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Public spending interactions and local politics. Empirical evidence from French municipalities

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Abstract This paper aims at testing whether there exist spending interactions between French municipalities by estimating a dynamic panel data model. Our results suggest that there are some interactions between neighbouring municipalities as regards primary and investment expenditures. A positive relationship between municipalities' wage bill and unemployment rates is likely to stress a rise of temporary employment in those municipalities that suffer from social troubles. Further, the estimation results show that these interdependences also exist between cities whose mayors have the same partisan affiliation. Finally, our results confirm the opportunistic behaviour of local governments, which increase all categories of public spending in pre-electoral periods

Keywords Spending interactions · France · Local government · Dynamic panel data

JEL Classification D72 · H2 · H7

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1 Introduction

Fiscal federalism literature has grown rapidly over the last ten years, improving our understanding of important issues regarding the relationships between governments at the same level or between different government tiers. In particular, the bulk of this literature has emphasized the problem of externalities concerning any decentralized governmental structures. Externalities arise whenever the existence of a multi-tiered government structure is considered and jurisdictions choose some tax or regulation policy autonomously. In this case, the expenditure or tax setting decisions of a given jurisdiction can affect the fiscal choices of other governments positively or negatively. These externalities are called "horizontal" when interactions occur at the same government level or "vertical" if they concern two different governmental tiers.

Most of the theoretical papers deal with "horizontal externalities" that are mainly due to the mobility of taxpayers and to information asymmetries between voters and their representatives in a world where policymakers do not behave cooperatively. The focus of these papers is mainly on tax setting. When tax bases are mobile, a policy action chosen by a jurisdiction affects the budget constraint of another jurisdiction, through a policy-driven flow of resources between jurisdictions, leading to strategic interactions in local fiscal choices. These fiscal games typically give rise to inefficient taxation. In the case of horizontal tax competition, taxes are inefficiently low as each policymaker neglects the benefit of an expanded tax base that other policymakers enjoy when it raises its tax rate (for a survey, see, for instance, Wilson 1999) and drive the tax base out. Externalities also arise whenever information asymmetries between voters and politicians exist. In such a setting, an action chosen by a politician in one jurisdiction affects the informational set of imperfectly informed voters in other jurisdictions. If voters use the performance of other governments as a benchmark, decreasing taxation in one jurisdiction may induce neighboring politicians to do the same in order not to be signaled as bad incumbents. This informational externality may therefore yield fiscal mimicking forms of behavior. As far as economic efficiency is concerned, yardstick competition has beneficial effects either in encouraging revenue-maximizing Leviathans to tilt tax rates toward their efficient level, or in signaling to voters the quality of their representatives (Salmon 1987; Besley and Case 1995a, 1995b).

A number of empirical studies showed the relevance of the theoretical literature on fiscal strategic interactions (for an empirical survey, see, for instance, Brueckner 2003). Generally speaking, observed tax rates in one jurisdiction positively depend on tax rates set in neighboring jurisdictions, leading to the conclusion that tax rates are "strategic complements". These empirical results were obtained using European subnational governments datasets (for example, Heyndels and Vuchelen 1998, in Belgium; Buettner 2001, in Germany; Feld and Reulier 2005, in Switzerland; Bordignon et al. 2003, in Italy; Solé-Ollé 2003, in Spain, and Feld et al. 2002, in France), as well as using US States and Canadian provincial datasets (for example Brett and Pinske 2000, in Canada or Brueckner and Saavedra 2001, or Shughart and Tollison 1991, in the US). Some papers, however, estimate reaction functions for taxes using OECD countries' datasets (see Besley et al. 2001; Devereux et al. 2002; Altshuler and Goodspeed 2002).

Indeed, most of the empirical literature estimates reaction functions for taxes. However, local governments are also concerned about how their expenditures compare with those of their neighbors. The reasons behind this behavior are broadly the same as for tax rates. One reason may be the fear of driving away taxpayers or attracting recipients from other states, if their social benefits are too generous. Another reason concerns "yardstick competition" and, more generally, the existence of spending spillover effects on neighboring jurisdictions.

There are a few papers, that focus explicitly on the public expenditure side. Exceptions are papers written by Case et al. (1993), Figlio et al. (1999), Baicker (2001) and Redoano (2003, 2007). Most of these papers are based on US datasets. For instance, Case et al. (1993) estimate the effect of one state's spending on that of its neighbors using a spatial lag model. The authors find that states' per capita expenditures are positively and significantly correlated with their neighbors' spending. These results are confirmed by Figlio et al. (1999), who check the existence of spillovers in welfare spending. Baicker (2001) also finds that each dollar of state spending causes spending in neighboring states to increase by 37 to 88 cents. Finally, Redoano (2003) estimates reaction functions for taxes, public expenditures, both aggregated and disaggregated, using a dataset including EU countries for the period 1985–1995. She finds that governments behave strategically with respect to those expenditures that are more directly comparable, such as expenditures in education: An increase by one dollar spent in education by the neighbors increases the same expenditure in a country by over 40 cents.

Following this literature, the purpose of this paper is to test the existence of interactions related to public expenditures between the biggest French municipalities (over 50,000 inhabitants), using a dynamic panel dataset covering the period 1983–2002. This issue is particularly interesting for at least three reasons. First, there are very few papers dealing with fiscal interactions using French fiscal data, because of a well-known and important lack of information provided by the administration. Further, none of these papers has so far used panel data (the exception being Feld et al. (2002) who use business taxation data but at the regional level). Secondly, to our knowledge, no empirical papers test the existence of local spending interactions in a dynamic model in order to take into account the high level of persistency in public expenditures.[1] Finally, most of the previous studies have been carried out using data covering federal countries. Conversely, France is a unitary country and one may expect that, despite the 1982–1983 decentralization laws, fiscal interactions between municipalities would remain modest. This paper shows that it is not the case and that some interactions take place among neighbouring municipalities with respect to primary and investment expenditures. Further, our estimation results show that these interdependences also exist between cities whose mayors have the same partisan affiliation. However, yardstick competition does not seem to explain these spending interactions. Our estimation results also show a positive relationship between municipalities' wage bill and unemployment rates that may be interpreted as a rise of temporary employment in those municipalities that suffer from social troubles. Temporary employment is likely to be used to pay for the 'social peace' in the red districts of these cities. Finally, our results confirm the opportunistic behavior of local governments, which increase all categories of public spending in pre-electoral periods.

The paper is structured as follows. Section 2 briefly reviews the main empirical studies using French data, emphasizing that most of them are based on cross-sectional datasets and only account for tax interactions. Section 3 presents the empirical test based on a panel data set of French municipalities (over 50,000 inhabitants) for the period 1983–2002. The empirical framework and the econometric procedure are detailed in Sect. 4. Results are presented in Sect. 5. Finally, Sect. 6 concludes.

[1] Veiga and Veiga (2007) include the lagged value of the dependent variable to explain respectively total, capital and investment expenditures of the Portuguese municipalities but they do not test the existence of spatial dependence in their decisions.

