Policy outcomes of single and double-ballot elections

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Abstract We use data for all Italian municipalities from 2001 to 2007 to empirically test the extent to which two different electoral rules, which hold for small and large municipalities, affect fiscal policy decisions at local level. Municipalities with fewer than 15,000 inhabitants elect their mayors in accordance with a single-ballot plurality rule where only one list can support her/him, while the rest of the municipalities uses a runoff plurality rule where multiple lists can support her/him. Per capita total taxes, charges and current expenditure in large municipalities are lower than in small ones if the mayor of the large municipality does not need a broad coalition to be elected, otherwise the use of a single- or double-ballot rule does not make any difference in the policy outcome.

Keywords Federal budget · Local budget · Single-ballot · Double-ballot · Coalition · Multiple list · Regression discontinuity

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1 Introduction

Electoral systems play a crucial role in shaping incentives within which public policies are established. Political economy literature includes a substantial body of work devoted to the task of exploring the impact on public expenditure of plurality versus proportional electoral rules and of the size of electoral districts. However, few works have been done (Osborne and Slivinski 1996; Bordignon et al. 2013; Bracco and Brugnoli 2012) on the possibility that elections do not take place in a one-shot game, but in a two-stage process.

We will focus our attention on the Italian case, which is very interesting from the point of view of the impact of different electoral systems on fiscal policies, since it includes municipalities which adopt the single-ballot system and others that adopt the double-ballot system, depending on the size of their respective populations. If a municipality's population is less than 15,000, the mayor is elected by means of a single-ballot system and only a single list can support her/him; otherwise, the election is conducted according to a double-ballot system and multiple lists are admitted to support her/him.

By using a dataset on the financial and electoral characteristics of Italian municipalities in 2001–2007,[1] we find evidence that as a result of different electoral rules, per capita own revenue and current expenditure (in this case, the evidence is weaker) are lower in large municipalities than in small ones. However, if the mayor of a large municipality is supported by a broad coalition, then the result tends to disappear.

The remainder of the paper is organized as follows. The next Section outlines the financial and electoral characteristics of Italy's municipalities. Section 3 reviews the relevant literature. In Sect. 4, we describe the theoretical background. The dataset is illustrated in Sect. 5. In Sect. 6, we develop the empirical approach to testing the impact of electoral systems on fiscal policies. Sections 7 and 8, respectively, present the results and some robustness checks. The final section concludes. An online Appendix provides further detailed description of the data and robustness checks.

2 Institutional framework

The Italian Constitution provides for five layers of government: central government, the regions (ordinary statute regions and special statute regions), the provinces, the

[1] We did not collect data available from 2008 to 2011, because in this period the local fiscal system has been deeply reformed more than one time. In 2008, the property tax (ICI) levied on principal dwellings was replaced by intergovernmental grants. In 2012, instead, a substantial part of intergovernmental grants to municipalities was replaced by the introduction of a new property tax on principal dwellings (IMU) and a set of local devolved small taxes in 2011. There is in Italy some narrative evidence showing that the change in 2008 determined an increase in local spending (linked to population, given that the vertical transfer are allocated according to population) and that in 2011–2012 a decrease in the local spending. On the contrary in the years 2001–2007, we do not assist to any structural reform of the Italian local fiscal tax system and so the electoral system effect we want to capture is more clear-cut identified.

local municipalities (more than 8,000 bodies), and the metropolitan authorities (which are yet to be constituted).

In our dataset, as regards their share of the overall government budget, municipalities account on average for about 8.6 % of total public expenditure in Italy during 2001–2007 (that is the time span we used in the empirical analysis). They are responsible for a large array of important public programs in the field of welfare services, territorial development, local transport, infant school education, sports and cultural facilities, local police services, as well as most infrastructural spending. On the revenue side, as a result of a lengthy process of fiscal devolution, municipalities can rely on own-source taxes for about 40 % (average during 2001–2007) of their total revenue. The main municipal taxes are a property tax, a tax on urban waste disposal, a tax on the occupation of public space, and a surtax on the personal income tax levied by central government. With regard to these taxes, municipalities have some powers to set rates and to establish other basic elements of the tax bases. Other revenue derives from various charges for public utilities and for services such as refuse collection or the provision of public infrastructures. Transfers from central government account on average for about 30 % of the municipal budget during 2001–2007.

As for the municipal-level electoral system, since 1993 Italy has opted for a mayor–council system: The municipal council members and the mayor are separately elected directly by citizens in elections normally held every five years. The mechanism of direct election implies that the mayor is endowed with strong powers over municipal politics (a basic feature of presidential government), even though the council retains the power to dismiss the mayor by means of a vote of no confidence in him/her (a basic feature of parliamentary government).[2]

There are two different systems for the election of the mayor and of the municipal council, depending on the number of inhabitants in the municipality. The first applies to municipalities with up to 15,000 inhabitants (referred to herein as "small" municipalities), while the second applies to those with more than 15,000 inhabitants ("large" municipalities). The decennial census is the statistics used to distinguish between small and large municipalities. According to the 1991 census, in our dataset, small municipalities (that is, the vast majority of Italian municipalities) count 6,044, whereas there are 508 large ones, while in the 2001 census, the small municipalities number 6,019, whereas there are 533 large ones.

In small municipalities, the electoral system is quite simple: Each mayoral candidate is associated with a list of candidates for member of the city council. Voters are entitled to vote for a mayoral candidate and may cast, if they wish, a preference vote for a specific candidate for member of the city council. The mayoral candidate who gains the largest number of votes is elected mayor.

A double-ballot majoritarian electoral mechanism is applied in the case of large municipalities. Each mayoral candidate is associated with one list, or coalition of

[2] The council performs this task through the discussion and approval of the executive's courses of action as set out in the program that the mayor has to submit to the council together with his/her budget proposals. If a vote of approval is not passed, then two different scenarios may ensue; either the government continues with its action without the council exercising its extreme power or else the council does in fact exercise said power by voting a motion of no confidence, which if approved leads to new elections for both the council and the mayor (Scarciglia 1993; Fabbrini 2001).

lists, of candidates for the post of councilor; in the first ballot, voters are entitled to vote for a mayoral candidate and, if they wish, for one list associated, or otherwise, with said candidate (that is a split vote is permitted). Each mayoral candidate must officially declare his/her affiliation to one or more lists running for election to the council. This declaration shall only be deemed valid if it coincides with similar declarations made by the candidates featured on the lists in question. In other words, a coalition of parties is offered to electors. The mayoral candidate who receives the absolute majority of votes is elected mayor in the first ballot.

