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# Electoral Cycles in Public Expenditures: Evidence from Czech Local Governments

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## **Abstract:**

This paper analyzes local political cycle in Czech municipalities over the period between 1997 and 2013. We apply the system GMM and the difference GMM estimators to identify distortion in current and capital expenditures per capita in electoral and pre-electoral years, while focusing on various spending groups (infrastructure, leisure, housing, education, etc.). We also test specific effects of local governments' characteristics (partisanship, strength, experience). In general, municipalities increase capital spending (primarily on infrastructure, housing, leisure activities) and decrease current spending (administration) before elections. Rightist governments target leisure activities and save more on administration, whereas leftist governments target current spending on social services. Stronger governments and those with newly elected mayors have lower incentive to create an electoral cycle. Voters' involvement in local policies and also success of ruling local (and parliamentary) parties in national parliamentary elections diminish local electoral cycles.

**Keywords:** political cycle, local government expenditures, municipalities

**JEL:** H72, D72, R50

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# 1 Introduction

The political economics literature mostly relies on the fundamental premise that incumbent politicians seek for re-election and hence maximize their re-election probability or number of votes received (Persson and Tabellini 2000, Drazen 2000). Strategic fiscal or monetary policy in electoral or pre-electoral period may serve as an instrument to increase re-election, which consequently creates political budget cycle (PBC).

In the 1990s, first empirical studies on political cycles using local-government-level data emerged. This paper contributes to the empirical research on local political budget cycles by analyzing a very detailed budget structure and its electoral pattern in a post-communist country. We analyze expenditures of 205 Czech municipalities between the years 1997 and 2013, featuring 4 electoral years and 5 pre-electoral years. We focus not only on total current and capital expenditures, but we also disaggregate both total capital and total current expenditures into various groups, such as infrastructure, education, leisure, housing, environmental protection, social services, public safety and administration, to show which specific spending is targeted before elections. This level of disaggregation is unique compared to other studies of local political cycles (only Kneebone and McKenzie (2001) present advanced analysis using disaggregated data).

Additionally, we investigate effects of various local governments' characteristics on an electoral cycle across expenditure groups. This allows to uncover which local governments diminish or strengthen local political cycle in a municipality, and how specific local governments' characteristics affect composition of budget before election. We focus not only on partisan political cycles, which is relatively common in the literature, but we also analyze effects of strength and experience of local government, as well as municipality size and voters' responsiveness on local policies.

Following the literature (Akhmedov and Zhuravskaya 2004; Veiga and Veiga 2007; Drazen and Eslava 2010; Sakurai and Menezes-Filho 2010; Aidt et al. 2011), the model is estimated by the system and the difference generalized method-of-moments (GMM) estimators, which are suitable for analyses of panel data with few time periods and many individuals.

We have found that municipalities decrease current expenditures and increase capital expenditures before elections. Local politicians primarily target infrastructure, leisure and housing before elections. Increase in spending is partly compensated by savings on current spending on administration. In addition, leftist governments tend to also increase current spending on social services before elections, while rightist governments boost even more capital spending on leisure activities (together with governments with mayors from non-parliamentary parties) and save on administration. Municipalities with stronger governments have much lower incentive to create electoral cycle; on the contrary, municipalities where mayors are more experienced involve in political cycle to a greater extent compared to governments when mayors are newly elected, but with increasing number of terms mayors are in office, the distortion of spending in favor of opportunistic behavior decreases (at least for some specific spending groups).

Exploiting the fact that national elections take place in the same year as local elections, we introduce two novel variables; one measuring voters' responsiveness to local policies and the other uncovering spillover effect from national elections to local electoral cycle. The voters' responsiveness is measured by the dissimilarity in results between national elections and local elections. We have found that politicians have lower incentive to distort spending when voters are more responsive and probably more involved in local policies, and also if the mayor's party expects success in national elections.

The paper is structured as follows: Section 2 provides a brief survey of local PBC literature, Section 3 presents the methodology, Section 4 introduces Czech municipalities and the data used, Section 5 presents estimation results and Section 6 concludes.

## 2 A brief survey of local political budget cycles

The model by Rogoff and Sibert (1988) explains the responsiveness of rational voters to distorted policies before elections by asymmetric information, considering that voters do not have information on the policy-maker's competence (ability to provide more public goods). In pre-electoral period, policy-makers demonstrate their competence by higher public spending. Visibility and a narrower group of targeted voters make local public spending very effective in signaling the policy-maker's competence, hence very relevant for analyzing any pre-electoral distortions.

