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# The Effects of Inter-Municipal Cooperation and Central Grant Allocation on the Size of the French Local Public Sector

Touria Jaaidane\*      Sophie Larribeau †

## Abstract

The analysis of French municipalities' public personnel expenditures allows us to study the issue of the size of the local public sector. We concentrate on two paths that French authorities have followed to limit it, i.e., the promotion of inter-municipal cooperation (IMC) and the cut in grants received by municipalities. Our objective is to evaluate their respective role in the evolution of public personnel expenditures at the municipal level, in a context where local politics comes into play. We consider a large panel dataset of municipalities embedded in IMC structures between 2011 and 2018. Our main results, obtained using an original identification strategy, are threefold. We first find evidence that a substitution effect between municipal and IMC personnel expenditures is at work. Second, we find a partisan distortion through the grant allocation: despite its formula-based definition, aligned and unaligned municipalities are treated differently by the central government. Third, we show that cuts in grants lead to cuts in municipalities' public wage bills, while partisanship hinders such cuts.

Keywords: Public sector size, Local governments, Inter-municipal cooperation, Intergovernmental transfers, Partisanship, Instrumental variables

JEL Classification:

D78 - Positive Analysis of Policy-Making and Implementation  
H70 - State and Local Government; Intergovernmental Relations  
H72 - State and Local Budget and Expenditures  
C23 - Models with Panel Data

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# 1 Introduction

We study French municipalities' public personnel expenditures to address the issue of the local public sector size. France has witnessed an increasing trend in the local public expenditures, as the result of the soft budget constraint falling on its municipalities. We choose to focus on two channels used by French authorities to limit this expansion. More precisely, French authorities have fostered inter-municipal cooperation (IMC) since the early 1990s and recently decided cuts in the grants received by municipalities. Our objective is to evaluate their respective role in the evolution of public personnel expenditures at the municipal level. However, French authorities good intentions are bedevilled by local politics. The attempt to put the brakes on this increase in spending is compromised by mayors' opportunistic and partisan behavior and strategic use of transfers by the central government.

French municipalities constitute a good laboratory for the study of this issue for different reasons. First, we concentrate on a category of current expenditures: local public personnel expenditures which have received little attention, though in France as in many other countries, an important fraction of the population works in the local public sector. Second, as in many European countries, IMC has been promoted in order to rationalize local public expenditures. The institutional change brought by the 2010 Act that forced municipalities to join an IMC structure by 2014 gave rise to interdependent local public decisions. Members of these consolidated structures choose, for instance, the scope of public services to deliver at the municipal and IMC levels. The gradual set up of IMC, reinforced by the 2015 Act, results in an entangledness<sup>1</sup> raising the issue of the public sector size with overlapping jurisdictions. The effect of this overlapping is ambiguous as it might either lead to an expansion for re-election purposes and other rent-seeking motives, or a contraction, reflecting a rationalization of the expenses. Third, the increase in current expenditures at the municipal level has become unsustainable for public finances and the rise in personnel expenditures is a major concern for French central government. Under the pressure of the EU Stability and Growth Pact, French authorities are compelled to contain the evolution of spendings and, without constitutional fiscal or budgetary binding rules, they are led to adopt other restrictive measures. Since 2014 municipalities have been required to participate in the recovery of public finances, hereafter CRFP<sup>2</sup>, which consists in a planned reduction in the central grant from 2014 to 2017. As the grant is an important share of the municipalities' resources, it is likely to play a key role in the evolution of expenditures. Local politics however blurs the outcomes.

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<sup>1</sup> Mutualization can be bottom-up (municipal resources such as equipment or personnel are provided to the IMC body) or top-down (from the IMC body to municipalities). Since 2010 municipalities and their IMCs can create common services for their procurement or to manage their computer systems. The extent of this mutualization is none the less still limited. The French Court of Auditors (Cour des comptes) reported that these bottom-up and top-down financial flows were respectively around 0,3 and 0,6 billion € in 2014.

<sup>2</sup> Contribution au Redressement des Finances Publiques.

With a dataset of 2,527 municipalities over the recent period 2011-2018, we use a panel fixed effects model and adopt an IV method to identify the causal effects of both the grant and the IMC wage bill on the municipal wage bill. We apply an identification strategy taken from the empirical industrial organization literature to local public finance. The idea is to build instruments that get rid of local unobservable factors by exploiting the environment of municipalities and IMCs. In short, for a given municipality (resp. IMC body), we look at those municipalities (resp. IMCs) which are comparable in terms of the characteristics relevant for the provision of local public services and compute the average grant (resp. average IMC wage bill) on these comparable neighbors. Below, we provide arguments justifying that our instruments are appropriate, i.e., that the exogeneity and relevance conditions are met. Our approach therefore departs from spatial econometrics as we do not define the neighborhood according to geographical distance and do not use a spatial autoregressive model, thereby avoiding the spatial/lag IVs simultaneity concerns (Gibbons and Overman (2012)).

We first show that municipalities do not take advantage of their IMC body to grow. A substitution effect<sup>3</sup> is operating between the two tiers. When an IMC body increases its wage bill, e.g. as a result of the increased competencies transferred by a municipality member, the latter decreases its own wage bill. This suggests that it would take more transfers of competencies to the IMC level to limit the municipal expenditures. This should however be interpreted with caution, owing to the magnitude of the personnel transfers<sup>4</sup>. Our result does not allow us to invalidate the hypothesis of a natural expansion of the public sector size (the Leviathan hypothesis) as, while the municipal wage bill decreases when the IMC wage bill increases, we do not know which of the two opposite effects dominates.

The objective of disciplining the Leviathan has led countries to adopt different strategies from institutional rules such as election rules to constitutional binding budgetary dispositions. In France the cut in the central grant has been used to curb the trend of increasing expenses, notwithstanding the absence of any budgetary rule. We find a positive grant-elasticity<sup>5</sup> of the municipal wage bill meaning that the planned decrease in grant, which started in 2014, did trigger a decline in public wage bills, all other things being equal. However municipalities executives resisted, as the grant-elasticity is smaller<sup>6</sup> after than before the reform, thereby altering the efficiency of the cuts in grant.

As mayors have their own agenda, we provide evidence of opportunistic effects on public wage bills: close to a municipal election, data show a spike in public wage bills. Pure partisan and alignment effects might also occur. As a matter of facts, municipi-

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<sup>3</sup> We find a negative elasticity with a point estimate=-0.022 with a 95% confidence interval [-0.037; -0.006].

<sup>4</sup> In 2014 the bottom-up reimbursement of wage bills was much larger than the top-down one. Municipalities paid 549 million € to their IMC bodies, while IMC bodies paid 167 million € for the staff the municipalities lend them.

<sup>5</sup> Point estimate=0.102 with a 95% confidence interval [0.039; 0.165].

<sup>6</sup> Point estimate=0.102-0.039 =0.063 and the difference is highly significant.

palties governed by a right-wing executive spend less, and this ideology-based effect is enhanced when the mayor's margin of victory is larger. Moreover, we actually find a partisan distortion in the grant allocation: despite its formula-based definition, municipalities aligned with the central government and those which are unaligned are treated differently. As a consequence, the effort in downsizing is antagonized by the mayors' partisanship: the wage bill decreases as the grant decreases for all municipalities, but those from the left-wing decrease theirs less.

The paper is organized as follows. Section 2 presents a review of the studies close to our work. Section 3 gives institutional facts related to French municipalities and their IMC bodies. Section 4 lays out the data and sketches the expected effects of the relevant determinants of the public wage bill. Section 5 is devoted to the identification strategy and gives the elements to support our instrumentation. The empirical results are given in Section 6. Robustness checks are developed in section 7 and concluding remarks close the paper in Section 8.

## 2 Relation to the literature

Our paper combines local public finance and political economy literatures. Since we focus on the interplay between the municipal and intermunicipal levels, our analysis relates to the literature on the effects of overlapping jurisdictions on the size and the composition of the public sector. Brennan et al. (1980) and Zax (1989), among others, point out the "natural expansion" of the local public sector in this context and argue that constitutional fiscal rules or competition among jurisdictions might help tame the Leviathan (see Galletta and Jametti (2015)). Turnbull and Djoundourian (1993) and Campbell (2004) model the strategic interaction between county and municipal expenditures. Though the result of the interaction is theoretically ambiguous, they empirically confirm the expansion hypothesis. Evidencing unambiguous effects is however difficult due to the complexity of the institutional structure of local governments (see Goodman (2015) and Berry (2008) for analyses on US data). A related question studied in the literature is the relative impact of grants and income on the size measured either by expenditures or taxes. The flypaper effect, stating that a one dollar increase in the grant has a larger positive impact on local government spending than does an equivalent rise in private income, has been evidenced in German (Baskaran (2016)) and Italian (Bracco et al. (2015)) municipalities.

The impact of IMC is particularly understudied in the economic literature. The developing research on this topic reveals it is a major concern worldwide and especially in Europe (e.g. Luca and Modrego (2020)). Among the rare contributions using French data, Tricaud (2021) and Di Porto et al. (2017) both analyze the determinants of joining an IMC body. Di Porto et al. (2017) adopt the spatial economics literature and use a control function approach to develop a binary discrete choice model with spatial interactions. They show that a municipality's decision to cooperate over the provision of local public goods depends on the decisions made by its neighbours. Tricaud (2021) exploits a

natural experiment—the 2010 Act— and evidences how the determinants of the reluctance to cooperate vary across municipalities. Using a DID strategy, she finds that urban municipalities forced to integrate experienced a large increase in construction while rural municipalities ended up with fewer local public services. The same effects are not found for municipalities that had voluntarily integrated prior to the law. Her results support the fact that municipalities resisted to avoid the local costs of integration.

Merging has also been promoted in some European countries. Although the IMC and the amalgamation processes differ particularly in their legal aspect, they are both justified by the search for economies of scale. Compared to the literature on IMC there is a much larger literature on municipal mergers. Blesse and Baskaran (2016) investigate the impact of municipal mergers in the German federal state of Brandenburg on municipal expenditure levels. They show that administrative expenditures decline after mergers. More precisely, the reductions are mainly due to compulsory mergers while voluntary mergers do not lead to expenditure cuts. Egger et al. (2022) study German data and show that the amalgamation results in a net positive impact on economic activity. Blom-Hansen et al. (2016) show that the amalgamation has no effect on Danish municipalities, as costs reduction in some areas are offset by costs increase in others. Harjunen et al. (2021) find that mergers lead to highly unequal political representation between the merging Finnish municipalities. Moreover, the less well represented municipalities experience reduction in local public jobs as compared to those that are more strongly represented.

Our study also contributes to a broad (threefold) agenda in political economy. First, a huge literature<sup>7</sup> has evidenced that policymakers resort to manipulations around election times to ensure reelection, thereby generating political budget cycles (Nordhaus (1975)). Some empirical studies of the occurrence and magnitude of electoral cycles concentrate on budget deficits (among others Gamez and Ibarra-yunez (2007)). Other contributions focus on several spending components to highlight those privileged by the incumbent and test the Rogoff (1990) "visibility"<sup>8</sup> assumption (Katsimi and Sarantides (2012), Enkelmann and Leibrecht (2013) and Garcia and Hayo (2021)). As it is closer to our concern, we mention contributions on electoral cycles in the local public sector both on employment and wages. Chortareas et al. (2017) and Cahan (2019) provide empirical evidence studying respectively municipal employees in Greece and US local and state government employees. Matschke (2003) gives support for electoral cycles in public sector wages in Germany.

A second part of the political economy literature studies different issues such as party and electoral rules effects. The partisan approach (Hibbs (1977); Alesina (1987)) states that politicians pursue ideological goals. The causal impact of parties on different economic outcomes such as expenditures and taxes<sup>9</sup> is evidenced in a large empirical body

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<sup>7</sup>For comprehensive reviews, see Dubois (2016) and Philips (2016).

<sup>8</sup>Strategic spending appear for highly visible policies that yield benefits in the immediate: public employment, transportation and road infrastructure, road cleaning and maintenance, waste disposal and green areas.

<sup>9</sup>Note that there are numerous, however contrasted, empirical results on budgetary decisions ma-

of papers. Several articles document the economic effects of electoral rules (Folke (2014), Ade (2014) and Streb and Torrens (2013)). Klein and Sakurai (2015) explores the effects of term limits. Freier and Odendahl (2015) analyzes the effects of multi-party systems and proportional rules. Other contributions focus on the effects of electoral competition—margin of victory, fragmentation, popularity—on policy outcomes (see Solé-Ollé (2006), Aidt et al. (2011) and Boukari (2019)).

Third, the partisan alignment through intergovernmental transfers has received increasing attention and is found in different countries (Kantorowicz (2017), Solé-Ollé and Sorribas-Navarro (2008), Padovano (2012), Brollo and Nannicini (2012), Bracco et al. (2015), Farvaque et al. (2019), Albouy (2013) and Hickey (2015)).

