Intergovernmental Grants as Signals and the Alignment Effect: Theory and Evidence

Emanuele Bracco[a], Ben Lockwood[b,d,e], Michela Redoano[b,*], Francesco Porcelli[c,f]

[a]*Department of Economics, Lancaster University, Lancaster LA1 4YW, UK.*
[b]*Department of Economics, University of Warwick, Coventry CV4 7AL, UK.*
[c]*Department of Economics, University of Exeter, Rennes Drive, Exeter EX4 4PU , UK.*
[d]*Centre for Economic Policy Research (CEPR), 77 Bastwick Street, London EC1V 3PZ*
[e]*Centre for Business Taxation, Oxford University,Park End Street, Oxford OX1 1HP UK.*
[f]*SOSE - Soluzione per il Sistema Economico S.p.A, Via Mentore Maggini 00143 Rome, Italy.*

Abstract

This paper provides a simple political agency model to explain the effect of political alignment between different tiers of government on intergovernmental grants and election outcomes. Key features of the model are: (i) rational voters interpret public good provision as a signal of incumbent competence, and (ii) realistically, grants are unobservable to voters. In this setting, the national government will use the grant as an instrument to manipulate the public good signal for the benefit of aligned local incumbents and challengers. Then, aligned municipalities receive more grants, with this effect being stronger before elections, and the probability that the aligned local incumbent is re-elected is higher. These predictions are tested using a regression discontinuity design on a new data-set on Italian municipalities. At a second empirical stage, the national grant to municipalities is instrumented with an alignment indicator, allowing estimation of a flypaper effect for Italian municipalities.

Keywords: Fiscal Federalism, Political Competition, Accountability, Flypaper effect

*Corresponding author at: Department of Economics, University of Warwick, Coventry CV4 7AL, UK. Tel. +44 (0) 24 765 23032. Email: Michela.Redoano@warwick.ac.uk

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1. Introduction

This paper makes two contributions. First, it presents a new theory of discretionary inter-governmental grants, based on a principal-agent model of multi-level government with political parties. In this theory, grants are *signals*, rather than *bribes*, as in standard political economy theory of grants (Cox and McCubbins, 1986; Dixit and Londregan, 1995, 1998). Specifically, a higher grant raises local public good provision, and the latter signals a higher local incumbent ability to the electorate. Assuming that central government cares about the electoral fortunes of politically aligned incumbents, this provides an incentive for the center to donate to districts with aligned incumbents[1]. By doing so, the center boosts the signal for the aligned incumbents, thus increasing their probability of re-election. For non-aligned districts, the effect works in reverse; a lower grant weakens the quality signal for the non-aligned incumbent, thus boosting the electoral chances of the challenger. This theory extends recent studies of the effects of grants on the behavior of rent-seeking politicians, notably Brollo et. al. (2013), by introducing an upper level of government and endogenizing the choice of grant.

Second, we develop and test a number of empirical predictions of our theory. The first prediction is of course, an alignment effect in grants. The second, which is new, is that a higher grant increases the probability of incumbent re-election, so that there is an alignment effect on incumbency advantage. Third, we predict that the alignment effect is stronger in election years than in non-election years. We also predict that conditional on grants, (i) local spending and taxes are independent of alignment, and (ii) there is a flypaper effect i.e. a one dollar increase in the grants has a bigger positive effect on local government spending than does an equivalent rise in private income. These last two predictions suggest that the flypaper effect can be identified by instrumenting grants by the alignment status of the local government.

[1]This result is not new; Arulampalam et al. (2009) have the same finding in a distributive politics model where a national government can "buy" support from swing voters for aligned local incumbents. What is new is that our result is established in a micro-founded political agency model, where the mechanism at work can be identified.

We then take these predictions to an original data-set on Italian mayoral elections and public finance for the period 1998-2010.[2] Italy is a good laboratory to test our hypotheses, as in Italy, grants from central government to municipalities have a large discretionary element, unlike most other OECD countries[3]. Our dataset includes almost 500 municipalities between 1998 and 2010, who depend on largely discretionary grants from central governments to fund around 25% of their expenditure. Moreover in the period covered by our data-set, the incumbent party at the central level has changed three times (in 2001, 2006 and 2008), and each year local elections were held in a number of municipalities. This gives us the variation in alignment that is needed to test our theory.

We use a regression discontinuity design to identify the alignment effects on grants and incumbent advantage.[4] Specifically, we compare municipalities where the elected mayor is *just* aligned with central governments with ones where the mayor is *just* unaligned, where "just aligned" means that the mayor won the election with a small margin and that the mayor and the central government belong to the same party. Using this design, we find highly significant alignment effects that are robust across a number of different specifications, for both grants and incumbency. If a municipality is politically aligned with the party in power at the central level, it will be rewarded with on average, 40% more grants than unaligned municipalities. The probability that the aligned incumbent mayor (or his coalition) is re-elected in the election is, on average, 30% higher than in non-aligned ones. Moreover, this alignment effect is stronger in the run-up to municipal elections than afterwards, in line with the theory.

The first empirical results tell us that alignment is potentially an appro-

[2]Data of Italian mayoral elections are taken for the period 1998-2008, therefore for the last two years we included in the sample only municipalities that did not have elections.

[3]Formula grants are extensively adopted, for example, in: Australia (82% of total grants to local government), Austria (98%), Denmark (97%), Portugal (85%), France (95%), United Kingdom. Discretionary ones are highly employed, for example, in Australia (at state level 90%), Czech Republic (88%), Turkey (100%). Data are our calculations from OECD Revenue Statistics, 2005 edition.

[4]The advantage of this design is that it overcomes a fundamental identification problem—the potential correlation between fiscal choices and the ideological characteristics of its voters—to identify the alignment effect on tax setting, grant allocation and public spending. A similar approach, in the context of grant allocation only, has been used in independent works by Brollo and Nannicini (2012) and Migueis (2013).

priate instrument to use in testing the effect of the grant on local expenditure and tax revenues. So, we test the effect of alignment on these variables[5], instrumenting the grant by an alignment dummy and also the margin of alignment. The IV estimates indicate the presence of a flypaper effect. First, public spending increases by about 0.4 Euros per capita for each Euro increase in grants. On the other hand, a Euro increase in private income has a negligible effect on public spending. So, the overall flypaper effect is around 0.4, in line with the results surveyed in Inman (2008).

The paper is organized as follows. The next section discusses the related literature. Section 3 introduces the theoretical framework, and Section 4 presents the main theoretical results. Section 5 presents some background information on Italy, data description and the econometric strategy. Sections 6 discuss the main empirical results on transfers and incumbents and Section 8 is devoted to the flypaper effect. Section 9 concludes.

2. Related Literature

Our work speaks to at least four related literatures. First, on the theoretical side, our paper develops a new political economy theory of intergovernmental transfers based on a principal-agent model of multi-level government. This extends the existing literature in two ways. First, there is now a huge literature on political agency (summarized in for example, Persson and Tabellini, 2002; Besley, 2007), which stresses the role of elections in screening and monitoring politicians. However, this literature focusses on one level of government, and has hardly considered intergovernmental grants. One exception is Brollo et al. (2013), which shows how higher grants from central governments can have negative effects on the behavior of lower-level governments in that the higher the transfer, the greater the rent taken by the lower-level incumbent, and when entry of incumbents is endogenized, the less good is incumbent quality. However, in that paper, grants are treated as exogenous[6]. Our theoretical contribution is to endogenize the grant in a

[5]In the Online Appendix we propose two alternative exercise, where the dependent variable is in turn (i) municipality expenditure net of (national and regional) grants, which corresponds to the sum of local taxes and fees, (ii) the total amount of public expenditures. The results for the estimation of the flypaper effect are very similar and around 40%

[6]Bordignon et al. (2013) extend Brollo et al. (2013) to allow for two "quality" dimensions of politicians. Richer municipalities (with larger tax bases) are more likely to attract

setting very similar to Brollo et al. (2013). So, this paper is the first, to our knowledge, to study intergovernmental grants in an agency framework.

Our approach is also in contrast to a "distributive politics" theory of intergovernmental grants due originally to Lindbeck and Weibull (1987), Dixit and Londregan (1995), and extended to a fiscal federalism setting more recently by Dixit and Londregan (1998) and Arulampalam et al. (2009)[7]. This literature takes a Downsian view; parties can pre-commit to intergovernmental transfers prior to the election, and these transfers are observable by voters, both strong assumptions. In Dixit and Londregan (1998), national parties choose intergovernmental transfers to maximize their vote share in the national election, taking into account any redistribution of these funds amongst voter groups by state governments. They find that the transfer from the center to a given state will be higher, the greater the average "clout" of voting groups in that state, where "clout" depends on the relative number of "swing" voters in that group, and how cheap those votes are to buy (the weight that voters in the group put on consumption relative to ideology).

Arulampalam et al. (2009) modify the Dixit-Londregan set-up to allow transfers from national government to impact *directly* on voters' incomes, and assume that national governments do not contest an election, but rather design grants to maximize the vote share of the aligned local candidates. Moreover, they assume that if the local and national incumbents are *not* aligned, the "goodwill" or utility increment generated by the grant is shared between the local incumbent and challenger (the latter being by definition, aligned with the national incumbent, as there are only two parties). Specifically, it is assumed that the local incumbent gets a share θ of the goodwill, and local challenger $1-\theta$. The qualitative predictions of the theory depend crucially whether this share is greater than one half. This θ is simply taken as exogenous in their theory, and indeed cannot be meaningfully endogenized in their model. One contribution of our theoretical model is that it effectively endogenizes θ; see Section 4 below for more discussion.

On the empirical side, there are several related literatures. First, there is the literature on political alignment effects on intergovernmental grants. There are a number of papers that establish, for various countries, that polit-

"productive" rather than "rent seeking" politicians. In their paper, rather than grants, the exogenous variation is from the 1999 reform in Italy that gave municipalities the power to set a surcharge on the income tax.

[7]See Johansson (1999) for an empirical test of the distributive politics theory.

ical alignment with the center generates higher levels of discretionary grant to the local government, for example, Levitt and Snyder (1995) and Larcinese et al. (2006), for the US, Solé-Ollé and Sorribas-Navarro (2008) for Spain, Arulampalam et al. (2009) for India, Case (2001) for Albania, Rodden and Wilkinson (2004) for India, Brollo and Nannicini (2012) for Brazil, Migueis (2013) for Portugal. In particular, our theoretical finding that alignment effects are stronger in election years is consistent with Brollo and Nannicini (2012).

Second, there is a large literature on incumbency advantage. In particular, several recent papers use a 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. The main contributions include Lee (2001, 2008); Lee et al. (2004) and Ferreira and Gyourko (2009). The common finding is that an incumbent policy maker enjoys a considerable advantage in winning elections.[8] 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 being just aligned with the central government increases an incumbent mayor's chance of being re-elected compared with a just unaligned mayor.

Third, our paper also relates to the large empirical literature on the flypaper effect (for surveys, see Hamilton, 1983 and Inman, 2008). One of the main problems faced by this literature is that intergovernmental grants may be endogenous, and thus unbiased estimates of the flypaper effect require either (i) identification of truly exogenous changes in intergovernmental grants as in Dahlberg et al. (2008), or (ii) appropriate instruments for grants, as in Knight (2002). Our work is a contribution to the second strand of the literature; we are the first, to our knowledge, to use alignment as an instrument to estimate the flypaper effect.

Finally our paper is related to Bracco and Brugnoli (2012) and Cioffi et al. (2012); they both analyze Italian local public finance data to investigate the effect of political competition on policies. Bracco and Brugnoli (2012) focus on the effect mayoral electoral system on grant allocation and finds that plurality elected mayors received less grants than colleagues elected under

[8]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.

dual ballot system. Cioffi et al. (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. A Theoretical Framework

3.1. The Environment

In a country there are two tiers of government: a central government, and $i = 1, ..n$ local jurisdictions, also referred to as municipalities. There are two parties L and R, which operate both at the central and local level. Without loss of generality, we assume that party L is ruling at the central level and in a subset M_A of local authorities, while the complementary subset of non-aligned municipalities M_N are ruled by party R. The subscripts A and N indicate that left-wing localities are aligned with the central government, while right-wing ones are non-aligned.