Analyses of the political cycle for local governments mainly focus on expenditures as local governments often do not have much discretion over tax decisions. Rosenberg (1992) was among the first studies providing empirical evidence that incumbents increase spending in the pre-electoral period. Nevertheless, using data for cities in Israel, he found out that incumbents running for reelection increase spending less than those not running for reelection. Baleiras and Costa (2004) proved the political cycle in spending for Portuguese municipalities. Akhmedov and Zhuravskaya (2004) analyzed monthly spending data for Russian regions and found sizeable political cycles. They point out to the importance of gathering the data so frequently due to the fact that political cycles are short-lived. Tellier (2006) tested for political cycles in public expenditures in Canadian provinces, and found that governments act opportunistically when they have lower chances of winning the next election.

Geys (2007) focused on local public debt in Flemish municipalities and found evidence of the political cycle. He additionally pointed out that fragmented governments tend to get involved more in political cycles because their re-election is more uncertain. Aidt et al. (2011) analyze mutual relationship between opportunistic behavior in pre-electoral expenditures and chances for reelection in Portuguese municipalities, they have concluded that incumbents behave more opportunistically when their win-margin is small. Foremny et al. (2014) and Furdas et al. (2015) analyzed German municipalities. Foremny et al. (2014) studied overlapping political cycles of public expenditures in executive and legislative elections, while Furdas et al. (2015) estimated separate effects of budgetary changes before state elections and local elections (two government tiers) and found increase in building investments before both elections.

Several studies focus more on the spending composition. Kneebone and McKenzie (2001) are among the first who analyzed composition of expenditures in a greater detail. They found that politicians in Canadian provinces target expenditures that are highly visible to the electorate, such as education, roads, recreation and culture, while decreasing spending on health, social services and industrial development. Veiga and Veiga (2007) found that Portuguese municipalities change their composition favoring investment spending. On the contrary, Sakurai and Menezes-Filho (2010) uncovered decrease of investment expenditures in electoral years in Brazilian municipalities. Drazen and Eslava (2010) provide a theoretical model of the political cycle in which incumbents try to gain votes by changing public spending composition towards spending which is more beneficial for voters. Rational voters respond to these changes, considering they reflect the incumbent's preference for this type of spending and expect its high level also in post-electoral period. The

authors found evidence of this effect for Colombian municipalities, which also increase spending on infrastructure (including road construction and construction of power and water plants) before elections.

Recently, factors determining magnitude of the local political budget cycle have been analyzed: Baskaran et al. (2015) found that fiscal institutions that create soft budget constraint may generate political budget cycle for Israeli municipalities; Aidt and Mooney (2014) analyzed how different suffrage regimes in London Metropolitan Boroughs in the period 1902–1937 affect political cycle; Benito et al. (2013) analyzed the effect of the balanced budget rule for Spanish municipalities.

Local political budget cycle in Czech municipalities was explored in Sedmihradská et al. (2011) for the period of 2001–2007. They indicate that capital spending increases before municipal elections, replacing current spending. However, this increase does not pay off to incumbents in terms of their re-election probability. The current paper provides more advanced analysis of political cycles; more electoral years are included, data are analyzed on disaggregated level and effects of various local governments' characteristics are analyzed.

### 3 Methodology

We will estimate empirical relationships using econometric techniques employed for the dynamic panel models. The basic model for local political cycle to be estimated is:

$$y_{it} = \sum_{j=1}^P \alpha_j y_{it-j} + \sum_{k=1}^L \beta_k x_{k,it} + \gamma \cdot Election + \nu_i + \varepsilon_{it}, \quad (1)$$

where  $y_{it}$  is a given spending in municipality  $i$  at time period  $t$ ,  $p$  denotes the number of lags of the dependent variable,  $x_{k,it}$  is a  $k$ -th control variable,  $Election$  is the dummy variable equal to 1 when  $t$  is electoral year and 0 otherwise,  $\nu_i$  is a specific municipality effect and  $\varepsilon_{it}$  is the error term. Additionally, the election dummy in interactions with some exogenous variables will be included among controls as well as the pre-election dummy and its interactions to uncover effects also for one year before elections. Hence, the basic model has been modified to:

$$y_{it} = \sum_{j=1}^P \alpha_j y_{it-j} + \sum_{k=1}^L \beta_k x_{k,it} + \sum_{m=1}^N \delta_m z_{m,it} + \gamma \cdot Election + \sum_{m=1}^N \eta_m \cdot Election \cdot z_{m,it} + \eta \cdot Pre-election + \sum_{m=1}^N \zeta_m \cdot Pre-election \cdot z_{m,it} + \nu_i + \varepsilon_{it}, \quad (2)$$

where  $z_{m,it}$  denotes a  $m$ -th control variable that is used in interaction with the election and the pre-election dummy.

To estimate the model, we employ the difference and the system generalized method-of-moments (GMM) estimators which were developed for analyzes with few time periods and many individuals. In our case, we have many cross sections (205 municipalities), but only a few time periods (17). The GMM is performed in two steps: in the first step, the GMM is run with an arbitrary covariance matrix ( $\Omega$ ), and in the second step, the residuals from the first step are used to construct a proxy for  $\Omega$  and the GMM estimation is run again. The final two-step estimator is then efficient and robust to whatever patterns of heteroskedasticity and cross correlation (Rood-

man 2009). This two-step estimator however produces downward biased standard errors when the number of instruments is large (Arellano and Bond 1991), therefore, we use the small-sample correction of standard errors suggested by Windmeijer (2005).

When applying the difference GMM estimator (developed by Arellano and Bond 1991), we remove the fixed effect  $\nu_i$  such that we differentiate (1) and then estimate the differentiated equation by the feasible GMM; levels of lagged variables serve as instruments. However, if the dependent variable is persistent over time, the difference GMM estimator performs poorly, as past levels do not predict future changes (Blundell and Bond 1998). Blundell and Bond (1998) develop the system GMM estimator where instead of transforming regressors to get rid of the fixed effect, they transform instruments (difference them) to make them exogenous to the fixed effects (Roodman 2009). We prefer to use the system GMM estimator and we apply the difference GMM estimator, as well as the biased OLS within groups estimator as a robustness check.

In our estimations, we instrument endogenous and predetermined variables (independent of current disturbances but influenced by past ones) with several lags (around 4 to 7 lags are included). We test for the validity of the instruments using the Hansen  $J$ -statistic as it is superior to the Sargan test (Roodman 2009), nevertheless we are aware of the fact that it is weakened by using many instruments. We follow the rule of thumb saying that the number of instruments should not exceed the number of individual units. We also use Difference-in-Hansen test to test validity of instruments for levels equation based on lagged differences of the dependent variable. Additionally, we perform the Arellano and Bond autocorrelation test of the error  $\epsilon_{it}$  which may reveal that some lags are invalid instruments. To estimate the model, we use the Stata command `xtabond2` (Roodman 2009).

## 4 Data

We perform the analysis for 205 Czech municipalities over the period 1997–2013. These municipalities constitute a specific administrative tier in the Czech government since 2003 and are called municipalities of extended scope. Our analysis starts in 1997 when major economic reforms to market economy from the early 1990s have been completed and covers the second and later municipal elections in the Czech Republic (1998, 2002, 2006, 2010).

### 4.1 Municipalities

There are 6,248 municipalities in the Czech Republic in 2013 and each municipality falls into a district controlled by a municipality of extended scope, i.e. each municipality of extended scope administers a district comprising on average 30 other municipalities and represents the central town in the district. The population of a municipality of extended scope thus constitutes a relatively large share of the total population in the district it administers. In total, all 205 municipalities of extended scope amount to 45% of total population in the Czech Republic. Municipalities of extended scope were created in the framework of administrative decentralization reform aimed at handing over the competencies of former 75 territorial districts (dissolved) to 205 municipalities of extended scope.<sup>1</sup>

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<sup>1</sup>Before 2000, there were three tiers of government in the Czech Republic: the central government, 76 district authorities, and 6,242 municipalities. The district authorities were mostly decentralized bodies of state administration that served as intermediaries between the central government and municipalities and supervised the municipalities' delegated powers. The decentralization reform proceeded in two steps: In the first stage, 14 new regional gov-

Each municipality exercises its independent competencies (provision of primary schools and kindergartens, primary health care, local police, fire brigade, public utilities, territorial planning, maintenance of local roads, and garbage collection), and in addition, a municipality of extended scope exercises also delegated powers (administration of official documents, water and waste management, environmental protection, management of forestry, provision of local transport, roads maintenance, payment of social benefits and social care services).

