The impact of local government size on the flypaper effect: evidence from the 2008 fiscal refom in Italy

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Abstract

We investigate the impact on expenditure of tax on principal dwellings before 2008 and the impact on expenditure of the grant which, after 2008, during the Berlusconi government, compensated for the abolition of the tax on principal dwellings. We setup a theoretical model in which the introduction of a political bias against taxation gives rise to the flypaper effect. If the public good is very important with respect to private consumption then an increase in the municipal size implies a decrease in the extent of the flypaper effect; the opposite happens if the public good is not important with respect to private consumption.We then test the hypotheses coming from the model by using data on Italian municipalities, focusing on two groups of expenditure: principal expenditures, which are those important to guarantee the minimum standard daily life of a municipality and the rest, defined as residual expenditures. We find that the flypaper effect holds for both kinds of expenditure, but decreases with respect to population in the case of principal expenditure and increases with respect to population in the case of residual expenditure.

Keywords: Flypaper, transfers, federal budget, property tax, fiscal reform.

JEL classification: C23, H71, H72

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1 Introduction

In 2006, just before the end of the election campaign, Berlusconi, the right-wing candidate for Prime Minister, said "If you vote for us again, we will abolish property tax for your primary residence". There is evidence in Italy (Bordignon and Piazza, 2010) that this tax is a salient political issue at local level[1]. This important claim bought homeowners' votes for the right-wing candidate, in fact before the promise to abolish the property tax, the margin between Berlusconi and his challenger, Prodi, was much higher than the final margin with which Prodi won the election. The weak government majority of Prodi lasted less than two years and was then replaced, in 2008, by the right-wing majority guided by Berlusconi. The new government maintained its promise by exempting citizens from the payment of the property tax (ICI) levied on principal dwellings, thus leading to a significant decrease in the availability of municipalities' own resources, which were replaced by a compensating transfer from the central government. Such a change in fiscal policy allows us to investigate the impact of the municipal revenue linked to principal dwellings (either raised by municipalities before 2008, or funded through the central transfers after 2008) on local expenditure.

Federal grants distributed to members of a federation should only alter income levels and affect state expenditure in the same way lump-sum grants to individual community members would (Bradford and Oates, 1971). However, empirical works in the field do not support this theory and one of the most accredited alternative explanations is the "flypaper effect". Grants stimulate government expenditures more than transfers to individuals for the same amount of money (Gramlich, 1977). Hence, a proportion of federal money remains in the public sector rather than of being distributed among citizens. In seminal empirical works, Henderson (1968) and Gramlich (1969) found that an extra dollar of personal income increased government spending from \$0.02 to \$0.05 but an equivalent extra dollar of grants increased government spending by \$0.30. Starting from these findings, much literature has developed documenting and seeking to explain the flypaper effect.[2]

According to Inman (2009), the flypaper effect can arise for four reasons. The first one concerns the data: researchers might confuse matching grants with lump-sum

[1] According to Corriere della Sera – the most popular Italian newspaper – this tax is considered as the most "hated" tax by Italian taxpayers (Corriere della Sera, May 22, 2007).

[2] For a comprehensive analysis see, e.g., Hines and Thaler (1995), Gamkhar and Shaw (2007) and Inman (2009).

grants or may be particularly sensitive to some kind of transfers as Wyckoff (1991) finds for capital expenditures. The second explanation relies on a possible econometric mis-specification as empirical studies on the flypaper effect often omit important unobserved input variables (Becker E. 1996; Megdal S. B., 1987; Zampelli E. 1986). A new interesting explanation, related to this second reason, comes from the idea that federal transfers can be endogenous in a regression of the local expenditure (Knight, 2002): a positive correlation between constituent preferences for public goods and intergovernmental grants biases upwards the coefficient relating federal transfer to local expenditure. The third explanation is based on the voter ignorance hypothesis. The representative voter does not know the level of grants received by the local government which it cannot then include in its private budget constraint, or, as stated by Hines and Thaler (1995) the representative voter is aware of the aid received by the local government but distinguishes between "public budget", which is the responsibility of government officials, and a "private budget", which is the citizen's responsibility, meaning that only part of the grant is included in the private budget. Finally, according to the fourth explanation, the flypaper effect is a consequence of an inability of citizens to write complete "political contracts" with their elected officials because they have imperfect information about intergovernmental grants and budget-maximizing bureaucrats who use hidden information to expand their budget (Wyckoff, 1988). Besides these explanations, part of the literature points out that the flypaper effect can arise where subnational governments use distortionary taxes to fund their expenditure (Hamilton, 1986; Becker and Mulligan, 2003; Voleden, 2007; Dahlby, 2011) and, at the same time, receive federal grants, which are very difficult, for the citizens, to relate to the federal taxes they pay, hence, they are perceived as lump sum grants.

There is a large amount of literature testing the flypaper effect. In particular, Winer (1983), using data on Canadian provinces for the period 1952-1970, shows that the effect of grants on provincial spending for poor provinces is about two times larger than that for the rich provinces. Blanco (2006) finds that the flypaper effect in Brazil is more marked in municipalities with a low level of population density. Buettner and Wildasin (2006) use a panel dataset of 1270 U.S. municipalities over the period 1972-1997 finding that a permanent one dollar per capita increase in grants leads to a 28.7 cent increase in spending and, interestingly, this effect is more pronounced for large US cities compared to small ones. Kalb (2010) uses data on German municipalities and shows that an increase in the amount of grants received by the local government

implies not only an increase in expenditure, but also a loss in productive efficiency.

In relation to the Italian case, Levaggi and Zanola (2003), using data at regional level from 1989 to 1993, find evidence of the flypaper effect for health expenditure. Revelli (2013) shows how excess sensitivity of local public spending to grants arises in the presence of tax limitations. By using data for the Italian provinces over the years 2000 to 2007 he finds that the response of local spending to grants is significantly higher for fully constrained provinces than for provinces that can handle at least one tax instrument. Gennari and Messina (2014) test the presence of flypaper also investigating the role played by some political factors like the electoral cycle or the political strength of the local cabinet, by using data on Italian municipalities from 1999 to 2006 and, find a strong flypaper effect but that is not affected by political factors. Finally, Bracco et al. (2015) find the flypaper effect for Italian municipalities in a framework where they instrument grants with the political alignment between central and local government.

In this work we exploit the exogenous change in fiscal policy, due to the switch during the Berlusconi government from a decentralized tax system to a centralized one, that allows the expenditure of the same municipality to be compared on two different financing systems: one based on own revenue (pre-2008) and the other based on compensating vertical transfers (post-2008). In fact, by exploiting the local fiscal policy reform we can follow the spending decision of each municipality, whose local property tax has been replaced with a less or equal compensating transfer exogenously determined. Reasonably, if the flypaper is holding we expect that municipalities increase their expenditure, even if they get a compensation lower (or equal) to the replaced property tax revenue. In a comparable framework, Dhalberg et al. (2008) find evidence of the flypaper effect for Swedish municipalities, showing that munciplaities getting federal transfers do not decrease taxes, but increase local public expenditure.

The work is structured as follows. Section 2 presents the theoretical model. Section 3 discusses the fiscal policy reform and provides some institutional information on Italian financing systems as well as a description of the data. Some preliminary evidence is illustrated in Section 4. Our empirical strategy and results are in Section 5. Section 6 is the conclusion.