In each of two periods $t = 1, 2$, the incumbent mayor in municipality i produces a local public good via the following production function

$$g_{i,t} = F(r_{i,t}) \exp(e_{i,t} + a_{i,t}),\ r_{i,t} = \tau_{i,t} + T_{i,t} \tag{1}$$

where $e_{i,t}$, $a_{i,t}$ are incumbent's effort and ability levels, $\tau_{i,t}$ is local tax revenue (from a property or income tax) and $T_{i,t}$ is a transfer from the central government. So, $r_{i,t}$ is total fiscal resources of the municipality, and is also equal to public expenditure. Also, we assume that $F(r_{i,t})$ is non-negative, increasing in $r_{i,t}$, and concave. Then, under these assumptions, $g_{i,t}$ is non-negative.

Finally, the incumbent abilities $a_{i,t}$ are determined as follows. First, the initial incumbent's ability, $a_{i,1}$ is drawn from a distribution with mean zero, where the distribution is common knowledge between voters and the incumbent. If the initial incumbent retains office, his ability is the same in the second period i.e. $a_{i,2} = a_{i,1}$. If he loses office, $a_{i,2} = a_{i,c}$, where $a_{i,c}$ is the challenger's ability, drawn from the same distribution as $a_{i,1}$.

The order of events is as follows. In period 1, each incumbent mayor chooses $e_{i,1}, \tau_{i,1},\ i = 1, \ldots, n$, and the national government chooses $T_{i,1},\ i = 1, \ldots, n.$. Then, $g_{i,1}$ is determined via (1). Having observed $g_{i,1}, \tau_{i,1}$ but not $e_{i,1},\ T_{i,1}$, the voters in region i vote in municipal elections for the incumbent or the challenger. The winners take office in period 2 and choose $e_{i,2}, \tau_{i,2},\ i = 1, \ldots, n$. The national incumbent does not face an election and retains office, and chooses $T_{i,2}\ , i = 1, \ldots, n$ in period 2.

3.2. Payoffs

In each municipality i, there are a large number (a continuum of measure 1) of identical voters who have utility

$$u(g_{i,t}, c_{i,t}) = \ln g_{i,t} + c_{i,t} \tag{2}$$

where $c_{i,t}$ is consumption of a private good. The private budget constraint of voter j in municipality i at time t is $c_{i,t} = m_j - d(\tau_{i,t})$ where m_j is private income, and $d(\tau_{i,t})$ is the cost to the household of tax revenue $\tau_{i,t.}$. We assume $d(0) = 0,\ d', d'' > 0,\ d(\tau) > \tau, \tau > 0$, so that d captures the sum of loss of income and any of deadweight losses and compliance costs of taxation. This specification is standard in the public finance literature (e.g. Bolton and Roland, 1997).

Substituting the budget constraint into (2), and ignoring m_j, we get a voter payoff over government policy of $\ln g_{i,t} - d(\tau_{i,t})$. Moreover, following Dixit and Londregan (1998), voter v in municipality i has an ideological preference for the incumbent, measured negatively by X_i. So, voter v's overall payoff is

$$\ln g_{i,t} - d(\tau_{i,t}) - X_i \tag{3}$$

We assume X_i is distributed independently across voters and uniformly on $[-1/(2\zeta_i),\ 1/(2\zeta_i)]$, with ζ_i inversely measuring the dispersion of ideological preferences in municipality i. So, ζ_i measures the strength of swing voting i.e. the sensitivity of voting choices to performance in office in municipality i.

The incumbent municipal politician is quasi-benevolent, i.e. cares about voter utility from $g_{i,t}, \tau_{i,t}$, but also dislikes effort and values the probability of winning the election $p_{i,t}$:

$$\lambda \left(\ln g_{i,t} - d(\tau_{i,t})\right) - \psi(e_{i,t}) + p_{i,t} V_{i,t},\ \lambda > 0 \tag{4}$$

Here, λ is the weight on voter welfare, and Here, $\psi(.)$ is a twice differentiable, strictly increasing and strictly convex cost of effort. Moreover, $V_{i,t}$ is the continuation value of office for the incumbent, calculated at the point when policy is chosen at time t. In period 2, by definition, $p_{i,2} \equiv V_{i,2} \equiv 0$; it can be shown (see the online Appendix) that $V_{i,1} = V$ for all municipalities, and $p_{i,1}$ is determined as described below. We assume, without loss of generality, that $V = 1$, so the payoff from re-election is measured solely by $p_{i,1}$. Overall, (4) is quite a standard objective for the politician (see for example Besley,

2007).

The incumbent national politician is similarly quasi-benevolent, and also (as in Arulampalam et al., 2009) cares about the re-election payoffs of incumbents in aligned jurisdictions, and challengers in non-aligned jurisdictions. So, his payoff is

$$\sum_{i \in M_A} p_{i,t} + \sum_{i \in M_N} (1 - p_{i,t}) + \sum_{i \in M} \lambda \left(\ln g_{i,t} - d(\tau_{i,t}) \right) - \sum_{i \in M} T_{i,t}$$

where $M = M_A \cup M_N$ is the set of all municipalities, and the cost of providing $T_{i,t}$ to a municipality i is normalized to unity. For simplicity, we assume a discount factor of one for all agents.

3.3. Discussion

The basic structure of the model is very similar to that of Brollo et al. (2013). The main differences are twofold. First, the details of the public good production function and voter utility function are somewhat different, and second, more importantly, we endogenize the transfer $T_{i,t}$ from central government. Note that a crucial assumption is that $T_{i,t}$ is not observed by the voter at the time of voting; without this, grants could not be used to signal. We believe that the assumption that $T_{i,t}$ is not observed is very realistic; voters typically do not understand the complex rules governing formula grants, much less understand how discretionary grants are allocated. Finally, note that the assumption that the incumbent does not know his own ability at the beginning of his term of office is a widely made one in the literature on political principal-agent models (e.g. Persson and Tabellini, 2002; Alesina and Tabellini, 2007); it keeps the analysis tractable while allowing the incumbent to signal his ability via higher public expenditure in equilibrium.

4. Theoretical Results

We solve the model backwards. In the second period, voter payoffs are increasing in incumbent ability. In fact, as shown in the online Appendix, incumbents of all abilities choose the same levels of tax and effort in the second period, so that the difference in second period voter payoffs over government policy between incumbents with abilities a, a' is just $a - a'$. So, because incumbent ability is persistent, the voter in i wishes to re-elect the incumbent only if the difference between his expected first-period ability $a^e_{i,1}$,

and zero, the expected ability of the challenger, is higher than the voter's ideological preference for the challenger, measured by X_i. So, the voter will re-elect the incumbent if

$$a^e_{i,1} \geq X_i \tag{5}$$

From now on, we drop time subscripts, as all relevant variables are first-period. So, we see from (5) that the probability of the incumbent winning, p_i, is generally

$$p_i = \Pr\left(X_i \leq a^e_i\right) = 0.5 + \zeta_i a^e_i \tag{6}$$

How is a^e_i determined? We can assume without loss of generality that the voter makes his inference about a_i by observing his utility from public good provision, which is

$$\ln g_i = f(\tau_i + T_i) + e_i + a_i, \;\; f = \ln F \tag{7}$$

Note that by the assumptions on F, $\;\; f$ is strictly increasing and concave.[9] Then, if the voter expects effort and the transfer to be at levels e^e_i, T^e_i, but observes $\ln g_i$, his inferred value of a^e_i must satisfy

$$\ln g_i = f(\tau_i + T^e_i) + e^e_i + a^e_i \tag{8}$$

Then, combining (7), (8), we get

$$a^e_i = f(\tau_i + T_i) + e_i - f(\tau_i + T^e_i) - e^e_i + a_i \tag{9}$$

That is, voter expectations are rational, up to any error in forecasting T_i, e_i.

The incumbent politician in i perceives his probability of victory to be the expectation of p_i with respect to a_i. Combining (6),(9), we see that this is

$$p^e_i = 0.5 + \zeta_i \left(f(\tau_i + T_i) + e_i - f(\tau_i + T^e_i) - e^e_i\right)$$

[9]This functional form implies that effort and tax revenue are independent in the sense that $\frac{\partial^2 \ln g}{\partial \tau \partial e} = 0$. If the two inputs τ, e are complements i.e. this cross-partial is strictly positive, Propositions 1, 3 and 4 would still hold. Proposition 2 instead would not, as—conditional on grants—aligned mayor would exert less effort and levy lower taxes.

So, local government i chooses τ_i, e_i to maximize

$$\lambda(f(\tau_i + T_i) + e_i - d(\tau_i)) - \psi(e_i) + 0.5 + \zeta_i p_i^e$$

taking T_i, T_i^e, e_i^e as given. The first-order conditions with respect to τ_i, e_i are:

$$\lambda + \zeta_i = \psi'(e_i),\ \lambda f'(\tau_i + T_i) + \zeta_i \left(f'(\tau_i + T_i) - f'(\tau_i + T_i^e)\right) = \lambda d'(\tau_i) \quad (10)$$

respectively. In equilibrium, expectations are rational, i.e. $T_i^e = T_i, e_i^e = e_i$. So, (10) reduces to

$$\lambda + \zeta_i = \psi'(e_i),\ f'(\tau_i + T_i) = d'(\tau_i) \quad (11)$$

The national government chooses T_i to maximize

$$\sum_{i \in M_A} \zeta_i p_i^e - \sum_{i \in M_N} \zeta_i p_i^e + \sum_{i \in M} \lambda(f(\tau_i + T_i) + \ e_i - d(\tau_i)) - \sum_{i \in M} T_i$$

taking $\tau_i, e_i, T_i^e, e_i^e$ as given. By the same argument, at equilibrium, the first-order conditions with respect to T_i are

$$(\lambda + \zeta_i) f'(\tau_i + T_i) = 1,\ i \in M_A \quad (12)$$
$$(\lambda - \zeta_i) f'(\tau_i + T_i) = 1,\ i \in M_N \quad (13)$$

Collectively, these first-order conditions characterize any Nash equilibrium to the game between the central government and the n municipalities. From these first-order conditions, we can then establish the following results, all of which are proved in the Online Appendix.

Proposition 1. *If i is aligned, and j is non-aligned, then $T_i > T_j$.*

The intuition is as follows. First, national government has a baseline incentive to give transfers, because it cares about voter welfare. This is captured by the terms $\lambda f'$ in (12)-(13). In addition, the national government perceives that by raising T_i, there will be an unanticipated (by the voter) increase in g_i, and the incumbent will get the credit for this, raising the re-election probability p_i. So, the national government will want to give more to aligned districts, and less to non-aligned ones. This is captured by the term $\zeta_i f'$ in (12), and $-\zeta_i f'$ in (13).

We can now compare our results to Arulampalam et al. (2009). They assume that with alignment, the "goodwill" or utility increase for the voter

generated by the grant is all captured by the local incumbent, but with non-alignment, it is shared between the local incumbent and challenger in *exogenous* shares θ, $1-\theta$ respectively. Their Proposition 1, one of their main results, states that aligned incumbents get higher grants, independently of voter responsiveness ζ_i when the share of credit going to the challenger, $\theta < 0.5$, because when this holds, a grant to a non-aligned municipality unambiguously benefits the incumbent. In our micro-founded approach, building on well-known political economy models, we see that the non-aligned incumbent gets all the credit i.e. $\theta = 1$.

Finally, note that Proposition 1 is a result for election years. By contrast, in the second period of the model, there are no alignment effects i.e. transfers to aligned and non-aligned municipalities are the same. So, generally, our empirical prediction is that alignment effects will be stronger in election years. The absence of an alignment effect in non-election years is an artefact of the simplicity of the model and such an effect could easily be introduced in a number of ways e.g. by supposing that the national government cares more about voter welfare in the aligned municipalities.

The second result says that alignment effects on local taxes and spending only work through transfers.

Proposition 2. *Conditional on transfers, local tax revenue τ_i and spending $r_i = \tau_i + T_i$ are independent of alignment.*

The proof of this is obvious from (11). Writing the relevant conditions out in full, for any municipality i, we have:

$$f'(\tau_i + T_i) = d'(\tau_i) \tag{14}$$

So, τ_i is independent of e_i, which does depend directly on alignment. It then follows directly from (14) that tax revenue and expenditure only depend on alignment via transfers. We can now be more precise about how transfers affect local taxes and spending:

Proposition 3. *A given increase in transfers will reduce taxes by less than the change in the transfer i.e.*

$$\frac{d\tau_i}{dT_i} = -\frac{f_{rr}}{f_{rr} - d''} > -1$$

and thus increase expenditures by

$$\frac{dr_i}{dT_i} = 1 - \frac{f_{rr}}{f_{rr} - d''} > 0$$

The intuition for this result is that as the transfer T_i rises, the marginal deadweight loss of taxation falls, encouraging the municipality to raise more revenue overall, and thus τ_i does not fall one-for-one with T_i.