Finally, research has also concentrated on the importance of fiscal and budgetary binding rules (such as the EU stability and growth pact) to limit the distortions due to politics (among others, Poterba (1994), Rose (2006) and Farvaque et al. (2017)).

## 3 Institutional Context

### 3.1 Municipalities' budgets

Municipalities' resources consist mainly of tax revenues and grants from the central government. The major grant<sup>10</sup> is allocated to municipalities to help them with their operating budget. It also has a fiscal equalization objective. This grant is received each year by all the municipalities and its allocation is formula based. The base grant depends on the population and is supplemented to count for the municipalities' heterogeneity. Municipalities differ in land area, in their nature (rural/urban), geography (mountain area), centrality, attractiveness (touristic area). They differ also in their resources (tax bases) and expenses (through the population characteristics, such as income, age structure, and through the number of beneficiaries of housing benefit, social housing, etc). The French constitution gives local governments autonomy<sup>11</sup>. Until 2014, there was no binding principle falling on municipalities concerning their budget, except the golden rule that forbids borrowing to finance current expenditures. In order to fix ideas, the share of personnel expenditures in total current spending represented 52% in 2011 and 55% in 2018. Since 2014, the evolution of local public expenditure has had to meet a non-binding target under the pressure induced by the planned decrease of the grant from the central government. A decrease was first observed in investment expenses, followed by a sharp decrease in current expenditures. The objective of reducing expenses was met for 2014-2016 but not in 2017. The target is about to become binding for large municipi-

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nipulations, that rely either on an opportunistic or partisan approach or both: among others Kneebone and McKenzie (2001), Serritzlew (2005), Foucault and François (2005), Foucault et al. (2008), François and Magni-Berton (2015) and Sakurai and Menezes-Filho (2011).

<sup>10</sup> Official statistics show that this grant represented 21% of total resources in 2011 and fell to 15% in 2018. There also exist distinct targeted grants which are discretionary that we do not consider.

<sup>11</sup> The institutional structure of local governments and the policy instruments available are the same for all localities.

palties, which must comply with the law on public finance for 2018-2022. An incentive mechanism has been adopted by which municipalities whose expenditures increase less than 1.2 % per year are rewarded and the others penalized.

### 3.2 Inter-municipal cooperation

Municipalities were compelled by successive Acts from 1992 to 2010 to join IMC bodies by 2014 for purposes of efficiency. These Acts aimed at reducing tax competition between municipalities and decreasing the costs of local public services through economies of scale. IMC has even been strengthened following the 2015 Act (loi NOTre).

The IMC bodies resources come mainly from tax revenues—as they have fiscal autonomy—and a grant from the central government. Two IMC taxation regimes exist. In the additional taxation regime (ATR), both the IMC and the municipalities can set the rates for each of the local taxes. Under the single business tax regime (SBT), the IMC body sets the business tax rate that applies to all its members which remain responsible for the other local taxes. IMC bodies do not receive any direct financial contribution from its members. However, under SBT regime, the IMC body gets an additional grant amount that is levied by the central government on the IMC members grant.

IMC structures also differ according to their jurisdictional type<sup>12</sup>, population size and the scope of competencies that municipalities must transfer<sup>13</sup> to them. Several large groups of competencies<sup>14</sup> can be distinguished: economic development (industrial, business and touristic programs), space management, social housing planning, urban policy, management of collective services (sanitation, water and fire services) and environment protection (waste collection, air pollution, noise pollution). The more integrated the IMC body, the larger the set of compulsory competencies transferred<sup>15</sup>. As a consequence, the IMC body is in charge of all the transferred competencies<sup>16</sup> management. When a municipality transfers a competence to its IMC body, it is followed by a transfer of the personnel dedicated to that competence, together with its associated expenditure. The two levels of government might also proceed—in the case the transfer is partial—to an exchange of staff, further complexifying their relationship. Besides the competencies transfers, IMC bodies and their members may create functional common services (human resources, computer maintenance services, finance, procurement services).

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<sup>12</sup> The principal jurisdictional types are the *communautés de communes* (CC) chosen in majority by municipalities in rural areas, the *communautés d'agglomération* (CA), the *communautés urbaines* (CU) and Metropoles preferred by municipalities in urban areas.

<sup>13</sup> The 2015 Act increased the scope of mandatory transferred competencies.

<sup>14</sup> The responsibility of some groups of competencies is shared between the three tiers of local governments (regions, counties and municipalities) leading to potential overlapping. The NOTre Act (2015) has contributed to clarify the allocation of competencies among the three tiers. On this issue, see Torre and Bourdin (2022).

<sup>15</sup> CC (resp. CU and Metropoles) are the least (resp. most) integrated IMC bodies. According to the jurisdictional type, the IMC body may be in charge of some optional competencies.

<sup>16</sup> Municipalities remain responsible for those competencies that have not be transferred (e.g. child-care, pre and elementary schools, care for the elderly).



All this mutualization must be, for budgetary reasons, formalized by contracts. Agreed upon accounting principles of reimbursement exist between IMCs and municipalities. Basically, if one entity uses staff provided by the other, then the former must reimburse the latter. There are bottom-up and top-down financial transfers between municipalities and their IMC. Our data do not allow us to distinguish between them: we only have their net result, i.e. the wage bills, respectively at the municipal and IMC levels.

### 3.3 Municipal election rules and political parties

Municipal elections are held simultaneously<sup>17</sup> every 6 years. The mayor and the municipal council are elected by direct universal suffrage. When a list gathers more than 50% of the votes there is no second round of voting. Otherwise, a second round is run with all lists obtaining more than 10 % of the votes. The winner takes half of the seats in the municipal council and the rest is allocated proportionally to all the lists of candidates which have more than 5 % of the votes. Before 2014 a municipality which was part of an IMC chose which municipal counsellors would represent it on the IMC council, and since 2014, for municipalities with more than 1,000 inhabitants, they are directly elected. The French political landscape is characterized by numerous competing parties. We retain four categories of party: left-wing<sup>18</sup>, right-wing<sup>19</sup>, far-right and other parties<sup>20</sup> bearing in mind that the latter two represent a small proportion of the elected mayors<sup>21</sup>.

## 4 Expected effects and data

### 4.1 Expected effects

The purpose of our analysis is to identify the effects of both the IMC wage bill and the central grant on the per capita<sup>22</sup> public employees' wage bill at the municipal level. We will use the municipal wage bill as a shorthand for our dependent variable.

As for the explanatory variables, we naturally consider the per capita IMC wage bill and per capita grant from the central government, bearing in mind its decline from 2014 onwards. Following our earlier discussion, we also introduce the variables usually considered in the political economy literature to investigate the role of politics. The mayor's party affiliation, the degree of electoral competition using the margin of victory and the partisan alignment are used to test for the partisan approach. The opportunistic hypothesis is tested thanks to time dummies for the election year and the preceding year. Finally, we control for the per capita tax revenues and the principal characteristics of the municipalities such as the households' median income, the unemployment rate, and the

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<sup>17</sup> No endogeneity could result from the timing of elections since election dates are fixed and defined exogenously.

<sup>18</sup> Socialists, communists, ecologists and far-left.

<sup>19</sup> Conservatives and centrists.

<sup>20</sup> Independents, regionalists and others without party affiliation.

<sup>21</sup> Far-left mayors were too few in our sample to be considered.

<sup>22</sup> We divide the total personnel expenditure by the number of inhabitants.

population, both in density and structure (respective share of young and elderly people) as these variables proxy the demand for public services.

On the one hand, the impact of the IMC wage bill on the municipal wage bill is a priori unknown owing to the literature on overlapping jurisdictions. On the other hand, we expect a positive effect for the central grant. Turning to the political variables, the partisan alignment should allow the aligned municipalities to spend more. Moreover, a partisan effect is expected, with right-wing (RW) municipalities spending less than those which are left-wing (LW), and a greater margin of victory is likely to enhance the effect of party affiliation. Finally, electoral manipulation should be reflected in a positive coefficient of the election time dummies.

## 4.2 Data

Our study covers the very recent period 2011-2018, starting right after the 2010 Act which required every municipality to be a member of an IMC structure by 2014. The following table 1 displays the definition and source of the different variables.

Table 1: Variables and sources

Variables	Sources
Municipal and IMC wage bills	Ministry of Finance (DGFIP)
Central Grant and Tax revenues	Ministry of Finance (DGFIP)
IMC members and IMC maps	Ministry of Home Affairs (DGCL)
Median income	National Public Statistics Institute (INSEE)
Population, Young and Elderly, Density	National Public Statistics Institute (INSEE)
Unemployment	Ministry of Labour (DARES)
Election results	Ministry of Home Affairs

Notes: Median income per unit of consumption is used to control for the number of people in the household. Young and Elderly are respectively the shares of 0-14 and above 75.

The unemployment rate is proxied by the ratio of job-seekers to the municipal population.

We consider 2008 and 2014 municipal elections and legislative elections of 2007 and 2012.

The results, including party affiliation and margin of victory, of the 2008 municipal elections are available only for municipalities above 3,500 inhabitants<sup>23</sup>. For that reason our sample only contains municipalities of more than 3,500 inhabitants in 2008<sup>24</sup>. All the monetary data are expressed in real values (2018 thousand €). Eventually we build an original panel dataset of 2,527 municipalities spanning the period 2011-2018. However, we face the usual issue of missing values in merging databases of different sources. Summary statistics and the cross-correlation table are respectively given in tables 8 and 9 in the appendix.

<sup>23</sup> The results of the 2014 municipal election are provided for municipalities of more than 1,000 inhabitants.

<sup>24</sup> Population size may have either increased or decreased in following years.

## 5 Motivations and identification strategy

Let us first give the sample average of the key variables under study. Over the period, the average municipal wage bill amounts to 590.6 € per inhabitant and the grant average is 213.2 € per inhabitant, resulting in the grant representing 36% of the municipal wage bill. The average IMC wage bill is equal to 133.1 € per inhabitant.

### 5.1 Partisan effect on personnel expenditures

We now investigate the relevance of partisanship as decisive for the municipal wage bill. Our data on the municipal wage bill show that, on average, LW municipalities spend more than RW ones. A T-test for comparing the means reveals that LW municipalities spend on average 19.5 € more per inhabitant than do their RW counterparts and this difference is statistically significant ( $p=0.00$ ).

In order to provide a causal design for the party effect on municipal wage bill, we use close elections RDD. This procedure allows to identify the party effect while fixing voter preferences. Lee and Lemieux (2010) and Cattaneo et al. (2019) show that this approach represents a quasi-random variation in party winners, because, as long as there is some unpredictability in voting behavior, when the race is very tight, the identity of the winning party is likely to be determined by pure chance.

We restrict our sample to the 1,626 municipalities which display LW and RW opponents during the 2014 municipal elections. More precisely, the winner and runner-up have distinct parties. The treatment<sup>25</sup> consists in a LW mayor being elected. The running variable is thus the LW versus RW margin, denoted  $LvsR$ , computed as the difference between the score of the LW and RW candidates. If  $LvsR > 0$  the LW candidate is elected, otherwise the RW wins the election. The cutoff is zero and  $LvsR$  lies<sup>26</sup> between -100% and +100%. Since the incumbent's party might matter, we split the total sample according to the mayor's party in the previous municipal election in 2008 (Caughey and Sekhon (2011)).

The results in table 2 and figure 1 show that municipalities that were LW in 2008 and remained LW in 2014 in a razor-thin election spent 58 € more than those which shifted to RW. This validates the existence of a party effect on municipal wage bill around the cut-off. The conditions under which the continuity-based RD design is valid are commented in the appendix 9.1.

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<sup>25</sup> We execute the RDD method following Cattaneo et al. (2019) RDD Foundations book.

<sup>26</sup> In some municipalities there was a unique candidate.

Table 2: Close elections RDD. Outcome: Municipal wage bill.  
Running variable: LvsR margin in 2014 municipal elections

	Total sample	LW Subsample	RW Subsample
2014			
RD estimate	0.002	0.025	0.018
90% CI	[-0.045;0.068]	[-0.041;0.113]	[-0.123;0.194]
Optimal BW	20.28	12.69	18.32
Effective obs.	432+301	193+179	130+43
Observations	1,626	907	718
2015			
RD estimate	0.005	0.032	0.030
90% CI	[-0.041;0.071]	[-0.032;0.122]	[-0.116; 0.213]
Optimal BW	20.12	11.84	18.27
Effective obs.	431+299	183+167	130+43
Observations	1,626	907	718
2016			
RD estimate	0.010	0.035	0.034
90% CI	[-0.037;0.079]	[-0.031;0.128]	[-0.113;0.219]
Optimal BW	18.80	11.61	18.47
Effective obs.	401+284	178+164	131+43
Observations	1,622	907	715
2014-2016 without covariates			
RD estimate	0.010	0.034	0.034
90% CI	[-0.027;0.065]	[-0.016;0.109]	[-0.074;0.177 ]
Optimal BW	18.23	10.97	17.31
Effective obs.	1,178+831	507+462	375+126
Observations	4,874	2,721	2,151
2014-2016 with covariates			
RD estimate		0.058*	-0.018
90% CI		[0.016;0.127]	[-0.091;0.097 ]
Optimal BW		10.30	11.62
Effective obs.		486+441	246+108
Observations		2,721	2,151

We report RD point estimates and use a conventional local linear polynomial and a triangular Kernel with MSE-optimal bandwidth for point estimation.