2 Is there evidence of tax mimicking behavior between French local governments? An overview

France is usually considered as a unitary country even if the different layers of local government have a great deal of fiscal autonomy. The structure of local government is broadly composed of three tiers. The lowest tier of local government is made up of 36,600 municipalities (of which 75% have less than 5,000 inhabitants). The middle-tier is made up of 96 departments. Finally, 22 regions are at the highest level of local government. Each level of local government sets its own tax rate on a common tax base for a large range of local direct taxes, which account for 75% of local tax revenues. The local business tax (the so-called "Taxe Professionnelle", TP) is the major source of tax revenue for local governments as it accounts for approximately 45% of revenue from direct local taxes (its tax base includes a number of items, including the rental value of buildings, the rental value of investment (assumed to be equal to 16% of the cost of the investment) and a share of gross salaries paid to employees[2]).

Hence, it is not surprising that empirical tests are mainly concerned with the local business tax. Empirical analysis has been carried out using regional, departmental and municipal data. The work by Feld et al. (2002) attempts to show the existence of mimicking behavior in 22 French regions over the 1986–1998 period.[3] The authors suppose that regional tax policy depends on a non-weighted average of taxes in the geographically neighboring regions, that is, the regions sharing borders. According to their results, local tax rates are significantly and positively influenced by the tax rates of neighboring regions. The local business tax seems to be the regional tax, which causes the highest degree of mimicking. In the short run (long run), an increase by one point of the TP rate in the neighboring communities of a given region translates into an increase of 0.225 (0.6) points of the same tax rate in the region considered. Conversely, the property tax seems to be subject to a much weaker mimicking behavior, the estimated coefficient is 0.081 in the short run and 0.29 in the long run. Thus, generally speaking, these results tend to show that regional tax rates are strategic complements. Feld et al. (2002) explain this phenomenon in terms of political competition as, in contradiction with the results of fiscal competition models, the regional rates in France have increased over the period considered.

Another paper (Leprince et al. 2007) deals with both horizontal and vertical interactions focusing on the departmental (or *county*) level. Cross-sectional data are gathered for a sample of 93 departments for 1999. The authors test the hypothesis according to which departments' tax rates depend on regional tax rates, on the average municipal tax rates and on the neighboring departments' tax rates. They first reject the hypothesis of tax interactions between French departments and regions, the two upper levels of local governments. They then provide evidence that business tax interactions among departments are significant. Finally, they conclude that including the vertical dimension in the estimated model does not lead to a decrease in the horizontal tax interactions parameter, nor to its non-significance.

[2]The reform initiated in 1999 was aimed at progressively suppressing the wage share of the TP base in order to encourage employment so that the TP is expected to rely only on capital by 2004.

[3]For instance, the elected politicians of the Ile de France consider the behavior of the Haute-Normandie, the Picardie, the Champagne-Arde imponnes, Bourgogne and Centre with respect to taxation, in order to define their own policy. As the average is non-weighted, none of the relevant regions has more influence than the others on the fiscal choices of the Ile de France.

By way of contrast, the main purpose of Charlot and Paty (2007) is to assess the existence of tax interdependencies between French municipalities by taking into account agglomeration forces. They therefore estimate a model of tax setting for the local business tax using spatial panel data for the period 1993–2003. They observe significant mimicking behaviour between jurisdictions when the latter choose their local business tax rate, and vertical interactions between municipalities and regions.

3 Is municipality spending influenced by the spending of competing municipalities?

As discussed in the previous section, the literature has mainly focused on empirical studies addressing tax competition. However, no empirical research has investigated the existence of strategic interactions among French municipal governments with regards to their spending decisions.

3.1 Dataset

Our dataset includes 90 municipalities with a population higher than 50,000 inhabitants at the beginning of the study period, that is in 1983[4] (see Table A1 in the Appendix for the set of municipalities). For homogeneity reasons, we excluded Paris since the French capital town is both a municipality and a department. Hence, we cannot determine for Paris whether public spending occurs through a municipal or a departmental decision process. The data sample includes 90 municipalities over a period of 20 years (1983–2002) and gathers 1800 observations in pooled series. Over this period, we observe three electoral cycles: 1983–1989, 1989–1995 and 1995–2001.

Two kinds of information are collected, the first being both budgetary and local public finance data for each town and each year available from the French Data Census of the Ministry of Finance. For a unbiased comparison between municipalities, we used a deflator index, provided by the OECD and called the implicit price index of final consumption expenditures of public administration. We considered also the annual unemployment rate for each local authority as another economic variable. Indeed, according to the theory of political business cycles,[5] the unemployment rate is likely to reflect the economic performance of local authorities. Table A2 (see Appendix) provides summary statistics.

Political data are the second kind of information that we considered to test the existence of partisan political budget cycles. In this regard, we considered for each municipality the partisan affiliation of the coalition government according to the classical binary index (left-wing or right-wing majority) at the municipal level. Another traditional point of view is to assume that municipal office holders try to manipulate the electoral agenda by increasing public spending before elections and, by lowering them during the year after the election. We have thus set up dummy variables for the election year, the year before the election, and the year after the election. In a previous empirical work, Binet and Pentecote (2004) also found an opportunistic use of local public spending in France for 883 municipalities.

[4]None of these municipalities' populations have fallen below this threshold since then.

[5]For an overview of recent literature on local political business cycles, see Blais and Nadeau (1992), Rosenberg (1992), Strate et al. (1993), Bhattacharyya and Wassmer (1995), Kneebone and McKenzie (2001), Petterson-Lidbom (2001), Galli and Rossi (2002), Besley and Case (2003), Coelho et al. (2006), and Veiga and Veiga (2007).

3.2 French local politics

French municipal elections are held every 6 years. The ballot is a mixed system combining a proportional list and a two-round majority system. To avoid the absence of a majority (which can occur under some circumstances), a complex system of calculation between the two rounds enables the transformation of votes into seats according to a nonlinear mechanism. A bonus of 50% of available seats is granted to the first ranked list. The formation of a new political assembly occurs with elected members (named "conseil municipal") whose number depends on the size of the population. The size of French municipal councils varies between 9 and 163 elected officials. Once the municipal council is elected, the mayor is designated by a vote among municipal officials. For small municipalities,[6] the mayor is the person who receives the most votes on the list. For larger municipalities (more than 3,500 inhabitants), the mayor is elected according to the majority rule among the elected municipal council members.

By matching the national election results with municipal election outcomes, we notice that municipal election outcomes follow an opposite trend with respect to previous legislative or presidential outcomes, with the exception of the 1989 elections when both general and local elections were won by left-wing parties (Auberger and Dubois 2005). In a sense, municipal elections do regularly act as a referendum for the newly elected government. We observed another interesting trend in this period, which concerns the electoral outcome. Since 1977, French local governments (at least for municipalities with more than 50,000 inhabitants) have won narrower electoral victories (in terms of vote percentages). From about 57.6% in 1983, the elected local governments have received an average outcome of 52.6% in 2001. Only the 1995 election has recorded an average outcome for right-wing municipal majorities below the threshold of 50% (39 municipalities have elected a right-wing local government with 48.35% of the votes).

3.3 Structure of local public expenditure

French municipalities experienced a huge change at the beginning of the 1980s. Indeed, the decentralization process initiated in March 1982 and January 1983 greatly modified the budgetary choices of local authorities as they are now responsible for providing new public policies like urban infrastructures, economic and social policy, health policy, pupils transport, first degree education and school equipment, and culture policy. Before the decentralization laws, municipalities were in charge of general affairs (elections, administrative and civil registration, first degree education since the Ferry Law in 1881, local safety and roads maintenance). As a result of decentralization, the transfer of new competencies has led municipalities to increase their tax receipts and to benefit from a higher level of public transfer from the central government.