If the mayoral candidate does not receive the absolute majority of votes in the first ballot, then a second ballot is held between the two candidates collecting the largest number of votes in the first round.[3] During the second ballot, voters are entitled to vote for a mayoral candidate, whereas council members are those elected in the first round. The candidate who ultimately obtains the absolute majority of votes is elected mayor.

3 Related literature

Political science literature investigated on the difference between single versus double ballot regarding the number of equilibrium candidates in the electoral competition both theoretically (Cox 1997; Myerson 1999) and empirically (Fujiwara 2011). There is also a narrow stream of literature in political economy, theoretical (Osborne and Slivinski 1996) and both theoretical and empirical (Bordignon et al. 2013), and only empirical (Bracco and Brugnoli 2012) looking at the impact of the two different electoral systems on public policy decisions.

The theoretical literature starts from the Duverger's Law (1954) saying that "simple majority single-ballot favors the two party system", whereas "simple majority with a second ballot or proportional representation favors multipartyism." This intuition has been formalized in two theoretical papers (Cox 1997; Myerson 1999) as the "$M + 1$ rule": if M is the number of seats available, $M + 1$ turns to be the number of candidates on whom the voters have an incentive, given the strategic behavior favored by the voting mechanism, to concentrate their votes. As a matter of fact, in a single-ballot plurality rule election, if a citizen believes that candidates one and two have the greatest chances of winning the election, even if said citizen's preferred candidate is candidate three, he/she strategically chooses to vote for one or two in order to maximize his/her chances of being a pivotal voter. As all voters vote according to a similar logic, candidate three is deserted by his/her supporters, who all vote for candidates one or two. Similarly, in the first round of a double-ballot plurality rule election, given that two seats are at stake in this case; three candidates remain in the running for the second round of voting (Cox 1997; Martinelli 2002). Note, however, that this holds when there is no risk of the unexpected victory of the minority candidate during the first round, that is, when the share of electors backing said candidate is very small (Bouton 2013).

[3] In the period between the first and second ballots, the lists excluded during the first round can now join those that are backing one of the two candidates in the second round, thus creating a sort of band-wagoning effect.

There are very few empirical works on the single- vs double- ballot electoral system. Fujiwara (2011) uses figures for mayoral elections held in Brazil in 1996–2004, to provide evidence that a transition from the single- to the double-ballot system leads to an increase in the number of votes cast for third-placed candidates and a reduction not only in the gap between the votes cast for the second and third-placed candidates but also in that between the winning candidate and the third-placed candidate. Bordignon et al. (2013) build up a theory linking the electoral mechanism with the fiscal decisions of the elected governments and use data on mayoral elections in Italy during the period 1985–2007 finding, in line with previous literature, that the double ballot leads to a larger number of candidates than the single ballot. However, in the presence of a not very polarized electorate, the double-ballot system reduces the influence of extremist groups on public policies, allowing moderate parties to run on their own platforms without being forced to reach a compromise with extremist parties, while for any given level of polarization, the single-ballot system favors coalitions of moderates and extremists. Consequently, they find, in line with Osborne and Slivinski (1996), that equilibrium policies are more dispersed under plurality than under runoff, which elicits more "centrist" policy platforms, limiting the influence of extremist voters. Bracco and Brugnoli (2012) in a post-dated work to ours find that in a double-ballot system taxes are lower than in a single ballot, without however investigating the impact on this result of the number of lists in the coalition supporting the mayor; moreover, interestingly, they also find that runoff municipalities politically aligned with the central government receive, ceteris paribus, more transfers than those not aligned.

4 Theoretical background

The single- and double-ballot regimes, for a given not too strong party polarization, imply centrist parties to implement their own policies (Bordignon et al. 2013). The reason of this behavior stands on the fact that under the double ballot what matters is not to win the first round but to pass it and to win the final election. A centrist party that manages to pass the first round has a larger probability to win the final election, as it can then collect the voters of the excluded extremist party, if it is not extremely ideological. It will consequently determine two different fiscal policies, which in the single-ballot case comes from an agreement between coalitions' parties and in the double-ballot case express the idea of only one party, which has to take account of both moderates and extremists and so the former is more moderate than the latter. This result holds for not very high polarization levels in the large municipalities. After some polarization level, the political outcome of the two regimes is identical (coalitions form also in large municipalities) and the two policy outcome become very close. We test this result by comparing fiscal output of small municipalities and large ones, for a given voter's polarization. Coherently, with the political science literature (Powell 1982; Pennings 1998), we proxy polarization in the double-ballot municipality with the number of lists backing the mayor.[4] The polarization level and so the incentive to

[4] Polarization is very often indirectly estimated through the number of parties in an electoral system (Powell 1982; Pennings 1998), building on Sartori's idea that in some systems—most often multiparty systems—

build up coalitions are crucial in determining the results of Bordignon et al. (2013). So if there is any difference in the outcome policies between the single and double ballot in the low polarization case, this is related to the possibility that in the double-ballot case there is no need of coalition to win the election.

Notice that Roubini and Sachs (1989) and Kontopoulos and Perotti (1999) who argue that coalition members can possibly have divergent interests and so they face a prisoner's dilemma with respect to budget cuts: All the partners have an incentive to protect a particular part of the budget (Alesina and Drazen 1991). If we link this result to the strategic features of the electoral system we can reasonably expect lower expenditure and taxes[5] in the double ballot (with low polarization), than in the single ballot. In fact the theory to which we refer (Bordignon et al. 2013) says that the single-ballot regime always induces parties to merge in coalitions and the double-ballot system induces coalitions only if polarization is very high.

5 Data

The empirical analysis is based on a dataset for Italy's municipalities resulting from a combination of different archives publicly available from the Italian Ministry of the Interior, the Italian Ministry of the Economy and the Italian Statistical Office. This panel dataset covers all Italian municipalities for the period 2001–2007. It includes a full array of information organized into four different sections: (1) fiscal data on spending and revenue items; (2) institutional data on the main political and personal features of municipal bodies (mayor, municipal executive, municipal council), as recorded at the end of each year; (3) electoral data covering the results of elections in which the mayor and the council members in office during the period covered by the dataset were elected; and (4) municipal demographic and socio-economic data such as population size, population age structure, and the average income of inhabitants.