Robust standard errors are used and adjusted for clusters (municipality level) for the period 2014-2016.

We display bias-corrected and robust 90% confidence intervals in brackets.

We report the size of the MSE-optimal bandwidth (h) for point estimation.

The effective sample size within the bandwidth reads as follows:

a+b means a (resp. b) observations between -h and 0 (resp. between 0 and +h).

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Covariates: Population density, Young, Elderly and Income.

We focus on 2014 to 2016 right after 2014 municipal elections and before 2017 legislative elections.

Subsamples respectively LW and RW in 2008 elections.

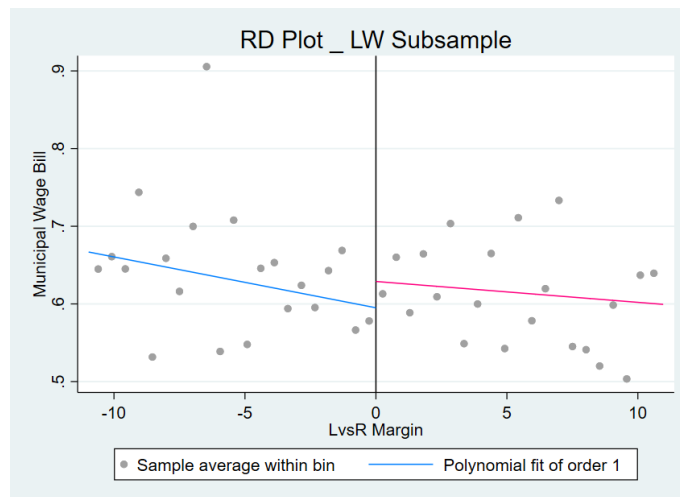


Figure 1

## 5.2 Endogeneity issue

We now tackle the endogeneity issue. First, we address the case of the grants received by French municipalities from the central government. Though they are assumed to be determined thanks to an official formula in different countries, a part of the literature points out a discretion in the allocation of intergovernmental transfers as mentioned earlier. As far as France is concerned, the Pirès–Beaune and Germain (2015) report<sup>27</sup> lamented the opacity of the allocation process. This leads us to take the view that the grant from the central state could be endogenous.

Second, in light of the existing relationships between municipalities and their IMC bodies (e.g. personnel transfers), the IMC wage bill is also suspected to be endogenous.

### Testing the grant formula

As a first step, we run year by year regressions using the grant formula. We regress the total grant (in logarithm) on population (in logarithm) and other individual municipal characteristics discussed in section 3.1. The results presented in the appendix (see table 18) show that the  $R^2$  surprisingly changes: from 0.91 between 2011 and 2014, it decreases sharply in 2015 and eventually reaches 0.30 in 2018. This is all the more striking in that the departure starts in 2015 and coincides with the CRFP reform (the planned reduction in grant). This fuels the claim (Pirès–Beaune and Germain (2015)) that the grant is allocated in a discretionary way. We can actually show that the CRFP has been thwarted by a partisan effect.

<sup>27</sup> A National Assembly report named after the representatives who authored it.

## Evidencing a partisan effect on the grant

From our sample data, we get the following descriptive figure representing the evolution of the averaged grant per inhabitant (in 2018 €) according to the mayor's party affiliation<sup>28</sup>.

Figure 2 shows that LW municipalities receive more, on average, than those which are RW. This difference is statistically significant for each year (see table 19 in the appendix). The figure displays the cut in grant from 2014 and an increasing gap between LW and RW municipalities. That the dashed (LW municipalities) curve is above the solid (RW) one could be attributed to the equalizing objective of the grant formula (worse wealth conditions, and/or more unemployment, population in need of subsidies). The widening gap could be explained by a deterioration in the economic and demographic conditions in LW municipalities. Suspecting it could be due to a partisan effect, we therefore test a possible alignment effect channeled through the grant allocation.

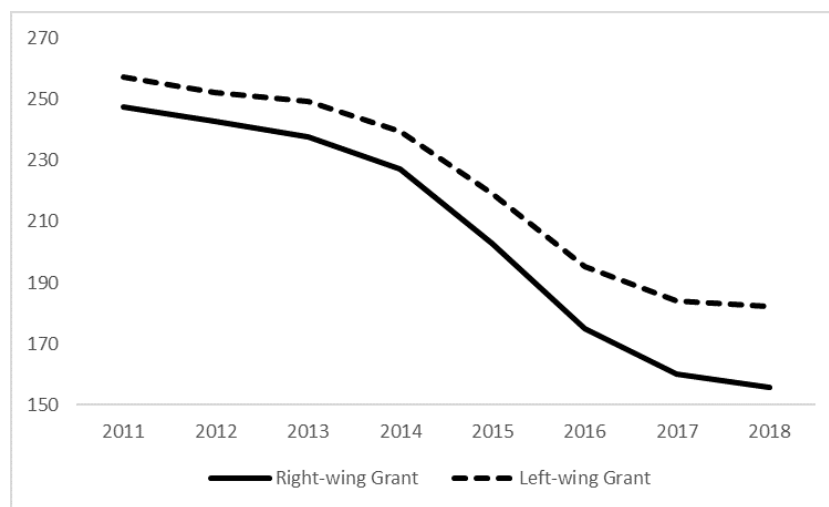


Figure 2: Average grant per inhabitant according to the mayor's party

We use the procedure provided by Solé-Ollé and Sorribas-Navarro (2008), called time difference-in-differences, which consists in collecting data on the grants allocated by the central government in successive terms of office, to estimate the effects of changes in alignment on changes in grants. We define an aligned municipality as having the same party affiliation as the majority of the National Assembly<sup>29</sup>. The legislative elections were held in 2007, 2012 and 2017 and led respectively to a "blue" majority (RW) in 2007 and a "pink" majority (LW) in 2012. In 2017, President Macron<sup>30</sup> came into office and the national assembly was neither "blue" nor "pink".

<sup>28</sup> We restrict ourselves to LW and RW mayors since far-right and other parties weigh less than 5% in our sample.

<sup>29</sup> The National Assembly has 577 representatives directly elected by the citizens for a five-year term in single seat-constituencies.

<sup>30</sup> He created a new political party LaRem (La République en Marche).

Table 3: Dependent variable: Change in per capita Grant between 2011 and 2016. Partisan alignment evidenced.

	$\Delta$ per capita Grant in thousand €
$\Delta$ Align	0.00444** (0.00139)
$\Delta$ Pop	0.000000320 (0.00000216)
Centrality	0.0254*** (0.00270)
Tourist	-0.0368*** (0.00445)
Land_area	-0.0000252 (0.0000407)
Land_area_Mount	-0.000324* (0.000138)
Control variables	yes
$N$	2,486
$R^2$	0.274

Robust standard errors in parentheses. OLS estimation.

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Control variables: Tax-Rev, Income, Unemp, Young and Elderly.

Control variables are in logarithm and first-differenced.

We adapt the Solé-Ollé and Sorribas-Navarro (2008) procedure to our setting and consider the grant received in 2011 (preceding the 2012 legislative elections) and the grant received in 2016 (right before the 2017 legislative elections), and compute the corresponding grant variation. The dummy variable *Align* takes value 1 (resp. 0) for aligned (resp. unaligned) municipalities. We compute the change in the alignment status which takes values of 1, 0 or -1.  $\Delta Align = 1$  corresponds to LW municipalities which remained LW (there are 845) and which status shifted from unaligned (in 2011) to aligned (in 2016). Similarly,  $\Delta Align = -1$  describes RW municipalities (aligned in 2011) which remained RW (unaligned in 2016) (there are 1141). Finally,  $\Delta Align = 0$  means that the status is unchanged and concerns 500 municipalities. The change in alignment status is therefore only due to a change in the majority of the National Assembly as the mayor's party is unchanged.

We regress the change in grant on the change in alignment status controlling for the variables used in the grant formula: centrality, touristic area, land area and mountain localization and the changes in respectively the municipality population, tax revenues, median income, unemployment rate and population structure.

Table 3 gives the results and suggests that partisan alignment between a municipality and the central government has a statistically significant impact on the received grant. As the coefficient is positive, a shift from unaligned (resp. aligned) to aligned (resp. unaligned) status leads to an increase (resp. decrease) in the grant change. This means that for two municipalities that have the same demographic, economic and fiscal char-

acteristics, the alignment status is decisive in the received grant. The interpretation is thus that the decrease in grant between 2011 and 2016 is lower by 4.44 € per inhabitant for aligned municipalities as compared to their unaligned counterparts.

In addition, in order to isolate the causal impact of the mayor's party on the grant while fixing voter preferences, we run a close elections RDD proceeding as we did with the municipal wage bill. The results are given in table 4, where we focus on 2014 to 2016, that is right after 2014 municipal elections and before 2017 legislative elections. It should be reminded that over this period, the National Assembly is LW.

Table 4 shows that LW municipalities in 2008 that are barely aligned with the central government in 2014 (LW) see their grant decrease by 59 € p.c. as compared to barely unaligned ones (RW) (or those that shift to the RW receive 59 € more). This result, illustrated in figure 3, suggests that leftist central government does not penalize former LW municipalities that lose by a narrow margin. It should be reminded that the 2014 municipal elections witnessed a huge victory of the RW party (the so called "blue wave"). There could be a strategic use of transfers to win them back, supporting the swing voter hypothesis (Dixit and Londregan (1995)). Moreover, the RW municipalities in 2008 that become barely aligned with the central government in 2014 (LW) obtain an additional 59€ p.c as compared to barely unaligned ones (RW), as shown in figure 4. These results confirm the existence of a party effect in the allocation of central grant.

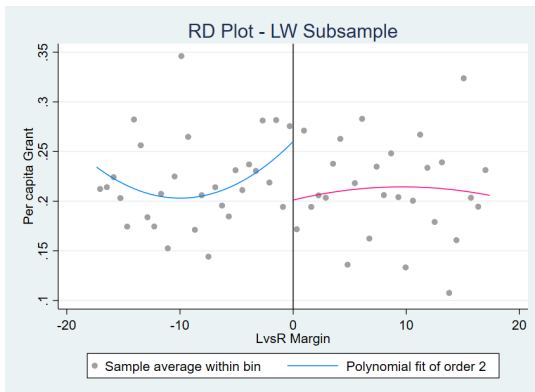


Figure 3

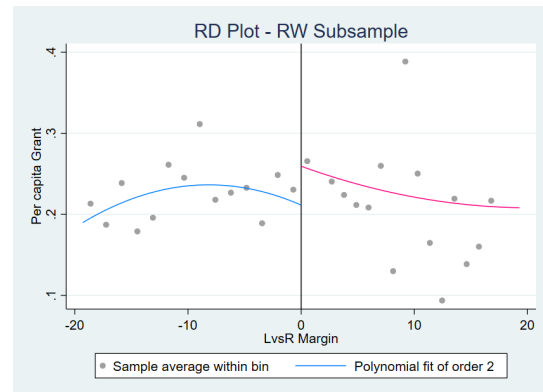


Figure 4



Table 4: Close elections RDD. Outcome: p.c. Grant.  
Running variable: LvsR margin in 2014 municipal elections.

	Total sample	LW Subsample	RW Subsample
2014			
RD estimate	-0.025	-0.057 <sup>+</sup>	0.053
90% CI	[-0.075;0.021]	[-0.116;-0.007]	[-0.073;0.199]
Optimal BW	23.92	17.75	21.47
Effective obs.	492+346	261+231	161+44
Observations	1,626	907	718
2015			
RD estimate	-0.027	-0.057 <sup>+</sup>	0.050
90% CI	[-0.076;0.018]	[-0.114;-0.009]	[-0.076;0.184]
Optimal BW	24.31	18.45	21.20
Effective obs.	503+348	265+239	159+44
Observations	1,626	907	718
2016			
RD estimate	-0.033	-0.061 <sup>*</sup>	0.035
90% CI	[-0.083;0.010]	[-0.119;-0.011]	[-0.089;0.168]
Optimal BW	23.69	17.63	20.01
Effective obs.	486+344	260+228	149+44
Observations	1,622	907	715
2014-2016 without covariates			
RD estimate	-0.029	-0.059 <sup>*</sup>	0.048
90% CI	[-0.070;0.008]	[-0.110;-0.016]	[-0.061;0.166]
Optimal BW	23.18	17.37	19.50
Effective obs.	1446+1017	771+681	435+129
Observations	4,874	2,721	2,151
2014-2016 with covariates			
RD estimate			0.059 <sup>+</sup>
90% CI			[0.001;0.130]
Optimal BW			14.61
Effective obs.			306+117
Observations			2,151

We report RD point estimates and use a conventional 2-order local polynomial and a triangular Kernel with MSE-optimal bandwidth for point estimation.