2 The theoretical model

In this Section we use a neoclassical model with a benevolent local government using a non-distortionary taxation, which is a reasonable assumption since in the empirical section we focus on taxes on principal dwellings. We also assume a political bias against local taxation, reflecting the reason of the strong claim of Berlusconi against property tax in 2006 which was so salient to let him get in power in 2008.[3]

Consider a municipality. The welfare of the municipality is represented by the quasi-concave utility function $u(c, G)$, where c is per capita private consumption and G is the public good.

The municipal government finances the public good with a tax on principal dwellings and with a transfer from the central government. The per capita local tax base, b, is exogenously given, and the tax is proportional, at rate τ.

The budget constraint of the private sector is

$$c = y - \tau b,$$

where y is the per capita income of the municipality, exogenously given.

The budget constraint of the municipality is

$$G = (\tau b + t)N,$$

where t is the per capita grant from the central government, in lump sum form, and N is the size (population) of the municipality.

The local government's objective function is

$$V = u(c, G) - l(\tau b)$$

where $l(\tau b)$ is a loss function that captures citizens aversion to taxation, strictly convex in tax revenues. This function captures in a reduced form the bias that citizens have when evaluating fiscal policies: they overvalue the costs of taxation while they undervalue the benefits of the public good. The policy maker maximizes her political support by maximizing true social welfare $u(.)$ while minimizing the unpopularity stemming from taxation.

[3]This feature of our model has some evidence in Italy, where municipalities, when increasing tax, usually prefer to increase the surtax on national income tax than local property tax on dwellings, since the former, even if it is formally a local tax, is perceived as a national one hence not related to local policy maker behavior (Bordignon and Piazza, 2010).

To illustrate, consider the following quadratic specification

$$u(c,G) = \left(\alpha - \frac{(1-\beta)c}{2}\right)c + \left(\alpha - \frac{\beta G}{2}\right)G$$
$$l(\tau b) = \frac{\phi}{2}(\tau b)^2$$

where $\alpha > 0$, $0 < \beta < 1$ are parameters characterizing the preferences for the private and the public good, and $\phi \geq 0$ is a parameter capturing the degree of aversion to taxation.

From the first order condition with respect to the tax rate we get:

$$\tau^*(y,t)b = \frac{(1-\beta)y + \alpha(N-1) - \beta N^2 t}{1+\phi+\beta(N^2-1)}; \tag{1}$$

hence:

$$G^*(y,t) = \frac{[(1-\beta)y + \alpha(N-1) + (1-\beta+\phi)t]\,N}{1+\phi+\beta(N^2-1)}. \tag{2}$$

In the absence of transfers, i.e., if $t = 0$, the provided public good (2) is N times the optimal raised per capita revenue, $\tau^*(y,0)b$. In fact, it is easy to see that in this case:

$$\tau^*(y,0)b = \frac{(1-\beta)y + \alpha(N-1)}{1+\phi+\beta(N^2-1)}, \tag{3}$$

and, the total revenue, which coincides with the provided public good when $t = 0$, is equal to

$$\Gamma(y,0) = \frac{[(1-\beta)y + \alpha(N-1)]\,N}{1+\phi+\beta(N^2-1)}.$$

If we introduce a transfer $t > 0$, the optimal raised revenue (1) is lower than the optimal raised revenue when no grant holds (3) because the grant ($t > 0$) increases the available total revenue not affecting the local political cost of taxation and therefore the local policy maker needs less taxes to finance any given public good. Moreover, since the policy maker knows that increasing the provision of the public good through the increase in transfer does not affect private consumption, she will choose a higher level of public good than in the case when there was no grant. In fact, using (3), we can re-write (2), as follows:

$$G^*(y,t) = \Gamma(y,0) + \frac{(1-\beta+\phi)tN}{1+\phi+\beta(N^2-1)},$$

which states that the provided public good when a transfer holds is higher than the public good provided when a transfer does not hold ($\Gamma(y,0)$).

We are interested in comparing the change in $G^*(y,t)$, when a change in local tax revenue is exogenously induced by, for example, an increase in y and comparing it, with the case when an increase in t is introduced. In the absence of political aversion to taxation (i.e., $\phi = 0$), since taxes are non-distortionary (i.e., tax bases are exogenous), we do not observe any flypaper effect:

$$\left.\frac{\partial G^*}{\partial t}\right|_{\phi=0} = \left.\frac{\partial G^*}{\partial \Gamma}\frac{\partial \Gamma}{\partial y}\right|_{\phi=0} = \frac{(1-\beta)N}{1+\beta(N^2-1)}.$$

Instead, if $\phi > 0$, which means that there are political costs in raising local taxation, we have the flypaper effect, since

$$\frac{\partial G^*}{\partial t} = \frac{(1-\beta+\phi)N}{1+\phi+\beta(N^2-1)} > \frac{(1-\beta)N}{1+\phi+\beta(N^2-1)} = \frac{\partial G^*}{\partial \Gamma}\frac{\partial \Gamma}{\partial y}$$

Transforming one unit of income into public good is more expensive for the local public government (because citizens must be locally taxed), than transforming one unit of transfers in public good, which does not have any political cost for the local policy maker. Note in fact that the flypaper effect is more marked the larger ϕ is.

Moreover:

$$\frac{\partial G^*}{\partial y \partial N} = \frac{(1-\beta)(1-\beta+\phi-\beta N^2)}{[1+\phi+\beta(N^2-1)]^2}$$

$$\frac{\partial G^*}{\partial t \partial N} = \frac{(1-\beta+\phi)(1-\beta+\phi-\beta N^2)}{[1+\phi+\beta(N^2-1)]^2}$$

and:

$$\frac{\partial G^*}{\partial t \partial N} - \frac{\partial G^*}{\partial y \partial N} = \frac{\phi(1-\beta+\phi-\beta N^2)}{[1+\phi+\beta(N^2-1)]^2}. \tag{4}$$

Note that $\frac{\partial g G^*}{\partial t \partial N} - \frac{\partial G^*}{\partial y \partial N} < 0$ if and only if $\beta > \frac{1+\phi}{1+N^2}$; in this case an increase in the municipality size decreases the size of the flypaper effect: if the public good is "very important" (i.e., $\beta > \frac{1+\phi}{1+N^2}$) and so a significant proportion of the private income (through taxation) has already been allocated to finance it, a further increase in population decreases the already positive flypaper effect.

The political cost of raising taxation is the reason why an increase in the lump sum grant increases the public good provided more than an increase in private income. The more highly populated the municipality is, the lower the per capita cost of providing the public good becomes, hence the political cost is also lower. This feature can imply a decrease in the flypaper effect if the initial level of the public good (before the increase

in population) is very high, such that the increase in marginal utility (net of marginal disutility due to the political cost of taxation) due to a unit increase in public good is lower than an increase in marginal utility due to unit increase in private consumption. On the other hand, $\frac{\partial G^*}{\partial t \partial N} - \frac{\partial G^*}{\partial y \partial N} > 0$ if and only if $\beta < \frac{1+\phi}{1+N^2}$, therefore the public good is not a high priority.