5.1 Dependent variables

Since we are interested in checking whether, and how, the electoral system affects budgetary decisions taken at municipal level, as our dependent variables we have adopted information on own revenue, subdivided into taxes and charges and information on municipal expenditure. As it regards taxes and charges, we used per capita revenue as in Besley and Case (1995) or in Esteller-Moré and Solé-Ollé (2001) and not tax rates as in Besley and Rosen (1998) or Devereux et al. (2007, 2008). The reason is threefold. First, a tax financial variable is coherent and comparable with spending. Second, it would be very difficult to have homogeneous comparable rates for all kind

Footnote 4 continued
centrifugal forces produce a fleeing from the center and a pattern of polarized pluralism (Sartori 1976, pp. 131–145).

[5] During 2001–2007, municipalities in Italy have a strong financial constraint (known as internal stability pact) and so total revenue and expenditure must trend in very similar way, otherwise municipalities can be very penalized with federal transfers in subsequent years.

of revenues we consider (tax and charges). Third, revenue gives account for both tax rate effort and effort in tax evasion control, which are both complementary important components of the municipality's fiscal policy.

5.2 The municipal electoral rule and other political variables

As said before, the municipal electoral rule prescribes two different electoral systems for small and large municipalities. This variation in the electoral mechanism is possibly exogenous with respect to policy-makers' decisional area: We set a dummy (*large*) equal to one when the mayor of a municipality, who held office in a certain year during the period 2001–2007, was elected according to the large municipality rule or to zero when, on the contrary, she/he was elected according to the small-municipality rule. The result is that our sample includes both those municipalities where the mayor in office in each single year over the period 2001–2007 was elected by means of one single electoral system, and those where the mayor in office in different years was elected under both electoral rules.

The 15,000-inhabitant threshold for the choice of the electoral system to be applied in a given municipality/election year is not measured with reference to the actual resident population in that year, but rather to the "certified" population as recorded by the census carried out during the first year of each decade by the Italian Statistical Office. This mitigates information about population size being misreported by local authorities in order to endogenously select the electoral mechanism to be applied in a given election year. Moreover, given these operational arrangements, the electoral rule may only lead to a change in the electoral system adopted in a given municipality if an increase/decrease in the "certified" population, determining a jump from below to above (or vice-versa) the discontinuity threshold of 15,000 inhabitants (which, as already mentioned, may occur once a decade), actually applies in the election years that fall, as a rule every 5 years, during that decade. The treatment variable of the regression discontinuity design is, in fact, from 2003 onwards (the year starting from which the 2001 census was used to redefine municipalities' election rules), a dummy equal 1 (from the year when election held) if the population of the 2001 census is greater than 15,000 and before 2003 a dummy equal 1 (until election held, after 2003) if the population of the 1991 census is greater than 15,000.

We measure the political power of the mayor by using the number of votes (*vote-share*) cast in the first ballot. Moreover, a categorical variable (*list*) accounts for the number of lists associated, in the first round, with the mayoral candidate running under the double-ballot rule. Since Italian law establishes a limit of no more than two consecutive mandates for the office of mayor, a dummy variable (*termlim*) has been created to indicate whether a mayor in office in a given year is in his/her second consecutive term of office, and thus ineligible for a further term: The impossibility of further re-election may significantly bias the budgetary decisions of a municipality (Besley and Case 1995; List and Sturm 2006).

5.3 Socio-economic and demographic controls

We include a set of time-varying variables that characterize a municipality's economic and demographic situation, namely the population of the municipality (*population*);

the average per capita income proxied by the personal income tax base (*income*); the proportion of citizens aged between 0 and 14 (*child*); the proportion of aged over 65 (*aged*); the proportion of foreign residents (*foreign residents*); and the population density computed as the number of citizens per area (*dens*). Finally, there are certain time-constant characteristics of a municipality that are likely to affect fiscal policies, such as climate and geography. We take these characteristics into account by including a dichotomous variable for each municipality. Changes in the macroeconomic situation may also affect fiscal policies of all municipalities in certain specific years. To account for this, we include a set of time dummies controlling for common yearly shocks.

6 Empirical framework

We first run OLS regressions of our financial variables by using the whole available dataset[6] and evaluate the impact of the large municipality electoral system by examining the coefficient of the dummy *large* and its interaction with the number of lists backing the elected mayor.

The financial variables we are interested in are related with actual population because of scale economies for expenditure or agglomeration economies for revenues; indeed, actual population is, by year, correlated with legal population (on average the correlation index is 0.9419 and it is statistically significant at 1 % all the years), implying that the effect of the treatment dummy could be determined solely by the level of population which must be controlled for assessing the effect of the electoral system on the dependent variable. However, in our case, the population mean of small municipalities (3,352) is statistically lower with respect to the population mean of large municipalities (53,531); therefore, the population variable which can mimic the large municipality dummy cannot be controlled for. To bypass this problem (Egger and Koethenbuerger 2010), we use a regression discontinuity design (RDD). Namely, we compare the outcome for municipalities "just below" and "just above" the treatment threshold because they will likely have similar characteristics on average, except for the treatment. If it is the case we expect to find a smooth relationship between the outcome and the forcing variable (population) at the cutoff point so that any discontinuity in the outcomes can be attributed to the treatment variable.

There are various ways to perform RDD. The simplest approach is to compare average outcomes in a small neighborhood on either side of the treatment threshold (Imbens and Lemieux 2008). Nevertheless, this approach could produce very imprecise measures of the treatment effect because the RDD method is subject to a large degree of sampling variability and this procedure would require very large sample size (Petterson-Lidbom 2008). Given our small sample size, we follow the polynomial approach (Petterson-Lidbom 2008, 2012), that is to regress our dependent variable on a pth-order polynomial of the population, in addition to the binary treatment indicator.

[6] Over 56,707 (8,101 municipalities for 7 years) potential observations, our dataset includes 44,466 observations. As a matter of fact, we exclude 9,786 (1,398 municipalities for 7 years) observations referred to municipalities in Special Statute Regions and Provinces, 2,455 observations relative to municipalities/years where data are not complete or incorrect or to municipalities put under commissioner.