This result leads to a prediction about the flypaper effect in our model. The flypaper effect is usually understood to be the stylized fact that grants have a bigger positive effect on local government spending than does an equivalent rise in private income (Inman, 2008). In our setting, households preferences are linear in income (see (2)), so there is no private income effect on government spending. However, we see from Proposition 3 that $\frac{dr_i}{dT_i} > 0$, so our model predicts a flypaper effect of transfers. Moreover, these results suggest a way of identifying the flypaper effect via the use of alignment as an instrument, as discussed in Section 8 below.

Finally, we ask how the alignment effect described in Proposition 1 impacts upon the fortunes of the incumbent in an election. We have seen that higher transfers from the center lead to greater public good provision, and one might expect that might help the incumbent win the election. It turns out that if all voters are fully rational, that is not the case; rational voters "see through" the higher $g_{i,t}$ because they rationally anticipate that aligned incumbents get higher transfers.

However, it seems implausible that all voters behave like that; after all, the retrospective voting literature demonstrates empirically that good performance is rewarded (see for example Fiorina, 1978; Wolfers, 2002). This can be formalized in our model by assuming that there is a fraction $1 - \beta$ of the voters who are "naive retrospective" i.e. they are more likely to re-elect the incumbent if they see that $g_{i,1}$ was higher (or equivalently, they received a higher utility $\ln g_{i,1} - d(\tau_{i,1})$ in period 1). This can be contrasted with the "sophisticated retrospective" behavior of the fully rational voters in our model, who are more likely to re-elect the incumbent if they believe that a_i was higher.[10] Assume in particular that naive retrospective voter v votes

[10] A similar result might be obtained with a multi-period model with solely forward-looking voters. In such a model all voters would be more likely to vote for the aligned incumbent, as long as aligned jurisdictions kept on offering more public good for less tax.

for the incumbent if $\ln g_{i,1} - d(\tau_{i,1}) \geq X_i$, where X_i is distributed uniformly on $[-1/(2\zeta_i), 1/(2\zeta_i)]$, as for the rational voters. It is then straightforward to show that:

Proposition 4. *Assume that municipality i is aligned, and j is not. If some fraction $\beta > 0$ of voters are naive retrospective, and $\zeta_i \geq \zeta_j$, the incumbent is more likely to be re-elected in i than in j.*

The intuition is simply that when voters are weakly more responsive in the aligned jurisdiction ($\zeta_i \geq \zeta_j$), alignment weakly increases effort and strictly increases expenditure on the public good, thus increasing the level of the public good itself, and this increases the attractiveness of the incumbent for the naive retrospective voters.

5. Empirical Analysis

5.1. Background Information on Italy

In this section we present some relevant background information on the Italian electoral system and local public finance.

5.1.1. Tiers of governments, elections and parties

Italy is a unitary parliamentary republic with three sub-national levels: regions (*regioni*), provinces (*province*), and 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 *giunta,* to which tasks are delegated, including land management and environment (water, sewage, public hygiene), local transport, local police, culture and recreation, education (nursery schools, complementary education services such as transport and meal services). Mayors also have some revenue-raising powers, further described below.

Following a political reform that took place in 1992, mayors are directly elected for five-year terms[11] and are subject to a two-term limit. Mayors

Nevertheless, the model would be substantially more complicated than the current one, as one would need to include further assumptions as to what extent voters are forward looking, how much "memory" the serially-correlated ability a_{it} has; it would also require the formalization of upper-tier elections.

[11] Four years if elected before year 2000.

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). 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 an absolute majority, voters vote again on just two candidates, the winner and the runner-up of the first round.

Generally speaking, in our sample period the political system was dominated, both at the local and at the national level, by two large electoral cartels, the center-right and the center-left. At the national level, the center-right coalition ruled Italy from 2001 to 2006 and again from 2008 to 2011. 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.

However, the two-tier electoral system means that the electoral cartels are less influential in the smaller municipalities. Specifically, in smaller municipalities, because of the first-past-the post system, there is less incentive for small parties and independents to form coalitions to support a single candidate, whereas in the larger municipalities, there is a strong incentive to field a candidate who can win at the first round. Coalitions, when they form, are usually easy to classify as left or right, because they usually affiliate with a national party. This means that the party of both the winning mayor and the other contestants in the election is much easier to classify as "left" or "right" in large municipalities.

This is shown in Table 1, which shows the type of party (or coalition of parties) of the winning mayors in all municipal elections from 1998 to 2008, using official data published by the Interior Ministry. Parties were classified as left or right, using the classification in Table AA4 of the Online Appendix. However, some could not be classified, for example, the *lista civica.* Table 1 indicates that for large municipalities, only a small fraction of the winners, about 5%, could not be classified as left or right. However, in the case of small municipalities, the reverse is true, and most of the winners, around 66%, could not be classified. Our study of alignment effects requires accurate identification of the party type (left or right). For this reason, we do not include the small municipalities in our data-set.

Insert Table 1 about here

5.1.2. Local Public Finance

Municipality expenditures are primarily in the areas of land management and environment (waste disposal, water, sewage, public hygiene), social services, education (schools, complementary education services), local transport, local police, culture and recreation. Municipalities' revenues come from two main sources: transfers from upper levels of government (mainly the central government) and own revenues (from own taxes and fees).[12]

The main source of own revenue for Italian municipalities is a property tax, called ICI (Imposta Comunale sugli Immobili),[13] introduced in 1992 and applied to real estate; the tax base is represented by the land registry income and mayors are free to set the tax rate within a given range (0.4% and 0.7% of income). Other important sources of own revenue are from the taxation of personal income, through the national income-tax surcharge, a waste disposal tax (TARSU), and fees (for example on the issue of parking permits and certificates, related to the occupation of public spaces and areas, on the use of public billboards).

Most of the remaining fiscal needs, about 30% of expenditure, are covered by intergovernmental grants (mainly unconditional) from the central government. It is important to note that these grants are not formula based. Every year, a Budget Bill determines the grant going to municipalities as a whole, and how it is distributed across municipalities. In practice, this involves a common percentage change (often negative in the last few years) for all municipalities, with an additional *ad-hoc* element, which is more likely to follow political, rather than efficiency and equity criteria. Indeed, the need for a radical reform of the whole grant allocation system towards a formula-based one has been widely recognized by Italian legislators[14].

[12]The use of debt is strongly restricted by the so-called "Internal Stability and Growth Pact", through which the central government limits the possibility of local authorities to incur debts, in order to comply with the EU constraints on deficit and debt. Moreover, the Art.119 of the Italian Constitution states that local governments can use debt financing only to cover capital expenditures. Therefore, as our analysis is focused on current expenditures, we abstract from considering the debt as an active source of financing.

[13]The property tax changed name, after a reform, in 2012 becoming IMU (Imposta Municipale propria).

[14]For example the national law n.42/2009 establishes the need to put in place a mechanism for the aggregation of the necessary parameters to calculate *standard expenditure needs*. The aim of the reform, which is currently being implemented, is to replace the old discretionary regime with a formula-based one.

5.2. Data Description

Our data set comprises financial, census, and election data at the municipal level from 1998 to 2010[15]. As described above, we restrict the analysis to large *comuni*. This leaves us with a sample of 526 local councils and 4086 observations.[16] Note also that, despite the fact the large municipalities only constitute about 10% in terms of number of *comuni*, over 60% of the population reside in large municipalities, which receive (depending on the year) between 64% and 71% of total central government transfers; detailed figures on grant allocation and population by municipality size are reported in Table AA5 of the Online Appendix.

Local elections take place in each municipality every five years, but not all at the same time. The large number of municipalities means that local elections occur every year in our sample. On the other hand, national elections have been held in 2001, 2006 and 2008, and at every national election, there has been a change in the ruling government coalition (from left to right in 2001 and from right to left in 2006, and again form left to right in 2008). Figure 1 visualizes the distribution of local governments by winning coalition for each year of the sample period. The figure is divided into four panels; the first and the third correspond to periods when the center-left coalition was in power at the national level, and second and the fourth correspond to the years dominated by a center-right national government.

Insert Figure 1 about here

In our regression discontinuity design (RDD) setting, 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 2 presents information on the number of elections by year and by winning coalition for aligned and non-aligned governments. It is interesting to note that the sample is equally split between aligned and non-aligned municipalities.

Insert Table 2 about here

[15]The dataset comprises electoral data from 1998 to 2008 and fiscal data and controls from 1998 to 2010.

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

Next, we construct our assignment variable for the RDD regressions, the margin of alignment, MA. This is defined as the difference between the percentage of votes obtained by the winning mayor and the percentage of votes obtained by the runner-up if the winner is aligned with the center, and minus this difference if the mayor is not aligned. If the mayor is elected in the first round (because he or she got an absolute majority), the first-round results are used, if a second round is held, then second-round results are used instead, (Table AA6 in the Online Appendix reports detailed information on first and second round elections). These political indicators have been collected from the Statistical Office of the Italian Ministry of Internal Affairs.

Table 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 4759 observations, but, if we consider only elections close to treatment thresholds, namely with a value of MA less than either 5% and 2%, the number of observations reduces drastically to 536 and 221 respectively; however the proportion of aligned and non-aligned municipalities remains virtually unchanged. Tables AA7 and AA8 of the Online Appendix report disaggregated information on the number of elections held in each year by winning coalition and alignment status.

Insert Table 3 about here

Our main dependent variables are: (i) current transfers from the central government to municipalities and (ii) local tax revenue. We focus on *current* expenditures and transfers 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. In particular, current transfers from the central government to municipalities are the item "*trasferimenti correnti dallo Stato*" in the municipality balance sheet.

Moreover, we employ a set of other controls which are generally thought to affect local public finance outcomes. First, we include variables measuring socio-demographic and geographical characteristics of municipalities, comprising resident population, proportion of population less than 14 and over 65 years old (the source of these variables is the Italian Institute of National

Statistics (ISTAT)). Second, we include economic variables, comprising income per capita from real estate and from other sources. The sources for these variables are the Ministry of Finance the Ministry of Interior.

Third, we include other political controls. First, we have dummies recording whether the incumbent mayor (or party) has been re-elected, if the mayor is elected at the second round, and if the municipality is aligned with the regional government. Moreover we also include dummies for political orientation both at the local and national level (the former equal to one if the mayor is supported by a center-left coalition and that latter equal to one if a center-left government is in power at the national level). Finally, we include an electoral cycle variable that records the number of years since the last local election. The sources for these variables are the Ministry of Interior.

Descriptive statistics for all the variables employed in the regressions are given in Table 4; 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.

Insert Table 4 about here

Looking at average *per capita* data for the full sample we can see that *comuni*'s current public expenditures amount to 790 Euros per capita, 20% of which is funded by grants from the central government. Figures for the restricted versions of the data set ($MA < 5\%$, $MA < 2\%$) are similar. Looking at our main controls, the values of the standard deviations suggest that there is a lot of variation within each variable included in the data set but the sample means for the three samples are similar.

As a further description of the data, Table AA3 of the Online Appendix 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 (177.42 and 132.50 Euros per capita), and raise lower taxes (236.88 and 250.85). 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.

6. Alignment and Transfers

6.1. Estimation Strategy

In this section we test the prediction of Proposition 1 on the effect of alignment on grant allocation. As already discussed, 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. Lee (2001, 2008) show 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 large sample size. Given the relatively limited 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 pth-order polynomial in the control function, in addition to the binary treatment indicator.

The model we estimate takes the following form:

$$\ln T_{i,t} = \gamma_0 AL_{i,t} + f(MA_{i,t}; AL_{i,t}) + \beta' X_{i,t} + \varsigma_t + \mu_i + v_{i,t} \qquad (15)$$

where $T_{i,t}$ is the *per capita* grant to municipality i at time t, and $AL_{i,t}$ 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. Finally, $MA_{i,t}$, the margin of alignment, already defined above, is our assignment variable. Recall that all observations with a positive (negative) $MA_{i,t}$ are municipalities which are aligned (unaligned) with the central government, and observations with a small $MA_{i,t}$ in absolute value refer to mayors who won the elections with a very small margin.[17]

[17]It is important to emphasize that both the alignment dummy and the assignment variable refer to the previous year's observation. This is due to the fact that, in the

We allow $f(MA_{i,t}; AL_{i,t})$ to be a *pth* order polynomial in $MA_{i,t}$, with coefficients all interacted with $AL_{i,t}$.[18] Finally $X_{i,t}$ is a vector of control variables, ς_t is a year dummy, and μ_i is the unobserved heterogeneity. We treat μ_i as a municipality fixed effect. The coefficient of interest is γ_0, which is our alignment effect at the zero threshold, and, following Proposition 1, its expected sign is positive.