If public good provision before the increase in population is low, the increase in marginal utility due to a unit increase in public good is higher than the increase in marginal utility (net of marginal disutility due to the political cost of taxation) due to a unit increase in private consumption. Hence, the lower cost of providing the public good due to the increase in population implies an increase of its provision and hence of the flypaper effect.

2.1 Testable Hypotheses

We are interested in comparing the change in $G^*(y,t)$, when an increase in local tax revenue is exogenously induced with the case when an increase in t is introduced. Hence, we can use our theory by assuming that the change in tax revenue on principal dwellings that we observe in our data (which will be described below) is due to an exogenous change in municipalities' endowments, which, through the optimization process, (that we described in the previous Section) gives rise to a change in equilibrium taxes affecting the provided public good. So we test the following Hypotheses:

Hypothesis 1: $\frac{\partial G^*}{\partial t}\big|_{t>0} > \frac{\partial G^*}{\partial \Gamma}\big|_{t=0}$ $\forall \beta \; and \; \phi > 0$

Hypothesis 2: $\frac{\partial G^*}{\partial t \partial N}\big|_{t>0} - \frac{\partial G^*}{\partial \Gamma \partial N}\big|_{t=0} < 0$ if and only if $\beta > \frac{1+\phi}{1+N^2} \;\; and \;\; \phi > 0$, which is the case for expenditure functions financed by the majority of tax revenue.

Hypothesis 3: $\frac{\partial G^*}{\partial t \partial N}\big|_{t>0} - \frac{\partial G^*}{\partial \Gamma \partial N}\big|_{t=0} > 0$ if and only if $\beta < \frac{1+\phi}{1+N^2} \;\; and \;\; \phi > 0$, which is the case for expenditure functions for which the minority of tax revenue is used.

3 Institutional framework

Municipalities in Italy are responsible for a wide range of important public programs regarding welfare services, territorial development, local transport, nursery school education, sports and cultural facilities, local police services, as well as most infrastructural spending. Municipalities can rely on two main revenue sources: transfers from upper

levels of government (mainly central and regional governments) and own revenues (from own taxes and fees).

In what follows we describe the financial feature of Italian municipalities over the years 2006 to 2011, which coincides with the time span of our dataset. The main local tax revenue is a property tax ICI (*Imposta comunale sugli immobili*) introduced in 1992 and applied to real estate. This tax is paid every year by property owners directly to the municipality where the property is located. In particular ICI levied differently on principal dwellings and on other properties and the tax base is the cadastral income, which does not vary over time. The difference between the two is the different possible tax rates: the maximum threshold is lower for the principal dwellings and deductions are allowed only for principal dwellings. Other important tax revenue sources for the Italian municipalities are the tax on urban waste disposal (Tarsu) which is calculated based on land registry values, the tax on the occupation of public space and a surtax on personal central income tax. Additional own revenues can be raised by Italian municipalities through fees which are linked to the municipal provision of various services.

3.1 The 2008 tax reform

Law no. 93/2008 replaced the property tax levied on principal dwellings with a compensating transfer from the central government. As a consequence in 2008 and subsequent years, each municipality received a transfer whose amount was determined by two criteria: a) efficiency in tax collection, given by a1) the ratio between the average value of the revenue of the property tax levied on principal dwellings for the period 2004-2006, measured in cash terms, and a2) the average value of the revenue of the property tax levied on principal dwellings for the period 2004-2006, measured in accrual terms; b) compliance of the domestic stability pact for the year 2007. Furthermore, some special exceptions were allowed for small municipalities.

Clearly the fulfillment of these two past goals can not be affected by today's policy maker decisions, making the received per capita transfer for the local policy maker exogenous.

Nevertheless, the aggregate amount of compensating transfer received by Italian municipalities in 2008 was about 2.8 billion euro, while the revenue from the property tax on principal dwellings collected in 2007 was around 3.5 billion euro.

In order to appreciate the impact of the reform on the composition of the municipal

budget, we analyze the source of municipal finance for the period 2006-2011.[4] For the period before the reform (2006-2007) property tax accounts, on average, for about 24% of municipalities' total revenue: in particular, the property tax levied on principal dwellings is about 8% and that levied on non – principal dwellings (buildings, lands, production activities, secondary dwellings) is about 16%. In the same period, current transfers from central government constitute on average 19% of the total revenue of Italian municipalities.

After the reform (from 2008 to 2011), the total property tax (only applied to non-principal dwellings) constitutes about 17% of the total revenue and current transfers from central government are, on average, 26% of total revenue. This increase (from 19% to 26%) in the central transfer quota of the municipal revenue is almost completely driven by the introduction of the compensating transfer which, for the period 2008-2011 is, on average, 5% of total municipal revenue.

3.2 Dataset

The empirical analysis is based on a dataset for Italian 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 Institute of Statistic. The distinction between revenue from property tax levied on principal dwellings and revenue from property tax levied on non-principal dwellings has only been recorded in Italian municipalities' budget since 2006. Therefore, our panel dataset covers all Italian municipalities belonging to Regions ruled by "ordinary" statutes for the period 2006-2011.[5] It includes a full range of information organized into three sections: 1) municipal financial data; 2) electoral data covering the results of elections in which the mayors in office during the period covered by the dataset were elected; 3) municipal demographic and socio-economic data such as population size, age structure, average income of inhabitants. Since we are interested in testing the flypaper effect and its relation with the size (population) of the municipality, we exclude from our dataset

[4]The reason why we use this time span is that municipalities started recording the revenue of property tax on principal dwellings on their balance sheet only from 2006. In addition we decided not to include data after 2011 because many changes occurred in the municpal fiancing system. In fact, a new reform decentralizing again the property tax took place, but a part of the collected revenue was retained by the central government and then redistributed and also the tax base has been changed.

[5]We also collected data for the period 2003-2005 since in the analysis which follows we use lags of the dependent variable and of some explanatory variables as instruments.

municipalities that are the capital of the province where they are situated, because their average population (180,000) is by far larger than the average population of all other municipalities (5,500) and this difference is statistically significant.[6] Moreover, municipalities that are the capital of the province normally provide a much wider range of services than others. Also, we did not include municipalities in regions with special autonomy and other municipalities with missing values from our dataset. Finally we obtain a sample of 5,651 municipalities including 33,906 observations from 2006 to 2011.[7]

3.2.1 Dependent variable

Our dependent variable is the level of per capita current expenditure in each municipality (G), which, according to our theoretical model, we split into two groups: principal expenditure (G_p) and residual expenditure (G_r). The principal expenditure group comprises three expenditure functions, *Administration & Management*, *Road & Transport* and, *Planning & Environment*. The total of these latter functions constitute, on average for the period 2006-2011, almost 70% of the total current expenditure (Table 1). The remaining 30% of total expenditure is for *Municipal police*, *Education*, *Culture*, *Sport*, *Tourism*, *Social welfare*, and also in a very low percentage for *Economic development*, *In-house productive services* and *Justice*. The latter functions are important, but not as the previous ones; in fact many medium-sized and small municipalities do not spend any money on them or they manage these function by networking with other municipalities.

***** insert here TABLE 1 *****

[6] In our dataset the number of municipalities that are the capital of the province is 77 for each year corresponding to 1,36% of the municipalities available in the sample.