Therefore, the model we estimate takes the following form:

$$Y_{i,t} = \gamma_1 large_{i,t} + \gamma_2 large_{i,t} * list_{i,t} + f\left(pop_{i,t}\right) + \beta' X_{i,t} + \tau_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

where $Y_{i,t}$ is a public policy outcome (e.g., total own revenues per capita, taxes per capita, charges per capita, and current expenditure per capita) for municipality i at time t; $large_{i,t}$ is a treatment indicator which equals 1 if the municipality is in the large electoral regime and 0 otherwise; $list_{i,t}$ is a variable accounting for the number of lists in the council election supporting the mayor: It equals 1 for the single-ballot municipalities and for those double-ballot municipalities where only one single list is supporting the mayor, otherwise it equals the number of lists supporting the mayor; $f\left(pop_{i,t}\right)$ is the control function[7] where the variable *pop* has been normalized at 0 when it equals 15,000 because we control not only for a polynomial functional form of the population but also the same function is interacted with the dummy *large*[8]; X_{it} is the vector of control variables discussed in both Sects. 5.2 and 5.3; μ_i accounts for municipality fixed effects; τ_t accounts for year fixed effects.

6.1 The identification strategy

In Italy, there are different policies based on population brackets that might affect the identification of the impact of the two electoral rules, which hold for small and large municipalities, on fiscal policy decisions. In particular, population size determines beyond the electoral rule (single round versus runoff), the salary of the mayor, the compensation of the members of the executive committee and of the councilors, the size of the council, the size of the executive committee, whether or not a municipality can have additional elective bodies in every neighborhood, and whether or not a municipality can host hospital facilities or organize a health-care district (Gagliarducci and Nannicini 2013). In addition, the vertical transfers financing system changes proportionally with the population (Law 504/1992). Finally, municipalities below 5,000 inhabitants are exempted from a set of rules imposed by the national government to the municipalities in order to improve fiscal discipline (Internal Stability Pact). The only range of the population for which it is possible to test the impact of the single- vs double-ballot electoral rule on fiscal policy decisions without additional overlapping institutional breaks (which would make impossible to separately identify the effect of a change in the electoral system) is the population threshold between 10,000 and 20,000 inhabitants. In fact, if we considered, for instance, the 5,000 to 20,000 population threshold, not only the electoral rule would change but also the wage of the

[7] The control function takes the following form:

$$f(pop_{i,t}) = \alpha_1 pop_{i,t} + \alpha_2 pop_{i,t}^2 + \cdots + \alpha_n pop_{i,t}^n + \beta_1 large_{i,t} * pop_{i,t}$$
$$+ \beta_2 large_{i,t} * pop_{i,t}^2 + \cdots + \beta_n large_{i,t} * pop_{i,t}^n$$

where n is the chosen polynomial order.

[8] The normalization ensures that the treatment effect at the cutoff point is the coefficient on the treatment variable in a regression model with interaction terms.

Table 1 Summary statistics

Variable	Obs.	Mean	SD	Min	Max
Total own revenue	3,531	513.72	231.29	92.04	1,815.87
Taxes	3,531	348.66	158.41	44.14	1,542.03
Charges	3,531	165.06	124.45	5.26	1,051.38
Current expenditure	3,531	676.68	207.94	138.38	1,814.08
Child	3,531	0.14	0.02	0.08	0.25
Aged	3,531	0.18	0.04	0.06	0.32
Foreign residents	3,531	0.04	0.03	0.00	0.21
Dens	3,531	676.45	831.59	39.19	8,033.67
Income	3,531	9,780.21	3,405.60	2,221.06	20,376.77
Voteshare	3,531	51.71	12.06	15.70	100.00
Large	3,531	0.25	0.43	0	1
Termlim	3,531	0.32	0.47	0	1
Population	3,531	−1,276.20	2,630.07	−4,999.00	4,991.00
List	3,531	1.67	1.47	1	7

The variable population has been normalized at 0 when it equals 15,000 inhabitants

mayor, the compensation of the members of the executive committee and of the councilors, the size of the council, the size of the executive committee, and especially the transfers from the central government (Law 504/1992) would change. If we considered the 10,000 to 30,000 population threshold, besides the electoral rule, also the possibility to host hospital facilities or organize a health-care district and the transfers (Law 504/1992) amount received by municipalities would change.

Hence, we restrict the sample to municipalities between 10,000 and 20,000 inhabitants[9]. The restriction on the population range 10,000–20,000, reduces the data set to a sample of 3,531 observations. Overall, we have information on 546 municipalities, observed at least two times, since our panel is unbalanced.[10] On average, over 2001–2007, the sample includes 504 municipalities whose 378 are small municipalities (2,644 observations) and 127 are large municipalities (887 observations.)[11]

As far as regards the timing and frequency of elections, the dataset allows to include for all municipalities at least two legislatures, not implying that physically the two elections happen in the period 2001–2007, but at least one should fall in that period. In fact, in 2001, we observe municipalities that held elections, respectively, in 1997, 1998, 1999, 2000, and 2001. If elections run every five years, municipalities having elections in 1997 (and observed from 2001) have again elections in 2002 and 2007. Following this rule, we observe municipalities having elections in 1998 and 2003, in 1999 and 2004, in 2000 and 2005, in 2001, and 2006. Table 3 shows that 82.05 % of

9 Summary and descriptive statistics are shown, respectively, in Tables 1 and 2.

10 275 observations are not included for the same reasons illustrated in footnote 6.

11 Full details on the municipality distribution across the small and large dimension, along all the years included in our dataset, are provided in Table A1 of the online appendix.