Each municipality has many powers concerning the expenditure side of the budget, but it cannot influence to a greater extent its revenue side, decentralization on the side of revenues being in the Czech Republic negligible. A municipality may influence its property tax and set various fees it collects, but revenues from fees and property tax amount on average to only 8% of the total consolidated revenues of a municipality. Hence, analysis of political budget cycle is relevant for spending decisions and not for tax setting behavior.<sup>2</sup>

In general, municipal budget has to be balanced: therefore, any pre-electoral increase in spending should be compensated by an increase in revenues (higher fees, property sale or higher effort to get more subsidies), otherwise a temporary deficit would be created. Hence, the pre-election period is more likely to change the spending composition; politicians may target more visible expenditures, while depressing less visible expenditures.

Each municipality has its municipal government, its members directly elected every four years. Timing of municipal elections is fully exogenous and the elections take place on the same day in all the municipalities. Municipal elections covered by the dataset took place in autumn 1998, 2002, 2006, and 2010. Municipal government elects the mayor, vice-mayor and other members of the municipal council, executive body of municipal government. The mayor does not have many powers to act independently, the municipal council being mostly responsible for municipal decision-making. It is the council who issues municipal legislative acts and who operates a municipal budget. The council may however entrust the mayor with the power to act independently in some matters. Additionally, the mayor may suspend a decision of the council and let the municipal government to decide.

## 4.2 Expenditures and revenues in electoral and non-electoral years

Table 1 presents the average capital and current spending in electoral and non-electoral years. We disaggregate the total capital and current spending to several groups relevant for the analysis of political cycles. To get more homogeneous dataset we analyze the data per capita (following for example Veiga and Veiga 2007, Sakurai and Menezes-Filho 2010, Aidt et al. 2011, Baleiras and Costa 2004).<sup>3</sup> The data on expenditures and revenues are taken from the databases of the

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ernments (NUTS 3 level) were established in 2000 and acquired a wide range of responsibilities from the national level. In the second stage, 76 district authorities were dissolved in 2003, and the bulk of their responsibilities (approx. 80%) passed to the 205 municipalities of extended competence (the rest passed to the regional governments). (Stastna and Gregor 2015)

<sup>2</sup>In general, the municipalities revenues consist of tax revenues, non-tax revenues, capital revenues and subsidies. The municipal tax revenues are essentially statewide tax revenues redistributed by the rules for budgetary allocation of tax revenues (representing on average 35% of the total consolidated revenues in the municipality budget over 2001–2013). Other tax revenues include the above-mentioned property tax revenues and municipal fees. The non-tax revenues include mainly revenues from municipality business, rents, gifts, interests and loans repaid; the capital revenues are the revenues from property sales (land, buildings, capital shares); finally, municipalities receive subsidies from the state budget (central authorities, mainly ministries) and regional budgets (regional governments) representing approximately 40% of the total consolidated revenues over 2001–2013.

<sup>3</sup>When analyzing data per capita we have 3,468 observations instead of 3,485, as population is not available for a few observations.



Czech Ministry of Finance (ARIS, UFIS, Monitor), all the financial data are adjusted for inflation with the base year 2005, the total current spending is net of administrative spending and other mandatory spending (social care payments, educational transfers for schools between 2001–2004).<sup>4</sup>

Table 1: Expenditures per capita in electoral and non-electoral years

|   | Current spending |               | Capital spending |               |
|---|------------------|---------------|------------------|---------------|
|   | Electoral        | Non-electoral | Electoral        | Non-electoral |
| Urban transportation and infrastructure | 0.866            | 0.851         | 0.995            | 0.801         |
| Water management                        | 0.135            | 0.116         | 0.721            | 0.702         |
| Education                               | 1.331            | 1.325         | 0.593            | 0.575         |
| Leisure activities                      | 1.313            | 1.374         | 1.022            | 0.757         |
| Housing and utilities                   | 1.752            | 1.722         | 1.735            | 1.518         |
| Environmental protection                | 0.906            | 0.915         | 0.180            | 0.219         |
| Social services                         | 0.470            | 0.438         | 0.261            | 0.194         |
| Public safety                           | 0.421            | 0.423         | 0.073            | 0.067         |
| Administration                          | 3.423            | 4.349         | 0.321            | 0.278         |
| Total                                   | 8.168            | 8.322         | 6.206            | 5.458         |

Notes: Data in thousands CZK. Observations in electoral years amount to 820, while in non-electoral years they amount to 2,648.