[7] Over 48,606 (8,101 municipalities for 6 years) potential observations, our sample includes 33,906 observations. As a matter of fact, we exclude 8,388 (1,398 municipalities for 6 years) observations referring to municipalities in Special Statute Regions and Province, 462 (77 municipalities for 6 years) observations relative to municipalities that are the capital of the province, and 5,850 observations (974 municipalities for 6 years) relative to municipalities/years where data are not complete or data are missing.

3.2.2 Explanatory variables

We build a variable *icigrants* containing the per capita value of the property tax on principal dwellings from 2006 to 2007 and the per capita value of the grants compensating for the corresponding missing revenue on principal dwellings from 2008 to 2011.

We then build a matrix of neighbors (W) to each municipality for every year based on geographical contiguity. We then make a row standardization such that the elements of each row add up to one. As a result we have, for each municipality in the period 2006-2011, an average value of its neighboring current per capita expenditure (WG), per capita principal expenditure (WG_p) and per capita residual expenditure (WG_r). We need these variables since expenditure in neighboring municipalities can be correlated with exogenous controls hence leading to biased and inconsistent estimates of the parameters (Case et al., 1993; Revelli, 2002). As additional variables we include the per capita value of the current grants (*netgrants*) which are net of compensating grants replacing ICI on principal dwelling from 2008 onwards.

3.2.3 Control variables

We also include a set of time-varying variables which characterize a municipality's demographic, economic and political situation. In relation to demographic control we include the population of the municipality (*pop*), the population density (*density*) calculated as the number of citizens per area and the inverse of the population *(ipop*): these variables can capture the presence of scale economies or diseconomies in the provision of public goods. The proportion of citizens aged between 0 and 5 (*child*); the proportion aged over 65 (*aged*) and the proportion of families (*families*) can account for some specific public needs (e.g., nursery school, nursing homes for the elderly).

Regarding economic and financial controls we include the average per capita income proxied by the personal income tax base (*income*) and the per capita value of the property tax levied on non-principal dwellings (*ici2*).

We add some political control that may influence local budget. In particular we set a dummy (*election*) equal to one for each election year during the period 2006-2011 and zero otherwise; we measure the political power of the mayor by using the percentage of votes cast in the first ballot (*voteshare*). Since Italian law establishes a limit of no more than two consecutive terms of office for a mayor, a dummy variable

(*termlim*) has been created to indicate whether a mayor in office in a given year is in her second consecutive term of office, and thus ineligible for a further term: the impossibility of further reelection may significantly bias the budget-related decisions of a municipality (Besley and Case, 1995; List and Sturm, 2006). The summary statistics, data description and data sources of all the variables used in the analysis are reported in Appendix, Tables A1 and A2.

4 Preliminary evidence

As a preliminary piece of evidence it is interesting to look at the mean difference in expenditure revenue variables before and after the reform (Table 2). In particular, average per capita current expenditure (from now on only "expenditure") after the reform is 56.47 euro higher than that before the reform and this difference is statistically significant at 1%. The same difference for both principal and residual expenditure is, respectively, 52.14 (1% significant) and 4.33 (10% significant). Note also that the per capita revenue from property tax on principal dwellings is, on average, 63.84 euro and after the reform, the corresponding revenue from compensating grants is 22.77 euro lower, the difference being statistically significant (1%). So we find preliminary strong evidence of an increase in expenditure after the reform, even if the available revenue compensating the municipalities was lower. The reform seems to have led to a significant increase in principal expenditures.

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We investigate further by focusing on the period 2007-2008[8], namely the years just before and after the fiscal reform, to test whether there is a difference in municipal spending behavior according to size. We apply the differences-in-differences approach (DID). To do this we use data in 2007 (when the tax on principal dwelling was still in force) and data in 2008 (the first year when tax on principal dwelling was replaced by a compensating transfer). We split the sample into large and small municipalities, where large municipalities are those with a population of over 5,500 inhabitants[9] (the mean)

[8]The restriction to the years 2007-2008 reduces the data set to a sample of 11.302 observations (5,651 municipalities observed twice).

[9]Municipalities with a population of over 5,500 account for almost 30% of the sample.

and, small municipalities are those below the mean. We also split the expenditure into principal and residual, as previously defined.

In relation to *principal expenditure*, the difference in principal expenditure (Table 3-Panel A) for small municipalities before and after the reform (22.12 per capita euros) is larger than the same difference for large municipalities (16.84) and such differences are statistically significant at 1%. The difference of the differences in principal expenditure between small and large municipalities, before and after the reform, leads to an estimate that is equal to -5.27 per capita euros (statistically significant at 1%). Therefore, the change in fiscal regime has led to an increase in principal expenditure for both small and large municipalities, however large municipalities increase their principal expenditure less than small municipalities.

As it regards *residual expenditure* (Table 3 - Panel B) we find evidence that the difference in residual expenditure for large municipalities before and after the reform (17.97 per capita euros, statistically significant at 1%) is higher than the same difference for small municipalities (3.43 per capita euros, statistically significant at 1%). Hence, the difference of the differences in residual expenditure between small and large municipalities, before and after the reform, leads to an estimate that is equal to 14.54 per capita euros (statistically significant ay 1%), implying that the change in fiscal regime has led to an increase in residual expenditure for both small and large municipalities, however large municipalities increase their residual expenditure more than small municipalities.

Our analysis suggests that after the change in fiscal regime, large municipalities increased their principal expenditure less than small municipalities (-5.27); on the other hand, large municipalities increased their residual expenditure more than small municipalities (14.54) .

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5 Econometric strategy and results

Our econometric strategy is based on a dynamic panel data model that also contains a space component. Thus, the dynamic version we estimate (Anselin et al. 2007) is as follows:

$$G_{it} = \alpha + \delta G_{it-1} + \lambda WG_{it} + \rho netgrants_{it} + \gamma_1 icigrants_{it} + \gamma_2 \left(icigrants_{it} \times post\right) + \gamma_3 \left(icigrants_{it} \times pop_{it}\right) + \gamma_4 \left(icigrants_{it} \times pop_{it} \times post\right) + \gamma_5 pop_{it} + \gamma_6 \left(pop_{it} \times post\right) + \beta^{'} x_{it} + \mu_i + \psi_t + \varepsilon_{it} \tag{5}$$

where G_{it} is total expenditure, which we then split into principal expenditure (G_{pit}) and residual expenditure (G_{rit}), for municipality i in year t; WG_{it} is the average expenditure of the neighboring municipalities of municipality i in year t, where W is a matrix of identical exogenous weights (based on geographical contiguity); $netgrants_{it}$ is the per capita value of the current grants which are net of the compensating grants (for the principal dwellings property tax abolished in 2008) ; $icigrants_{it}$ is the per capita revenue from the property tax on principal dwellings from 2006 to 2007 and the per capita revenue from grants compensating for the corresponding missing revenue on principal dwellings from 2008 to 2011; *post* is a dummy variable equal to 1 in the years when the property tax had been replaced by the compensating grant (from 2008 onwards); pop_{it} is the population of municipality i in year t; x_{it} is the vector of explanatory variables described in section 3.2.3; ψ_t is a year specific intercept; μ_i is an unobserved municipal specific effect and ε_{it} is a mean zero, normally distributed random error.