Table 2 Descriptive statistics

Variable	Small					Large				
	Obs.	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max
Total own revenue	2,644	510.98	236.17	92.04	1,815.87	887	521.89	216.02	101.06	1,406.95
Taxes	2,644	347.19	164.72	44.14	1,542.03	887	353.04	137.88	50.54	894.16
Charges	2,644	163.79	125.91	5.26	1,051.38	887	168.85	119.98	16.60	862.47
Current expenditure	2,644	668.61	208.91	138.38	1,814.08	887	700.72	203.24	393.42	1,636.78
Child	2,644	0.15	0.02	0.08	0.25	887	0.14	0.02	0.08	0.22
Aged	2,644	0.18	0.04	0.06	0.32	887	0.19	0.04	0.07	0.30
Foreign residents	2,644	0.04	0.03	0.00	0.21	887	0.04	0.03	0.00	0.15
Dens	2,644	631.57	735.90	39.19	8,033.67	887	810.22	1,056.33	55.55	8,033.67
Income	2,644	9,688.65	3,341.34	2,221.06	19,229.04	887	10,053.14	3,578.37	2,692.98	20,376.77
Voteshare	2,644	52.60	11.47	16.01	100.00	887	49.03	13.31	15.70	82.45
Termlim	2,644	0.33	0.47	0	1	887	0.30	0.46	0	1
Population	2,644	−2,461.88	1,729.48	−4,999.00	4,828.00	887	2,258.10	1,391.57	−1,509.00	4,991.00
List	2,644	1.00	0.00	1	1	887	3.67	1.81	1	7

The variable population has been normalized at 0 when it equals 15,000 inhabitants

Table 3 Number of elections by municipalities

Number of elections	Obs.	%
2	448	82.05
3	96	17.58
4	2	0.37
Total	546	100

Table 4 Switching municipalities by year

Year	From small to large	From large to small	Total
2001	0	0	0
2002	0	0	0
2003	6	1	7
2004	12	2	14
2005	1	1	2
2006	5	1	6
2007	8	1	9
Total	32	6	38

municipalities (448) held two elections, while 96 municipalities (17.58 %) held three elections. Just two municipalities held four elections.[12]

Our empirical strategy relies on the treatment coefficient *large* which is identified through municipalities that switch from being small to large electoral regime in the period 2001–2007,[13] given that we use a fixed effect estimate (1). In our dataset, there are 38 municipalities out of 546 that switched in the considered period. Table 4 shows that 32 municipalities switched from small to large electoral regime and six municipalities switched from large to small electoral regimes. In particular, most of the municipalities (14) switched in the 2004 election followed by others 9 municipalities that switched in 2007 elections.[14]

Mean differences in policy outcome variables of the switching municipalities subset between small and large electoral regimes, even not statistically different from zero, are negative (the last column of Table 5 reports difference in means with standard errors in parenthesis). In particular, average per capita total own revenue of large municipalities is 22.66 euro lower than that of small municipalities; the same difference for per capita current expenditure is 31.84.

[12] For both cases, the major resigned before the term and the elections were held at the same year. Additionally, it might be the case that among those municipalities which held two or three elections the mayors resigned before the term and so municipalities held again elections before the regular time (five years). However, there are no cases where the mayor was brought down through a vote of no confidence during her legislature.

[13] Details of the switches are in Table A2 of the online appendix.

[14] There is only one municipality (Brusciano) that actually switches from one regime to the other that is not considered in our datastet because it was put under commissioner in the considered period.

Table 5 Descriptive statistics for small and large electoral regimes relative to switching municipalities

	Small electoral regime				Large electoral regime				Difference in means
	Mean	SD	Min	Max	Mean	SD	Min	Max	
Total own revenue	543.23	214.32	194.21	990.28	520.57	193.58	188.93	897.54	−22.66
									(−0.47)
Taxes	364.40	163.23	83.81	801.99	354.82	145.66	133.58	706.23	−9.58
									(−35.49)
Charges	178.83	102.77	31.24	543.55	165.75	88.41	29.12	341.57	−13.08
									(−22.00)
Current expenditure	696.49	190.03	399.47	1,099.75	664.65	170.14	407.81	1,031.93	−31.84
									(−41.38)

6.2 The large dummy coefficient

Notice that γ_1 accounts for the impact of the large electoral system on the public policy and γ_2 let us understand how the last impact varies according to the number of lists supporting the elected mayor. As long as $\gamma_1 + \gamma_2 * list_{i,t}$ is statistically significant, we can confirm that being in a large electoral regime with the mayor supported by a given number of lists affects the policy decision of the municipality. If γ_2 is opposite in sign with respect to γ_1 it means that the presence of multiple lists offsets (at least partially) the difference between the double ballot where the mayor is supported only by one list and the single ballot where only a unique list can support the mayor. In our sample used in the RDD, there are municipalities belonging to the double-ballot regime (887 observations) with only one list backing the mayor (164 observations), with two lists (65), three lists (192), four lists (166), five lists (136), six lists (108), and with seven or more lists (56).[15]

7 Results

We first run fixed effects regressions using the whole sample with robust standard error, clustering by municipality (Table 6). The double-ballot system negatively affects *total own revenue* compared to the single-ballot system (−52.92 and 1 % significant), but this effect becomes smoother the greater the number of lists supporting the successful mayoral candidate. The same result stems from regressions of *taxes* (−32.58 and 1 % significant), *charges* (−20.34 and 5 % significant) and *current expenditures* (−43.33 and 1 % significant). The interaction with *list* is not significant.

We then run fixed effect regressions by using a RDD with robust standard error, clustering by municipality. Also in this case, we run regressions for *total own revenue*, *taxes*, *charges*, and for *current expenditure* where we interact the dummy *large* with the categorical variable *list*. For each regression, we choose the polynomial order of the

[15] Further statistical details are in the online appendix (Table A3).

Table 6 Impact of the large electoral system on the fiscal policy outcome: fixed effect estimates

Dependent variable	Total own revenue (1)	Taxes (2)	Charges (3)	Current expenditure (4)
Large	−52.92***	−32.58***	−20.34**	−43.33***
	(14.32)	(11.98)	(10.37)	(15.68)
Large*list	2.24	1.50	0.74	0.16
	(1.62)	(1.07)	(1.25)	(1.63)
Population	−2,571.42	−1,680.96**	−890.46	−4,134.04**
	(1,990.52)	(691.49)	(1,391.23)	(1,905.48)
Termlim	−0.28	0.89	−1.17	1.02
	(2.33)	(1.24)	(1.95)	(2.30)
Child	421.96	248.65	173.31	148.94
	(714.33)	(532.56)	(217.99)	(823.06)
Old	−1,153.69	−581.39	−572.29*	−1,287.90
	(1,117.71)	(835.47)	(314.68)	(1,294.47)
Foreign residents	−1,388.83***	−489.44	−899.39***	−1,572.29***
	(503.44)	(375.22)	(149.93)	(583.89)
Dens	−0.18**	−0.08**	−0.10**	−0.20**
	(0.07)	(0.03)	(0.04)	(0.08)
Income	−74.56	23.67	−98.24	−80.77
	(87.19)	(37.98)	(90.35)	(78.55)
Votshare	158.71	−2.40	161.12	499.21*
	(427.37)	(331.02)	(182.66)	(272.54)
Overall observations	44,466	44,466	44,466	44,466
Observations small municipalities	41,023	41,023	41,023	41,023
Observations large municipalities	3,443	3,443	3,443	3,443
R-squared	0.57	0.42	0.86	0.46