Robust standard errors are used and adjusted for clusters (municipality level) for the period 2014-2016.

We display bias-corrected and robust 90% confidence intervals in brackets.

We report the size of the MSE-optimal bandwidth (h) for point estimation.

The effective sample size within the bandwidth reads as follows:

a+b means a (resp. b) observations between -h and 0 (resp. between 0 and +h).

<sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Covariates: Centrality, Mountain, Touristic, Elderly and Income.

We focus on 2014 to 2016 right after 2014 municipal elections and before 2017 legislative elections.

Subsamples respectively LW and RW in 2008 elections.

## Instrumenting the grant

In order to identify the causal effect of the central grant on a municipality's wage bill, we build an instrument defined as the average grant computed on its comparable neighbors. This strategy is inspired from the empirical industrial organization literature (Hausman

et al. (1994) and Azar et al. (2019)) and is used in other fields (e.g. in finance, Karpoff et al. (2017) and Gogineni et al. (2020)).

The conventional approach to selecting an appropriate instrument requires the following two conditions. First, the excluded instrument must be distributed independently of the error process (exogenous). Second, the excluded instrument must be sufficiently correlated with the included endogenous regressor (not weak). As a result, exclusion restriction is met when the excluded instrument is shown to exert indirect influence on the dependent variable only through the endogenous regressor.

In what follows we give the arguments that support the exclusion restriction in our case. Our instrumental variable departs from the spatial econometrics neighbour/spatial lag instrument, therefore avoiding the simultaneity issues generated by spatial lag IVs (Gibbons and Overman (2012)).

More specifically, as the grant is allocated by the central government according to a formula, it is very unlikely that a grant attributed to a given municipality depends on the grant received by another, except within the IMC body to which it belongs. Indeed, the IMC fiscal regime (as already mentioned) might modify the grant amount received by its members. As a consequence, municipalities within an IMC body could be affected by common unobservable shocks. Since we consider as neighbors only municipalities outside the IMC body, our instrument can be reasonably considered as exogeneous (immune to the criticism made to Hausman-type instruments).

Moreover as the grant instrument is computed on comparable neighbors (see below for the criteria used to define the eligible neighbors) it can be seen as a relevant proxy for the given municipality's grant, since similar municipalities are expected to receive the same grant amount according to the formula. Therefore, this instrument will impact the municipal wage bill indirectly, only through the endogeneous grant.

Comparable neighbors are chosen following<sup>31</sup> the grant allocation formula, which turns out to be biased by a partisan effect. The neighbors are the municipalities having the same population size, land area<sup>32</sup>, operating within the same county<sup>33</sup>, and having the same party affiliation<sup>34</sup>. The instrument for a given municipal grant is thus computed as the average grant of the surrounding comparable municipalities but excluding those which belong to the same IMC body<sup>35</sup>.

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<sup>31</sup> Considering all the criteria of the allocation rule would have been difficult as we need enough neighbors to compute the instrument.

<sup>32</sup> We consider three population size sub-groups: below 5,000 inhabitants, between 5,000 and 10,000 and above 10,000. Similarly, we partitioned the land area into four sub-groups according to the three quartiles of the land area distribution.

<sup>33</sup> There are 95 metropolitan counties. We do not compute a nation-wide instrument as it would result in municipalities having almost the same instrument. Taking the county ensures enough variability in the instrument.

<sup>34</sup> In order to find comparable neighbors, we restrict the grant instrument computation to LW and RW municipalities.

<sup>35</sup> All things being equal (same county, population size, area) the grant computed on a LW neighborhood will be larger than that of a RW from 2013 on as the National Assembly is "pink".

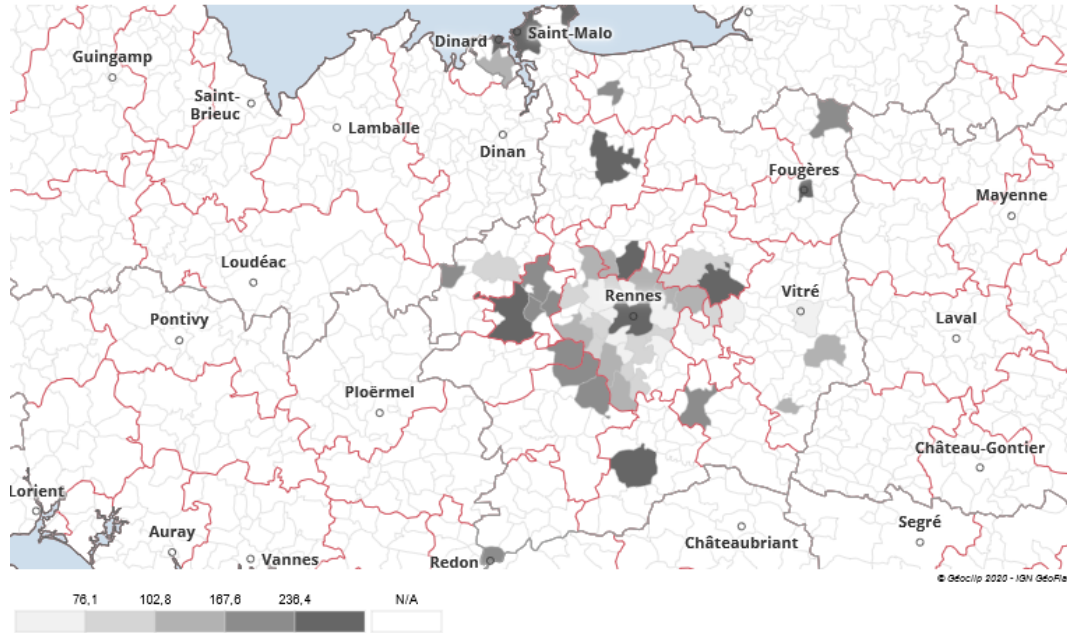


Figure 5: 2018 Municipal grant per inhabitant in euros. Ile-et-Vilaine county.

Figure 5 illustrates an example of how we compute the instrument at the county level, here, Ile-et-Vilaine. 54 municipalities of our sample are plotted according to their grant levels. The IMC bodies frontiers are in red while the county border is in grey. Consider the case of the Redon municipality, located at the south-west of the county. In 2018, it has a population of 9151 inhabitants, a land area of 1509 hectares and its mayor is RW. To instrument the grant of Redon, we consider cities that are comparable in terms of population, land area and party affiliation but excluding those municipalities within the same IMC body (CA Redon agglomération). As a result, we find two neighbors<sup>36</sup> for Redon: Dol-de-Bretagne (located at the south-east of Saint-Malo) and Saint-Grégoire (in the same IMC as Rennes).

### Instrumenting the IMC wage bill

Proceeding in the same way, we construct an instrument for the IMC wage bill to measure its causal impact on municipal wage bill. We now give reasons why we believe the exclusion restriction is satisfied.

First, as the wage bill is concerned, the employment zones (EZ) are relevant to consider

<sup>36</sup> The number of neighbors is variable across municipalities since French counties are heterogeneous for different reasons. France has indeed rural and urban counties and these counties gather more or less municipalities, which sizes and areas vary. If no neighbor satisfying the 4 criteria is found for a given municipality, the rule is relaxed to allow for 3 criteria. In such a case, we choose as neighbors municipalities in the same county that have the same population size and the same party affiliation.

since they reflect local labor markets. The EZs are geographical zones<sup>37</sup> in which the workers live and work and where firms can find a large share of their labor force. IMCs within a same EZ are therefore likely to be affected by local common shocks (i.e., specific to the EZ). In order for the instrument to be exogenous, we select IMC neighbors outside this geographic area. Moreover as the IMC wage bill instrument is calculated on comparable neighbors it can be seen as a good proxy for the given IMC wage bill: IMCs that are alike are expected to have a similar personnel expenditure<sup>38</sup>. As a result, the instrument will impact the municipal wage bill indirectly, only through the endogenous IMC wage bill.

We exploit the IMC bodies map<sup>39</sup> and employment zones (EZ) partition<sup>40</sup>. The wage bill of a given IMC is instrumented by the average wage bill computed on the neighboring comparable IMC bodies. The latter consist of the IMC bodies within the same county, of the same size<sup>41</sup>, the same fiscal regime, but excluding the IMCs part of the same EZ as the considered IMC body.

As an illustration, we represent in figures 6 and 7 respectively the 4 EZs and the 17 IMCs which cover the Aveyron county. It is interesting to note that the Figeac EZ spreads over two counties, Lot and Aveyron, escaping the administrative borders. Similarly the Villefranche de Rouergue EZ spreads over Aveyron and Tarn-et-Garonne counties.

As an example described by figure 8, consider the IMC CC Saint Affricain, Roquefort, Sept Vallons, located at the south-east of the county and part of the Millau EZ. It turns out to have five comparable neighbors<sup>42</sup> located at the north of the county and all nested in the Rodez EZ.

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<sup>37</sup> We use the 2010 geographical partition, produced by INSEE, that provides information for 304 EZs in Metropolitan France.

<sup>38</sup> Appendix 9.3 shows that the neighboring environment indeed matters.

<sup>39</sup> The number of IMC bodies decreased over the period from 2,599 in 2011 to 1,264 in 2018.

<sup>40</sup> As the two maps are provided separately, we allocate each IMC body to the EZ where the IMC chief town is located.

<sup>41</sup> We consider four categories for the IMC population size: under 5,000; between 5,000 and 10,000; between 10,000 and 20,000 and over 20,000 inhabitants.

<sup>42</sup> The number of neighbors is variable across IMC bodies since French counties are heterogeneous for different reasons. The number of EZs and the number of IMC bodies vary across counties as well as IMC population size and tax regime. If no neighbor satisfying the 3 criteria is found for a given IMC body, the rule is relaxed to allow for 2 criteria. In such a case, we choose as neighbors IMCs in the same county that have the same fiscal regime.



Figure 6: Employment zones. Aveyron county

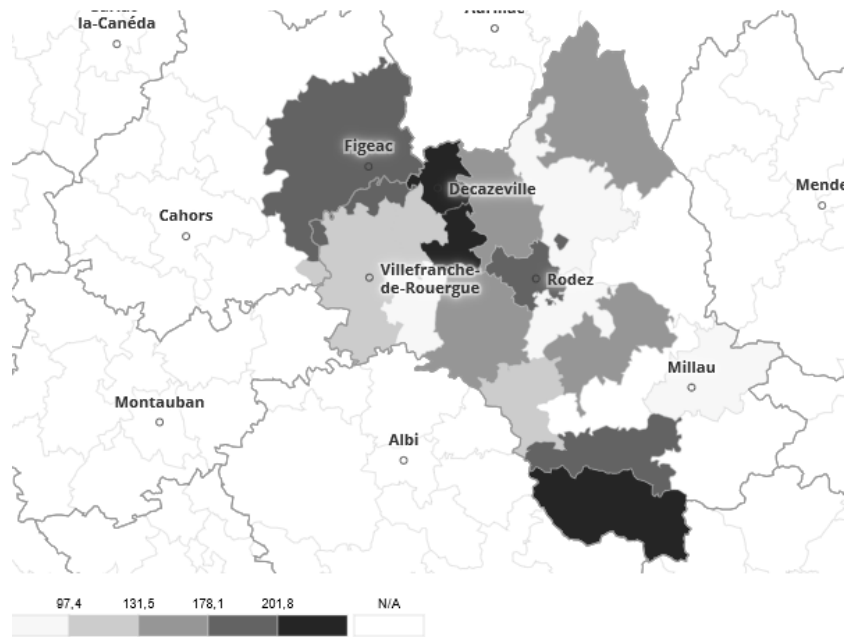


Figure 7: IMCs Wage bill per inhabitant (in euros). Aveyron county

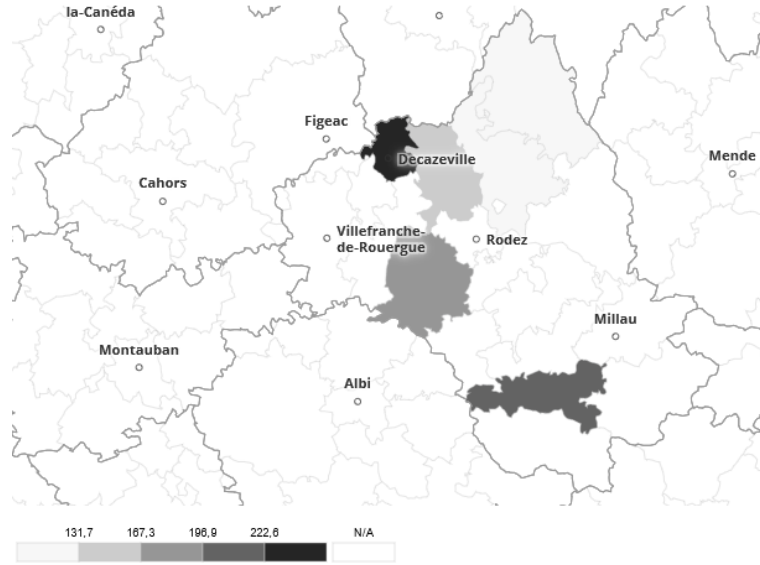


Figure 8: Example. Neighborhood of CC Saint Affricain, Roquefort, Sept Vallons. Aveyron county.