Thus, the coefficient $\gamma_1 + \gamma_3 \times pop_{it}$ which corresponds to $\frac{\partial G^*}{\partial \Gamma}\big|_{t=0}$ in Section 2.1, captures the impact of an increase in tax on principal dwellings for a given level of population and the coefficient $\gamma_1 + \gamma_2 + \gamma_4 \times pop_{it}$, which is $\frac{\partial G^*}{\partial t}\big|_{t>0}$ in Section 2.1, captures the impact of an increase in the compensating transfer for a given population level. Our first hypothesis (the flypaper effect) $\frac{\partial G^*}{\partial t}\big|_{t>0} - \frac{\partial G^*}{\partial \Gamma}\big|_{t=0} > 0$ stated in Section 2.1, is then verified if $\gamma_2 + \gamma_4 \times pop_{it} - \gamma_3 \times pop_{it} > 0$, regardless of whether we use the principal or the residual expenditure as dependent variables.

Since γ_4 proxies $\frac{\partial G^*}{\partial t \partial N}\big|_{t>0}$ and γ_3 proxies $\frac{\partial G^*}{\partial \Gamma \partial N}\big|_{t=0}$ in Section 2.1, our second hypothesis $\frac{\partial G^*}{\partial t \partial N}\big|_{t>0} - \frac{\partial G^*}{\partial \Gamma \partial N}\big|_{t=0} < 0$ is verified, when we use the principal expenditure as the dependent variable, if $\gamma_4 - \gamma_3 < 0$, it means that an increase in population decreases the flypaper effect. Finally our third hypothesis $\frac{\partial G^*}{\partial t \partial N}\big|_{t>0} - \frac{\partial G^*}{\partial \Gamma \partial N}\big|_{t=0} > 0$ is verified, when we use the residual expenditure as the dependent variable, if $\gamma_4 - \gamma_3 > 0$, it means that an increase in population increases the flypaper effect.

5.1 The choice of instruments

In order to estimate (5) we use the system GMM dynamic panel estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). This estimator is an augmented version of the difference GMM (Arellano and Bond, 1991) hence more efficient than the latter (Blundell and Bond, 1998). The system GMM, unlike the difference GMM, which just employs the difference equation, builds a stacked dataset, one in levels and one in differences. Then the differences equations are instrumented with levels, while the levels equations are instrumented with differences.

The dynamic model we estimate includes the lagged endogenous variable of G_{it} and, in our case, it also includes further endogenous variables: the neighboring spending (WG_{it}) and the grants net of compensative grants from 2008 (*netgrants*). These variables are then instrumented by using the other exogenous variables and their lags. In relation to the other variables, one might argue about the endogeneity of *icigrants* and *ici2*. However, we consider the variable *icigrants* as exogenous because, on one hand, the tax base of the property tax is given by the cadastral income that is exogenous (for the same reason the variable *ici2* is also exogenous); on the other hand, compensating grants were determined for each municipality using previous socio-economic indicators as explained in Section 3.1 therefore must necessarily be perceived by the policy maker as exogenous.

The validity of the instruments used in the regression is evaluated according to the Hansen and the AR tests. In particular, in the equation for total expenditure, we start by instrumenting our lagged dependent variable and the other endogenous variables using the standard treatment i.e. using the first order lag to instrument the lagged endogenous variable and the second order lag to instrument the other two endogenous variable WG_{it} and $netgrants_{it}$. However, it turns out that these instruments are not valid since we reject the null hypothesis of the Hansen test (p-value=0.024). As a consequence we use longer lags, namely the second order lag for the lagged endogenous variable and the third order lag for both WG_{it} and $netgrants_{it}$. Again in this case we reject the null hypothesis of the Hansen test (p-value=0.029), and we also find second-order serial correlation (p-value=0.078). Finally, using longer lags, we find the combination of lags that allows us to deal with both the serial correlation condition and the validity of instruments. In particular, we instrument the endogenous lagged variable by using its sixth and seventh order lag i.e. using G_{it-7} and G_{it-8} for the equations

in differences and ΔG_{it-6} for the equations in levels;[10] for WG_{it} we use the third, forth and fifth order lag i.e. using WG_{it-3}, WG_{it-4} and WG_{it-5} for the equations in differences and ΔWG_{it-2} for the equations in levels.[11] Finally, for $netgrants_{it}$ we only use lag 5, namely $netgrants_{it-5}$ for the equations in differences and $\Delta netgrants_{it-4}$ for the equations in levels.[12] In this way we do not reject the null hypothesis of no second-order serial correlation (p-value = 0.523) and we do not reject the null hypothesis of the Hansen test (p-value = 0.354). We also test the validity of any subset of instruments, namely instruments for the level equations, instruments for the lagged endogenous variables G_{it-1}, instruments for WG_{it} and instruments for $netgrants_{it}$, using the C-test and also in this case, for each subset, we do not reject the null hypothesis that the specified variables are proper instruments.[13]

In relation to the equation for principal expenditure (G_{pit}), we start again by instrumenting our lagged dependent variable and the other endogenous variables using the first order lag to instrument the lagged endogenous variable and the second order lag to instrument both the other two endogenous variables WG_{pit} and $netgrants_{it}$. However, it turns out that our instruments are not valid since we reject the null hypothesis of the Hansen test (p-value=0.002). As a consequence we use longer lags, namely the second order lag for G_{pit-1} and the third order lag for both WG_{pit} and $netgrants_{it}$. In this case, we do not reject the null hypothesis of the Hansen Test (p-value=0.178) and also we do not reject the null hypothesis of no second-order serial autocorrelation (p-value=0.329). However, by looking at the C-test, we reject the hypothesis of exogeneity for the instruments of G_{pit-1}, namely the instruments are not exogenous (p-value=0.087). Again, we use longer lags and we come up with the combination of lags that allows the tests to be passed. In particular, we instrument G_{pit-1} by using its fifth and its sixth lag, i.e. using G_{pit-6} and G_{pit-7} for the equations in differences and ΔG_{pit-5} for the equations in levels;[14] for WG_{pit} we use lags 3 and 4, namely WG_{pit-3} and WG_{pit-4} for the equations in differences and ΔWG_{pit-2} for the equations in lev-

[10] An addition instrument ΔG_{it-7} is available but it would be mathematically redundant in system GMM, which is why it is dropped (Roodman, 2009).

[11] see footnote 9.

[12] see footnote 9.

[13] P-value instruments for level equation is 0.376; P-value instruments for G_{it-1} is 0.289; P-value instruments for WG_{it} is 0.440 and P-value instruments for $netgrants_{it}$ is 0.824. The null hypothesis is that specified variables are exogenous.