As pointed out by Imbens and Lemieux (2008), the above estimation method may be sensitive to outcome values for observations far away from the threshold. To address this issue, as a robustness check, we also implement the *local linear regression* approach, which restricts the sample to municipalities in the interval $MA_{i,t} \in [-h, +h]$, where h is an optimally chosen bandwidth, here selected following the methodology suggested by Imbens and Kalyanaraman (2012).

6.2. Graphical Analysis

We begin with a graphical approach to make the main point clearly. Figures 2(a) and 2(b) show the margin of alignment, MA, on the horizontal axis, and the per capita grant allocated to each municipality on the vertical axis. Figure 2(a) reports the fitted values from a running-mean smoothing of per capita grants fitted over the interval [-40, +40] in the MA, performed separately on each side of the cutoff point, as well as the 95% confidence intervals. Following Lee and Lemieux (2010) we include 50 bins in all figures. Figure 2(b) reports graphical representation of the local linear regression model of per capita grants in the MA fitted over the optimal bandwidth.

Insert Figure 2 about here

The figures show quite clearly that there is a discontinuity in the distribution of grants between aligned and unaligned municipalities at $MA = 0$. Figure 2(a) also shows that grants tend to rise with the margin of alignment, even away from the zero threshold.

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.

[18] That is, our control function is: $f = \beta_{01} MA_{it} + \beta_{02} MA_{it}^2 + ... + \beta_{0p} MA_{it}^p + \beta_1 AL_{it} MA_{it} + \beta_2 AL_{it} MA_{it}^2 + ... + \beta_p AL_{it} MA^p$.

6.3. Regression Results

The results of regression (15) are displayed in Table 5. As the dependent variable is the log of the per capita grant, the coefficient γ_0 in equation (15) has the interpretation of the percentage change in per capita transfer due to the alignment effect.[19] In all our specifications standard errors are clustered at municipal level.

The table is divided into three panels. In the first panel we display results for the so-called OLS regression model (which corresponds to equation (15) in the case of zero-order polynomial in the control function). In the second panel we report the estimated γ_0 in equation (15) considering the optimal polynomial order in the control function (according to tests reported in Table A1, the optimal polynomial order is the the 4th). The coefficients' point estimates obtained considering all polynomial orders are displayed in Table AA1 of the Online Appendix. We produce two sets of results, the first one generated by employing the full RDD sample, and the second one by restricting the sample to those municipalities whose mayor was elected in the second round. By doing so we address a possible concern on the robustness of our results due to the fact that 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 in the first round and for those decided in a second round.[20]

Finally, in the bottom panel we report the results for the local linear regression model, where the sample is restricted to observations within an optimally chosen bandwidth, calculated following Imbens and Kalyanaraman (2012), using the full RDD sample. As a robustness checks we also present results for when the sample is restricted to double as well as half the optimal bandwidth size.

For each specification we propose three variations. In the first column,

[19] In a previous working paper version of this paper Bracco et al. (2013) we present results when the variables are in level, which are qualitatively similar.

[20] Recall that second-round elections are, by definition, 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 is clearly confirmed by looking at the summary statistics for the first round election dummy reported in Table 4. Taking the full sample, 44% 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 90%.

we run the regressions without additional controls, in the second one we include the full set of controls listed in Table 4 as well as year dummies, in the third column we also include a municipality fixed effect. As pointed out by Pettersson-Lidbom (2008), the inclusion of these additional covariates is a way of checking whether alignment status is as good as randomly assigned (conditional on $f(MA_{i,t}; AL_{i,t})$) and it should not significantly affect the estimate of the alignment effect. Finally, the last column reports the number of observations.

Insert Table 5 about here

A common denominator to all these specifications is that the estimated effect of alignment on grants is always positive and generally highly significant. In order to obtain more precise estimates on the magnitude of the alignment effect in Table A1 we report the Akaike Information Criterion (AIC) as well as p-values from the goodness-of-fit test (F-test), which provide formal guidance on the choice of the best polynomial order.[21] According to these criteria the polynomial order that fits the data best is the fourth. Using the full sample, this means that a *just* aligned municipality should receive between 36% and 47% more grants than a *just* unaligned one. The specifications with and without controls produce very similar results and it is consistent with the hypothesis that the use of the control function makes redundant the inclusion of further controls. Also the magnitude of these coefficients is in line with the results obtained from the local linear regression model using an optimal bandwidth, which, in our case, restricts the sample to the observations within $\pm 13\%$ MA. The estimated coefficients for the local linear regression model are indeed between 0.33 and 0.44. Moreover it is important to note that RDD coefficient estimates are more stable to the introduction of control variables than OLS coefficient estimates, showing that the control function reduces the risk of biased estimates due to the problem of omitted variables.

If we consider only municipalities where the mayor was elected in the second round the number of observations drops from 3141 to less than half

[21] Following Lee and Lemieux (2010), this is 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. A bin width of 0.01 has not been used because was generating to much collinearity in relation to the size of the sample.

(1263), but the results remain very similar to the ones previously analyzed. Note also that for this sub-sample, the margin of alignment is on average smaller, as can be clearly seen from Table 4. Full summary statistics for the sample of second round election are displayed in Table AA9 of the Online Appendix.

Finally, in Table A3 of the Appendix, we show that the effect of alignment on grants is stronger at the end of the term, as predicted by the theoretical model. In particular, in Table A3 we estimate the model (15) including, as an additional regressor, the interaction between the alignment dummy and the electoral cycle, defined in section 5.2, which records the number of years since the last election in the municipality. The coefficient of the interaction term is positive and statistically significant. In the same table we also provide a different specification of the electoral cycle defined by a dummy for the last year of the term. Again, the alignment effect is stronger at the end of the term. These last findings are in line with Brollo and Nannicini (2012).

Further analysis in support of the correctness of the procedure we implement is provided in Figure A1 and Table A2. Using the McCrary (2008) procedure, Figure A1 shows a graph of the distribution of MA computed over bins with a bandwidth of 0.01 (100 bins in the graph), along with a smooth 4th-order polynomial model.[22] The graph shows no evidence of discontinuity at the cutoff. Therefore, there is no statistical evidence of manipulation of the assignment variable around the cutoff. Another important test for the validity of the RD design is to examine whether the covariates do not exhibit any discontinuity in relation to MA. As suggested by Lee and Lemieux (2010) we test the null of discontinuities in all covariates simultaneously estimating a set of regressions where each covariate is a dependent variable, and the explanatory variables are AL, and the polynomial in MA. This system is estimated by Seemingly Unrelated Regression (SUR), and then we perform a chi-square test for joint hypothesis that AL is insignificant in all regressions (zero discontinuity). As reported in Table A2 we cannot reject the null hypothesis of zero discontinuity in all covariates in relation to almost all polynomial orders of the margin of victory. Therefore, we can conclude that there is no statistical evidence of discontinuity in the covariates.

[22]Higher order polynomial produce very similar results.

7. The Turnover of Incumbents

7.1. Estimation Strategy

We now investigate our prediction that the probability of the incumbent mayor being re-elected is higher when aligned with the central government. To this, we estimate the following model:

$$I_{i,e+1} = \gamma_1 AL_{i,e} + f(MA_{i,e}; AL_{i,e}) + \beta' X_{i,e} + \tau_e + \mu_i + v_{i,e} \qquad (16)$$

Note that the temporal unit is now election years, e. The outcome variable is now $I_{i,e+1}$, which is equal to one if the winner of the local election at time $e+1$ is the same (or at least belongs to the same party) as the winner in the previous election (held at time e) and zero otherwise. As before, $f(MA_{i,e}; AL_{i,e})$ is a polynomial function of up to fourth order in $MA_{i,e}$, where the coefficients are interacted with $AL_{i,e}$. The coefficient of interest is γ_1, which is our alignment effect on the probability of incumbent re-election; γ_1 should be interpreted as the difference between the (absolute) probability of re-election of the aligned incumbent and the unaligned one. We expect γ_1 to be positive.

The variable $I_{i,e+1}$ is calculated in two ways. First, we use a broad definition of incumbent, *incumbent party*, under which $I_{i,e+1}$ is equal to 1 if the winning mayor at elections held at time $e+1$ in municipality i belongs to the same *coalition* as the winner of the elections at time e; this is quite consistent with the Italian case where usually the deputy mayor steps in when the incumbent mayor cannot re-run for elections. Second, we consider a narrower definition, *incumbent candidate*, where $I_{i,e+1}$ is equal to 1 only if the incumbent *mayor* is re-elected for the second time at $e+1$ and zero otherwise. So under this definition we exclude all the cases where the mayor cannot run because of term limits (there is a limit of two consecutive terms for Italian mayors).

7.2. Graphical Analysis

Figures 3(a),(b) show the plots of the probability of re-election within each bin against MA, the margin of alignment in the previous election. Following Lee and Lemieux (2010) we include 50 bins in all figures. We also report the fitted values from a running-mean smoothing of the variable on the vertical axis performed separately on each side of the cutoff point (the darker solid line) as well as the 95% confidence intervals (the two lighter

lines). Both figures clearly show the "jump" in the probability of incumbent re-election around the zero threshold. Note also that while the probability of re-election for non-aligned mayors is strongly affected by their popularity (i.e. the margin of victory) in the previous elections, this is much less obvious for aligned candidates. At the right hand side of Figure 3(b), the fitted polynomial function is much flatter than the one displayed on the left hand side of the figure. This is consistent with the fact that *marginal* aligned mayors, facing potentially high probability of losing the election, receive extra help, i.e. more grants, from the central government.

Insert Figure 3 about here

7.3. Regression Results

Table 6 below reports results for different specifications of model (16), using the above two definitions of incumbency. Note that the number of observations is now drastically reduced since we are only using election years; for this reason, we display results only for the regressions where the full sample is employed.[23] Note that in all specifications standard errors are clustered at municipal level. Using the AIC reported in Table A1 in the Appendix, the polynomial order that fits the data best is the second for both definitions of incumbent, so we will base our discussion on this polynomial order. The complete set of results related to other polynomial orders are reported in Table AA2 of the Online Appendix. Now our RDD sample comprises 363 observations if we use the *incumbent party* definition for $I_{i,e+1}$ and 205 for the *incumbent candidate* one. This relatively small number of observations explains why, when we estimate the model using a high polynomial order, the coefficients tend to lose significance. The estimated coefficients for the incumbent effect are between 0.20 and 0.31 (without and with controls) for the incumbent *party* and between 0.25 and 0.35 for the incumbent *candidate*, which means that being aligned with the central government at the time of election gives local incumbents a strong advantage in comparison to non-aligned ones. The inclusion of fixed and time effects and controls does not affect the magnitude or the significance of the coefficients.

[23]Regressions using only second round elections produce very similar results, but given the reduced number of observations (127) standard errors are larger than when the full sample is employed, and this obviously affects the significance of the coefficients. Output for 2nd round elections is available upon request.

Insert Table 6 about here

8. The Flypaper Effect

The final step in our empirical analysis is to trace the effect of political alignment on taxes and expenditures via the grant. Following Knight (2002), we estimate:

$$\tau_{i,t} = \alpha T_{i,t} + \beta' X_{i,t} + \varsigma_t + \mu_i + v_{i,t} \tag{17}$$

where $\tau_{i,t}$ is a measure of local tax revenue, as in the theoretical model. Also, $X_{i,t}$ includes all the control variables employed in previous regressions and displayed in Table 4. Proposition 3 above suggests that $0 > \alpha > -1$. Of course, $T_{i,t}$ is endogenous, and our previous results suggest that we use the alignment dummy $AL_{i,t}$, as an instrument, which we know to be correlated with $T_{i,t}$.

Tables 7 reports the main results for model (17). In Table 7, the dependent variable is *municipality core tax revenue*, which comprises revenue from the (ICI) and the personal income tax, the two main source of municipal tax revenue. As a robustness check we also experiment with alternatives dependent variables (see Tables AA10 and AA11 in the Online Appendix): (i) *municipality expenditures net of (national and regional) grants,* i.e. revenues from taxes and fees and (ii) *municipality expenditures*. In all specifications, we report standard errors clustered at municipal level, which are robust for serial correlation and heteroscedasticity. We also include time dummies and the full set of controls. Due to space constraints, the coefficients on the controls are not reported, with the exception of the per capita private sector income (the variable "income per capita" in the tables), as this is needed for the calculation of the flypaper effect.[24] Finally, municipality fixed effects are included in all specifications.