## 6 Results

We choose a log-linear specification<sup>43</sup> of the relationship between the municipal wage bill, denoted  $WM$ , and the regressors discussed above:

$$\begin{aligned} \ln(WM_{it}) = & \beta_{WI} \ln(WI_{it}) + \beta_G \ln(G_{it}) + \beta_{G_{1418}} \ln(G_{it}) * d_{1418} + \sum_j \gamma_j Pol_{it}^j \\ & + \beta_T \ln(T_{it}) + \beta_Y \ln(Y_{it}) + \beta_U \ln(U_{it}) + \sum_k \delta_k \ln(X_{it}^k) + u_i + \epsilon_{it} \end{aligned} \quad (1)$$

where  $i$  denotes the municipality index,  $t$  denotes time and  $u_i$  refers to the individual municipal effect. The municipality being part of an IMC, we consider the IMC wage bill denoted by  $WI$ <sup>44</sup>. The per capita grant is denoted  $G$  and we introduce an interaction term  $G * d_{1418}$  to count for the grant decline from 2014 onwards.

We introduce the variables usually considered in the political economy literature<sup>45</sup>. They are denoted  $Pol$  and refer alternatively to mayors' party affiliations (a dummy we call  $RW$ ), the margin of victory ( $MoV$ )—defined as the difference between the share of votes cast for the winning candidate and the second-place candidate— and their interaction

<sup>43</sup> This makes it possible to directly interpret the coefficients as elasticities.

<sup>44</sup> On average 2.5% of municipalities are not in an IMC, with a larger share at the beginning of the period (6.6% in 2011, 1.7% until 2015 and 0.08% in 2016). For these municipalities  $WI$  is not available. To avoid excluding them from the sample we assign 0 to  $\ln(WI)$ .

<sup>45</sup> Part of the empirical literature uses the GMM method with the lagged endogenous variable as a regressor to count for persistence in cycles. We choose the IV-FE method allowing for the use of an original instrumentation.

Table 5: Dependent variable: municipal wage bill. Main results

	(1) P-OLS	(2) FE	(3) IV-WI-FE	(4) IV-G-FE	(5) IV-WI-G-FE	(6) IV-WI-G-FE
<i>WI</i>	-0.00529* (0.00268)	-0.00449** (0.00157)	-0.0167* (0.00658)	-0.00600** (0.00212)	-0.0219** (0.00788)	-0.0220** (0.00789)
Grant ( <i>G</i> )	-0.0606*** (0.0126)	0.0352** (0.0109)	0.0451*** (0.0115)	0.0763** (0.0262)	0.102** (0.0321)	0.102** (0.0322)
Grant* <i>d</i> <sub>1418</sub>	0.0186** (0.00602)	-0.0244*** (0.00692)	-0.0282*** (0.00680)	-0.0325*** (0.00458)	-0.0387*** (0.00551)	-0.0392*** (0.00555)
<i>RW</i>	-0.0404*** (0.00870)	-0.0113* (0.00534)	-0.0116* (0.00538)	-0.0157* (0.00668)	-0.0162* (0.00680)	
<i>MoV</i>	-0.00146 (0.00323)	-0.00339* (0.00137)	-0.00349* (0.00142)	-0.00439** (0.00145)	-0.00455** (0.00154)	
<i>MoV</i> * <i>RW</i>						-0.00660*** (0.00192)
<i>d</i> <sub>2013</sub>	-0.00814* (0.00396)	0.00897* (0.00350)	0.0149*** (0.00411)	0.00949*** (0.00279)	0.0163*** (0.00365)	0.0164*** (0.00365)
<i>d</i> <sub>2014</sub>	0.0400*** (0.00495)	0.00216 (0.00565)	0.00298 (0.00576)	-0.00715 (0.00542)	-0.00876 (0.00571)	-0.00966+ (0.00582)
Tax_Rev ( <i>T</i> )	0.556*** (0.0203)	0.179+ (0.0937)	0.186+ (0.0949)	0.150 (0.0940)	0.150 (0.0929)	0.150 (0.0929)
Income ( <i>Y</i> )	-0.271*** (0.0441)	0.144 (0.110)	0.129 (0.113)	0.196* (0.0964)	0.205* (0.100)	0.205* (0.100)
Unemp ( <i>U</i> )	0.264*** (0.0307)	0.0783** (0.0262)	0.0683* (0.0274)	0.0877** (0.0270)	0.0814** (0.0278)	0.0812** (0.0277)
Density	0.0548*** (0.00502)	-0.542*** (0.0851)	-0.539*** (0.0846)	-0.530*** (0.0858)	-0.512*** (0.0891)	-0.512*** (0.0890)
Young	-0.287*** (0.0445)	0.0327 (0.0485)	0.0273 (0.0475)	0.0432 (0.0519)	0.0391 (0.0517)	0.0376 (0.0517)
Elderly	-0.0875*** (0.0206)	0.101** (0.0308)	0.114*** (0.0332)	0.124** (0.0456)	0.152** (0.0520)	0.152** (0.0522)
Regional Dummies	yes	yes	yes	yes	yes	yes
<i>N</i>	18,831	18,831	18,831	18,002	18,002	18,002
<i>Cities</i>	2,550	2,550	2,550	2,527	2,527	2,527
<i>R</i> <sup>2</sup>	0.577	0.133	0.1195	0.1249	0.0918	0.0914

Standard errors (in parentheses) are clustered at the municipality level. +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$   
 All variables in logarithm except dummies. Instruments:  $\overline{WI}$ ,  $\overline{G}$ ,  $\overline{G}_{1418}$ .

term  $MoV * RW$ . The partisan alignment is introduced via the grant instrumentation. The opportunistic hypothesis is tested thanks to time dummies: the election year  $d_{2014}$  and the preceding year  $d_{2013}$ .

$T$  represents the per capita tax revenues. We also control for the principal characteristics of the municipalities. We consider the households' median income  $Y$ , the unemployment rate  $U$  as well as the population, both in density and structure (respective shares of young and elderly). Finally, we introduce regional dummies to capture specific regional features<sup>46</sup>.

Table 5 presents the estimation of equation (1) using six different models. Model (1) corresponds to the pooled OLS method ignoring the panel structure of our sample. Model (2) is a fixed effect (FE) model using the within method and neglects the endogeneity of  $WI$  and  $G$ . Model (3) (resp. model (4)) is a FE model, using an IV method instrumenting  $WI$  only (resp.  $G$  only). Models (5) and (6) are FE models instrumenting both the IMC wage bill  $WI$  and the grant  $G$ .

In models (1) to (3) the sample of 2,550 cities consists of the four categories of parties: LW, RW, far-right and other parties. In models (4) to (6), the grant instrumentation leads to losing observations as we consider only LW and RW parties resulting in 2,527 cities. Moreover instead of 20,216 observations (2,527\*8 years) we have 18,002. Almost all of the lost observations are due to missing values in the DGFIP dataset, in particular the IMC wage bill is not always available despite the existence of the IMC body. The beginning of the period is particularly concerned with missing values. In 2017 and 2018 almost no missing values are recorded.

From the endogeneity test of endogenous regressors,  $\text{Chi2}(3)=63.838$  and  $p=0.00$ , we can conclude that both  $WI$  and  $G$  are endogenous regressors. We therefore concentrate on the results of models (5) and (6)<sup>47</sup>.

Before stating our main results, we display in table 21 in the appendix the first stage regressions corresponding to model (5). We find a highly significant effect of each of the instruments ( $\overline{WI}$ ,  $\overline{G}$  and  $\overline{G_{1418}}$ ) on its associated endogenous regressor. Moreover, the Sanderson-Windmeijer test for under-identification concludes that each excluded instrument is relevant, i.e., correlated with the endogenous regressor.

We comment now on the main results of models (5) and (6). We first find that a substitution effect governs the two tier public wage bills. The coefficient of  $WI$  is negative and highly significant<sup>48</sup>: when the IMC wage bill increases, the municipality decreases its own.

We also show that cuts in grants lead to cuts in municipal wage bills. The grant-elasticity of the municipal wage bill is positive<sup>49</sup> but lessened by the implementation of the planned

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<sup>46</sup> The regions map has been modified by the 2015 Act that reduced the number of metropolitan regions from 22 to 13.

<sup>47</sup> We also run the Anderson-Rubin Wald test for the joint significance of the endogenous regressors and find  $\text{Chi2}(3)=113.39$  and  $p=0.00$  so that we reject the null hypothesis of no joint significance.

<sup>48</sup> Treating the endogeneity of  $WI$  changes the magnitude of its coefficient: it is more than four times higher in model (5) than in model (2).

<sup>49</sup> Instrumenting the grant also increases its coefficient: it is almost three times higher in model (5)



grant reduction from 2014. Therefore the decline in  $G$  generated a decrease in municipal wage bills all other things being equal. This measure seemed to have met the expected objective to contain expenditures at the local level. Faced with this cut in their grant, municipalities resisted, as the grant-elasticity is smaller after than before the reform. However, partisanship puts a brake on this. To show this, we run another version of model (6) differentiating between the impact of the grant reduction according to the mayor's party affiliation. The results of table 6 show that, after the reform, the grant-elasticity of the municipal wage bill is smaller for LW municipalities than those which are RW. More precisely, the grant-elasticity of the municipal wage bill is equal to 0.0607 after the reform for LW and 0.0721 for RW municipalities<sup>50</sup>. This difference is highly significant. LW municipalities—which turn out to be aligned during the period concerned with the CRFP reform—resist more to the cut in grant than those on the RW. As a result, for municipalities comparable as regards their demographic, economic and fiscal features, we find that a 10% decrease in annual grant leads to 0.607% and 0.721% decreases in respectively LW and RW municipalities' wage bills. This should be contrasted with the grant-elasticity before the reform: a 10% decrease in annual grant leads to a 1.07% decrease in the municipal wage bill.

Finally, our results support both the opportunistic and partisan hypotheses. Models (5) and (6) in table 5 reveal first the existence of an opportunistic effect, since the coefficient of  $d_{2013}$  is positive and significant. Just before the election, the municipal wage bill reaches a peak but the election year  $d_{2014}$  has a null impact in model (5) and a weakly significant negative impact in model (6), probably because it is a transition year<sup>51</sup>. We also estimate our models (5) and (6) to take the whole electoral timetable into account using time dummies from 2012 to 2018 (see table 23 in the appendix). Compared to 2011, the reference year, the negative sign indicates that the personnel expenditures decrease from 2014 onward, which may capture the efficiency of the cut in grant. Only the 2013 coefficient has a positive sign confirming the opportunistic effect. We are not able to display the intensity of the electoral cycle since the coefficient of such time dummies are difficult to interpret in a FE model. Moreover, model (5) also shows that a partisan effect is at play, as evidenced by a negative sign on the dummy  $RW$ , and that, regardless of the party affiliation, a greater margin of victory leads to reductions in the municipal wage bill<sup>52</sup>. Moreover, model (6) shows that for RW municipalities a greater margin of victory increases the partisan effect: the coefficient of  $MoV * RW$  is negative and highly statistically significant.

Though it is not central to the analysis, our data do not evidence a flypaper effect (contrasting with Baskaran (2016)) since the coefficient associated to the median income  $Y$  is significant and much larger than the coefficient of  $G$ . The coefficient associated

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than in model (2).

<sup>50</sup> Using column All Municipalities of table 6, the after-reform grant-elasticity is respectively  $0.0607 = 0.107 - 0.0463$  for LW and  $0.0721 = 0.107 - 0.0463 + 0.0114$  for RW.

<sup>51</sup> We also find that the opportunistic effect does not vary with the degree of electoral competition. Nor does it change with the party affiliation. See table 22 in the appendix.