[14] see footnote 9.

els.[15] For $netgrants_{it}$ we only use lag 4, that is to use $netgrants_{it-4}$ for the equations in differences and $\Delta netgrants_{it-3}$ for the equations in levels[16]. In this way we do not reject the null hypothesis of no second-order serial correlation (p-value = 0.777) and do not reject the null hypothesis of the Hansen test (p-value = 0.430). We then test the validity of any subset of instrument by using the C-test and, for each subset, we do not reject the null hypothesis that the specified variables are proper instruments.[17]

Finally, for residual expenditure (G_{rit}) we use the standard instrumenting treatment i.e. the first order lag to instrument the lagged endogenous variable (namely we use G_{rit-2} as an instrument for the equations in differences and ΔG_{rit-1} for the equations in levels[18]), the second order lag to instrument the endogenous variable WG_{rit} (we use WG_{rit-2} as an instrument for the equations in differences and ΔG_{rit-1} for the equations in levels[19]) and the second order lag to instrument the other endogenous variable $netgrants_{it}$ (we use $netgrants_{it-2}$ as an instrument for the equations in differences and $\Delta netgrants_{it-1}$ for the equations in levels[20]). It turns out that the instruments are valid since we do not reject either the null hypothesis of the Hansen Test (p-value=0.307), or the null hypothesis of no second-order serial autocorrelation (p-value=0.868). We also test the validity of any subset of instrument by using the C-test and again in this case, for each subset, we do not reject the null hypothesis that the specified variables are proper instruments.[21]

5.2 Results

We do our estimations using the SYS-GMM (Table 4 col. 3 and Table 5, col. 3 and col. 6), which in our framework is necessary to correct the bias and inconsistency of the estimates we would get by using the OLS (Table 4, col.1 and Table 5 col. 1 and col. 4) or, the FE estimator (Table 4, col.2 and Table 5, col. 2 and col. 5).

[15] see footnote 9.

[16] see footnote 9.

[17] P-value instruments for level equation is 0.190; P-value instruments for G_{pit-1} is 0.371; P-value instruments for WG_{pit} is 0.634 and P-value instruments for $netgrants_{it}$ is 0.540. The null hypothesis is that specified variables are exogenous.

[18] see footnote 9.

[19] see footnote 9.

[20] see footnote 9.

[21] P-value instruments for level equation is 0.307; P-value instruments for G_{rit-1} is 0.166; P-value instruments for WG_{rit} is 0.623 and P-value instruments for $netgrants_{it}$ is 0.177. The null hypothesis is that specified variables are exogenous.

We start considering total expenditure as the dependent variable (Table 4, col. 3). The coefficient of the lagged dependent variable (0.5525) is positive and statistically significant at 10% implying that the total expenditure has a certain degree of inertia. In relation to neighboring expenditure, the estimated coefficient is 0.3825 and significant at 10%, meaning that municipalities tend to increase their own current spending as a response to an increase in expenditure of their neighboring municipalities.

The coefficient accounting for the flypaper effect, $\gamma_2+\gamma_4\times pop_{it}-\gamma_3\times pop_{it}$, is positive and statistically significant for any level of population from 13,000 inhabitants, thus confirming the presence of the flypaper effect (Hypothesis 1). In order to appreciate this effect consider, as an example, a municipality with population of 13,000 inhabitants, then the impact on expenditure of a unit increase in revenue from compensating grant is given by $[-0.1145 + (0.0313 \times 13) - (-0.0016 \times 13) = 0.3139]$ which is statistically significant at 10%.[22]

***** insert here TABLE 4 *****

When we consider principal expenditure as the dependent variable (Table 5 - col. 3) we find a degree of inertia of expenditure (the coefficient of the lagged dependent variable is 0.5482 and statistically significant at 1%), while we do not find any evidence of horizontal spill-over since the coefficient of the neighboring expenditure (0.0985) is not statistically different from zero.

The coefficient accounting for the flypaper effect, $\gamma_2+\gamma_4\times pop_{it}-\gamma_3\times pop_{it}$, is always positive and statistically significant as long as the population is less than 15,000 inhabitants, hence confirming the presence of the flypaper effect for this group (Hypothesis 1). As an example, take a municipality with an average population level (5,500 inhabitants), then the impact on principal expenditure of a unit increase in the compensating grant is given by $[0.3801 + (-0.0214 \times 5.5) - (-0.0066 \times 5.5) = 0.2988]$ an estimation that is statistically significant at 1%. Notice that, the population threshold of 15.000 inhabitants after which the flypaper effect does not hold, anticipates to a certain extent the test of Hypothesis 2, which states that the flypaper effect is negatively linked with the population. However, in order to test Hypothesis 2, we need to compare both coefficients γ_4 and γ_3 (see the last paragraph of Section 5). The former coefficient is

[22] In what follows, all the linear combinations have been computed dividing the population by 1000 since in the regressions the variable *pop* has been rescaled dividing it by 1000.

negative and equals -0.0214 (statistically significant at 1%), the latter one is -0.0066 and statistically significant at 5%. The difference between the two coefficients is negative $[-0.0148 = -0.0214 - (-0.0066)]$ and statistically significant at 10%, implying that an increase in population leads to a decrease in the extent of the flypaper effect for this group of expenditures hence confirming Hypothesis 2.

Finally, when we use the residual expenditure as the dependent variable (Table 5 - col. 6) we again find a degree of inertia in the expenditure (the coefficient of the lagged dependent variable is 0.6344 and statistically significant at 1%) and no evidence of horizontal spill-over (the coefficient of the neighboring expenditure is 0.0340 but not statistically significant from zero).

The coefficient accounting for the flypaper effect, $\gamma_2+\gamma_4 \times pop_{it}-\gamma_3 \times pop_{it}$, is always positive and statistically significant for any given population level confirming Hypothesis 1. Let us consider again, as an example, a municipality with an average population level (5,500 inhabitants), then the impact on residual expenditure of a unit increase in the compensating grant is given by $[0.0897 + (0.0071 \times 5.5) - (-0.0012 \times 5.5) = 0.1354]$ an estimation that is statistically significant at 1%. Furthermore, in order to test Hypothesis 3, we compare coefficients γ_4 and γ_3. The former coefficient is positive and equal to 0.0071 (statistically significant at 1%), the latter is -0.0012 and not statistically significant. The difference between the two coefficients is positive $[0.0083 = 0.0071 - (-0.0012)]$ and statistically significant at 1%, implying that an increase in population leads to a increase in the extent of the flypaper effect (Hypothesis 3). Note that in this case, as we would expect, the flypaper effect holds for any population level since the relationship between flypaper and population is positive.

***** insert here TABLE 5 *****

6 Conclusion

In this study we investigated the impact on local expenditure of a very salient fiscal reform, introduced by the Berlusconi government in 2008. In particular, the revenue from the local property tax on principal dwellings was replaced, in 2008, by a compensating transfer from the central government. This particular feature makes the reform really interesting, since it allows the existence of the flypaper effect in the spending behavior

of Italian municipalities to be tested. In fact, by exploiting the local fiscal policy reform we can follow each municipality, whose local property tax has been replaced with a less or equal compensating transfer exogenously determined and, test whether the flypaper is holding by comparing how compensating transfers and property tax affect local expenditure.

First, we set up a theoretical model in which the introduction of a political bias against taxation gives rise to the flypaper effect. If the public good is very important with respect to private consumption then an increase in the municipal size implies a decrease in the extent of the flypaper effect; the opposite happens if the public good is not important with respect to private consumption. The increase in size of the municipality makes the public good cost less and this feature, when the public good is very important, increases the sensitivity of the public good to the grant less than the sensitivity of the public good to the tax. On the other hand, when the public good is less important, the increase in the size of the municipality increases the sensitivity of the public good to the grant more than the sensitivity of the public good to the tax.