Let us discuss the results displayed in Table 7. The first column presents the results when equation (17) is estimated by OLS and $T_{i,t}$ is treated as exogenous; in the following columns we present results for the 2SLS when $T_{i,t}$ is instrumented with (i) the alignment dummy only; (ii) the alignment dummy as well as the fourth order polynomial function in MA; (iii) the alignment

[24]This variable is defined as total income declared in the tax return minus real estate income, since real estate income is used as a separate regressor to control for variation in the tax base of the property tax.

dummy, and the first order polynomial function in MA, and we restrict the sample to those observations falling within the optimal bandwidth employed in the local linear regression on grants above. For the 2SLS specifications, we include first and second stage regression outputs.

Insert Table 7 about here

When grants are not instrumented (column 1) our results suggest that an increase of 1 Euro per capita in grants reduces local taxes by 0.167 Euros, which means that there is an increase of overall public spending of about 0.83 Euros per capita. By contrast, conditional on the grant, a 1 Euro per capita increase in private income has no effect on public spending. The flypaper effect can be then measured as the difference between one plus the coefficient on the grant, and the coefficient on private income. So when grants are not instrumented, the flypaper effect in Italian municipalities is calculated to be around 83% percent (1-0.169=0.83).

However the tests reported at the bottom of Table 7 indicate that the grants are endogenous (Hausman test) and that the alignment dummy is a good instrument for it (Sargan-Hansen test), so in the following column of the table we report results for IV estimation. When grants are instrumented (column 2) with the alignment dummy, the coefficient on grants becomes now -0.571, and it is significant at 1%. Private income per capita becomes significantly positive; however, the size of the effect is very small (a 1 Euro increase in private income gives at most a 1 cent increase in core tax revenue). Overall the extent of the flypaper effect *decreases*, going down to 0.43% (i.e. 1+(-0.571+0.006)). This means that public spending increases of about 0.43 Euros per capita for each Euro increase in grants. This estimate is almost unchanged when we add a fourth-order polynomial in MA as an additional instrument in column 3.

The Sargan-Hansen test displayed at the bottom of the panel suggests that the excluded instruments are valid instruments. Moreover in both cases, an F-statistic on the significance of the first stage regressor is very large, suggesting that weak instruments are not a problem (Staiger and Stock, 1997). Finally, in the last column (column 4), we restrict the analysis to those municipalities whose margin of alignment in previous mayoral elections was within the optimal bandwidth (i.e. a value of MA $\pm 0.13\%$). The sample

shrinks from 3527 observations to 837. The estimated coefficient on the grant is now -0.55.

So, overall, the flypaper effect is estimated to be between 43% and 48%. This estimate is in line with other studies in the survey by Inman (2008). In particular, Inman finds that across a large number of studies, the flypaper effect ranges from about 0.25 to 1.00. It is worth noting that our finding (namely, that instrumenting decreases the flypaper effect) is similar to what is found in Knight (2002).

In order to test the validity of our results with respect to different measures of $\tau_{i,t}$, we re-run model (17) using *municipality expenditures net of (national and regional) grants* (which is equivalent to revenues from taxes and fees) as the dependent variable. Table AA10, included in the Online Appendix, displays the results for this exercise. In Table AA11 we displayed the results for the estimation of model (17) using *municipality expenditures* as dependent variable. This specification has been usually employed in the past to investigate the extent of the flypaper effect. For both cases the results are consistent with those displayed in Table 7.

9. Conclusions

This paper has explored both theoretically and empirically the effect of political alignment on local public finance and elections. Our model predicts that aligned jurisdictions are assigned more grants by the central government because a higher grant to aligned mayors (because not directly observed by voters) signals higher competence of that mayor and thus increases the probability of their re-election. Moreover, the model shows that part of the extra grants will be used to reduce taxes, and part to increase local expenditure, implying a flypaper effect.

We test these predictions using a new data set on Italian local public finance and elections over the 1998-2010 period. Our empirical strategy is based on regression discontinuity design (RDD), exploiting the fact that being or not aligned with the central government changes discontinuously at 50% of the votes at local election. Moreover, the RDD approach also provides a good identification strategy to estimate the relationship between grants and expenditure providing an unbiased measure of the flypaper effect.

Our empirical results are largely consistent with our theoretical predictions. 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 increase

in grants between 36% and 47%; moreover, the probability of re-election of aligned municipalities will be between 20% and 35% higher than for non-aligned local governments. Finally, we find a positive flypaper effect; 40% of each Euro of extra grants will be used to increase expenditure and 60% will be used, instead, to reduce local taxes.

The theoretical and the empirical analysis showed, in the end, that when 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, thus generating an inefficient allocation of resources. So, our analysis provides another reason why formula-based grants are to be preferred to discretionary ones.

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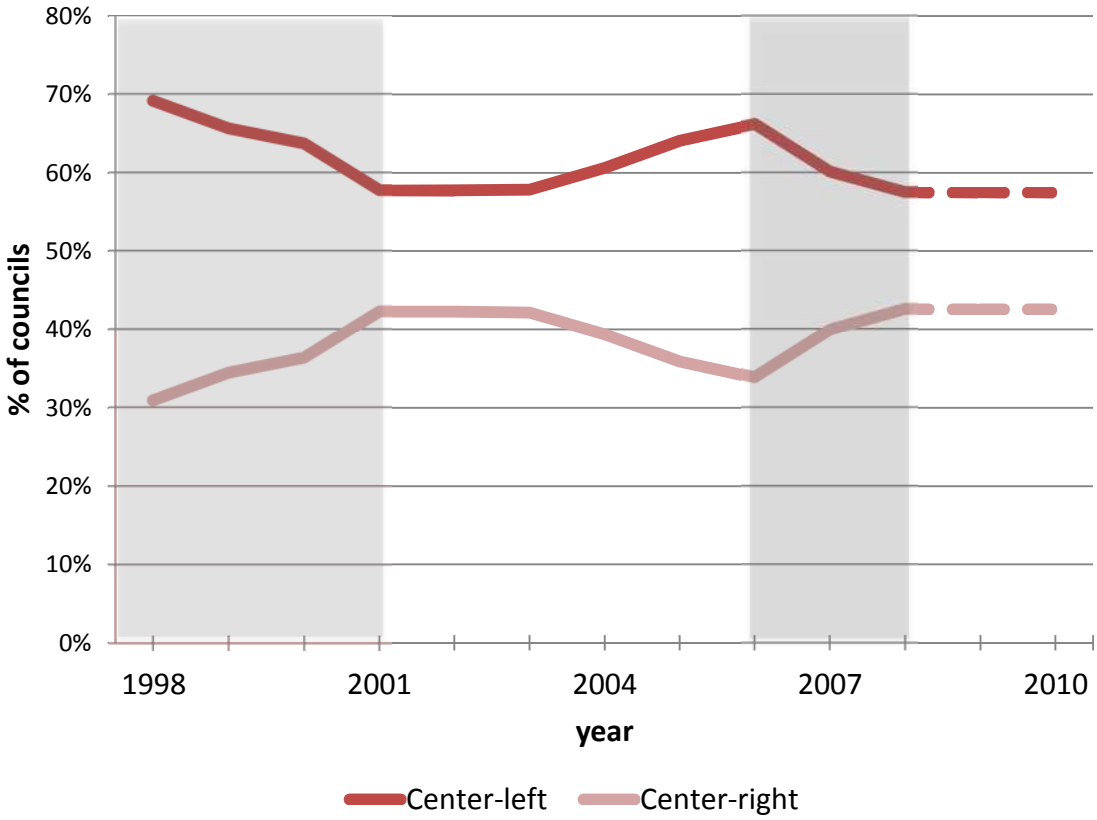
Appendix

Insert Table A1-A3 about here

Insert Figure A1 about here

Figures

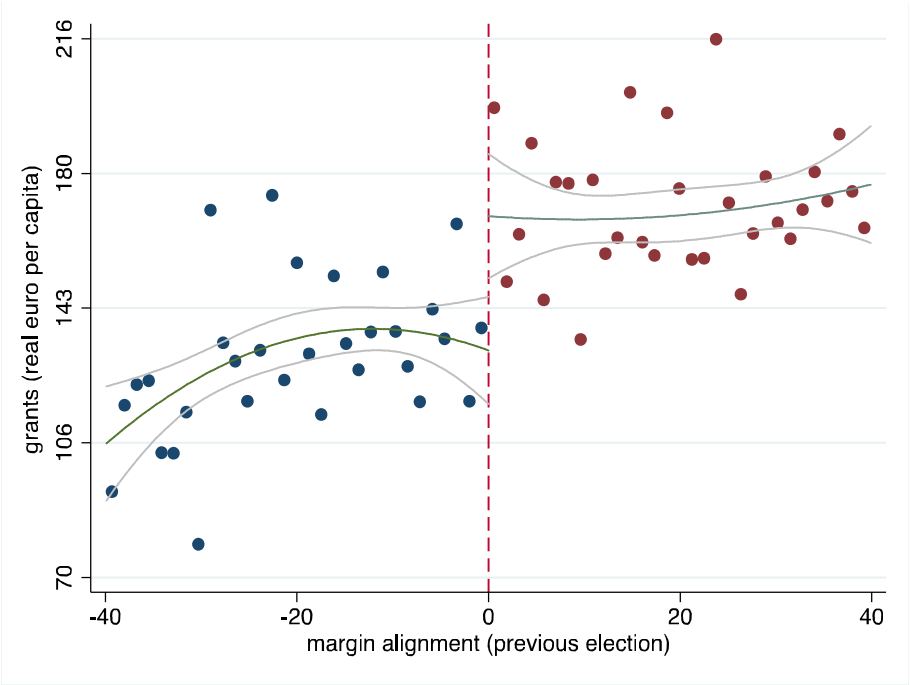
Figure 1. Yearly distribution of municipalities by winning coalitions



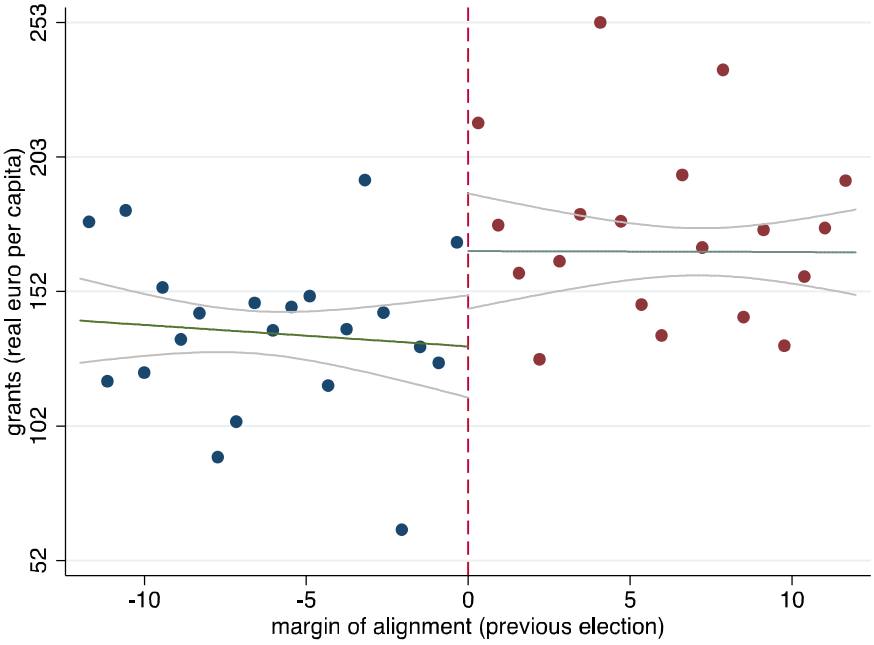
Notes: electoral data covers the 1998-2008 period, however we retain in the dataset municipalities without mayoral election between in 2009 and 2010. The (un)shaded areas refer to years when a central-left (right) government was in power.