Our sample provides useful information on local public finance. Per capita municipal spending (in real terms) shows an increasing trend. Between 1983 and 2002, total local spending has been multiplied by 600% and capital expenditures have increased by about 500% (Fig. 1) while French per capita GDP has increased by 40% only. Comparing the evolution of public spending of French municipalities and the evolution of public spending of all public administration authorities, we observe a huge difference as the latter have increased expenditures by 80% only (60% for capital spending). Starting from the first

[6] Recall that France is composed of about 34,760 municipalities of less than 5,000 inhabitants and 2000 municipalities over 5,000 inhabitants.

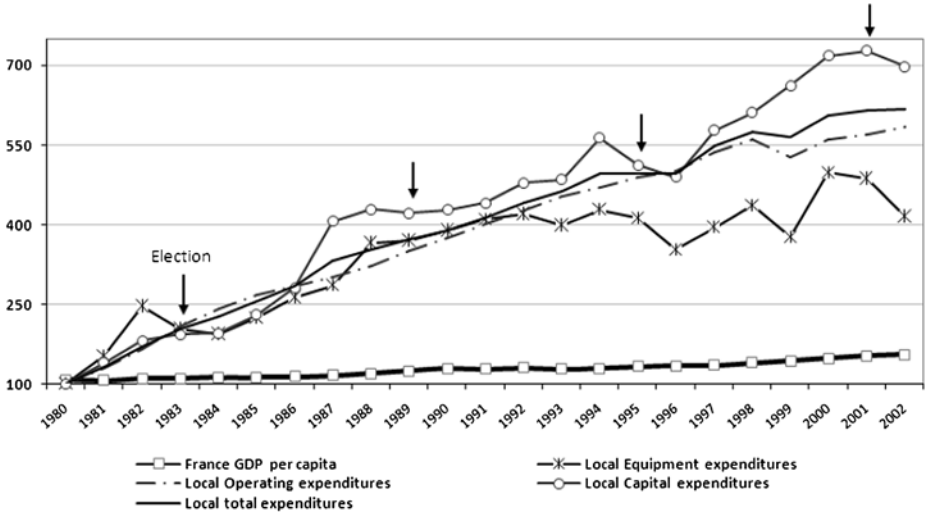

Fig. 1 Expenditures trends and electoral municipal cycle (data expressed in base 100 for 1980 year)

process of decentralization in 1983, we observe an accelerating increase of capital spending. These expenditures (investment) were largely financed by government borrowing up to the early 1990s. After that period, the rate of annual change has been more discontinuous because cuts in capital expenditures were necessary to diminish the tax pressure in larger French municipalities.

The fiscal structure of French municipalities has to be analyzed by distinguishing capital from current expenditures. Indeed, as depicted in Fig. 2, these two types of expenditures have not evolved in the same direction throughout the time period considered. Even if the shares of both capital and current expenditures are stable, Fig. 2 illustrates the fact that current expenditures account for about 60 to 80% of overall local spending.

As put forward by Drazen and Eslava (2003), voters and incumbents may prefer different types of government expenditures. For instance, incumbents try to influence voters by changing the composition of government spending, rather than the total level of public spending. In this perspective, Kneebone and McKenzie (2001) found no evidence of a political budget cycle for Canadian provinces with respect to aggregate spending. However, they found a budgetary cycle for capital expenditures (what they call "visible expenditures"), mostly investment expenditures such as construction of roads and heavy infrastructures. Owing to the decentralization process that occurred in France in 1982 and 1983, which consisted in transferring some competencies from the central government to local governments, the amount of investment expenditures has increased in the 1980s and the 1990s to become a strategic tool in the hands of local officials for attracting corporate activities and households. Consequently, the influence of capital expenditures is expected to be spatially correlated. The same result is expected for current expenditures with a strategic electoral purpose as such expenditures have an impact in the short run that is consistent with the opportunistic budget cycle.

Finally, it is interesting to note that there is a trend for an opportunistic political business cycle during the three municipal legislatures. Figure 3 shows the average annual change of each kind of municipal public expenditure. Both the election year (year 1 on the horizontal axis) and the year before the election (year 6) show a significant increase in capital expendi-

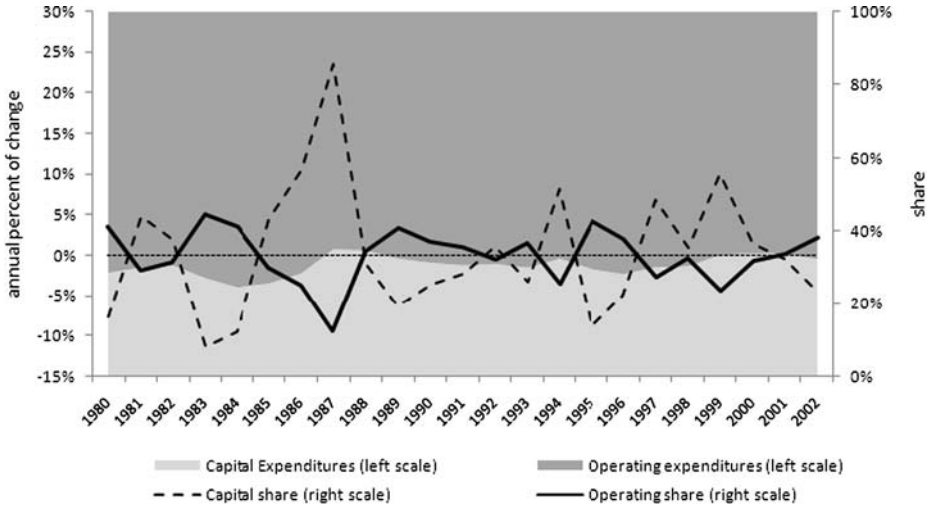

Fig. 2 Local public expenditures structure (1983–2002)

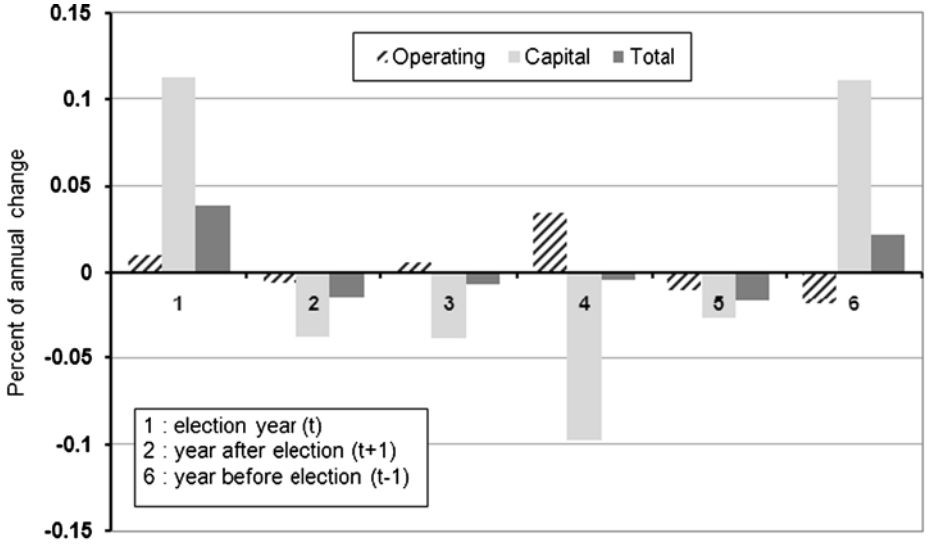

Fig. 3 Annual change of local spending according to the year of the municipal electoral cycle (1983–2001)