On average, we observe higher levels of capital spending in electoral years compared to non-electoral years. If we inspect the capital-expenditure groups, we can see substantially higher levels of spending before elections for urban transportation and infrastructure, leisure activities, housing, social services and also administration. On the contrary, the data suggest outflow of resources related to environmental protection in electoral years. The data on current spending do not provide such a straightforward picture, differences of average spending between electoral and non-electoral years being generally not so significant. The exception is administrative spending, for which we observe a significant decrease before elections despite an increase of this spending related to the elections organization. The descriptive statistics suggests that some capital spending is raised before elections, while some savings are made on current administrative spending. More rigorous analysis to uncover real effects will follow.

Table 2 shows the volume of different types of revenues in electoral and non-electoral years to uncover different structure of revenues before elections. Lower tax revenues in electoral years may demonstrate political cycle on national level as the majority of these revenues are just redistributed to municipalities from the overall state tax revenues (national elections took place in the same year as local elections since 1998 until the snap parliamentary elections in 2013).

Higher amount of subsidies (net of own transfers, special-purpose grants on mandatory social care payments, mandatory payments to educational institutions and organization of elections) before elections may reflect two effects: (i) the national government aims to increase its re-election prospects in parliamentary elections, hence it provides higher amount of subsidies to municipalities and this increase is due to the national political cycle, or (ii) the municipal government puts higher

<sup>4</sup>Reasons for excluding the administrative spending are twofold: firstly, administrative spending includes election-related costs in electoral years, hence it is distorted even in case when there is no political cycle; secondly, reporting of own financial operations is not consistent for all the municipalities in early years, distinguishing them from other administrative spending is thus not straightforward. Nevertheless, we include a separate analysis of current administrative spending net of own financial flows, excluding the outlying observations for which administrative spending is too large. The elimination is based on the deviation from the mean, and we eliminate 88 observations out of 3,485.

effort to get more subsidies in electoral year to increase spending before elections and this increase is due to the local political cycle. The averages of deficit suggest that higher spending in electoral years is not balanced with higher revenues, because deficit is very high in electoral years, while municipal budgets are almost balanced in non-electoral years.<sup>5</sup> Nevertheless, a detailed analysis of political cycle on the side of revenues exceeds the scope of this paper, which focuses just on the expenditure side of the municipal budget.

Table 2: Revenues and deficit per capita in electoral and non-electoral years

|                                  | Electoral | Non-electoral |
|----------------------------------|-----------|---------------|
| Tax revenues                     | 8.336     | 8.750         |
| Non-tax revenues                 | 2.699     | 2.684         |
| Capital revenues                 | 1.559     | 1.608         |
| Net subsidies                    | 2.921     | 2.188         |
| Total revenues (adjusted)        | 17.092    | 17.166        |
| Share of self-generated revenues | 24.17     | 25.10         |
| Deficit                          | -0.387    | 0.112         |

Notes: Mean values, data in thousands CZK. Observations in electoral years amount to 840, in non-electoral years to 2,665.

### 4.3 Control variables

To comply with the law, municipalities have to balance their budget. Therefore, their revenues constitute main factor affecting the spending volume and should be included in estimations. The revenues variable (adjusted revenues) is net of transfers from own funds and subsidies for education and social care payments (these payments are also excluded from expenditure variable), as these subsidies are earmarked grants going through the municipal budget directly to their recipients (schools and people in need receiving social care payments). Additionally, we include demographical variables, such as **population density**, shares of the **elderly** and the **youth** (or share of the population in **productive age**) that determine spending composition in municipalities.

In the paper we aim to analyze specific characteristics of municipalities making them more prone to pre-electoral manipulations. Firstly, we consider the **size** of municipality. Although bigger municipalities have more resources to manipulate, looking at per capita spending, manipulation in municipalities with lower budgets may be more visible. We introduce the following groups of municipalities: extra small (population below 10,000), small (10,000–20,000), medium (20,000–50,000) and big (above 50,000). In the estimation, we use dummies of the small, medium and big municipalities.