Figure 2. Grants

(a) - all sample

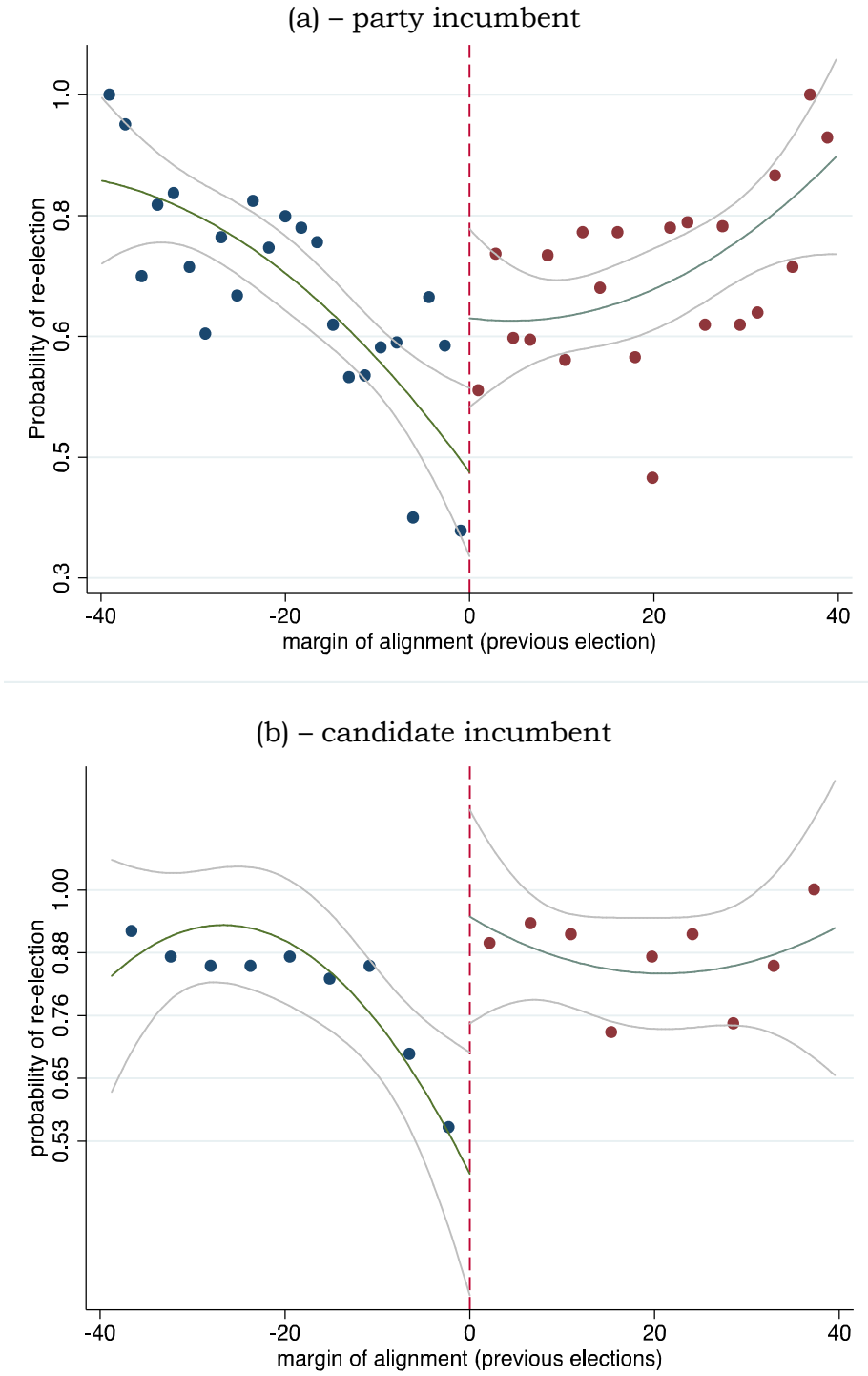


(b) – optimal bandwidth



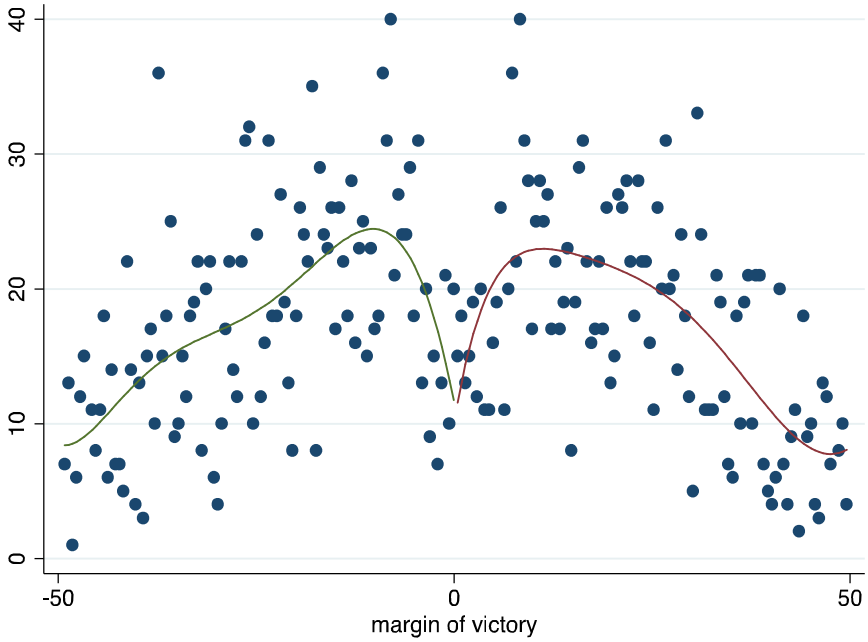
Notes. The central line split the polynomial functions in the margin of alignment fitted over the interval [-40, +40] in panel (a), and over the optimal bandwidth in panel (b). The lateral lines represent the 95% confidence interval. Scatter points are averaged over 2-unit intervals.

Figure 3. Probability of re-election



Notes. The central line split the polynomial function in the margin of alignment fitted over the interval [-40, +40]. The lateral lines represent the 95% confidence interval. Scatter points are averaged over 2-unit intervals.

Figure A1. Density of the forcing variable



Notes. The figure 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.

Table 1. Party affiliation of mayors in all elections (1998-2008)

	All municipalities		Only < 15000		Only > 15000	
	No.	*%*	*No.*	*%*	*No.*	*%*
Center-left	20,641	23.69	16,588	20.68	4,053	58.54
Center-right	13,413	15.39	10,924	13.62	2,489	35.95
Independents (*Lista civica*)	53,015	60.84	52,639	65.62	376	5.43
Missing	75	0.09	70	0.09	5	0.07
Total	87,144		80,221		6,923	

Note. The table reports statistics on mayors' party affiliation on annual basis for the period 1998-2008.

Table 2. Distribution of elections by aligned and non-aligned municipalities (regression sample)

year	Aligned			Not Aligned			Total
	Center-right	*Center-left*	*Total*	*Center-right*	*Center-left*	*Total*	*election*
1998	0	23	23	21	0	21	44
1999	0	122	122	47	0	47	169
2000	0	26	26	19	0	19	45
2001	47	0	47	0	42	42	89
2002	59	0	59	0	68	68	127
2003	17	0	17	0	29	29	46
2004	43	0	43	0	144	144	187
2005	18	0	18	0	45	45	63
2006	0	62	62	44	0	44	106
2007	0	42	42	75	0	75	117
2008	34	0	34	0	23	23	57
Total	218	275	493	206	351	557	1050

Table 3. Descriptive statistics, observations in the regression sample

	All sample	*MV < 5%*	*MV < 2%*
Aligned	2,312	265	116
Not Aligned	2,447	271	105
Total	4,759	536	221

Table 4. Descriptive statistics, means and standard deviations by margin of alignment (regression sample)

	Mean			Std. Dev.		
	All sample	*MV < 5%*	*MV < 2%*	*All sample*	*MV < 5%*	*MV < 2%*
Current grants from central government, real euro per-capita	154.71	162.65	152.17	91.88	92.98	91.79
Current grants from regional government, real euro per-capita	45.56	47.26	46.45	41.24	46.08	52.83
Total municipal taxes (property + income tax) - real euro per capita	243.96	229.20	250.72	85.63	79.75	69.77
Current municipal fees real euro per-capita	268.55	257.54	274.12	142.00	134.68	149.02
Current municipal expenditure real euro per-capita	790.57	764.97	797.97	203.71	202.18	183.81
1 = if incumbent mayor is re-elected	0.7896	0.6521	0.5010	0.4078	0.4797	0.5107
1 = if incumbent party is re-elected	0.8028	0.6782	0.5294	0.3982	0.4699	0.5066
1 = if mayor elected at the second round	0.4406	0.9085	0.9049	0.4965	0.2884	0.2939
Margin of victory, municipal election	21.82	2.53	1.02	14.96	1.47	0.54
1 = if municipality is aligned with the central government	0.4858	0.4944	0.5249	0.4999	0.5004	0.5005
1 = if municipality is aligned with the regional government	0.5999	0.4384	0.5294	0.4899	0.4966	0.5000
Resident population	55,292	76,601	48,489	151,946	273,192	68,768
Percentage of residents under15 years old	14.57	15.05	14.11	3.17	3.64	2.87
Percentage of residents over 65 years old	17.54	16.90	17.96	4.53	4.49	4.26
Income different form real estate, real euro per-capita	16,851	16,873	17,590	3,263	3,409	3,083
Income from real estate, real euro per-capita	1,777	1,769	1,821	521	514	551
Electoral cycle (0 = election year, 4 = year before election)	1.84	1.84	1.77	1.37	1.38	1.37
Local government dummy (1 = left council)	0.6090	0.4683	0.4661	0.4880	0.4995	0.5000
Central government dummy (1 = left central government)	0.3137	0.3060	0.2805	0.4641	0.4612	0.4503

Note. Number of observations: All sample = 4,759; MV < 5% =536; MV < 5% = 221.

Table 5. Political alignment and grant allocation

Regression specifications	No Controls	With Controls	With controls & Fixed Effect	Observations
OLS regression (all sample)	0.555***	0.138***	0.134***	3546
	(0.0324)	(0.0218)	(0.0314)	
OLS regression (all sample, 2nd round)	0.386***	0.143***	0.131***	1431
	(0.0523)	(0.0343)	(0.0444)	
Fourth order polynomial (RD Sample)	0.475***	0.364***	0.365***	3141
	(0.157)	-0.105	(0.137)	
Fourth order polynomial (RD Sample, 2nd round)	0.713***	0.588***	0.523***	1263
	(0.219)	(0.147)	(0.195)	
Local Linear regression (h)	0.326***	0.403***	0.439***	856
	(0.120)	(0.121)	(0.0930)	
Local linear regression (half h)	0.174	0.449**	0.301**	324
	(0.183)	(0.182)	(0.137)	
Local linear regression (double h)	0.319***	0.348***	0.303***	1750
	(0.0792)	(0.0838)	(0.0643)	

Notes. The table reports coefficients on alignment dummies. RD sample included all municipal elections where the winner and the runner up belong to the centre-left and centre-right coalition. Controls include: municipal population and population squared, income per capita, income per capita from real estate, proportion of population under 14 and over 65 years old. Time dummies are included in all regressions in columns 2 and 3. Optimally chosen bandwidth (h) in local linear regressions is +/-13. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level. The number of observations drops from 3546 to 3141 because the lagged margin of victory is missing for the first year of the dataset since we do not have election data for the year 1997.

Table 6. Alignment and the probability of incumbent re-election

Coefficient on Alignment	Panel 1: Incumbent Party			Obs.	Panel 2: Incumbent Candidate			Obs.
	No controls	Controls	Controls & FE		No controls	Controls	Controls & FE	
Linear regression	0.0279	0.144***	0.156***	768	0.156***	0.119***	0.128***	641
	(0.0275)	(0.0378)	(0.0359)		(0.0373)	(0.0433)	(0.042)	
Second order polynomial (RD Sample)	0.208	0.312***	0.267***	363	0.358**	0.314**	0.256*	205
	(0.130)	(0.101)	(0.101)		(0.140)	(0.134)	(0.141)	
Local Linear regression (h)	0.759**	0.521		26	0.623*	0.119		22
	(0.356)	(0.468)			(0.357)	(0.428)		
Local linear regression (half h)	0.840**	0.838		17	0.714	0.778		15
	(0.387)	(0.828)			(0.470)	(0.631)		
Local linear regression (double h)	0.631**	0.715**		42	0.611*	0.303		33
	(0.290)	(0.356)			(0.300)	(0.282)		

Notes. The table reports coefficients on alignment dummies. RD sample included all municipal elections where the winner and the runner up belong to the centre-left and centre-right coalition. Controls include: municipal population and population squared, income per capita, income per capita from real estate, proportion of population under 14 and over 65 years old. Time dummies are included in all regressions in columns 2 and 3, 5 and 6. Optimally chosen bandwidth (h) in local linear regressions is +/-3.5%. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level. The number of observations drops from 641 to 205 because the lagged margin of victory is missing for the first year of the dataset since we do not have election data for the year 1997.