We then tested the hypotheses coming from the model by using data on Italian municipalities, focusing on two groups of expenditures: the principal expenditure, which should be that important to guarantee the minimum standard daily life of a municipality and the rest, defined as residual expenditure. We find that the flypaper effect holds for both kinds of expenditure, but decreases with respect to population in the case of principal expenditure and increases with respect to population in the case of residual expenditure. The intuition is that small municipalities can struggle to provide public goods important to guarantee the minimum standard daily life, identified with our principal expenditure, and so, when they receive the incentive to increase their expenditure by getting the compensation transfer, they use it by increasing the provision of these important public goods. On the contrary large municipalities, having already provided public goods important to guarantee the minimum daily life, when they receive the incentive to increase their expenditure, by getting the compensation transfer, they use it by increasing the provision of the public goods identified with our residual expenditure.

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Table 1: Composition of current expenditure in the period 2006-2011, average values.

Expenditure function	Per capita value (1)	Percentage on the total (2)
Administration & Management	331.11	41.67
Justice	0.62	0.08
Municipal Police	35.15	4.42
Education	74.20	9.34
Culture	15.65	1.97
Sport	12.61	1.59
Tourism	8.57	1.08
Roads & Transport	81.55	10.26
Planning & Environment	140.44	17.67
Social welfare	80.23	10.10
Economic development	4.10	0.52
In-house productive services	10.33	1.30
Per capita current expenditure	794.57	100.00
Per capita current principal expenditure	553.10	69.61
Per capita current residual expenditure	241.47	30.39

Table 2: Mean difference in expenditure and revenue from principal dwellings before-after the reform.

Expenditure	Before the reform (1)	After the reform (2)	Difference in means (3)=(2)-(1)
Current expenditure	756.93	813.39	56.47***
Principal expenditure	518.34	570.48	52.14***
Residual expenditure	238.59	242.92	4.33*
icigrants	63.84	41.07	-22.77***

Notes: Period 2006-2011. Years before the reform are 2006 and 2007. Years after the reform are 2008, 2009, 2010 and 2011.

Table 3: Regression DD estimates of fiscal reform on principal and residual expenditure.

	A. Principal current expenditure			B. Residual current expenditure		
	Small	Large	Difference (Large-Small)	Small	Large	Difference (Large-Small)
	(1)	(2)	(3)	(4)	(5)	(6)
2007	611.65	387.16	-224.49***	227.88	259.72	31.84***
	(5.74)	(3.62)	(6.79)	(4.29)	(3.19)	(5.35)
2008	633.77	404.00	-229.77***	231.31	277.69	46.38***
	(6.00)	(3.69)	(7.04)	(4.27)	(3.31)	(5.40)
Difference (2008 - 2007)	22.12***	16.84***	**-5.27*** **	3.43***	17.97***	**14.54*** **
	(1.49)	(1.32)	**(2.00)**	(0.96)	(1.16)	**(1.52)**

Notes: Number of observations 11,302. Column (1) reports average per capita principal current expenditure for small municipalities before and after the reform; column (2) displays average per capita principal current expenditure for large municipalities before and after the reform; column (3) shows the average difference of per capita principal current expenditure for small and large municipalities before and after the reform. Column (4) reports average per capita residual current expenditure for small municipalities before and after the reform; column (5) displays average per capita residual current expenditure for large municipalities before and after the reform; column (6) shows the average difference of per capita residual current expenditure for small and large municipalities before and after the reform. Robust standard errors, clustered at the municipal level, are shown in parentheses. Significance at 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 4: Estimation results on total current expenditure.

	Per capita current expenditure		
	OLS	FE	SYS-GMM
Variables	(1)	(2)	(3)
lagged dependent variable	0.9753***	0.2882***	0.5525*
	(0.0217)	(0.0435)	(0.3218)
neighboring expenditure	0.0285**	0.2520***	0.3825*
	(0.0120)	(0.0519)	(0.2194)
icigrants	0.1112***	-0.0229	0.1371
	(0.0360)	(0.0445)	(0.1210)
icigrants*post	0.0466	0.0403	-0.1145
	(0.0651)	(0.0985)	(0.2738)
icigrants*pop	-0.0027	-0.0003	-0.0016
	(0.0026)	(0.0028)	(0.0047)
icigrants*pop*post	-0.0028	0.0167***	0.0313*
	(0.0042)	(0.0048)	(0.0163)
pop	-0.5041**	-6.9518	1.0450
	(0.2484)	(4.8706)	(1.2108)
pop*post	0.9575***	-1.0796***	-1.6695
	(0.2909)	(0.3310)	(1.2214)
post	-52.8555***	9.6041	-39.2583*
	(5.5080)	(9.3868)	(23.3774)
ici2	0.0348	0.0068	0.0911
	(0.0223)	(0.0094)	(0.1378)
netgrants	0.1354***	0.2571***	-0.7411
	(0.0410)	(0.0932)	(0.4640)
income	0.0014*	0.0085***	-0.0211**
	(0.0008)	(0.0024)	(0.0090)
Constant	-11.6067	221.5237***	138.6382
	(14.0894)	(81.2008)	(91.3486)
Observations	33,906	33,906	33,906
R-squared	0.946	0.323	
N° instruments			31
AR(1) (p-value)			0.003
AR(2) (p-value)			0.523
Hansen test (p-value)			0.354

Notes: Column (1) reports OLS robust estimator. Column (2) shows FE robust estimator. Column (3) displays two-step system-GMM estimator. In all regressions we control for *ipop*, *child*, *aged*, *families*, *density, election*, *termlim*, *votshare* and *year effects*. The variable *pop* has been rescaled dividing it by 1000. In column (3) the *lagged dependent variable* is instrumented by using lags six and seven, the *neighboring expenditure* variable is instrumented by using lags three, four and five; the *netgrants* variable is instrumented by using lag five. A part from the Hansen test, we have employed the C-test for checking the validity of our procedure of instrumentation (see Section 5.1). Robust standard errors are shown in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 5: Estimation results on principal and residual current expenditure.

	per capita principal current expenditure			per capita residual current expenditure		
	OLS	FE	SYS-GMM	OLS	FE	SYS-GMM
Varibales	(1)	(2)	(3)	(4)	(5)	(6)
lagged dependent variable	0.9009***	0.2569***	0.5482***	0.9993***	0.2768***	0.6344***
	(0.0259)	(0.0640)	(0.1420)	(0.0310)	(0.0278)	(0.0708)
neigboring expenditure	0.0630***	0.3212***	0.0985	0.0054	0.1173***	0.0340
	(0.0129)	(0.0637)	(0.0974)	(0.0156)	(0.0332)	(0.0524)
icigrant	0.1306***	-0.0177	0.2686***	0.0079	-0.0068	0.0699***
	(0.0439)	(0.0550)	(0.0633)	(0.0213)	(0.0177)	(0.0261)
icigrant*post	0.0623	0.0286	0.3801***	0.0138	0.0188	0.0897
	(0.0693)	(0.0869)	(0.1216)	(0.0342)	(0.0461)	(0.0546)
icigrant*pop	-0.0025	-0.0003	-0.0066**	-0.0007	0.0001	-0.0012
	(0.0024)	(0.0028)	(0.0031)	(0.0013)	(0.0014)	(0.0014)
icigrant*pop*post	-0.0055	0.0097**	-0.0214***	0.0022	0.0066***	0.0071***
	(0.0038)	(0.0040)	(0.0083)	(0.0021)	(0.0024)	(0.0025)
pop	-0.2333	-8.8298***	0.3734	-0.2431	1.7584	1.0587***
	(0.2060)	(2.7650)	(0.2805)	(0.1615)	(3.6068)	(0.2538)
pop*post	0.7283***	-0.7718***	0.7506	0.1297	-0.2815	-0.3399**
	(0.2496)	(0.2742)	(0.5252)	(0.1516)	(0.1795)	(0.1529)
post	-43.3130***	10.7279	-44.9094***	-6.4807***	-2.7137	-6.4843***
	(5.5198)	(11.0747)	(8.8441)	(2.1035)	(2.3244)	(2.3934)
ici2	0.0482*	0.0063	0.1326**	0.0050	0.0005	0.0441*
	(0.0273)	(0.0081)	(0.0570)	(0.0051)	(0.0016)	(0.0229)
netgrants	0.1342***	0.2144**	0.7082***	0.0228***	0.0416**	0.0424
	(0.0395)	(0.0833)	(0.1717)	(0.0078)	(0.0190)	(0.0365)
income	0.0009	0.0054***	0.0089**	0.0005	0.0033*	0.0015
	(0.0008)	(0.0019)	(0.0038)	(0.0003)	(0.0017)	(0.0014)
Constant	-7.4981	113.8762*	-153.8324***	-6.2728	122.1438***	-42.8764***
	(12.1028)	(65.2132)	(46.2517)	(6.8085)	(39.5522)	(14.1906)
Observations	33,906	33,906	33,906	33,906	33,906	33,906
R-squared	0.921	0.348		0.939	0.091	
N° instruments			30			28
AR(1) (p-value)			0.000			0.000
AR(2) (p-value)			0.777			0.868
Hansen test (p-value)			0.430			0.307