<sup>52</sup> We do not show any non-linearity of the margin of victory as shown theoretically by Hanusch and Magleby (2014) and evidenced on French data by Boukari (2019). See table 22 in the appendix.

with population density is negative and statistically significant, reflecting economies of density in local public service provision (taking implicitly the wage bill as a proxy for the production costs). Finally, wage bills increase with the unemployment rate, suggesting that mayors either hire more or pay more when local unemployment<sup>53</sup> increases.

Table 6: Dependent variable: Municipal wage bill. Versions of model (6) according to the mayor's party.

	All municipalities	Right-wing	Left-wing
<i>WI</i>	-0.0229** (0.00799)	-0.0248* (0.0111)	-0.0222+ (0.0132)
Grant ( <i>G</i> )	0.107** (0.0326)	0.127* (0.0498)	0.0632* (0.0262)
Grant* <i>d</i> <sub>1418</sub>	-0.0463*** (0.00611)	-0.0359*** (0.00680)	-0.0430*** (0.00805)
Grant* <i>d</i> <sub>1418</sub> * <i>RW</i>	0.0114*** (0.00276)		
<i>MoV</i>		-0.00296 (0.00210)	-0.00363 (0.00232)
<i>MoV</i> * <i>RW</i>	-0.00428* (0.00190)		
<i>d</i> <sub>2013</sub>	0.0162*** (0.00367)	0.00788+ (0.00476)	0.0246** (0.00758)
<i>d</i> <sub>2014</sub>	-0.0107+ (0.00585)	-0.0145+ (0.00874)	-0.000857 (0.00611)
Control Variables	yes	yes	yes
Regional Dummies	yes	yes	yes
<i>N</i>	18,002	10,330	7,672
<i>Cities</i>	2,527	1,609	1,351
<i>R</i> <sup>2</sup>	0.0867	0.0666	0.1817

Standard errors (in parentheses) are clustered at the municipality level.

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . IV-FE estimation.

Control variables: Tax-Rev, Income, Unemp, Density, Young, Elderly.

All variables in logarithm except dummies.

## 7 Robustness checks

To provide for external validity of our results, we extend our analysis to other municipal economic outcomes. We consider current, investment and total expenditures in order to produce a richer picture in response to IMC and central grant. First as for the IMC effect, table 7 shows that a substitution effect is at work from 2015 onwards for the current expenditures regardless of the party. Next, we find a complementary effect on

<sup>53</sup> On the relationship between unemployment and public employment see Caponi (2017) and Faggio and Overman (2014).

investment expenditures, suggesting the existence of IMC projects adding public services to those already delivered by municipality members. Moreover, the IMC elasticity for total expenditures is positive at the beginning of the period and is subsequently reduced but still positive from 2015 onwards (the substitution on current expenditures is slightly dominated by the complementarity on investment expenditures).

Second the grant elasticity of current expenditure is null when considering the whole sample. This impact of the grant on current expenditures is better captured on subsamples according to the mayor's party. The grant elasticity of current expenditures is positive for RW municipalities while it is null in LW ones, whether before or after the public finance recovery plan. The downsizing that LW municipalities accept on personnel expenditures vanishes when considering the current expenditures. The grant elasticity is negative for investment expenditures regardless of the party and positive for total expenditures only from 2015.

As a conclusion, these results bring additional insights as for the IMC and the grant effects on other municipal expenses. We show in particular that the objective of curbing the increasing trend on total expenditures seems to be achieved using the cuts in grant channel. Our main results on IMC effects on municipal wage bill hold studying current expenditures. The results on the grant effects on municipal wage bill are robust considering both current and total expenditures. Finally, additional data are needed to understand the mechanisms underlying investment expenditures.

Table 7: Alternative dependent variables using model (6).

	CurExp All	CurExp Right-wing	CurExp Left-wing	InvExp All	TotExp All
CurExpI	0.0108 (0.0100)	0.00764 (0.00887)	0.0193 (0.0223)		
CurExpI* $d_{1518}$	-0.0222** (0.00691)	-0.0265** (0.00995)	-0.0289* (0.0143)		
InvExpI				0.0484* (0.0243)	
InvExpI* $d_{1518}$				-0.00602 (0.0228)	
TotExpI					0.0908+ (0.0518)
TotExpI* $d_{1518}$					-0.0663* (0.0318)
Grant ( $G$ )	-0.00851 (0.0693)	0.0675+ (0.0399)	-0.107 (0.155)	-0.438+ (0.228)	-0.457 (0.314)
Grant* $d_{1518}$	0.00559 (0.0126)	-0.00162 (0.0110)	0.0189 (0.0325)	0.187*** (0.0466)	0.204*** (0.0534)
$MoV$		-0.00436* (0.00194)	0.000127 (0.00275)		
$MoV * RW$	-0.00457** (0.00148)			-0.000270 (0.00596)	-0.00502 (0.00662)
$d_{2013}$	0.00497 (0.00421)	0.00259 (0.00624)	0.00423 (0.0101)	0.0341* (0.0165)	0.0263 (0.0216)
$d_{2014}$	0.00932+ (0.00560)	0.00613 (0.00800)	0.0117 (0.0148)	-0.155*** (0.0222)	-0.161*** (0.0282)
Control Variables	yes	yes	yes	yes	yes
Regional Dummies	yes	yes	yes	yes	yes
$N$	17,956	10,312	7,644	17,956	17,956
$Cities$	2,527	1,608	1,351	2,527	2,527
$R^2$	0.1076	0.1065	0.0774	0.0031	0.0045

Standard errors (in parentheses) are clustered at the municipality level.

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . IV-FE estimation.

Control variables: Tax-Rev, Income, Unemp, Density, Young, Elderly.

All variables in logarithm except dummies. In the third column  $R^2$  overall is reported as the  $R^2$  within is negative because of IV estimation procedure.

## 8 Conclusion

The present contribution focuses on municipal public personnel expenditures that have been on a long term rising trend. Rationalization in expenses at the local public government level is a justification for municipalities' mandatory membership to IMC bodies. In that respect, the objective has been met as we find a substitution effect between the two tier wage bills. The other channel used, the cuts in central grant, turns out to be partially effective as the municipal wage bill decreases with the cuts in grant. However, this effect is hindered by partisanship and strategic use of transfers by the central government. To get a richer view of the impact of grants and IMC on municipal outcomes, we explore alternatively current, investment and total expenditures. Our main results still hold for current and total expenditures as far as the grant impact is concerned.

In light of our findings, evidencing a substitution effect is not enough to conclude regarding the IMC effect on the local public sector size. Considering the consolidated level (IMC body and its members), the IMC effect is ambiguous and needs to be clarified. Moreover, the cuts in grant seem to be a promising avenue in containing the rise in public spendings. But the partisan-distorted allocation of the grant, in spite of its formula-based definition, calls obviously for more transparency. The grant allocation deserves to be more thoroughly studied owing to the formula complexity. For instance, it would be interesting to disaggregate the grant amount into its different components—base grant, compensating part, equalizing part—and explore through which channel the distortion operates.

Our results being contingent on the data availability, related questions still deserve attention. Distinguishing between different types of personnel (occupation, status (private vs tenured) and part-time vs full-time) could allow us to test whether a cut in grant leads to a uniform adjustment in personnel expenditures. Moreover, there is a need to investigate the strategic political interactions between the IMC body and its members. Finally, the bonus-malus mechanism adopted for the years 2018-2022, which introduces a budgetary binding rule for large municipalities, is another way of extending our work.

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## 9 Appendix

Table 8: Summary statistics

Variable	Panel	Mean	sd	min	max	Observations
<i>WM</i>	Overall	.5905659	.2587263	.0010571	4.627391	N = 19404
	Between		.2523626	.1643298	4.376578	n = 2597
	Within		.0382578	-.1444329	1.404888	T = 7.47
<i>WI</i>	Overall	.1331015	.1240684	.0001144	5.069007	N = 18898
	Between		.1019298	.0003739	1.228965	n = 2592
	Within		.0732105	-1.01132	4.30161	T = 7.29
$\overline{WI}$	Overall	.1262852	.082562	.0011711	3.218057	N = 18898
	Between		.0569043	.0136155	.870913	n = 2592
	Within		.0609027	-.6906636	2.473429	T = 7.29
Grant	Overall	.213185	.1216387	.0000871	1.492846	N = 19405
	Between		.1106619	.0071395	1.142801	n = 2597
	Within		.0487323	-.6376508	.8541956	T = 7.47
$\overline{Grant}$	Overall	.2174249	.092061	1.86e-09	1.513784	N = 19410
	Between		.0787595	.007944	.6034503	n = 2597
	Within		.0486156	-.1672293	1.309834	T = 7.47
RW	Overall	.5412993	.4983037	0	1	N = 20303
	Between		.448622	0	1	n = 2613
	Within		.218429	-.292034	1.255585	T = 7.77
LW	Overall	.4158499	.49288	0	1	N = 20303
	Between		.4439277	0	1	n = 2613
	Within		.2153286	-.2984358	1.249183	T = 7.77
FarRight	Overall	.0032015	.0564925	0	1	N = 20303
	Between		.0444977	0	.7142857	n = 2613
	Within		.0343312	-.7110842	.3782015	T = 7.77
Others	Overall	.0396493	.1951387	0	1	N = 20303
	Between		.1609293	0	1	n = 2613
	Within		.1142611	-.793684	.6646493	T = 7.77
MoV	Overall	22.08229	15.91298	.02	100	N = 18045
	Between		13.77542	.12	78.74	n = 2533
	Within		8.587613	-14.58271	58.7473	T = 7.12
Tax-Rev	Overall	.5479447	.2778172	.0071188	6.945487	N = 19405
	Between		.2641926	.0668674	5.852285	n = 2597
	Within		.0695648	-1.559857	2.187963	T = 7.47
Income	Overall	21.70431	4.692018	9.855404	52.67	N = 19419
	Between		4.61929	10.07837	50.1504	n = 2597
	Within		.4548778	17.30227	24.31694	T = 7.47
Unemp	Overall	.0808263	.0240195	.0243576	.2890961	N = 19382
	Between		.0226158	.0302696	.1905411	n = 2591
	Within		.0082882	-.0268477	.1793814	T = 7.48
Density	Overall	13.37303	24.19062	.2083917	273.0996	N = 19412
	Between		23.5771	.2181455	268.555	n = 2597
	Within		.8650296	-5.331591	44.62549	T = 7.47
Young	Overall	.1820229	.0311843	.0763109	.301416	N = 19412
	Between		.030558	.080751	.2958476	n = 2597
	Within		.0054307	.1439575	.2262534	T = 7.47
Elderly	Overall	.0991046	.0374546	.0099316	.3069162	N = 19412
	Between		.0368757	.0128522	.2930059	n = 2597
	Within		.0052126	.047037	.1348573	T = 7.47
Popul	Overall	15554.86	51662.89	2661	2249975	N = 19412
	Between		52792.43	2773.25	2217858	n = 2597
	Within		842.1618	-14776.71	47672.29	T = 7.47

Variable	Panel	Mean	sd	min	max	Observations
Land_area	Overall	2309.096	2816.454	70	75893	N = 20904
	Between		2816.926	70	75893	n = 2613
	Within		0	2309.096	2309.096	T = 8
Mountain	Overall	.1069793	.3090945	0	1	N = 20303
	Between		.306432	0	1	n = 2613
	Within		0	.1069793	.1069793	T = 7.77
Touristic	Overall	.1155987	.319759	0	1	N = 20303
	Between		.3188542	0	1	n = 2613
	Within		0	.1155987	.1155987	T = 7.77
Centrality	Overall	.2997094	.4581419	0	1	N = 20303
	Between		.4581948	0	1	n = 2613
	Within		0	.2997094	.2997094	T = 7.77
CurExp	Overall	1.163884	.5481728	.001	20.0335	N = 20224
	Between		.5176237	.3749271	11.53765	n = 2613
	Within		.167222	-3.063256	9.659739	T = 7.74
CurExpI	Overall	.5281618	.4050557	0	16.98247	N = 19781
	Between		.3123916	.0019098	3.042079	n = 2612
	Within		.2604765	-2.201577	14.48839	T = 7.57
$\overline{CurExpI}$	Overall	.4409773	.220087	.0194001	7.768514	N = 19781
	Between		.1355992	.1439075	2.081808	n = 2612
	Within		.1744425	-1.41302	6.127683	T = 7.57
InvExp	Overall	.4912716	.3972198	.001	20.43462	N = 20224
	Between		.2894293	.0797772	7.975799	n = 2613
	Within		.2707671	-4.488762	12.95009	T = 7.74
InvExpI	Overall	.3504381	.4730285	0	23.11072	N = 19781
	Between		.2925364	.001983	5.477451	n = 2612
	Within		.3717235	-4.919775	19.82623	T = 7.57
$\overline{InvExpI}$	Overall	.2715228	.2484713	.0000953	11.85572	N = 19781
	Between		.1241691	.0438514	2.79195	n = 2612
	Within		.2147441	-2.504432	9.335297	T = 7.57
TotExp	Overall	.705853	3.448299	1.00e-06	409.377	N = 20224
	Between		2.356422	.0466109	110.5215	n = 2613
	Within		2.48244	-78.73762	299.5613	T = 7.74
TotExpI	Overall	.8785999	.835018	0	40.09318	N = 19781
	Between		.575619	.0038929	8.51953	n = 2612
	Within		.6075304	-7.077294	34.31463	T = 7.57
$\overline{TotExpI}$	Overall	.7124217	.4481081	.0130194	18.67905	N = 19781
	Between		.244219	.1877589	4.873758	n = 2612
	Within		.3762644	-3.887284	14.51771	T = 7.57