tures. Hence, an opportunistic cycle of capital expenditures exists, as the trend is decreasing the year after election (−3.8% on average). A similar trend can be observed for local aggregate expenditures but to a lesser extent than for capital expenditures. This means in turn that the current expenditure cycle does not have all the properties characterizing an opportunistic cycle. Indeed, current expenditures increase during the election year but decrease strongly during the year before the election and slightly decrease in the year after the election. This justifies the introduction of dummy variables for the years around the election period. Another important point concerns the weak variance of current expenditures throughout the

electoral cycle. In other words, current expenditures (mainly wages) are less sensitive to electoral periods than capital expenditures, which are used for financing tangible assets that have to be implemented at the beginning of the cycle. We should not forget that some years (1984 and 1997) are characterized by the transfer of new financial responsibilities to local governments and by the implementation of a stability pact for local government finance. This shock was a common denominator for all French municipalities.

4 Empirical framework and econometric procedure

As the aim of this paper is to test the existence of spending interactions among municipalities, we have to consider spatial dependence in a panel data framework. In line with the earlier literature (see, e.g., Devereux et al. 2002; Solé-Ollé 2003; Dreher 2006), we assume that a municipality's policy reaction function can be written down as follows:

$$Z_{i,t} = R_i(Z_{j,t}, X_{i,t}),$$

where $Z_{i,t}$ is the vector of public expenditures in a municipality i at time t. $Z_{j,t}$ is the vector of public spending in the set of the other municipalities j $(j \neq i)$ at time t, and $X_{i,t}$ is the vector of the socio-economic characteristics of municipality i at time t. We then replace vector $Z_{j,t}$ by a weighted average, such as $\sum_{j \neq i} w_{ij} Z_{jt}$, which implies that every municipality responds in the same way to the weighted average expenditures. The equation then becomes:

$$Z_{i,t} = \alpha_i + \rho W Z_{j,t} + \beta X_{i,t} + \varepsilon_{i,t}. \quad (1)$$

As suggested by Anselin (1988), an a priori set of interactions has to be defined and then tested. While a variety of weighting schemes may be explored to allow different patterns of spatial interaction, a scheme that assigns weights based on Euclidean distance or contiguity is commonly used in the relevant empirical literature. In the tax competition literature, jurisdictions are likely to take into account capital flight to the neighboring communities induced by an increase in its own tax rate. In the yardstick competition literature, residents consider neighboring jurisdictions—on which they are likely to get better information—as a yardstick to compare the performance of their incumbent.

Following the relevant empirical literature, we have chosen a common geographical definition of neighborhood based on the Euclidean distance between jurisdictions.[7] This scheme is given by the weight matrix W^d and imposes a smooth distance decay, with weights w_{ij} given by $1/d_{ij}$ where d_{ij} is the Euclidian distance between jurisdictions i and j for $j \neq i$.

Secondly, we define a political weight matrix W^{Pol} based on the partisan affiliation of mayors. The value 1 is assigned when both mayors of municipality i and municipality j have the same partisan affiliation, zero otherwise. There is a strong stability of partisan affiliation in most municipalities on the three electoral periods considered (1983–1989, 1989–1995 and 1995–2003). Sixty out of the 90 cities kept the same partisan affiliation during the whole period of our study. For the remaining 30 cities, as the weight matrix has to remain the same during the whole period in order to estimate a coefficient of spatial correlation,

[7] An alternative way of considering weights is based on a contiguity matrix, where the value 1 is assigned if two jurisdictions share the same border and zero otherwise. We could not use this matrix because our jurisdictions do not necessarily share a border.

we have considered the mayor's partisan affiliation that remains the same during two of the three electoral periods (see Case et al. 1993, for as discussion on weight matrices). Both weight matrices are standardized so that the elements in each row sum to one.

There are two econometric issues raised by the presence of the dependent variable on the right-hand side of (1).

First, if localities do react to each others' spending choices, then neighbours' spending decisions are endogenous and correlated with the error term (ε). OLS (ordinary least squares) yields a biased estimate of parameter ρ (Anselin 1988). Basically, two approaches exist for getting consistent estimates of the spatial parameter ρ in (1). The first approach is based on an instrumental variables (IV), two-stage least squares (2SLS) method. It consists in finding variables that are correlated with neighbours' spending fiscal choices but uncorrelated with the error term. The IV approach suggests the use of the weighted average of neighbours' exogenous or control variables, (WX), as instruments (Kelejian and Robinson 1993; Kelejian and Prucha 1998). Empirical studies that use the IV approach to estimate spatial coefficients are Ladd (1992), Kelejian and Robinson (1993), Brett and Pinske (2000), Heyndels and Vuchelen (1998), Figlio et al. (1999), Buettner (2001), and Revelli (2001). The second method is based on the maximum likelihood (ML). Under this method, a non-linear reduced form for (1) is computed by inverting the system. A non-linear optimization routine is then used to estimate the spatial coefficient ρ. Like the IV method, the ML approach also yields consistent estimates of the parameters of the equation (Brueckner 2003). Several papers use the maximum likelihood approach, e.g., Case et al. (1993); Besley and Case (1995a); Brueckner (1998) and Brueckner and Saavedra (2001). Revelli (2003) shows results from both IV and ML estimation techniques.

Secondly, if neighbors' localities are subject to correlated shocks, we may find a correlation between jurisdictions' spending choices. The omission of explanatory variables that are spatially dependent may generate spatial dependence in the error term, which is given by the following equation:

$$\varepsilon_{i,t} = \lambda W \varepsilon_{i,t} + \nu_{i,t}. \tag{2}$$

When spatial error dependence is ignored, estimation of (1) can provide false evidence of strategic interaction. To deal with this problem, one possible approach is to use ML to estimate (1), taking into account the error structure in (2). This method, which is implemented by Case et al. (1993), is computationally challenging (Brueckner 2003). This is not a problem anymore when using the IV method, which yields consistent estimations even with spatial error dependence (Kelejian and Prucha 1998). A last approach is to use the robust tests of Anselin et al. (1996). Based on OLS estimates of (1), these tests are not contaminated by uncorrected spatial error dependence and can properly detect the presence of spatial lag dependence. This approach is notably used by Brueckner (1998), Saavedra (2000), and Brueckner and Saavedra (2001).