Period 2001–2007. All estimates include municipality and year fixed effects. The variables *population*, *dens*, and *income* have been rescaled by dividing by 1,000. Robust standard errors, clustered at municipal level, are reported in brackets. Significance at the 10 % level is represented by *, at the 5 % level by **, and at the 1 % level by ***

control function *f(pop)*, by using the Akaike Information Criterion (AIC). According to the AIC, the best polynomial order for the four dependent variables, above mentioned, is the sixth (Table 7).

Panel A of Table 8 shows that the double-ballot electoral system with only one list supporting the mayor negatively affects *total own revenue* compared to the single-ballot system where only a unique list can support the mayor, but this effect becomes smoother the greater the number of lists supporting the successful mayoral candidate In a double ballot, in the sixth degree polynomial specification, the coefficient of *large* interacted with the variable *list* is +6.18 and 10 % significant. When we compute the linear combination of the coefficient (*large*) not interacted with the same coefficient

Table 7 Akaike's information criterion on Table 8's regressions

Polynomial order	Controls	Total own revenue	Taxes	Charges	Current expenditure
1	Yes	40,977.21	38,210.16	39,067.37	40,396.44
2	Yes	40,979.50	38,210.07	39,068.14	40,399.40
3	Yes	40,975.64	38,211.58	39,057.27	40,393.52
4	Yes	40,972.89	38,210.17	39,047.12	40,389.09
5	Yes	40,972.74	38,208.94	39,047.34	40,389.21
6	Yes	40,972.13	38,206.41	39,046.51	40,388.61
1	No	41,071.40	38,235.36	39,141.30	40,489.62
2	No	41,073.33	38,236.58	39,141.18	40,490.89
3	No	41,068.89	38,237.99	39,129.95	40,484.30
4	No	41,067.34	38,236.43	39,122.09	40,481.73
5	No	41,066.56	38,234.81	39,122.56	40,482.90
6	No	41,065.87	38,232.61	39,121.20	40,481.54

interacted with *list*, it is always significant until the number of lists is equal to five and decreases as the number of lists increases.

This result is almost entirely due to the revenue from *charges* (in the 6th degree polynomial specification, the coefficient of *large* is −36.80 and 10 % significant; the runoff coefficient interacted with *list* is 4.91 and 10 % significant). The revenue from *taxes* is always lower than in the single-ballot system (in the sixth degree polynomial specification, the coefficient of *large* is −31.87, 10 % significant and the interacted coefficient is 1.26, but not significant). *Current expenditure* is also lower than in the single-ballot system in fact in the sixth degree polynomial specification, the coefficient of *large* is −44.41, 10 % significant and the interacted coefficient is 4.05, but not significant, however when we compute the linear combination of the coefficient (*large*) not interacted with the same coefficient interacted with *list*, it is always significant until the third list and decreases as the number of lists increases (Table 8).

We can then conclude that whatever the polarization of the electorate supporting the mayor in the large municipality, the double-ballot electoral rule leads to a lower *current expenditure* and *total own revenue* with respect to the single ballot. The reason is that in single-ballot municipalities, common pool problems can emerge in forming the unique list supporting the mayor,[16] or in double-ballot municipalities with explicit numerous coalitions (the case when the electorate is highly polarized and so the candidate has incentive to merge), the incentive to free-ride is stronger than in double-ballot municipalities with no coalition (the interaction of the dummy *large* with the variable *list* in both estimates of per capita total revenue and expenditure is in fact positive), which is the case when the electorate polarization is low and so there is no incentive for the candidates to merge (Bordignon et al. 2013).

[16] Even if there is formally a unique list supporting the mayor, common pool problems show up because different parties often ally to form the very frequent single Council list (Lista Civica).

Table 8 Impact of the large electoral system on the fiscal policy outcome: RDD estimates with fixed effects

Polynomial order	(A) Estimations without covariates				(B) Estimation with covariates			
	Total own revenue	Taxes	Charges	Current expenditure	Total own revenue	Taxes	Charges	Current expenditure
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1st large	−39.18*	−23.83	−15.36	−23.08	−54.32***	−29.58*	−24.74	−33.57*
	(20.55)	(15.54)	(15.08)	(19.65)	(19.96)	(15.13)	(15.39)	(19.68)
Large*list	6.26*	1.38	4.88*	4.04	7.96**	1.64	6.32**	5.85
	(3.66)	(2.30)	(2.88)	(3.97)	(3.43)	(2.18)	(2.89)	(3.94)
2nd large	−45.30**	−23.26	−22.04	−27.36	−61.55***	−29.01*	−32.54**	−38.90*
	(22.67)	(16.85)	(14.48)	(21.68)	(22.27)	(16.44)	(14.95)	(21.60)
Large*list	6.30*	1.38	4.92*	4.11	7.90**	1.63	6.27**	5.82
	(3.64)	(2.30)	(2.85)	(3.95)	(3.40)	(2.17)	(2.86)	(3.92)
3rd large	−43.09*	−24.47	−18.62	−26.38	−58.73**	−30.09*	−28.64*	−37.08*
	(23.08)	(16.52)	(15.90)	(21.79)	(22.73)	(16.11)	(16.21)	(21.74)
Large*list	6.43*	1.37	5.06*	4.23	8.03**	1.61	6.43**	5.95
	(3.65)	(2.31)	(2.84)	(3.96)	(3.41)	(2.18)	(2.86)	(3.93)
4th large	−61.97**	−27.56	−34.41*	−38.79	−77.40***	−33.93**	−43.47**	−48.92*
	(25.36)	(17.02)	(19.80)	(25.10)	(25.01)	(16.65)	(19.80)	(25.05)
Large*list	6.21*	1.32	4.89*	4.10	7.79**	1.53	6.26**	5.82
	(3.54)	(2.32)	(2.73)	(3.88)	(3.30)	(2.19)	(2.74)	(3.85)
5th large	−66.74***	−31.13*	−35.62**	−43.68*	−84.08***	−37.91**	−46.17**	−55.51**
	(24.64)	(17.18)	(17.85)	(24.00)	(24.90)	(16.82)	(18.57)	(24.07)
Large*list	6.13*	1.23	4.90*	4.02	7.72**	1.45	6.27**	5.76
	(3.56)	(2.31)	(2.75)	(3.91)	(3.32)	(2.19)	(2.76)	(3.87)