Table 9: Cross-correlation table

Variables	WM	WI	Grant	MoV	Tax_Rev	Income	Unemp	Density	Young	Senior
WM	1.000									
WI	-0.036 (0.000)	1.000								
Grant	0.249 (0.000)	-0.121 (0.000)	1.000							
MoV	0.045 (0.000)	-0.023 (0.002)	-0.023 (0.002)	1.000						
Tax_Rev	0.696 (0.000)	-0.007 (0.330)	0.209 (0.000)	0.007 (0.321)	1.000					
Income	-0.053 (0.000)	-0.002 (0.743)	-0.464 (0.000)	0.043 (0.000)	0.131 (0.000)	1.000				
Unemp	0.265 (0.000)	0.065 (0.000)	0.360 (0.000)	-0.037 (0.000)	0.076 (0.000)	-0.690 (0.000)	1.000			
Density	0.275 (0.000)	-0.072 (0.000)	0.110 (0.000)	0.056 (0.000)	0.134 (0.000)	0.115 (0.000)	0.043 (0.000)	1.000		
Young	-0.088 (0.000)	-0.111 (0.000)	-0.017 (0.014)	0.017 (0.022)	-0.232 (0.000)	-0.020 (0.004)	-0.048 (0.000)	0.154 (0.000)	1.000	
Senior	0.052 (0.000)	0.040 (0.000)	0.149 (0.000)	-0.035 (0.000)	0.158 (0.000)	-0.200 (0.000)	0.180 (0.000)	-0.231 (0.000)	-0.792 (0.000)	1.000

Note: The significance level of each correlation coefficient is reported in parentheses.

## 9.1 Validity of Continuity-based RDD

To check the validity of RDD, we first test the continuity of the score density around the cutoff. We implement the McCrary (2008) manipulation density test where the null hypothesis is that there is no manipulation of the density at the cutoff. Failing to reject the null offers evidence supporting the validity of the RDD.

Figures 9, 10, 11 and table 10 show that we can not reject the null neither on the total sample nor on the subsamples<sup>54</sup>.

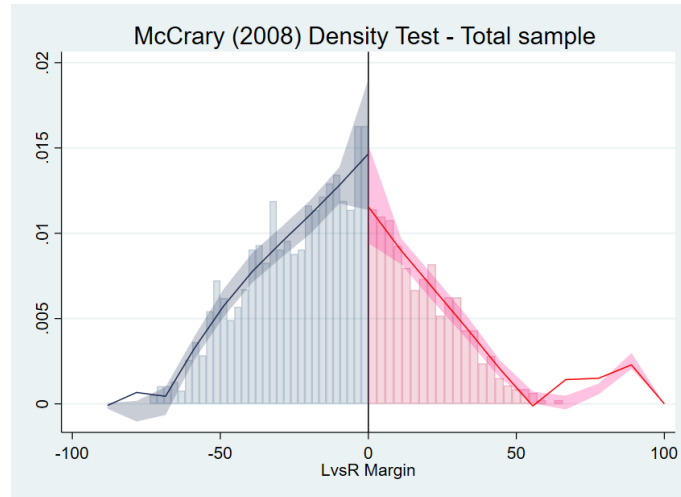


Figure 9

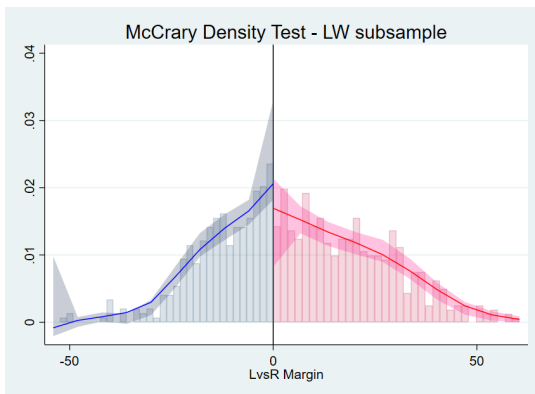


Figure 10

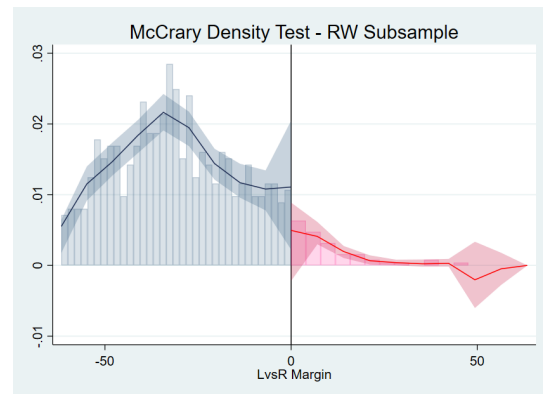


Figure 11

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<sup>54</sup>Recall that we split the total sample according to the mayor's party in the previous municipal election in 2008.

Table 10: RD manipulation test using local polynomial density estimation

Running variable: LvsR Margin. 2014 elections	Total Sample	LW Subsample	RW Subsample
T	-1.129	-0.979	-1.450
p-value	0.259	0.327	0.147
Observations	1,626	907	718
Polynomial order	2	4	3

We use a triangular Kernel with MSE-optimal bandwidth.  
Subsamples respectively LW and RW in 2008 elections.

Next, we test the null treatment effect on predetermined covariates. Table 11 shows that the predetermined covariates do not differ systematically at the cutoff.

Table 11: Balance tests on covariates.

	LW Subsample		RW Subsample	
	RD coefficient	p-value	RD coefficient	p-value
Centrality	-0.027	0.572	-0.176	0.250
Mountain	-0.033	0.551	0.060	0.693
Touristic	0.007	0.881	0.147	0.403
Tax_Rev	0.045	0.516	0.187	0.314
Elderly	-0.107	0.148	-0.015	0.945
Density	-0.027	0.930	0.562	0.254
Young	0.012	0.646	-0.054	0.607
Income	0.048	0.144	-0.062	0.377
<i>N</i>	907		718	

Sharp RDD using local linear regression and a triangular Kernel with MSE-optimal bandwidth.  
Running variable: LvsR Margin in 2014 municipal elections.  
Subsamples respectively LW and RW in 2008 elections.

Table 12: Sensitivity to bandwidth. Outcome: Municipal wage bill. Running variable: LvsR margin. LW Subsample. 2014-2016 period with covariates.

BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
5	0.074	[-0.007;0.175]	288+213
8	0.056 <sup>+</sup>	[0.001;0.156]	402+345
MSE-optimal=10.30	0.058*	[0.016;0.127]	486+441
15	0.030*	[0.014;0.134]	678+606
20	0.014 <sup>+</sup>	[0.002;0.110]	836+765
30	0.004	[-0.014;0.077]	983+1086

Table 13: Sensitivity to bandwidth. Outcome: p.c. Grant. Running variable: LvsR margin. LW Subsample 2014-2016 period without covariates.

BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
8	-0.060 <sup>+</sup>	[-0.139;-0.003]	402+345
12	-0.067	[-0.120;0.001]	555+501
MSE-optimal=17.37	-0.059*	[-0.110;-0.016]	771+681
20	-0.056 *	[-0.117;-0.017]	837+765
25	-0.051*	[-0.109;-0.018]	942+936

Table 14: Sensitivity to bandwidth. Outcome: p.c. Grant. Running variable: LvsR margin. RW Subsample. 2014-2016 period with covariates.

BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
5	0.106 **	[0.067;0.208]	105+54
10	0.071**	[0.044;0.188]	189+99
MSE-optimal=14.61	0.059 <sup>+</sup>	[0.001;0.130]	306+117
20	0.049 <sup>+</sup>	[0.001;0.134]	444+132
25	0.045	[-0.007;0.122]	582+138



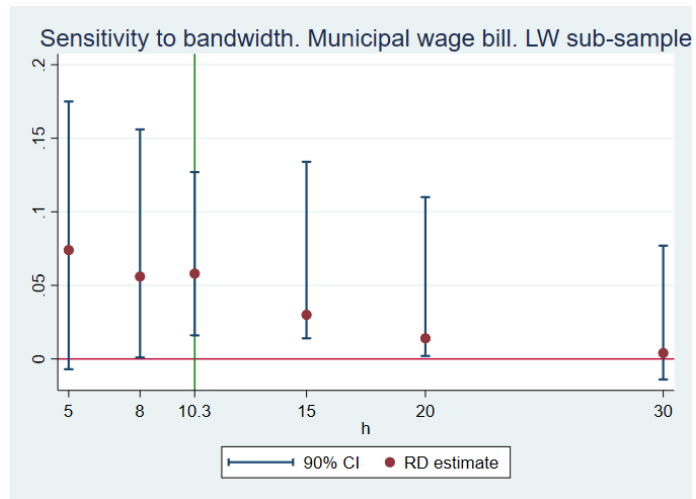


Figure 12

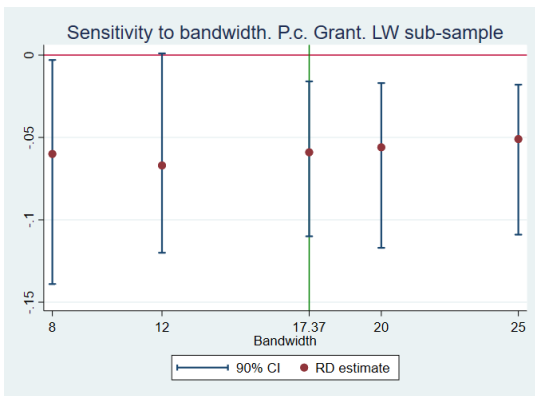


Figure 13

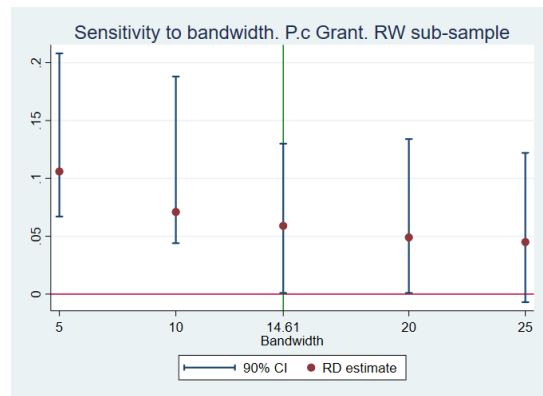


Figure 14

Table 15: Placebo cutoffs. Outcome: Municipal wage bill. Running variable: LvsR margin. LW Subsample. 2014-2016 period with covariates.

Alternative cutoff	MSE-optimal BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
-3	14.48	-0.019	[-0.065;0.030]	588+669
-2	11.50	0.007	[-0.035;0.068]	492+546
-1	14.48	-0.017	[-0.063;0.037]	633+651
0	10.30	0.058	[0.016;0.127]	486+441
1	14.43	0.013	[-0.032;0.074]	663+579
2	17.24	-0.013	[-0.061;0.038]	768+660
3	19.70	-0.017	[-0.066;0.030]	873+738

Table 16: Placebo cutoffs. Outcome: p.c. Grant. Running variable: LvsR margin. LW Subsample. 2014-2016 period without covariates.

Alternative cutoff	MSE-optimal BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
-3	13.80	0.033	[-0.019;0.083]	561+642
-2	11.04	-0.074	[-0.133;-0.038]	462+525
-1	15.11	-0.052	[-0.106;-0.010]	657+654
0	17.37	-0.059	[-0.110;-0.016]	771+681
1	22.92	-0.025	[-0.071;0.019]	933+858
2	16.43	-0.001	[-0.039;0.051]	735+636
3	16.40	0.008	[-0.026;0.055]	756+609

Table 17: Placebo cutoffs. Outcome: p.c. Grant. Running variable: LvsR margin. RW Subsample. 2014-2016 period with covariates.