Notes: Columns (1) and (4) report OLS robust estimator by using, respectively, per capita principal current expenditure and per capita residual current expenditure as dependent variables. Columns (2) and (5) show FE robust estimator by using, respectively, per capita principal current expenditure and per capita residual current expenditure as dependent variables. Columns (3) and (6) display two-step system-GMM estimator by using, respectively, per capita principal current expenditure and per capita residual current expenditure as dependent variables. In all regressions we control for *ipop*, *child*, *aged*, *families*, *density*, *election*, *termlim*, *votshare* and *year effects*. The variable *pop* has been rescaled dividing it by 1000. In column (3) the *lagged dependent variable* is instrumented by using lags five and six, the *neighboring expenditure* variable is instrumented by using lags three and four; the *netgrants* variable is instrumented by using lag four. In column (6) the *lagged endogenous variable* is instrumented by using lag one, the *neighboring expenditure* variable is instrumented by using lag two; the *netgrants* variable is instrumented by using lag two. A part from the Hansen test, we have employed the C-test for checking the validity of our procedure of instrumentation (see Section 5.1). Robust standard errors are shown in parenthesis. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table A1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Per capita current expenditure	33906	794.57	519.15	269.09	25996.78
Per capita current expenditure (-1)	33906	774.31	499.06	235.89	25996.78
Neighboring per capita current expenditure	33906	788.66	288.45	0.00	5750.50
Per capita principal current expenditure	33906	553.10	360.29	157.91	11107.39
Per capita principal current expenditure (-1)	33906	533.11	344.83	146.44	11107.39
Neighboring per capita principal current expenditure	33906	539.91	241.92	0.00	4641.49
Per capita residual current expenditure	33906	241.47	254.63	0.00	14968.78
Per capita residual current expenditure(-1)	33906	241.20	245.68	0.00	14889.39
Neighboring per capita residual current expenditure	33906	248.76	109.24	0.00	2673.00
icigrants	33906	48.66	58.88	0.00	3405.58
$pop \times 10^{-2}$	33906	5.44	8.40	0.04	97.06
post	33906	0.67	0.47	0.00	1.00
icigrants×post	33906	27.38	27.40	0.00	238.10
icigrants×pop	33906	302.40	666.31	0.00	31567.97
icigrants×pop×post	33906	182.11	453.72	0.00	9269.29
pop×post	33906	3.65	7.37	0.00	97.06
ici2	33906	168.70	242.94	0.00	27321.85
netgrants	33906	279.50	241.56	2.52	14177.54
$ipop \times 10^{-2}$	33906	0.90	1.60	0.01	28.57
child	33906	0.05	0.01	0.00	0.12
old	33906	0.22	0.06	0.04	0.63
families	33906	0.43	0.06	0.25	0.83
density	33906	297.50	605.66	0.87	11309.75
income	33906	11114.08	3190.84	1689.84	45377.29
election	33906	0.20	0.40	0.00	1.00
termlim	33906	0.19	0.39	0.00	1.00
votshare	33906	0.59	0.16	0.00	1.00

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Table A2: Descriptive statistics

Variable	Definition and measure	Avaialbale from-to	Source
Per capita current expenditure	Current expenditure per resident; 2011 Euros	2003-2011	Italian Ministry of Interior
Neighboring per capita current expenditure	Neighboring average value of per resident current expenditure	2003-2011	Our computation on Ministry of Interior data
Per capita principal current expenditure	Sum of the current expenditure per resident of the following spending functions: Administration and Management, Roads & Transport services and Planning and Environment; 2011 Euros	2003-2011	Italian Ministry of Interior
Neighboring per capita principal current expenditure	Neighboring average value of per resident primary current expenditure	2003-2011	Our computation on Ministry of Interior data
Per capita residual current expenditure	Sum of the current expenditure per resident of the following spending functions: Municipal police, Justice, Education, Culture, Sport, Tourism, Social welfare, Economic development and In-house productive services; 2011 Euros	2003-2011	Italian Ministry of Interior
Neighboring per capita residual current expenditure	Neighboring average value of per resident secondary current expenditure	2003-2011	Our computation on Ministry of Interior data
icigrants	Revenue per resident of property taxes on principal dwellings from 2006 to 2007 and compensating grants per resident for the corresponding missing revenue on principal dwellings from 2008 to 2011; 2011 Euros	2006-2011	Italian Ministry of Interior
post	Dummy variable equal to 1 for the years 2008, 2009, 2010 and 2011.	2006-2011	Our computation
pop	Population of the municipality	2003-2011	ISTAT
ici2	Revenue per resident of property tax on non-principal dwellings	2006-2011	Italian Ministry of Interior
netgrants	Total current transfers per resident net by compensating transfer from 2008 onwards	2003-2011	Italian Ministry of Interior
ipop	1/population	2003-2011	Our computation on ISTAT data
child	Share of the population aged between 0-5	2003-2011	ISTAT
old	Share of the population over the age of 65	2003-2011	ISTAT
families	Share of families	2003-2011	ISTAT
density	Numbers of citizens per area	2003-2011	ISTAT
income	Real personal income tax base per resident; 2011 Euros	2003-2011	Italian Ministry of Economy, Department of Finance
election	Dummy variable equal to 1 for each election year of the municipalities and zero otherwise	2003-2011	Italian Ministy of Interior, Department of Internal Affairs
termlim	Dummy variable equal to 1 when the mayor of the municipality cannot run for the next election because he/she is already in his/her second term of office, and zero otherwise	2003-2011	Italian Ministy of Interior, Department of Internal Affairs
votshare	Percentage of votes obtained by the mayor when elected (the variable refers to the first round of voting for double-ballot municipalities	2003-2001	Italian Ministy of Interior, Department of Internal Affairs