the same time, local tax burden will be around 22 Euros per capita lower. Local expenditures instead do not show statistically significant variation between aligned and unaligned municipalities. Finally, the probability that an aligned incumbent mayor (or his/her coalition) is re-elected in the next round of elections is between 50% and 73% higher than for a non-aligned one. Restricting the sample only to those municipalities where the electoral race was decided in a second round does not affect the significance and the magnitude of the results.

The theoretical and the empirical analysis showed in the end that where local governments are responsible for the provision of local public goods, there is a perverse trade-off between the level of discretion in the distribution of intergovernmental grants and the disciplining and selection role of elections. In fact if grants are not formula-based and voters attribute, correctly, most of the credit for providing local public goods to the local government, then the central government will tend to divert resources toward aligned jurisdictions for electoral purposes generating an inefficient allocation of resources.

In other words, when intergovernmental grants are allocated on discretionary bases it would be more efficient not to have local election, but without local election one loses the possibility to stimulate the electoral accountability of local politicians on which are based most of the benefits of having a decentralized system. Therefore, we can reach the conclusion, still missing in the literature, that in a decentralized system an efficient allocation of resources will require both formula based grants and local elections with rational voters.

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8. Appendix

8.1. Tables

Table 8.1. Party coalitions, only municipalities > 15000, between 1998 and 2007

Center-left	No.	Center-right	No.	Independents	No.
CEN-SIN(LS.CIVICHE)	2565	CEN-DES(LS.CIVICHE)	1,252	LISTA CIVICA	251
CEN-SIN	325	FORZA ITALIA	237	IND	56
DEMOCRATICI SINISTRA	230	CEN-DES	201	SVP	18
PDS	192	LEGA NORD	174	UV	7
SINISTRA	135	CENTRO	117	PATTO SEGNI	6
L'ULIVO	82	ALLEANZA NAZIONALE	84	SI	4
P.POPOLARE ITALIANO	39	POLO PER LE LIBERTA'	30	MOV. PER L'AUTONOMIA	3
PPI (POP)	27	CCD	26	LA RETE-MOV.DEM.	3
LA MARGHERITA	15	CASA DELLE LIBERTA'	17	LEGA D'AZIONE MERID.	1
RIF.COM.	15	CDU	14	LISTA LOCALE	1
DL.LA MARGHERITA	14	LEGA LOMB-LEGA NORD	10	PRI	1
PROGRESSISTI (1994)	7	L.VEN-L.NORD	9		
CEN-SIN(CONTR.UFF.)	6	LG.NORD-LG.VENETA	9		
POPOLARI	6	UDC	8		
IND.SIN.	5	CCD-CDU	7		
PER VERONA	5	DESTRA	7		
PROGRESSISTI SALERNO	5	FI-CCD	5		
SDI-ALTRI	5	FI-CCD-AN	5		
FED.DEI VERDI	4	POLO BUON GOVERNO	5		
ALL. DI PROGRESSO	3	CDL	3		
I DEMOCRATICI	3	LG.VENETA REPUBBLICA	3		
UNITI NELL'ULIVO	3	U.D.EUR	2		
U.D.EUR	2	FI-CCD-CDU	1		
SDI	2	FORZA IT.-POLO POP.	1		
U.D.EUR POPOLARI	2				
LA MARG.	1				
PATTO DEMOCRATICI	1				
POPOLARI-CIVICA	1				
VERDI	1				

Table 8.2. Distribution of election by first round and second round (regression sample).

year	First round			Second round			Total election
	Center-right	Center-left	Total	Center-right	Center-left	Total	
1998	8	21	29	34	28	62	91
1999	17	86	103	43	49	92	195
2000	10	11	21	18	23	41	62
2001	17	17	34	24	26	50	84
2002	37	27	64	16	28	44	108
2003	12	18	30	9	14	23	53
2004	16	90	106	27	27	54	160
2005	14	21	35	6	18	24	59
2006	20	26	46	17	19	36	82
2007	18	22	40	24	18	42	82
Total	169	339	508	218	250	468	976