Table 8 continued

Polynomial order	(A) Estimations without covariates				(B) Estimation with covariates			
	Total own revenue	Taxes	Charges	Current expenditure	Total own revenue	Taxes	Charges	Current expenditure
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
6th large	−68.67***	−31.87*	−36.80*	−44.41*	−85.13***	−38.32**	−46.81**	−55.30**
	(25.47)	(17.37)	(19.13)	(24.63)	(25.65)	(16.98)	(19.71)	(24.68)
Large*list	6.18*	1.26	4.91*	4.05	7.74**	1.46	6.28**	5.76
	(3.56)	(2.32)	(2.76)	(3.93)	(3.32)	(2.19)	(2.77)	(3.89)
Overall observations	3,531	3,531	3,531	3,531	3,531	3,531	3,531	3,531
Observations small municipalities	2,644	2,644	2,644	2,644	2,644	2,644	2,644	2,644
Observations large municipalities	887	887	887	887	887	887	887	887
R-squared	0.88	0.88	0.76	0.87	0.88	0.88	0.76	0.88

Period 2001–2007; municipalities with a resident population of between 10,000 and 20,000 inhabitants. Estimation methods: polynomial approximation to the first, second, third, fourth, fifth and sixth degrees. All estimates include municipality and year fixed effects. The estimations in panel B also includes the following covariates: mayor's lame-duck dummy, percentage of votes obtained by the mayor when elected (for the double ballot we consider the votes obtained at the first round), share of population aged between 0 and 14, share of population over 65 years, share of foreign residents, population density computed as the ratio between population and area, per capita personal income tax base. Robust standard errors, clustered at municipal level, are reported in brackets. The R-squared is obtained by taking the average R-squared of each polynomial order across regressions. Significance at the 10 % level is represented by *, at the 5 % level by **, and at the 1 % level by ***

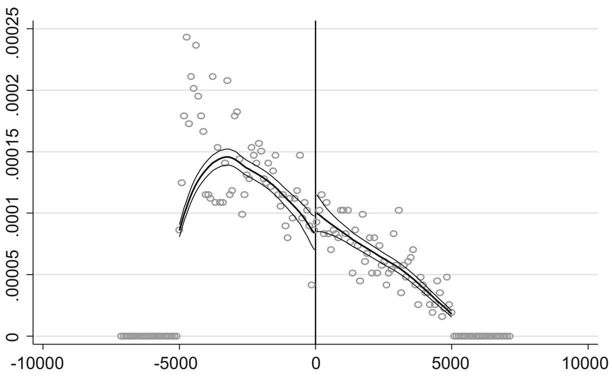

Fig. 1 McCrary test. Weighted kernel estimation of the log density performed separately on either side of the threshold. Optimal bandwith and binsize as in McCrary (2008)

8 Robustness checks

In order to confirm that our results are robust and the identification strategy holds, we need to be sure that the discontinuity we found in the dependent variables is not driven by the discontinuity of our exogenous variables.

First, we replicate all the regressions of the previous Section, by controlling for all covariates: All the results obtained in the polynomial specifications still hold (Table 8, panel B).

Second, we check whether there is a discontinuity in the forcing variable by performing a McCrary test (McCrary 2008) which is shown in Fig. 1. The figure displays no evidence of strong discontinuity at the cutoff.

Third, we test whether the covariates do not show any discontinuity with respect to the population.[17] We do not reject the null hypothesis of zero discontinuity in all polynomial order, for *dens*, *votshare and termlim*, while for *child* we find a significance only in the fifth polynomial order and for both *old* and *foreign residents* we do not reject the null hypothesis of zero discontinuity starting from the fourth polynomial order. *Income* is significant for the second, third, fourth, and fifth polynomial order; however, the sign (positive) of the discontinuity goes in the opposite direction of the sign (negative) we find for the large dummy. Notice that in our preferred specification, namely the sixth polynomial order degree, we do not reject the null hypothesis for any of our covariates.

Forth, we test whether the treatment dummy (*large*) is determined by any of the covariates and we do that by regressing it against all the covariates and the control function.[18] We replicate the regressions by using different control functions from the first up to the sixth polynomial order. We test whether the coefficients are significantly different from zero and also not jointly significantly different from zero. All the coefficients, excluding the control function, are not significant except *old* in the first, second,

[17] Results are in Table A4 of the online appendix.

[18] Results are displayed in Table A5 of the online appendix.

third, and fourth order polynomial control function, *foreign residents* in the regression with a first order polynomial control function, and *dens* in the sixth order polynomial control function; in all the regressions the covariates are never jointly significantly different from zero.

Fifth,[19] we run a placebo test for the polynomial from the first up to the sixth order. We used the sample of municipalities with populations of between 10,000 and 20,000, and in the sub-sample of the small municipalities, we set a threshold corresponding to the median population (12,057) and did likewise for the sample of large municipalities, which gave a median population of 16,957. We ran the same regressions that we had run with the 15,000 threshold, but the coefficient that accounts for the threshold effect was never significant a part that of *charges* (10 % significant) in the regression with the "fake" threshold of 16,957 inhabitants for the first order polynomial control function and covariates.