Table 7- Testing for flypaper effect, determination of municipal taxes (Euros per capita)

	(1) OLS	(2) 2SLS (baseline model)		(3) 2SLS (polynomial instruments)		(4) 2SLS (optimal bandwidth)	
		1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
Dependent Variable	Taxes	Grants	Taxes	Grants	Taxes	Grants	Taxes
Grant	-0.167***		-0.571***		-0.526***		-0.535***
	(0.0181)		(0.0834)		(0.056)		(0.076)
Income (per capita)	0.001	0.012***	0.006***	0.013***	0.006***	0.023***	0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)
Alignment dummy		12.73***		41.86***		22.28***	
		(1.368)		(7.377)		(6.427)	
MA (fourth order polynomial)		no		yes		no	
MA (first order polynomial)		no		no		yes	
Observations	3527	3527	3527	3122	3122	837	837
R-squared	0.424						
F-test on joint significance covariates (F-statistics)		86.59		19.22		32.24	
Sargan-Hansen statistic Chi-sq					(8) 4.757		(2) 0.360
Ho: valid excluded instrument (p-value)					0.783		0.835
Hausman test (Prob>chi2)			0.000		0.000		0.000
Control variables	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes
Municipality Fixed Effect	yes	yes	yes	yes	yes	yes	yes

Notes. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level.
Controls include: Resident population, Percentage of residents under15 years old, Percentage of residents over 65 years old, Electoral cycle, Local government dummy (1 = left council), Central government dummy (1 = left central government), Municipal alignment with the regional government dummy (1 = aligned municipality), Current grants from regional government (real euro per-capita).

Table A1. AIC and Goodness of Fit tests for grants and Incumbent regressions

Polynomial Grade	Grants		Incumbent (Party)		Incumbent (Candidate)	
	F-test	AIC	F-test	AIC	F-test	AIC
0	0.0883	3450.742	0.0969	596.109	0.5605	56.384
1	0.2128	3451.338	0.3802	599.719	0.5576	59.812
2	0.2322	3451.204	0.7173	603.011	0.6727	63.411
3	0.2866	3454.528	0.7893	605.798	0.7333	67.104
4	0.2563	3448.634	0.9586	606.434	0.9156	69.986
5	0.2345	3451.392	0.9388	599.423	0.8051	65.674
6	0.3804	3448.036	0.9226	595.748	0.8230	63.592

Table A2. Testing for the continuity of the covariates in close elections

Polynomial Grade	Chi2(12)	Prob > Chi2
0	27.18	0.0073
1	17.27	0.1396
2	16.89	0.1538
3	26.3	0.0097
4	20.87	0.0523
5	15.55	0.2127
6	15.57	0.2115

Notes. The table reports chi-square tests for the discontinuity gaps to examine whether the covariates in the RD do not exhibit any discontinuity in relation to the margin of alignment. 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.

Table A3. Testing the interaction between alignment and electoral cycle on grants

	OLS regression		Fourth polynomial order (RD sample)	
alignment dummy	0.087**	0.089**	0.311**	0.329**
	(0.039)	(0.036)	(0.139)	(0.144)
Electoral cycle	0.005		0.006	
	(0.012)		(0.012)	
Alignment dummy	0.025*		0.027*	
X Electoral cycle	(0.013)		(0.015)	
Electoral cycle 2		-0.009		-0.002
		(0.045)		(0.045)
Alignment dummy		0.110**		0.109*
X Electoral cycle 2		(0.055)		(0.056)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Municipal FE	Yes	Yes	Yes	Yes
No. of observations	3546	3546	3141	3141

Notes. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level. Here, "e" denotes election year. Electoral cycle 2 is a dummy = 1 in year before election only. In columns 3 and 4, the number of observations drops from 3546 to 3141 because the lagged margin of victory is missing for the first year of the dataset since we do not have election data for the year 1997.

Online Appendix

Second-Period Equilibrium and Derivation of the Continuation Value V

In the second period, the incumbent politician in i chooses τ_i, e_i to maximize

$$\lambda(f(\tau_i + T_i) + e_i + a_i^e - d(\tau_i)) - \psi(e_i) \tag{AA.1}$$

taking T_i as given, where a_i^e is the expected value of a_i conditional on the incumbent's information set at the beginning of period 2. If the period 1 incumbent wins the election, he has enough information to calculate a_i i.e. $a_i^e = a_i$, but if the challenger wins the election, $a_i^e = 0$. The first-order conditions are

$$\lambda = \psi'(e_i),\ f'(\tau_i + T_i) = d'(\tau_i) \tag{AA.2}$$

At the same time, the national government chooses T_i to maximize

$$\sum_{i \in M} \lambda(f(\tau_i + T_i) + \ e_i + a_i^e - d(\tau_i)) - \sum_{i \in M} T_i$$

taking τ_i, e_i as given. So, at equilibrium, the first-order conditions with respect to T_i are

$$\lambda f'(\tau_i + T_i) = 1,\ i \in M \tag{AA.3}$$

Clearly, all these first-order conditions are identical across municipalities. We assume for convenience that conditions (AA.2),(AA.3) have the unique solution $\hat{\tau}, \hat{e}, \hat{T}$. Then, from (AA.1) and $a_i^e = a_i$, the continuation value to the incumbent of winning the election, from the perspective of the beginning of period 2, is

$$\lambda(f(\hat{\tau} + \hat{T}) + \hat{e} + a_i - d(\hat{\tau})) - \psi(\hat{e}) \equiv V + \lambda a_i$$

Now, at the time of choosing policy before the election in period 1, neither the incumbent in i nor the national government have observed a_i, or any variable correlated with it, so their expectation of the continuation value is simply V.

Proof of Proposition 1. First, note that T_i, τ_i, e_i are determined independently from T_j, τ_j, e_j for any two municipalities i and j. Moreover, the

first-order condition for e_i is independent of the remaining first-order conditions. So, the conditions determining T_i, τ_i can be written

$$(\lambda + B)f'(\tau_i + T_i) = \Psi'(T_i) \tag{AA.4}$$

$$f'(\tau_i + T_i) = d'(\tau_i) \tag{AA.5}$$

where

$$B = x\zeta_i - (1 - x)\zeta_i$$

and where $x = 1$ if $i \in M_A$, $x = 0$ if $i \in M_N$. Totally differentiating (AA.4)-(AA.5), by Cramer's rule, we get:

$$\frac{dT_i}{dB} = \frac{\begin{vmatrix} -f' & (\lambda + B)f'' \\ 0 & f'' - d'' \end{vmatrix}}{\begin{vmatrix} (\lambda + B)f'' & (\lambda + B)f'' \\ f'' & f'' - d'' \end{vmatrix}} = \frac{-f'(f'' - d'')}{D} \tag{AA.6}$$

where $D = d'' - f''(\lambda + B)d'' > 0$ from $f'' < 0$, $d'' > 0$. So, consequently, from (AA.6), $\frac{dT}{dB} > 0$. So, as $B = \zeta_i$ if i is aligned, and $B = -\zeta_j$ if j is non-aligned, then $T_i > T_j$. □

Proof of Proposition 4. We need to show that for any two municipalities i, j where i is aligned and j is not, that expected voter utility is higher in i, because then the retrospective voter is more likely to vote for the incumbent in i. Expected first-period voter utility in i is

$$f(\tau_i + T_i) + e_i - d(\tau_i)$$

Note first from Proposition 1 that $T_i > T_j$, and from Proposition 3, as τ_i falls less than one for one with an increase in T_i, $\tau_i + T_i$ will be higher also. Next, note that from Proposition 1-3, τ_i is lower when aligned i.e. $\tau_i < \tau_j$, so $d(\tau_i) < d(\tau_j)$. Finally, as e_i is increasing in ζ_i, and unaffected by T_i, $\zeta_i \geq \zeta_j$ ensures $e_i \geq e_j$. So, putting all this together,

$$f(\tau_i + T_i) + e_i - d(\tau_i) > f(\tau_j + T_j) + e_j - d(\tau_j)$$

as required. □

Insert Table AA1-AA11 about here

Table AA1. Political alignment and grant allocation

Regression specifications	No Controls	With Controls	With controls & Fixed Effect	Observations
OLS regression (all sample)	0.555***	0.138***	0.134***	3546
	(0.0324)	(0.0218)	(0.0314)	
OLS regression (all sample, 2nd round)	0.386***	0.143***	0.131***	1431
	(0.0523)	(0.0343)	(0.0444)	
First order polynomial (RD Sample)	0.263***	0.257***	0.265***	3141
	(0.0663)	(0.044)	(0.0572)	
Second order polynomial (RD Sample)	0.462***	0.323***	0.289***	3141
	(0.099)	(0.0652)	(0.0816)	
Third order polynomial (RD Sample)	0.571***	0.414***	0.432***	3141
	(0.128)	(0.085)	(0.108)	
Fourth order polynomial (RD Sample)	0.475***	0.364***	0.365***	3141
	(0.157)	-0.105	(0.137)	
First order polynomial (RD Sample, 2nd round)	0.280**	0.333***	0.335***	1263
	(0.112)	(0.0718)	(0.0852)	
Second order polynomial (RD Sample, 2nd round)	0.124	0.289***	0.254**	1263
	(0.148)	(0.0957)	(0.117)	
Third order polynomial (RD Sample, 2nd round)	0.423**	0.499***	0.405***	1263
	(0.185)	(0.119)	(0.151)	
Fourth order polynomial (RD Sample, 2nd round)	0.713***	0.588***	0.523***	1263
	(0.219)	(0.147)	(0.195)	
Local Linear regression (h)	0.326***	0.403***	0.439***	856
	(0.120)	(0.121)	(0.0930)	
Local linear regression (half h)	0.174	0.449**	0.301**	324
	(0.183)	(0.182)	(0.137)	
Local linear regression (double h)	0.319***	0.348***	0.303***	1750
	(0.0792)	(0.0838)	(0.0643)	

Notes. The table reports coefficients on alignment dummies. RD sample included all municipal elections where the winner and the runner up belong to the centre-left and centre-right coalition. Controls include: municipal population and population squared, income per capita, income per capita from real estate, proportion of population under 14 and over 65 years old. Time dummies are included in all regressions in columns 2 and 3. Optimally chosen bandwidth (h) in local linear regressions is +/-13. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level.

Table AA2. Alignment and the probability of incumbent re-election

Coefficient on Alignment	Panel 1: Incumbent Party			Obs.	Panel 2: Incumbent Candidate			Obs.
	No controls	Controls	Controls & FE		No controls	Controls	Controls & FE	
Linear regression	0.0279	0.144***	0.156***	768	0.156***	0.119***	0.128***	641
	(0.0275)	(0.0378)	(0.0359)		(0.0373)	(0.0433)	(0.042)	
First order polynomial	0.135	0.240***	0.189***	363	0.303***	0.265***	0.191*	205
	(0.0845)	(0.0641)	(0.0648)		(0.0960)	(0.0933)	(0.101)	
Second order polynomial (RD Sample)	0.208	0.312***	0.267***	363	0.358**	0.314**	0.256*	205
	(0.130)	(0.101)	(0.101)		(0.140)	(0.134)	(0.141)	
Third order polynomial (RD Sample)	0.403**	0.403***	0.335**	363	0.581***	0.513***	0.411**	205
	(0.165)	(0.134)	(0.136)		(0.179)	(0.172)	(0.186)	
Fourth order polynomial (RD Sample)	0.337	0.334*	0.287	363	0.555***	0.423*	0.352	205
	(0.209)	(0.177)	(0.184)		(0.210)	(0.215)	(0.222)	
Local Linear regression (h)	0.759**	0.521		26	0.623*	0.119		22
	(0.356)	(0.468)			(0.357)	(0.428)		
Local linear regression (half h)	0.840**	0.838		17	0.714	0.778		15
	(0.387)	(0.828)			(0.470)	(0.631)		
Local linear regression (double h)	0.631**	0.715**		42	0.611*	0.303		33
	(0.290)	(0.356)			(0.300)	(0.282)		

Notes. The table reports coefficients on alignment dummies. RD sample included all municipal elections where the winner and the runner up belong to the centre-left and centre-right coalition. Controls include: municipal population and population squared, income per capita, income per capita from real estate, proportion of population under 14 and over 65 years old. Time dummies are included in all regressions in columns 2 and 3, 5 and 6. Optimally chosen bandwidth (h) in local linear regressions is +/-3.5%. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level.