Table 8.3. Local elections by coalition and margin of victory.(regression sample)

year	All sample		MV<5%		MV<2%	
	Center-Right	Center-Left	Center-Right	Center-Left	Center-Right	Center-Left
1998	42	49	16	7	5	2
1999	60	135	22	24	13	8
2000	28	34	10	12	3	5
2001	41	43	16	18	8	5
2002	53	55	12	21	7	7
2003	21	32	4	5	1	1
2004	43	117	19	10	8	4
2005	20	39	7	7	1	0
2006	37	45	12	7	5	2
2007	42	40	12	13	4	3
Total	387	589	130	124	55	37
Mean	39	59	13	12	6	4

Table 8.4. Local elections by alignment and margin of victory.(regression sample)

year	All sample		MV<5%		MV<2%	
	Aligned	Not-Alighed	Aligned	Not-Alighed	Aligned	Not-Alighed
1998	49	42	7	16	2	5
1999	135	60	24	22	8	13
2000	34	28	12	10	5	3
2001	41	43	16	18	8	5
2002	53	55	12	21	7	7
2003	21	32	4	5	1	1
2004	43	117	19	10	8	4
2005	20	39	7	7	1	0
2006	45	37	7	12	2	5
2007	40	42	13	12	3	4
Total	481	495	121	133	45	47
Mean	48	50	12	13	5	5

8.2. Proofs of propositions

Let us first state the first order condition related to two jurisdictions, an aligned and an unaligned one with the same voters' density ζ, as these are going to be used in most of the proofs that follow.

First order conditions:

$$\frac{\partial U^{CG}}{\partial Tr_a} = 0: \; f'(g_a) + \zeta u'(g_a) = C'(Tr_a) \tag{8.1}$$

$$\frac{\partial U^{CG}}{\partial Tr_u} = 0: \; f'(g_u) + \zeta(2\theta - 1)u'(g_u) = C'(Tr_u) \tag{8.2}$$

$$\frac{\partial U_a^{LG}}{\partial t_a} = 0: \; f'(g_a) + \zeta(u'(g_a) - 1) = 0 \tag{8.3}$$

$$\frac{\partial U_u^{LG}}{\partial t_u} = 0: \; f'(g_u) + \zeta[(1 - 2\theta)u'(g_u) - 1] = 0 \tag{8.4}$$

Proof of Lemma 1.

Given the position of an indifferent voter X, and a density ψ_i, the share of votes V accruing to party L is:

$$V = \frac{X - (m -^1 /_{2\psi_i})}{(m +^1 /_{2\psi_i}) - (m -^1 /_{2\psi_i})} = \frac{1}{2} + \psi(X - m)$$

The probability of winning p of party L is equal to the probability of $V > 1/2$, which is

$$p = \frac{V - \frac{1}{2\zeta}}{\frac{1}{2\zeta} - (-\frac{1}{2\zeta})} = \frac{1}{2} + \zeta X$$

As we know, in aligned jurisdictions $X_a = u(g_a) - t_a$, while in unaligned ones $X_u = (2\theta - 1)u(g_u) + t_u$, which implies that:

$$p_a = \frac{1}{2} + \zeta[u(g_a) - t_a], \quad p_u = \frac{1}{2} + \zeta[(2\theta - 1)u(g_u) + t_u]$$

Proof of Proposition 1.

Given the concavity of utility functions, (8.3) and (8.4) are decreasing functions in g. As $\theta \in [0, 1]$, we can observe how if $g_a = g_u$ and the first order condition as in (8.3) is satisfied, then expression (8.4) is strictly negative. In order to make (8.4) equal to zero, because of concavity, the amount of public g_u must be decreased. From this we can state that in equilibrium for any value of θ, $g_a > g_u$, which proves Proposition 1.

Proof of Proposition 2.

To prove Proposition 2, let's start from analyzing a special case, when $\theta = 1/2$. The first-order conditions as from (8.1)-(8.4) become:

$$\frac{\partial U^{CG}}{\partial Tr_a} = 0 : \; f'(g_a) + \zeta u'(g_a) = C'(Tr_a) \tag{8.5}$$

$$\frac{\partial U^{CG}}{\partial Tr_u} = 0 : \; f'(g_u) = C'(Tr_u) \tag{8.6}$$

$$\frac{\partial U_a^{LG}}{\partial t_a} = 0 : \; f'(g_a) + \zeta u'(g_a) = \zeta \tag{8.7}$$

$$\frac{\partial U_u^{LG}}{\partial t_u} = 0 : \; f'(g_u) = \zeta \tag{8.8}$$

From (8.6) and (8.8) we can state that:

$$\zeta = C'(Tr_a) \tag{8.9}$$

while from (8.5) and (8.7) we can state that

$$\zeta = C'(Tr_u) \tag{8.10}$$

which in turn implies that, given the assumption on $C(\cdot)$, in case $\theta = 1/2$, $Tr_a = Tr_u$, i.e. the central government does not discriminate among jurisdictions on the basis of political alignment. This also implies, given Proposition 1, that at $\theta = 1/2$ the aligned local government imposes higher taxes than its unaligned counterpart.