Alternative cutoff	MSE-optimal BW	RD estimate	Bias-corrected and robust 90% CI	Effective observations
-3	12.82	-0.010	[-0.055;0.046]	273+153
-2	12.79	0.018	[-0.030;0.079]	267+144
-1	15.35	0.016	[-0.029;0.070]	330+132
0	14.61	0.059	[0.001;0.130]	306+117
1	9.81	-0.070	[-0.199;0.016]	201+81
2	13.41	-0.046	[-0.128;0.012]	264+93
3	16.87	0.020	[-0.039;0.069]	324+102

Tables 15, 16 and 17 examine treatment effects at placebo cutoff values for our two outcomes. They show that there is no evidence of discontinuity away from the cutoff in tables 15 and 17 confirming that we can be confident in our RDD results. However, table 16 calls for caution in the interpretation.

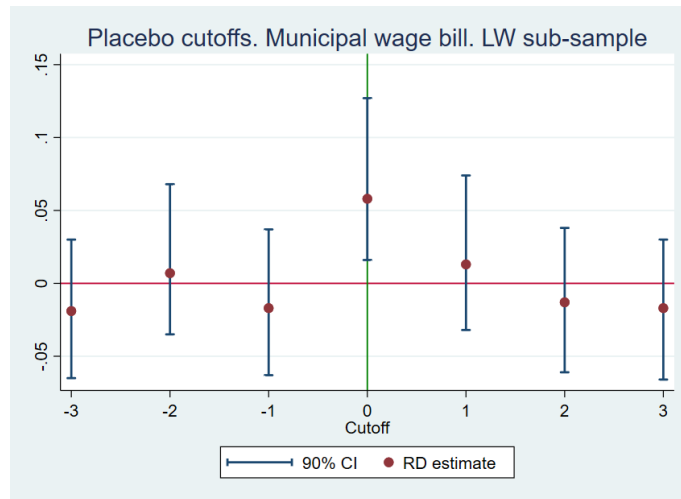


Figure 15

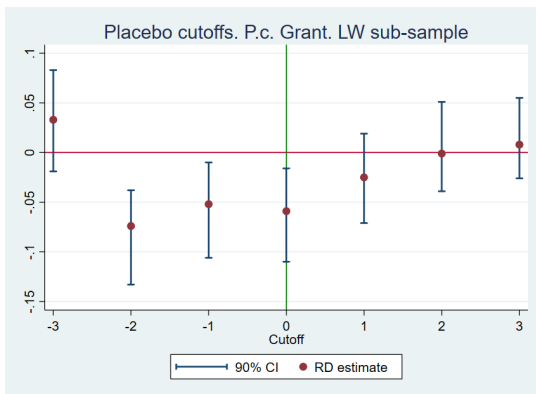


Figure 16

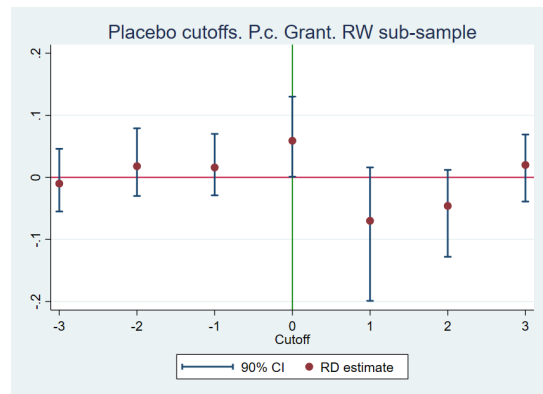


Figure 17

## 9.2 Grant formula

Table 18: Dependent variable: total grant (in log). Testing the grant formula.

	2011	2012	2013	2014	2015	2016	2017	2018
Pop (in log)	1.069*** (0.00911)	1.067*** (0.00893)	1.063*** (0.00937)	1.079*** (0.00956)	1.119*** (0.0186)	1.129*** (0.0309)	1.220*** (0.0486)	1.227*** (0.0551)
Centrality	0.156*** (0.0142)	0.157*** (0.0140)	0.174*** (0.0147)	0.183*** (0.0149)	0.246*** (0.0289)	0.332*** (0.0482)	0.469*** (0.0756)	0.543*** (0.0849)
Tourist	0.215*** (0.0218)	0.216*** (0.0216)	0.200*** (0.0228)	0.236*** (0.0233)	0.306*** (0.0456)	0.422*** (0.0763)	0.365*** (0.120)	0.485*** (0.134)
Land_area	-0.000233 (0.000248)	-0.000149 (0.000244)	-0.000227 (0.000257)	-0.000112 (0.000260)	-0.000206 (0.000505)	-0.0000761 (0.000843)	-0.0000720 (0.00132)	-0.000128 (0.00150)
Land_area_Mount	0.00232*** (0.000563)	0.00223*** (0.000555)	0.00208*** (0.000583)	0.00219*** (0.000591)	0.00290* (0.00115)	0.00377* (0.00191)	0.00593* (0.00299)	0.00727* (0.00336)
Tax_Rev (in log)	0.237*** (0.0185)	0.224*** (0.0185)	0.309*** (0.0184)	0.143*** (0.0203)	-0.0470 (0.0401)	-0.365*** (0.0673)	-0.704*** (0.106)	-0.948*** (0.123)
Income (in log)	-0.819*** (0.0577)	-0.804*** (0.0575)	-0.954*** (0.0610)	-0.912*** (0.0618)	-1.100*** (0.118)	-1.403*** (0.194)	-1.896*** (0.302)	-2.082*** (0.336)
Unemp (in log)	0.0963* (0.0402)	0.137*** (0.0400)	0.0456 (0.0429)	0.109* (0.0445)	0.0409 (0.0876)	0.0805 (0.148)	0.0181 (0.229)	0.136 (0.253)
Young	-0.120+ (0.0626)	-0.124* (0.0617)	-0.0608 (0.0640)	-0.132* (0.0652)	-0.196 (0.125)	-0.142 (0.206)	-0.389 (0.320)	-0.378 (0.360)
Elderly	0.0548* (0.0253)	0.0660** (0.0254)	0.0814** (0.0269)	0.0925*** (0.0277)	0.119* (0.0546)	0.288** (0.0935)	0.448** (0.149)	0.464** (0.168)
Regional Dummies	yes	yes	yes	yes	yes	yes	yes	yes
$N$	2,606	2,606	2,604	2,607	2,607	2,607	2,605	2,600
$R^2$	0.912	0.914	0.906	0.903	0.721	0.487	0.330	0.299

Standard errors in parentheses. OLS estimation. +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .  
Because of missing values the number of observations varies across years.

Table 19: Testing for the difference in p.c grant according to mayor’s party.

	student t	p-value
2011	1.87	0.0305
2012	1.86	0.0311
2013	2.08	0.0190
2014	2.51	0.0061
2015	3.30	0.0005
2016	4.17	0.0000
2017	4.88	0.0000
2018	5.29	0.0000

H0: LW and RW grants are equal.  
H1: LW grant is larger than RW grant.

### 9.3 Relevance of the IMC wage bill instrument

We investigate whether a change in a municipality’s neighborhood in terms of the IMC wage bill has an impact on the wage bill of the IMC to which the municipality belongs. To do so, we proceed as if the change in the environment resulted from a treatment and follow the Difference-in-Differences approach. The treatment is defined as the shift from a sober (low wage bill) to a lavish (large) IMC neighborhood. We consider a subsample comprising 360 municipalities whose IMC neighborhood in 2011 is below the first quartile of the instrument distribution, and observed in 2011 (before the treatment) and in 2018 (after). The control group brings together those 122 municipalities which remained below the first quartile in 2018. The treated group is composed of 238 municipalities that shifted in 2018 from below the first to above the third quartile. Table 20 gives the results of the diff-in-diff estimation. The coefficient of the interaction term *Lavish\*2018* is highly statistically significant, confirming the change in the municipality environment matters.

Table 20: Dependent variable: IMC wage bill (in log). Relevance of the instrument.

	IMC wage bill
$d_{2018}$	-0.880*** (0.203)
Lavish	-0.543** (0.206)
Lavish* $d_{2018}$	1.289*** (0.236)
cons	-1.819*** (0.172)
$N$	719
<i>Cities</i>	360
$R^2$	0.049

Robust standard errors in parentheses. DiD estimation.

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Table 21: First stage regressions of model (5). Endogenous regressors:  $WI$ ,  $G$ ,  $G_{1418}$

	$WI$	$G$	$G_{1418}$
$\overline{WI}$	0.8555*** (0.0518)	0.0762*** (0.0100)	0.0585*** (0.0124)
$\overline{G}$	0.2148*** (0.0529)	0.0154 (0.0295)	-0.7171*** (0.0414)
$\overline{G_{1418}}$	-0.1531*** (0.0414)	0.0937*** (0.0121)	0.8705*** (0.0196)
Exogenous regressors	yes	yes	yes
Regional dummies	yes	yes	yes
$N$	18,002	18,002	18,002
Cities	2,527	2,527	2,527
$R^2$	0.2016	0.4120	0.8384
Under-identification			
$SW\chi^2(1)$	491.68 (p=0.00)	285.45 (p=0.00)	587.26 (p=0.00)
Endogeneity test			
$\chi^2(1)$	63.57 (p=0.00)	3.84 (p=0.0502)	3.40 (p=0.065)

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . IV- FE estimation.

Standard errors clustered at the municipality level.

All variables in logarithm except dummies.

Table 22: Dependent variable: Municipal wage bill. Further explorations of political effects on model (5).

	(1)	(2)	(3)
<i>WI</i>	-0.0219** (0.00788)	-0.0219** (0.00788)	-0.0219** (0.00788)
Grant ( <i>G</i> )	0.102** (0.0320)	0.102** (0.0321)	0.103** (0.0321)
Grant* <i>d</i> <sub>1418</sub>	-0.0387*** (0.00548)	-0.0387*** (0.00552)	-0.0389*** (0.00552)
<i>RW</i>	-0.0164* (0.00660)	-0.0161* (0.00677)	-0.0164* (0.00680)
<i>MoV</i>	-0.00453** (0.00155)	-0.00448** (0.00157)	-0.00188 (0.00286)
<i>d</i> <sub>2013</sub>	0.0158*** (0.00461)	0.0177** (0.00548)	0.0163*** (0.00364)
<i>d</i> <sub>2014</sub>	-0.00877 (0.00569)	-0.00877 (0.00572)	-0.00897 (0.00570)
<i>d</i> <sub>2013</sub> * <i>RW</i>	0.00102 (0.00444)		
<i>d</i> <sub>2013</sub> * <i>MoV</i>		-0.000535 (0.00168)	
<i>MoV</i> <sup>2</sup>			-0.000809 (0.000824)
Control Variables	yes	yes	yes
Regional Dummies	yes	yes	yes
<i>N</i>	18,002	18,002	18,002
<i>Cities</i>	2,527	2,527	2,527
<i>R</i> <sup>2</sup>	0.0918	0.0917	0.0914

Standard errors (clustered at the municipal level) in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Control variables: Tax-Rev, Income, Unemp, Density, Young, Elderly.

IV-FE estimation. All variables are in logarithm except dummies.

Table 23: Dependent variable: Municipal wage bill. Electoral cycle all year dummies on models (5) and (6).

	model (5')	model (6')
<i>WI</i>	-0.0236* (0.00977)	-0.0236* (0.00977)
Grant ( <i>G</i> )	0.185* (0.0886)	0.185* (0.0889)
Grant* <i>d</i> <sub>1418</sub>	-0.129** (0.0409)	-0.130** (0.0410)
<i>RW</i>	-0.0143+ (0.00731)	
<i>MoV</i>	-0.00477** (0.00163)	
<i>MoV</i> * <i>RW</i>		-0.00643** (0.00211)
<i>d</i> <sub>2012</sub>	0.00387 (0.00347)	0.00390 (0.00346)
<i>d</i> <sub>2013</sub>	0.0201** (0.00738)	0.0201** (0.00739)
<i>d</i> <sub>2014</sub>	-0.140** (0.0526)	-0.141** (0.0527)
<i>d</i> <sub>2015</sub>	-0.130** (0.0479)	-0.130** (0.0478)
<i>d</i> <sub>2016</sub>	-0.143** (0.0490)	-0.144** (0.0489)
<i>d</i> <sub>2017</sub>	-0.129** (0.0455)	-0.130** (0.0454)
<i>d</i> <sub>2018</sub>	-0.148** (0.0450)	-0.149*** (0.0449)
Control Variables	yes	yes
Regional Dummies	yes	yes
<i>N</i>	18,002	18,002
<i>Cities</i>	2,527	2,527
<i>R</i> <sup>2</sup>	0.0787	0.0782

Standard errors (clustered at the municipal level) in parentheses.

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Control variables: Tax-Rev, Income, Unemp, Density, Young, Elderly.

IV-FE estimation. All variables are in logarithm except dummies.