Sixth, we use a local linear regression approach by restricting the sample to municipalities in the interval $[-h, +h]$, where h is an optimal bandwidth selected following the methodology suggested by Imbens and Kalyanaraman (2009) that, in our case, turns out to be approximately 1,500 inhabitants.[20] Therefore, we restrict our sample to the interval 13,500–16,500 which implies using 1,018 (30 % of the total) observations (547 at the left of the cutoff and 471 at the right). The *large* coefficient[21] is negative and significant (5 % for *total own revenue* and 10 % for *current expenditure*), and the interactions have the right sign but are not significant (the drawback of estimating local linear regressions with so few observations can result in too high standard errors). The coefficients we get with the local linear regressions are very close to those we get with the polynomial specification from the forth polynomial order degree onwards. This should imply that our polynomial functions from the fourth degree are well specified (Petterson-Lidbom 2008). We also did estimates by changing bandwidths. In one case, by using two times, the optimal ones (2h = 3,000) and so enlarging the sample (in this case we face with 2,098 observations—60 % of the total—1,286 at the left of the cutoff and 812 at the right) and in another by using half the optimal ones ($h/2 = 750$) and so restricting the sample (in this case we face with 515 observations—15 % of the total—264 at the left of the cutoff and 251 at the right). In the case of the very restricted sample, we get very significant coefficients for all dependent variables,[22] while in the larger one, whose width is very similar to that used for the polynomial estimates, only total own revenue turns out to be significant.[23]

Finally, we do a graphical analysis (Fig. 2) for all the dependent variables used in the regression. The population is normalized at 15,000. The graphs report the fitted values from a regression model estimated separately on each side of the threshold, using the polynomial of the population that best fits the data. We choose to divide

[19] See Tables A6–A7 of the online appendix.

[20] This is implemented using the Stata command *rd* developed by by Nichols (2011).

[21] See Table A8 and or Figures A1 and A2 of the online appendix.

[22] See Table A9 of the online appendix.

[23] See Table A10 of the online appendix.

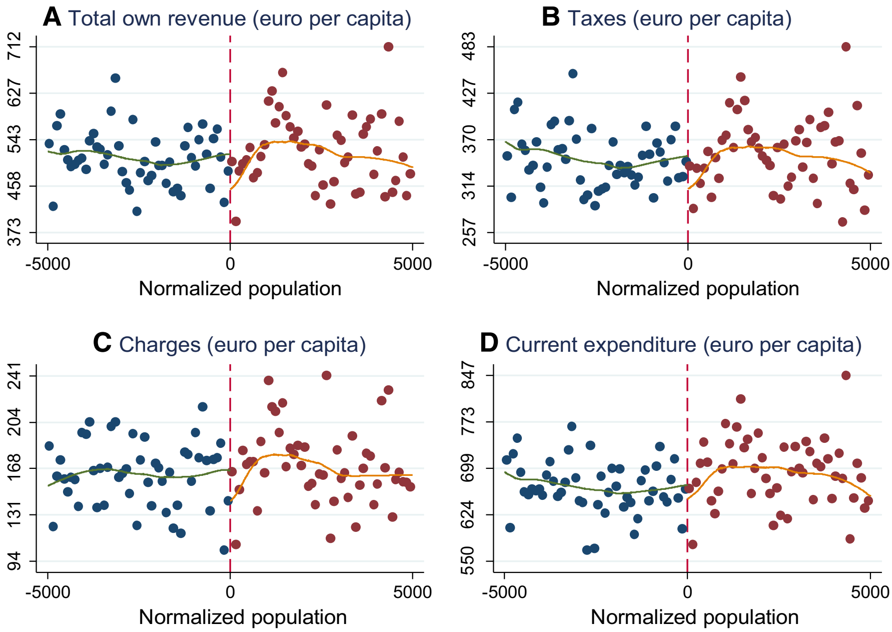

Fig. 2 The impact of double-ballot elections on fiscal policies. *Notes*: Period 2001–2007 ,municipalities with population between 10,000 and 20,000 inhabitants. The *solid line* is the fitted value from a regression model estimated separately on each side of the cutoff point using the polynomial that best fits the data. Scatter points are averaged over a bandwidth of 50 bins at either side of the normalized population size (i.e., population minus 15,000). Each bins on the left of the cutoff contains, on average, 48 observations, while each bins on the right of the cutoff includes, on average, 22 observations

both sides of the cutoff in 50 bins,[24] taking for each bin the average of the reported dependent variable.[25] The graphs related to *total own revenue* (Panel A), *taxes* (Panel B) and *charges* (Panel C) show a clear evidence of discontinuity around the cutoff; while for the *current expenditure* the discontinuity seems less clear-cut (Panel D).

9 Conclusions

We studied the impact of two different electoral systems on fiscal policies, based on the case of Italy's municipal elections. In Italy, municipalities with less than 15,000 inhabitants elect their mayor according to a plurality single-ballot system whereby only one list can support the candidate who is eventually elected mayor, and very often this list represents a coalition of parties converging in a single list. In municipalities with more than 15,000 inhabitants, the mayor is elected according to a plurality double-ballot system, whereby an officially-declared coalition of lists may support her/him.

[24] The graphical analyses with 25, 100, 200 bins are available upon request.
[25] Each bins on the left of the cutoff contains on average 48 observations, while each bins on the right of the cutoff includes, on average, 22 observations.

We use a 2001–2007 panel dataset of all Italian municipalities with financial, socio-economic, and political data. We test through a RDD at the 15,000 population cutoff the impact of the runoff electoral system on public output and evaluate it for a given polarization of the electorate supporting the mayor (proxied by the number of lists supporting the mayor).

We find that municipalities under the double-ballot system have lower per capita total revenue and current expenditure than those municipalities where a single-ballot system holds. These differences become increasingly less robust, the greater the number of lists supporting the successful mayoral candidate in the first round of voting in double-ballot municipalities. The result confirms previous findings (Roubini and Sachs 1989; Kontopoulos and Perotti 1999) where coalitions can generate free-riding which, in the Italian case, leads to high level of expenditure and, given the tight financial constraints imposed to municipalities, also high level of taxes. The novelty of our result is that it is associated to the used electoral system (single ballot or double ballot) for given polarization. In fact it is reasonable to think that in single-ballot municipalities, for the ex-ante strong incentive of candidates to merge in coalitions (Bordignon et al. 2013), or in double-ballot municipalities with explicit numerous coalitions (the case when the electorate is highly polarized and so the candidates have incentive to merge), the incentive to free-ride is stronger than in double-ballot municipalities with no coalition, which is the case when the electorate polarization is low and there is no incentive for the candidates to merge.

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