Let us now analyze how Tr_u and t_u change as θ changes. As all functions are well behaved, it will be enough to analyze the comparative statics of these variables around $\theta = 1/2$. To do this, through the Implicit Function Theorem, we can solve the following matrix-form system of simultaneous equation, and evaluate its solution at $\theta = 1/2$.

$$\begin{bmatrix} f''(g_u) + \zeta(2\theta-1)u''(g_u) - C''(Tr_u) & f''(g_u) + \zeta(2\theta-1)u''(g_u) \\ f''(g_u) - \zeta(2\theta-1)u''(g_u) & f''(g_u) - \zeta(2\theta-1)u''(g_u) \end{bmatrix} \begin{bmatrix} \frac{d\ Tr_u^*}{d\ x} \\ \frac{d\ t_u^*}{d\ x} \end{bmatrix} = - \begin{bmatrix} \frac{\partial^2 U^{CG}}{\partial Tr_u \partial x} \\ \frac{\partial^2 U^{LG}}{\partial t_u \partial x} \end{bmatrix} \tag{8.11}$$

where x is our exogenous variable with respect to which we are doing the comparative statics exercise. If we solve this for $x = \theta$, and evaluate it at $\theta = 1/2$, we obtain:

$$\left.\frac{d\ Tr_u^*}{d\ \theta}\right|_{\theta=1/2} = \frac{-4\zeta f''(g_u)u'(g_u)}{-f''(g_u)C''(Tr_u)} > 0, \quad \left.\frac{d\ t_u^*}{d\ \theta}\right|_{\theta=1/2} = \frac{4\zeta f''(g_u)u'(g_u) - 2\zeta u'(g_u)C''(Tr_u)}{-f''(g_u)C''(Tr_u)} < 0 \tag{8.12}$$

The signs are easily assigned knowing that $f(\cdot)$ ($C(\cdot)$) is a strictly increasing concave (convex) function. This leads us to prove Proposition 2, according to which $Tr_a < Tr_u$ ($Tr_a > Tr_u$) for $\theta > 1/2$ ($\theta < 1/2$).

Proof of Lemma 2 and Proposition 3.

From Propositions 1-2 we know that:

for	$\theta = 0$	$\theta = 1/2$	$\theta = 1$
Public Good	$g_a < g_u$	$g_a > g_u$	$g_a > g_u$
Grants	$Tr_a > Tr_u$	$Tr_a = Tr_u$	$Tr_a < Tr_u$
Local Taxes	$t_a < t_u$	$t_a > t_u$	$t_a > t_u$

This implies, by continuity, that $\exists \bar{\theta} \in [0, 1/2]$ s.t. $t_a = t_u$, and $g_a > g_u$.

Proof of Proposition 4.

The probabilities of winning of the incumbent aligned and unaligned mayors are:

$$p_a = \frac{1}{2} + \zeta[u(g_a) - t_a], \quad 1 - p_u = \frac{1}{2} + \zeta[(1 - 2\theta)u(g_u) - t_u]$$

As we can see only p_u is affected by the value of θ, while p_a is constant across the whole span of θ. When $\theta = 0$, from Proposition 3.2 we know that $g_a > g_u$ and that $Tr_a > Tr_u$, which implies that $t_a < t_u$, and therefore that $p_a > 1 - p_u(\theta|\theta = 0)$.
From Lemma 2 we know that $\theta = \bar{\theta}$ implies $t_a = t_u$, and $g_a > g_u$. This in turn means that $p_a > 1 - p_u(\bar{\theta})$.

By continuity, these findings imply that $p_a > 1 - p_u$ for $\theta \in [0, \bar{\theta}]$. It is not possible to assess whether this is true also for other values of $\theta \in [\bar{\theta}, 1]$. Nevertheless, again by continuity, we can state that this will be true also in a small-enough neighborhood of $\bar{\theta}$.