Additionally, we aim to find whether electoral manipulation is affected by ideology. We identify a mayor to be **left-/right-wing** if he is affiliated with major leftist/rightist parliamentary party.<sup>6</sup> Moreover, mayors from **nonparliamentary** parties may have different incentives, representing usually local parties and being more loyal to their municipality.

The strength of the mayor’s party influences political cycles through two channels giving rise to two distinct effects: (i) on the one hand, stronger governments may have lower incentive to

<sup>5</sup>Deficit = consolidated spending – consolidated revenues, available since 2001.

<sup>6</sup>We apply left/right division of parliamentary parties as the political spectrum is clear on parliamentary level, but not clear on local level where many local parties exist.

manipulate spending before elections as they expect to receive many votes also in the following elections; (ii) on the other hand, stronger governments can push for higher spending more easily should an incentive for manipulation arise. We introduce two dummies, **majority** dummy equals 1 when the mayor’s party received more than 50% of votes in previous local elections (limited to several cases), **strong** dummy equals 1 when there is only a modest polarization in municipal council and there are not representatives of opposing blocks of rightist and leftist political parties at the same time, which means that there should be generally lower disagreement on government policy. Hence, a mayor from either left-wing or right-wing party can more smoothly pursue a local policy when representatives from the main opposing block are missing.<sup>7</sup> To analyze the effect of the first channel, we further introduce **winning margin** of the mayor’s party in previous elections.

The mayor’s experience may also affect local political cycle. If the mayor has been in office for more terms, he or she may not have an alternative job and hence may push harder to get reelected. Nevertheless, this mayor is at the same time more experienced, gets high awareness level among voters and having been already reelected in the past, he is more likely to be reelected again. We introduce two variables, the **seniority** variable represents the number of terms the mayor has been in office (uninterrupted mandate). The dummy variable **new** expresses the fact that the mayor is in office for the first time.

Furthermore, we include voters’ **turnout** from the previous local elections to measure voters’ involvement in local politics. On the one hand, if voters are more involved, they have more information about the budget and local government may be therefore less motivated to manipulate pre-electoral spending. On the other hand, higher voters’ turnout means more significant variety of voting population to be targeted by pre-electoral spending, which may in turn increase the spending before elections.

We introduce a novel hypothesis concerning national shocks. Local elections and the incentive for opportunism of the ruling government may be influenced by national politics and the general public perception of a party. Failure of the right-wing national government, a purely exogenous shock, may worsen the performance of right-wing parties in local elections. In the analysis, we exploit the fact that national parliamentary elections take place always 5 months before local elections. Incumbent parties which have improved their position in national elections within given municipality, may expect to receive more votes also in local elections and thus do not have an incentive to involve in opportunism to a large extent. Hence, we will interact the election-year dummy with the incumbent-party variable “**change of national electoral outcome**” (national outcome in current election – national outcome in past election).<sup>8</sup>

The other novelty is that results from national parliamentary elections are used to measure the level of voters’ responsiveness to local policies. Local results in some municipalities are very loosely related to national results, while in some municipalities, national results matter a lot. We introduce **dissimilarity** variable for electoral outcomes in previous elections (National outcome of right-wing – local outcome of right-wing)<sup>2</sup> + (National outcome of left-wing – local outcome of left-wing)<sup>2</sup> expressing the difference of support for left- and right-wings for local and national elections in a municipality in previous elections. On the one hand, a municipality that features larger dissimilarity with national results is thus more likely to be responsive to local policies, hence, may be more prone to pre-electoral opportunism as it is more effective. On the other hand, voters

<sup>7</sup>Nevertheless there can be still representatives from a nonparliamentary party forming opposition.

<sup>8</sup>Note that the variable “change of national electoral outcome” is zero for two post-electoral years, as the effect should matter only for pre-electoral period. Additionally, we believe that public opinion polls on the party support in national elections are relevant 1 year before elections at the earliest.

in such a municipality may be also more involved in local policies, which would diminish incentives of local politicians to create political cycle. Additionally, significant dissimilarity may also result from the fact that candidate lists for local and national elections differ and people support well-known local-specific candidates in local elections irrespective of their political affiliation in local elections. Hence, the effect of dissimilarity on manipulation is not as straightforward. Table 3 summarizes the control variables.