Finally, following Devereux et al. (2002), Dreher (2006), Redoano (2007), Veiga and Veiga (2007), we include the lagged dependent variable $Z_{i,t-1}$ in order to take the autoregressive component of the time series into account. The system of equations can be written as follows:

$$\begin{aligned} Z_{i,t} = {} & \alpha_i + \gamma Z_{i,t-1} + \rho W Z_{j,t} + \beta_0 UnRate_{i,t} + \beta_1 Density_{i,t} + \beta_2 PA_i \\ & + \beta_3 Elec_{t-1} + \beta_4 Elec_t + \beta_5 Elec_{t+1} + \varepsilon_{i,t}, \end{aligned} \tag{3}$$

where:

$Z_{i,t}$ is the per capita expenditure of municipality i $(i \neq j)$ on year t,
$Z_{i,t-1}$ is the lagged value of our dependent variable,
$Z_{j,t}$ is the per capita public spending in the set of the other municipalities j $(j \neq i)$ at time $t-1$,
$UnRate_{i,t}$ is the annual rate of unemployment in municipality i in year t,[8]
$Density_{it}$ is the population density of jurisdiction i in year t,
PA_{it} is a dummy variable for partisan affiliation, which takes the value 1 if the local government i in year t belongs to a right-wing party and 0 otherwise,
$Elec_{t-1}$ is a dummy variable, which takes the value 1 the year before the election, and zero otherwise,
$Elec_t$ is a dummy variable, which takes the value 1 for each election year, and zero otherwise and
$Elec_{t+1}$ is a dummy variable, which takes the value 1 the year after the election, and zero otherwise.

As the previous estimators are likely to be inconsistent when including the time-lagged dependent variable in the regression (Devereux et al. 2002; Dreher 2006; Redoano 2007), the GMM estimator developed by Arellano and Bond (1991) in addition to the IV estimator of the spatial coefficient (ρ) is more appropriate here. The GMM estimator first-differences the estimating equation and uses lags of dependent variables from at least two periods earlier as well as lags of the right-hand side exogenous variables as instruments. The validity of the instruments used in the regressions is evaluated with two different statistics. The Sargan test (or overidentifying restriction test) examines the hypothesis that the instruments are not correlated with the residuals. The second test is the test proposed by Arellano and Bond (1991). This test examines the hypothesis that the residuals from the first-differenced estimating equation are not second-order correlated. Both statistics are necessary to confirm the validity of the instruments used.

However, as there is some persistence of expenditures, it may be appropriate to estimate system-GMM (Veiga and Veiga 2007). Basically, Blundell and Bond (1998) show that this extended GMM estimator is preferable to that of Arellano and Bond (1991) when the dependent variable, the independent variables, or both are persistent. If the level of an explanatory variable is correlated with the fixed effects but its first-differences are not, lagged values of the first-differences can be used as instruments in the equation in levels (Arellano and Bover 1995). Lagged differences of the dependent variable may also be valid instruments for the levels equations. The Sargan test indicates whether the system-GMM is preferable to the GMM that only includes the first-differenced equations.

5 Results

Our estimation strategy is as follows. We first estimate (3) using OLS without taking into account the possible influence of the expenditures set by other jurisdictions ($\rho = 0$) and without taking into account the lagged value of our dependent variable ($\gamma = 0$). The estimations results are shown in Table A3. Columns 1 to 4 show the OLS estimation results of the model without fixed effects and without spatial lag for four types of expenditures:

[8] This was computed as an average of local quarterly rate.

primary expenditures (i.e., current expenditures and capital expenditures altogether, excluding interest payments and capital debt), current expenditures (excluding interest payments), wage expenditures and investment expenditures (excluding capital debt). We then run the appropriate spatial tests based on the Lagrange Multiplier, which indicate the presence of spatial lag dependence for some categories of spending (not for wages) but not the existence of spatial error dependence.[9] We also test the fixed effects spatial lag model against the spatial lag model without fixed effects using the usual Fisher's test. We keep the former as the Fisher's test leads us to reject the spatial lag model without spatial (or municipal) fixed effects (see F test in Table A3). Finally, the Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the coefficients estimated by the consistent fixed effects estimator. As we obtain significant p-values for any spending category (see H test in Table A3), we may reject the model with random effects.

Secondly, we estimate (3) using ML and taking into account the possible influence of the expenditures set by other jurisdictions ($\rho \neq 0$) but without taking into account the lagged value of our dependent variable ($\gamma = 0$). The estimation results are shown in Tables A4 and A5 in Appendix. Columns 1a to 2b in Table A4 show respectively the regression results of the model with spatially lagged dependent variable and with spatial (or jurisdiction) fixed effects using the ML method for primary expenditures and current expenditures and with respect to both weight matrices based respectively on geographic proximity W^d and on political proximity W^{Pol}. Finally, columns 3a to 4b in Table A5 show respectively the regression results of the model with spatially lagged dependent variables and with spatial (or jurisdiction) fixed effects using the ML method for wages and investment expenditures and with respect to both weight matrices based respectively on geographic proximity W^d and on political proximity W^{Pol}.

Finally, we estimate (3) taking into account the possible influence of the expenditures set by other jurisdictions ($\rho \neq 0$) and the lagged value of our dependent variable ($\gamma \neq 0$). Tables 1 and 2 show the estimation results of this dynamic using the distance decay matrix and the political matrix for each category of public spending (primary and current expenditures in Table 1 and salaries and investment expenditures in Table 2). We include the lagged dependent variable, because municipality expenditures are likely to change only slowly over time (Veiga and Veiga 2007). As the previous estimators are likely to be inconsistent when including the lagged dependent variable in the regression and as there is some persistence of expenditures, we estimate the extended GMM estimator[10] as suggested by Blundell and Bond (1998) in addition to the IV estimator of the spatial coefficient (ρ). As for the neighbours' spending decisions, following Devereux et al. (2002) and Redoano (2007), we use the weighted average of neighbours' control variables, i.e., their socio-economic characteristics (WX), as instruments.

Four main results can be put to the fore. As Tables 1 and 2 show, the lagged endogenous variable ($Z_{i,t-1}$) is always significant and takes a positive sign in all specifications. As the coefficients on lagged public spending provide an estimate γ varying between 0.287 and 0.772, the first point to note is the relatively high level of persistency in wages. As in Veiga and Veiga (2007), this result confirms both the consistency of the autoregressive specifica-

[9] We compute the robust LM test statistics for spatial lag dependence and for spatial error dependence (see Anselin et al. 2007). Results depend on the weighting scheme, either W^d or W^{Pol}.

[10] The Sargan test indicates that the system-GMM is preferable to the GMM that only includes the first-differenced equations.