Table AA3. Descriptive statistics, means and differences in means between aligned and non-aligned (regression sample)

	Aligned	Not Aligned	Diff.	P-value H0: diff ≠ 0
Current grants from central government, real euro per-capita	177.42	132.50	44.92	0.0000
Current grants from regional government, real euro per-capita	44.33	46.86	-2.53	0.1125
Total municipal taxes (property + income tax), real euro per capita	236.88	250.85	-13.97	0.0000
Current municipal fees real euro per-capita	274.06	262.76	11.3	0.3266
Current municipal expenditure real euro per-capita	792. 8	788.88	3.400	0.3336
1 = if incumbent mayor is re-elected	0.7827	0.7945	-0.011	0.7184
1 = if incumbent party is re-elected	0.7961	0.8098	-0.013	0.9095
1 = if mayor elected at the second round	0.4403	0.4409	-0.000	0.9647
Margin of victory, municipal elections	21.71	21.94	-0.230	0.9746
1 = if municipality is aligned with the regional government	0.6111	0.5880	0.0231	0.0809
Resident population	53,804	56,862	-3,058	0.4200
Percentage of residents under15 years old	14.63	14.50	0.130	0.0114
Percentage of residents over 65 years old	17.42	17.68	-0.260	0.0038
Income different form real estate, real euro per-capita	16,786	16,919	-133	0.2338
Income from real estate, real euro per-capita	1,779	1,775	4.000	0.8669
Municipal electoral cycle (0 = election year, 4 = year before election)	1.80	1.87	-0.070	0.1343
Local government dummy (1 = left council)	0.4928	0.7314	-0.238	0.0000
Central government dummy (1 = left central government)	0.3578	0.2673	0.090	0.0002

Table AA4. Political classification of parties (1998-2008)

Center-Left	No.	Center-Right	No.	Independents	No.
CEN-SIN(LS.CIVICHE)	2,565	CEN-DES(LS.CIVICHE)	1,245	LISTA CIVICA	265
CEN-SIN	629	CEN-DES	403	IND	57
DEMOCRATICI SINISTRA	246	FORZA ITALIA	251	SVP	20
PDS	193	LEGA NORD	181	UV	7
SINISTRA	140	CENTRO	127	PATTO SEGNI	6
L'ULIVO	84	ALLEANZA NAZIONALE	87	DEMOCRAZIA EUROPEA	5
P.POPOLARE ITALIANO	39	POLO PER LE LIBERTA'	30	MOV. PER L'AUTONOMIA	5
PPI (POP)	27	CCD	26	RINNOV.IT-ALTRI	5
DL.LA MARGHERITA	18	CASA DELLE LIBERTA'	17	SI	4
RIF.COM.	17	CDU	14	LISTA LOCALE	1
LA MARGHERITA	16	IL POPOLO DELLA LIBE	13	PRI	1
PROGRESSISTI (1994)	8	LEGA LOMB-LEGA NORD	10		
CEN-SIN(CONTR.UFF.)	7	LG.NORD-LG.VENETA	10		
PARTITO DEMOCRATICO	7	L.VEN-L.NORD	9		
POPOLARI	6	LISTA CIVICA	9		
IND.SIN.	5	UDC	9		
PER VERONA	5	CCD-CDU	7		
PROGRESSISTI SALERNO	5	DESTRA	7		
SDI-ALTRI	5	FI-CCD	5		
FED.DEI VERDI	4	FI-CCD-AN	5		
UNITI NELL'ULIVO	4	POLO BUON GOVERNO	5		
ALL. DI PROGRESSO	3	CDL	4		
CENSIN	3	CENDES	4		
I DEMOCRATICI	3	LG.VENETA REPUBBLICA	4		
LA MARG.	2	U.D.EUR	3		
SDI	2	U.D.EUR POPOLARI	1		
SOCIALISTIALTRI	2	FI-CCD-CDU	1		
U.D.EUR	2	FORZA IT.-POLO POP.	1		
U.D.EUR POPOLARI	2	PDL	1		
P.DEM.	1				
PATTO DEMOCRATICI	1				
POPOLARI-CIVICA	1				
VERDI	1				
TOTAL	4,053		2,489		376

Notes: Frequencies record the number of elected mayors in large municipalities classified as supported by each party. U.D.EUR and U.D.EUR POPOLARI are classified as a Center-Left party for the years 2006-2008 when they supported the center-left government.

Table AA5. Large municipalities

years	Large municipalities as % of total municipalities	% of residents in large municipalities	% of total grants to large municipalities
2002	9.41%	60.87%	65.97%
2003	9.41%	60.86%	64.93%
2004	9.41%	60.99%	65.55%
2005	9.41%	60.80%	66.23%
2006	9.41%	60.84%	65.98%
2007	9.41%	60.65%	68.86%
2008	9.41%	60.55%	70.64%
2009	9.41%	60.50%	70.49%
2010	9.41%	60.54%	69.33%
2011	9.41%	60.23%	68.90%

Table AA6. Distribution of elections by first round and second round (regression sample)

year	First round			Second round			Total election
	Center-right wins	Center-left wins	Total	Center-right wins	Center-left wins	Total	
1998	4	12	16	17	11	28	44
1999	13	84	97	34	38	72	169
2000	7	10	17	12	16	28	45
2001	22	17	39	25	25	50	89
2002	40	34	74	19	34	53	127
2003	11	15	26	6	14	20	46
2004	16	105	121	27	39	66	187
2005	15	24	39	3	21	24	63
2006	27	39	66	17	23	40	106
2007	40	23	63	35	19	54	117
2008	14	7	21	20	16	36	57
Total	209	370	579	215	256	471	1050

Table AA7. Local elections by coalition and margin of victory (regression sample)

year	All sample		MV < 5%		MV < 2%	
	Center-right wins	Center-left wins	Center-right wins	Center-left wins	Center-right wins	Center-left wins
1998	21	23	3	1	0	0
1999	47	122	12	10	4	3
2000	19	26	2	4	2	1
2001	47	42	4	6	1	1
2002	59	68	7	8	5	4
2003	17	29	1	1	0	1
2004	43	144	12	8	7	5
2005	18	45	3	5	1	3
2006	44	62	8	5	1	2
2007	75	42	6	4	3	1
2008	34	23	4	3	4	2
Total	424	626	62	55	28	23

Table AA8. Local elections by coalition and alignment status (regression sample)

year	All sample		MV < 5%		MV < 2%	
	Aligned	Not-Aligned	Aligned	Not-Aligned	Aligned	Not-Aligned
1998	21	23	3	1	0	0
1999	47	122	12	10	4	3
2000	19	26	2	4	2	1
2001	42	47	6	4	1	1
2002	68	59	8	7	4	5
2003	29	17	1	1	1	0
2004	144	43	8	12	5	7
2005	45	18	5	3	3	1
2006	44	62	8	5	1	2
2007	75	42	6	4	3	1
2008	23	34	3	4	2	4
Total	557	493	62	55	26	25

Table AA9. Descriptive statistics, means and standard deviations by margin of alignment, second round elections, (regression sample)

	Mean			Std. Dev.		
	All sample	*MV < 5%*	*MV < 2%*	*All sample*	*MV < 5%*	*MV < 2%*
Current grants from central government, real euro per-capita	155.88	161.84	151.94	92.12	90.90	91.13
Current grants from regional government, real euro per-capita	46.66	48.52	48.76	46.07	46.82	54.35
Total municipal taxes (property + income tax) - real euro per capita	229.54	232.40	251.87	80.05	79.15	69.92
Current municipal fees real euro per-capita	258.33	258.69	279.58	133.63	134.87	149.21
Current municipal expenditure real euro per-capita	755.15	767.51	808.89	190.85	201.26	185.98
1 = if incumbent mayor is re-elected	0.6703	0.6250	0.4545	0.4710	0.4880	0.5096
1 = if incumbent party is re-elected	0.6778	0.6456	0.4839	0.4680	0.4814	0.5080
Margin of victory, municipal election	12.4520	3.8259	3.3667	9.6211	5.0825	7.0532
1 = if municipality is aligned with the central government	0.4855	0.5010	0.5450	0.4999	0.5005	0.4992
1 = if municipality is aligned with the regional government	0.4854	0.5010	0.5400	0.4999	0.5005	0.4992
Resident population	52,574	67,797	49,734	174,964	257,521	71,367
Percentage of residents under15 years old	15.04	14.83	13.91	3.13	3.30	2.49
Percentage of residents over 65 years old	16.79	17.03	18.04	4.32	4.22	3.93
Income different form real estate real euro per-capita	16,713	16,994	18,056	3,323	3,168	2,770
Income from real estate, real euro per-capita	1,743	1,756	1,852	514	511	556
Electoral cycle (0 = election year, 4 = year before election)	1.804	1.844	1.775	1.361	1.376	1.365
Local government dummy (1 = left council)	0.5513	0.4723	0.4350	0.4975	0.4997	0.4970
Central government dummy (1 = left central government)	0.3019	0.3018	0.2800	0.4592	0.4595	0.4501

Number of observations: All sample = 2,097 MV < 5% =487 MV < 5% = 200

Table AA10. Testing for flypaper effect, determination of current expenditures net of grants from central government and regional governments (Euros per capita)

	(1) OLS	(2) 2SLS (baseline model)		(3) 2SLS (polynomial instruments)		(4) 2SLS (optimal bandwidth)	
		1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
Dependent Variable	Net Expenditure	Grants	Net Expenditure	Grants	Net Expenditure	Grants	Net Expend.
Grant	-0.858***		-0.638***		-0.623***		-0.405***
	(0.047)		(0.212)		(0.140)		(0.185)
Income (per capita)	-0.003	0.012***	-0.006	0.013***	-0.006	0.023***	-0.011
	(0.007)	(0.002)	(-0.005)	(0.002)	(0.005)	(0.004)	(0.009)
Alignment dummy		12.86***		42.53***		23.99***	
		(1.365)		(6.911)		(5.92)	
MA (fourth order polynomial)		no		yes		no	
MA (first order polynomial)		no		no		yes	
Observations	3546	3546	3546	3141	3141	856	856
R-squared	0.432						
F-test on joint significance covariates (F-statistics)		88.74		19.92		34.14	
Sargan-Hansen statistic Chi-sq					(8) 15.40		(2) 4.259
Ho: valid excluded instrument (p-value)					0.051		0.118
Hausman test (Prob>chi2)			0.016		0.016		0.000
Control variables	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes
Municipality Fixed Effect	yes	yes	yes	yes	yes	yes	yes

Notes. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level.
Controls include: Resident population, Percentage of residents under15 years old, Percentage of residents over 65 years old, Electoral cycle, Local government dummy (1 = left council), Central government dummy (1 = left central government), Municipal alignment with the regional government dummy (1 = aligned municipality), Current grants from regional government (real euro per-capita).

Table AA11. Testing for flypaper effect, determination of current expenditures (Euros per capita)

	(1) OLS	(2) 2SLS (baseline model)		(3) 2SLS (polynomial instrument)		(4) 2SLS (optimal bandwidth)	
		1st Stage	2nd Stage	1st Stage	2nd Stage	1st Stage	2nd Stage
Dependent Variable	Current Expenditures	Grants	Current Expenditures	Grants	Current Expenditures	Grants	Current Expenditures
Grant	0.142***		0.362*		0.377***		0.595***
	(0.0478)		(0.211)		(0.140)		(0.185)
Income (per capita)	-0.00374	0.011***	-0.00631	0.013***	-0.006	0.023***	-0.011
	(0.00770)	(0.002)	(0.00497)	(0.002)	(0.005)	(0.004)	(0.048)
Alignment dummy		12.92***		42.53***		23.99***	
		(1.27)		(6.91)		(5.92)	
MA (fourth order polynomial)		no		yes		no	
MA (first order polynomial)		no		no		yes	
Observations	3546	3546	3546	3141	3141	856	856
R-squared	0.149						
F-test on joint significance covariates (F-statistics)		88.74		19.92		34.14	
Sargan-Hansen statistic Chi-sq					(8) 15.40		(2) 4.29
Ho: valid excluded instrument (p-value)					0.051		0.118
Hausman test (Prob>chi2)			0.034		0.034		0.000
Control variables	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes
Municipality Fixed Effect	yes	yes	yes	yes	yes	yes	yes

Notes. Significance at 1% is represented by *** , at 5% by ** and at 10% by *. Robust standard errors in brackets clustered at municipal level.
Controls include: Resident population, Percentage of residents under15 years old, Percentage of residents over 65 years old, Electoral cycle, Local government dummy (1 = left council), Central government dummy (1 = left central government), municipal alignment with the regional government dummy (1 = aligned municipality), Current grants from regional government (real euro per-capita).