Table 3: Summary statistics: control variables

|                                | Mean   | St. dev. | Min    | Max   |
|--------------------------------|--------|----------|--------|-------|
| Revenues per capita            | 17.16  | 4.89     | 5.38   | 76.71 |
| Population density             | 512.5  | 396.9    | 67.55  | 2,706 |
| Youth                          | 15.45  | 1.78     | 11.44  | 23.05 |
| Elderly                        | 15.07  | 2.31     | 8.50   | 22.70 |
| Pop. in productive age         | 69.48  | 2.55     | 61.11  | 75.40 |
| Extra small                    | 0.393  | 0.488    | 0      | 1     |
| Small                          | 0.307  | 0.461    | 0      | 1     |
| Medium                         | 0.200  | 0.400    | 0      | 1     |
| Big                            | 0.100  | 0.300    | 0      | 1     |
| Left-wing                      | 0.139  | 0.346    | 0      | 1     |
| Right-wing                     | 0.500  | 0.500    | 0      | 1     |
| Nonparliamentary               | 0.281  | 0.450    | 0      | 1     |
| Majority                       | 0.019  | 0.137    | 0      | 1     |
| Strong mayor                   | 0.284  | 0.451    | 0      | 1     |
| Winning margin                 | 7.045  | 8.347    | 0      | 49.59 |
| Seniority                      | 1.592  | 0.845    | 1      | 5     |
| New                            | 0.567  | 0.496    | 0      | 1     |
| Turnout                        | 44.12  | 8.516    | 21.69  | 77.31 |
| Dissimilarity                  | 423.3  | 393.9    | 0.34   | 2,609 |
| Change in national el. outcome | -1.328 | 6.180    | -36.39 | 34.74 |

Notes: Observations amount to 3,485. Data on revenues in thousands CZK.  
Source: Czech Statistical Office, own computation.

## 5 Estimation results

The following tables reveal whether municipalities manipulate expenditures in electoral and pre-electoral period and uncover municipalities' characteristics which may influence this manipulation. Firstly, we test for the effect for current and capital expenditures in total. Later on, the expenditures will be decomposed into groups to test manipulation within each group.

### 5.1 Total current and capital expenditures

Tables 4 and 5 present results for current and capital expenditures. Primary estimates using the system GMM are displayed in columns (1)–(4). To test the robustness of the effects, column (4) shows the results when the number of instruments is significantly reduced, columns (5) and (6) present results when the difference GMM and the OLS within estimators are applied, respectively.

As we have dynamic panel data, we include one lag of spending where the coefficient illustrates persistence of spending. Among regressors, we also include the revenues which may fluctuate over time due to Czech economy performance (significant decrease resulting from the post 2008 crisis).

These variables are predetermined and are instrumented by their lagged values (around 4 to 7 lags are included). We also control for demographic variables (e.g. population density, share of young, share of elderly whenever significant).

Concerning current expenditures, column (1) and (2) in Table 4 suggest that municipalities spend less in pre-electoral period.<sup>9</sup> A municipality spends around CZK 520 per capita less in pre-electoral year, which amounts on average to 6.3% of current spending. In electoral years, current spending is higher than in pre-electoral years. Nevertheless, when compared to two post-electoral years, there is a decrease of approx. CZK 140, i.e. 1.7%. In general, municipalities experience a boom in current spending after elections, with half of term marking the start of saving period which ends before elections, when spending increases again.

We aim to find out whether some special characteristics of local government affect the size of current spending in electoral/pre-electoral years. Column (3a) shows unconditional effects, while column (3b) originates from (3a) and shows effects of variables conditional on years of the electoral term leaving general (pre-)electoral year effects aside (conditional effect = general effect of the specific variable + unconditional (pre-)electoral-year effect of the specific variable). General effects hence represent effects of variables in two post-electoral years, while conditional effects represent the overall effects in (pre-)electoral years of these variables. The Wald test was computed to assess the significance of conditional effects. We interpret the results from Column (3a) and (3b) which are robust across other estimation procedures.