Table 1 GMM estimation results (1)

	(1a)	(1b)	(2a)	(2b)
Dependent var.	Primary expenditures		Operating expenditures	
Estimation method	GMM	GMM	GMM	GMM
Weighting scheme	W^d	W^{Pol}	W^d	W^{Pol}
Lagged dep. var. ($Z_{i,t-1}$)	0.287*** (0.005)	0.306*** (0.002)	0.377*** (0.006)	0.445*** (0.004)
$WZ_{j,t}$	0.370*** (0.000)	0.367*** (0.000)	0.277 (0.360)	0.221 (0.220)
Unemployment rate	0.009* (0.064)	0.012* (0.069)	0.025* (0.053)	0.019* (0.060)
Pop. density	−0.014 (0.318)	−0.010 (0.496)	−0.012 (0.432)	−0.006 (0.554)
Partisan affiliation	0.033 (0.145)	0.021 (0.365)	0.026 (0.303)	0.012 (0.491)
Election year ($t-1$)	0.004** (0.033)	0.008** (0.044)	0.001* (0.085)	0.010* (0.082)
Election year (t)	−0.002 (0.680)	−0.003 (0.779)	0.001 (0.937)	0.002 (0.854)
Election year ($t+1$)	−0.014** (0.038)	−0.009** (0.039)	−0.006** (0.026)	−0.002** (0.036)
Intercept	0.330** (0.037)	0.193 (0.265)	0.284 (0.139)	0.211 (0.223)
Arellano Bond test (p-value)	0.709	0.794	0.331	0.169
Sargan test (p-value)	0.432	0.169	0.242	0.378
Observations	1710	1710	1710	1710

Variables are in log except for dummies. Probability values are given into brackets. Standard errors are estimated robustly. The lagged dependent variable is instrumented by lags of the dependent variable from at least two periods earlier as well as lags of the right-hand side exogenous variables

*Significant at 10%

**Significant at 5%

***Significant at 1%

tion in (3) and the hypothesis that municipal expenditures are likely to change slowly over time.

Let us now turn to the estimation results associated with the presence of spending interactions between French municipalities. As suggested by Case et al. (1993), there is no reason to assume that patterns of expenditures interdependence are identical for all categories of public spending. We thus estimate the model in (3) for every category of public spending, including a specific and more "visible" category of expenditures, that is, investment expenditures.

Result 1: There are some spending interactions between neighboring jurisdictions for the most "visible" category of expenditures (investment) and for the total primary expenditures. However, our results do not corroborate the existence of yardstick competition in municipal decisions.

As for the weighting scheme based on Euclidean distance (W^d), we find both a significant and positive sign for the coefficient associated with the neighboring municipalities' decisions in primary and investment expenditures. However, the estimation results do not confirm the existence of horizontal interactions in wages nor in current expenditures between French municipalities. This implies the existence of spending interactions between neigh-

Table 2 GMM estimation results (2)

	(3a)	(3b)	(4a)	(4b)
Dependent var.	Payroll		Investment expenditures	
Estimation method	GMM	GMM	GMM	GMM
Weighting scheme	W^d	W^{Pol}	W^d	W^{Pol}
Lagged dep. var. ($Z_{i,t-1}$)	0.754*** (0.000)	0.772*** (0.000)	0.326*** (0.000)	0.356*** (0.000)
$WZ_{j,t}$	0.177 (0.168)	0.163 (0.165)	0.630*** (0.000)	0.608*** (0.000)
Unemployment rate	0.030** (0.049)	0.032** (0.047)	−0.079** (0.029)	−0.110** (0.012)
Pop. density	−0.007 (0.256)	−0.005 (0.321)	−0.008 (0.683)	−0.005 (0.812)
Partisan Affiliation	0.001 (0.915)	0.002 (0.811)	0.041 (0.180)	0.020 (0.537)
Election year ($t-1$)	0.015** (0.046)	0.016** (0.045)	0.039** (0.037)	0.043** (0.018)
Election year (t)	0.028*** (0.001)	0.029*** (0.001)	−0.017 (0.428)	−0.024 (0.296)
Election year ($t+1$)	−0.003 (0.643)	−0.004 (0.588)	−0.058** (0.018)	−0.065*** (0.007)
Intercept	0.403*** (0.000)	0.364*** (0.000)	0.456 (0.114)	0.476* (0.098)
Arellano Bond test (p-value)	0.165	0.183	0.676	0.765
Sargan test (p-value)	0.162	0.285	0.259	0.297
Observations (20×90)	1710	1710	1710	1710

Variables are in log except for dummies. Probability values are given into brackets. Standard errors are estimated robustly. The lagged dependent variable is instrumented by lags of dependent variable from at least two periods earlier as well as lags of the right-hand side exogenous variables

*Significant at 10%

**Significant at 5%

***Significant at 1%

boring jurisdictions for the most "visible" category of expenditures (investment spending) and for the total primary expenditures (which include investment). For primary expenditures (column 1a in Table 1), the estimate takes a value of 0.370. This implies that an average primary spending increase of 10% in the neighboring municipalities induces an increase of around 3.7% in local primary expenditure. We find a higher coefficient (0.630) for investment expenditures (column 4b in Table 2) suggesting the existence of stronger interactions among municipalities with respect to investment. Notice that this result of horizontal spending interactions in the French jurisdictional case is close to those obtained in previous tests carried out in other countries (see Case et al. 1993; Figlio et al. 1999; Baicker 2001; Redoano 2007).

We investigate further interdependence in municipal spending choices in order to test the existence of yardstick competition. Yardstick competition occurs when citizens compare fiscal and spending decisions made by their incumbent with the neighbours' decisions (Salmon 1987; Besley and Case 1995a, 1995b). In this case, policymakers are particularly concerned about the neighbouring incumbents in the elections period and strategic interactions are likely to be stronger during the electoral period. A straightforward way of testing this hypothesis is to use the election cycle variables (Redoano 2007; Solé-Ollé 2003). Since French municipal elections are usually held every six years for all

local jurisdictions, we then include a variable that interacts the neighbours' spending decisions ($Z_{j,t}$) with the election year dummy ($Elec_t$) in order to test the hypothesis that interactions may be stronger in election periods. We also explore another possibility by interacting the year_before_election dummy with neighbours' spending decisions ($Elec_{t-1} * Z_{j,t}$). We find that the coefficients of the interaction between neighbours' spending decisions and the electoral dummies ($Elec_t * Z_{j,t}$) are positive, as expected, although never statistically significant for any weighting scheme (political and geographical weight matrices). The results shown in Tables A6 and A7 (using the election year dummy only) do not corroborate the existence of yardstick competition in municipal decisions.

Result 2: Spending interactions are also shown to exist between municipalities that share the same political affiliation.

We obtain a positive and significant parameter for the other municipalities' primary and investment expenditures weighted by political affiliation (W^{Pol}). This outcome suggests that spending interactions also exist between municipalities that have the same political affiliation. However, there is no evidence of ideological effects on the spending decisions, as the coefficient of the partisan affiliation is never significant. Left-wing municipalities do no set higher public spending than right-wing municipalities, but local incumbents who share the same ideology seem to react in the same way when they are confronted by common shocks. We thus confirm that local public finance is affected by political interactions between local jurisdictions.

Let us turn to the estimation results associated with the remaining explanatory variables.

Result 3: Temporary employment is likely to be used to pay for the 'social peace' (or to avoid social cohesion troubles) in the red districts of these cities.

We find a positive and significant sign for the parameter associated with the unemployment rate (*UnRate*) for three categories of expenditures: primary expenditures, current expenditures and wages. This implies that payroll, current and primary spending are higher in those municipalities that are confronted with unemployment. However, this variable has a negative impact on investment, suggesting that there is some substitution effect between current expenditures and investment expenditures in those municipalities that are confronted with unemployment. We thus find that local governments do not use investment expenditures to reduce unemployment within their constituencies. By contrast, increasing current expenditures represents an alternative to curb unemployment by accelerating temporary recruitment (i.e., hiring more public employees). This result strengthens the idea that local governments may marginally intervene in the local economy through a strategic use of current expenditures. It is interesting to note that French municipalities cannot freely hire civil servants. Indeed, a nationwide regulation sets the maximum number of civil servants according to the size of municipalities. In other words, the number of statutory positions should theoretically be the same as in the municipalities covered by our sample (municipalities over 50,000 inhabitants). Further, wages are expected to be the same across the whole territory (at least for those people having the same seniority and qualification). In short, municipalities have little room to maneuver with such statutory positions. As a result, finding a positive relationship between wages and unemployment rate may be interpreted as a rise of temporary employment in those municipalities that suffer from unemployment (a proxy for social difficulties). Temporary employment includes positions created in order to pay for the 'social peace' in the red districts of these cites (the riots, which broke out in 2005 in France were concentrated in the suburbs of the largest cities).

Result 4: There is evidence of an opportunistic behavior of local governments for all categories of public spending.

Dummies associated with election years indicate an opportunistic use (notably, an increase) of all categories of public spending during the year before the election. Moreover, primary, current and investment expenditures tend to decrease during the year after election. As observed by Kneebone and McKenzie (2001) and Veiga and Veiga (2007), we find strong evidence of a political budget cycle for investment expenditures, which are the most "visible expenditures". Indeed, we presume that among investment expenditures, only investment spending with a high discount rate will be selected by elected officials according to their electoral time horizon. Finally, the coefficient associated with density is negative although never significant.

6 Conclusion

The aim of this paper is to test the existence of spending interactions between a set of French municipalities by estimating a dynamic panel data model. Our results suggest that there are some interactions between neighboring municipalities with respect to primary and investment expenditures. Further, the estimation results show that these interdependences also exist between cities whose mayors have the same partisan affiliation. However, yardstick competition does not seem to explain these spending interactions. We finally find strong evidence of an opportunistic behavior of local governments for all categories of public spending.

By combining the strategic interactions literature and the theory of political business cycles, we confirm that local public finance is strongly affected by political interactions between local jurisdictions. This result has to be appreciated keeping in mind that French municipalities are supposed to be autonomous and less dependent from the centre since the inception of decentralization laws. By showing that municipalities having the same partisan affiliation react in the same way, we are able to conclude that local decision makers have a high degree of freedom when setting the level of investment expenditures. We also find that current expenditures on temporary employment are likely to be used to avoid social cohesion troubles in these cities. Finally, our estimation results reveal the opportunistic behavior of local governments who increase all categories of public spending in pre-electoral periods.

Further research work have to compare other kinds of expenditures to strengthen our results, namely by collecting some functional spending data (health, education, road infrastructures and so on) as done by Veiga and Veiga (2007). Another extension might analyse vertical strategic interactions between municipalities and upper-level governments (e.g., the intermediate level of government, the so-called departments and the regions) public spending choices.

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Appendix

Table A1 Set of municipalities

Marseille	Tours	Champigny s/Marne	La Seyne s/Mer
Lyon	Aix-en-Provence	Poitiers	Quimper
Toulouse	Metz	Colombes	Lorient
Nice	Villeurbanne	St-Maur-des-Fossés	Troyes
Strasbourg	Besançon	Bourges	Antony
Nantes	Caen	Calais	Mérignac
Bordeaux	Mulhouse	Asnières	Niort
Montpellier	Perpignan	La Rochelle	Charleville-Mézières
Rennes	Orléans	Béziers	Sarcelles
Saint-Etienne	Rouen	Dunkerque	Cholet
Le Havre	Nancy	Antibes	Chalon s/ Saône
Reims	Boulogne-Billancourt	Cannes	Beauvais
Lille	Roubaix	Aubervilliers	Chambéry
Toulon	Montreuil	Rueil-Malmaison	Ivry s/Seine
Grenoble	Argenteuil	Courbevoie	Maisons-Alfort
Brest	St-Denis	Villeneuve d'Ascq	Arles
Dijon	Versailles	Saint-Nazaire	Pessac
Le Mans	Avignon	Colmar	Chateauroux
Angers	Nanterre	Valence	Laval
Clermont-Ferrand	Vitry s/Seine	Neuilly s/Seine	Belfort
Limoges	Aulnay-sous-Bois	Drancy	Tourcoing
Amiens	Pau	Saint-Quentin	
Nîmes	Créteil	Vénissieux	

Table A2 Summary statistics

Variable	Obs.	min	max	mean	stand. dev.
Primary exp.	1800	249.72	6214.43	1276.61	528.75
Operating exp.	1800	198.45	3174.90	888.37	334.60
Payroll	1800	34.16	1391.48	415.67	162.33
Investment exp.	1800	25.15	1413.16	213.48	113.23
Unemploy. rate	1800	4.52	18.65	10.78	2.71
Pop. density	1800	2.58	377.68	51.97	57.30

Notes: expenditures are expressed in euros per capita

Unemployment rate is in percentage

Population density is in units of persons per square kilometer

Table A3 Estimation results with no spatial lag dependence

	(1)	(2)	(3)	(4)
Estimation method	OLS	OLS	OLS	OLS
Dependent var.	Primary Exp.	Operating Exp.	Payroll Exp.	Investment Exp.
Unemployment rate	0.049** (0.045)	0.092*** (<.0001)	0.165*** (<.0001)	−0.16*** (<.0001)
Pop. density	−0.013** (0.043)	−0.010* (0.094)	−0.018** (0.013)	−0.003 (0.756)
Partisan affiliation	0.066*** (<.0001)	0.054*** (<.0001)	0.023* (0.087)	0.093*** (<.0001)
Election year ($t-1$)	0.017 (0.353)	−0.010 (0.530)	−0.013 (0.498)	0.101*** (0.001)
Election year (t)	−0.036** (0.033)	−0.045*** (0.003)	−0.014 (0.427)	−0.011 (0.707)
Election year ($t+1$)	−0.064*** (0.001)	−0.047*** (0.002)	−0.017 (0.334)	−0.133*** (<.0001)
Intercept	6.249*** (<.0001)	5.843*** (<.0001)	5.038*** (<.0001)	5.182*** (<.0001)
Fixed effects	no	no	no	no
$\overline{R}^2$	0.605	0.656	0.562	0.216
LM test (spatial lag, W^d)	(0.049)	(0.051)	(0.150)	(0.045)
LM test (spatial lag, W^{Pol})	(0.003)	(0.063)	(0.142)	(0.011)
LM test (spatial error, W^d)	(0.503)	(0.762)	(0.821)	(0.235)
LM test (spatial error, W^{Pol})	(0.641)	(0.842)	(0.901)	(0.332)
F value	376.14***	409.77***	231.70***	55.25***
H test (p. value)	(0.00)	(0.00)	(0.00)	(0.00)
Observations (20×90)	1800	1800	1800	1800

All variables are log-transformed except for dummies. Probability values are given into parentheses

*Significant at 10%

**Significant at 5%

***Significant at 1%

Table A4 Estimation results with spatial lag dependence (1)

	(1a)	(1b)	(2a)	(2b)
Dependent var.	Primary expenditures		Operating expenditures	
Estimation method	ML	ML	ML	ML
Weight matrix	W^d	W^{Pol}	W^d	W^{Pol}
$WZ_{j,t}$	0.152 (0.208)	0.215*** (0.009)	0.122* (0.070)	0.172** (0.033)
Unemployment rate	0.124*** (0.000)	0.117*** (0.000)	0.234*** (0.000)	0.224*** (0.000)
Pop. density	−0.823*** (0.000)	−0.811*** (0.000)	−0.749*** (0.000)	−0.747*** (0.000)
Partisan affiliation	0.016 (0.168)	0.017 (0.135)	0.001 (0.928)	0.002 (0.844)
Election year $(t-1)$	0.013 (0.170)	0.012 (0.202)	−0.006 (0.498)	−0.005 (0.518)
Election year (t)	−0.023** (0.018)	−0.021** (0.032)	−0.021** (0.015)	−0.020** (0.023)
Election year $(t+1)$	−0.043*** (0.000)	−0.040*** (0.000)	−0.023*** (0.008)	−0.021*** (0.015)
Trend	0.048*** (0.000)	0.045*** (0.000)	0.050*** (0.000)	0.047*** (0.000)
Juris. fixed effects	yes	yes	yes	yes
$\overline{R}^2$	0.87	0.88	0.89	0.89
Log-likelihood	966.00	978.90	1152.12	1158.31
Observations	1800	1800	1800	1800

All variables are log-transformed except for dummies. Probability values are given into parentheses

*Significant at 10%

**Significant at 5%

***Significant at 1%

Table A5 Estimation results with spatial lag dependence (to be continued)

	(3a)	(3b)	(4a)	(4b)
Dependent var.	Payroll expenditures		Investment expenditures	
Estimation method	ML	ML	ML	ML
Weight matrix	W^d	W^{Pol}	W^d	W^{Pol}
$WZ_{j,t}$	0.063 (0.375)	0.111 (0.218)	0.110 (0.129)	0.185** (0.038)
Unemployment rate	0.231*** (0.000)	0.223*** (0.000)	−0.194*** (0.003)	−0.181*** (0.005)
Pop. density	−0.692** (0.000)	−0.682** (0.000)	−0.863** (0.000)	−0.814** (0.000)
Partisan Affiliation	−0.005 (0.646)	−0.005 (0.684)	0.031 (0.264)	0.036 (0.188)
Election year $(t-1)$	−0.013 (0.240)	−0.012 (0.268)	0.083** (0.000)	0.076** (0.002)
Election year (t)	−0.006 (0.540)	−0.005 (0.589)	−0.022 (0.344)	−0.020 (0.376)
Election year $(t+1)$	−0.007 (0.469)	−0.006 (0.517)	−0.120*** (0.000)	−0.111*** (0.000)
Trend	0.053*** (0.000)	0.050*** (0.000)	0.037*** (0.000)	0.034*** (0.000)
Jurisdiction fixed effects	yes	yes	yes	yes
$\overline{R}^2$	0.865	0.866	0.541	0.549
Log-likelihood	793.72	799.260	−604.09	−589.39
Observations	1800	1800	1800	1800

All variables are log-transformed except for dummies. Probability values are given into parentheses

*Significant at 10%

**Significant at 5%

***Significant at 1%

Table A6 GMM estimation results / yardstick competition test (1)

	(1a)	(1b)	(2a)	(2b)
Dependent var.	Primary expenditures		Operating expenditures	
Estimation method	GMM	GMM	GMM	GMM
Weighting scheme	W^d	W^{Pol}	W^d	W^{Pol}
Lagged dep. var. ($WZ_{i,t-1}$)	0.323** (0.019)	(0.001) 0.454***	0.315*** (0.007)	0.444*** (0.002)
$WZ_{j,t}$	0.360*** (0.000)	0.345*** (0.000)	0.257 (0.355)	0.234 (0.217)
$Elec_t * WZ_{j,t}$	0.002 (0.957)	0.001 (0.986)	0.157 (0.393)	0.008 (0.823)
Unemployment rate	0.010* (0.083)	0.014* (0.072)	0.023* (0.055)	0.013* (0.043)
Pop. density	−0.015 (0.325)	−0.014 (0.318)	−0.013 (0.431)	−0.008 (0.590)
Partisan affiliation	0.035 (0.161)	0.033 (0.345)	0.025 (0.322)	0.017 (0.505)
Election year ($t-1$)	0.004** (0.029)	0.007** (0.033)	0.003* (0.077)	0.003* (0.061)
Election year (t)	−0.002 (0.580)	−0.003 (0.980)	0.001 (0.992)	0.005 (0.808)
Election year ($t+1$)	−0.014** (0.035)	−0.008** (0.038)	−0.005** (0.021)	−0.003** (0.027)
Intercept	0.295* (0.079)	0.150 (0.406)	0.232 (0.261)	0.263 (0.212)
Arellano Bond test (p-value)	0.555	0.644	0.342	0.184
Sargan test (p-value)	0.332	0.161	0.251	0.369
Observations	1710	1710	1710	1710

Variables are in log except for dummies. Probability values are given into parentheses. Standard errors are estimated robustly. Lagged dependent variable is instrumented by lags of dependent variable from at least two periods earlier as well as lags of the right-hand side exogenous variables

*Significant at 10%

**Significant at 5%

***Significant at 1%

Table A7 GMM estimation results / yardstick competition test (2)

	(3a)	(3b)	(4a)	(4b)
Dependent var.	Payroll expenditures		Investment expenditures	
Estimation method	GMM	GMM	GMM	GMM
Weighting scheme	W^d	W^{Pol}	W^d	W^{Pol}
Lagged dep. var. ($WZ_{i,t-1}$)	0.755*** (0.000)	0.601*** (0.000)	0.296*** (0.000)	0.318*** (0.000)
$WZ_{j,t}$	0.186 (0.143)	0.160 (0.161)	0.668*** (0.000)	0.656*** (0.000)
$Elec_t * WZ_{j,t}$	0.111 (0.185)	0.069 (0.184)	0.030 (0.833)	0.024 (0.877)
Unemployment rate	0.028** (0.035)	0.051** (0.041)	−0.079** (0.019)	−0.112** (0.018)
Pop. density	−0.007 (0.258)	−0.007 (0.383)	−0.008 (0.687)	−0.005 (0.817)
Partisan Affiliation	0.001 (0.937)	0.001 (0.970)	0.043 (0.177)	0.024 (0.490)
Election year ($t-1$)	0.016** (0.045)	0.012** (0.039)	0.034** (0.047)	0.037** (0.015)
Election year (t)	0.047** (0.007)	0.021** (0.002)	−0.018 (0.540)	−0.015 (0.853)
Election year ($t+1$)	−0.003 (0.690)	−0.005 (0.588)	−0.053** (0.015)	−0.059** (0.012)
Intercept	0.346*** (0.000)	0.224* (0.083)	0.410 (0.165)	0.432 (0.160)
Arellano Bond test (p-value)	0.164	0.174	0.589	0.663
Sargan test (p-value)	0.158	0.209	0.201	0.136
Observations (20×90)	1710	1710	1710	1710

Variables are in log except for dummies. Probability values are given into parentheses. Standard errors are estimated robustly. Lagged dependent variable is instrumented by lags of dependent variable from at least two periods earlier as well as lags of the right-hand side exogenous variables

*Significant at 10%

**Significant at 5%

***Significant at 1%

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