Analyzing the strength of local government, we observe that government with a mayor's party having had majority in previous elections has higher spending in pre-electoral year, hence it does not engage in saving as other governments. The explanation is twofold: (i) the government has incentive to manipulate spending and it is easier to push for higher spending already in the pre-electoral year, or (ii) the government does not have such an incentive to manipulate and to shift spending to electoral year, when it is more effective for attracting votes, or to capital expenditures which may be more visible to voters. Results from separate analyses of expenditure groups will help us to uncover what effect is behind. Additionally, we found that the higher winning margin the mayor's party had, the lower is spending in pre-electoral years. When incumbent mayor's party had larger winning margin, it has lower incentive to increase spending before next elections.

Concerning the dissimilarity in results of national elections and local elections, the larger the dissimilarity, the lower the spending before elections. The results suggest that when voters are more responsive to local policies (larger dissimilarity), they tend to be also more involved in policies; politicians are more responsible to voters and do not involve in manipulation before elections. Additionally, greater dissimilarity can be observed in municipalities where there are strong mayors who run for the next term in office. As these mayors are strong and popular, they do not involve so much in opportunism.

Interesting results were obtained in variable measuring a change in votes of the mayor's party (if parliamentary) between two national parliamentary elections. In pre-electoral years the results obtained were as expected. On the one hand, if the mayor's party expects success in national elections (improvement), it tends to have lower spending; on the other hand, if it expects worse results, it increases spending. But surprisingly, the effect is opposite in electoral years: there are 5 months (after parliamentary elections but before local elections) when it is clear that the mayor's party succeeded/failed in parliamentary elections. If it succeeded/failed (increased/decreased votes'

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<sup>9</sup>Note that municipal government is elected every four years, hence the effect for electoral year and pre-electoral year is compared to the first two post-electoral years.

share), the spending increases/decreases as well. The effect may be driven by higher revenues from national bodies that could be targeted to municipalities where mayors are affiliated with parties in national government, or at least there is an expectation of getting higher revenues in future. In this case, there may be also an endogeneity problem if an increase in the spending (mainly through transfers from the central government) increases the votes of ruling local party in the national parliamentary elections. In such a case, the effect in the electoral year would be overestimated.

The estimated coefficients for voters' turnout suggest that the variable does not represent voters' involvement (this effect is better captured by the dissimilarity variable), rather it measures the variety of services local government has to target before elections to attract more votes. In post-electoral years, municipalities with higher voters' turnout spend less, while in the pre-electoral year the spending gets once again higher (the unconditional effect is significant and positive).

Table 4: Total current expenditures

|   | System GMM   |              |              |             | Difference GMM | OLS, FE      |             |
|---|--------------|--------------|--------------|-------------|----------------|--------------|-------------|
|   | (1)          | (2)          | (3a)         | (3b)        | (4)            | (5)          | (6)         |
|   | Conditional  |              |              |             |                |              |             |
| Electoral year                            | -0.1193 **   | -0.1378 ***  | 0.0264       |             | -0.0333        | -0.6019 †    | -0.0362     |
| Pre-electoral year                        | -0.5667 ***  | -0.5176 ***  | -1.0202 **   |             | -1.0448 **     | -1.4140 ***  | -1.1784 *** |
| Current expenditures <sub>t-1</sub>       | 0.4891 ***   | 0.4479 ***   | 0.4849 ***   |             | 0.4833 ***     | 0.4123 ***   | 0.4369 ***  |
| Revenues                                  | 0.1150 **    | 0.1318 ***   | 0.1200 **    |             | 0.1256 **      | 0.0661 **    | 0.1259 ***  |
| Elderly                                   |              | -0.1494 ***  | -0.1474 ***  |             | -0.1448 ***    | -0.3039 ***  | -0.2769 *** |
| Population density                        |              | 0.0006 ***   | 0.0004 ***   |             | 0.0005 **      | -0.0416 ***  | -0.0149 *** |
| Left                                      |              |              |              |             |                |              | 0.2782 **   |
| Majority                                  |              |              | -0.3304      |             | -0.4636        | -0.8778      | -0.7841 *   |
| Election × Majority                       |              |              | 0.8277       | 0.4973      | 0.9248         | 0.9704       | 0.7827      |
| Pre-election × Majority                   |              |              | 1.5188 **    | 1.1883 *    | 1.7363 **      | 1.3587 **    | 1.2434 **   |
| Winning margin <sub>t-4</sub>             |              |              | 0.0081       |             | 0.0074         | -0.0495 ***  | -0.0033     |
| Election × Win. margin <sub>t-4</sub>     |              |              | -0.0135 *    | -0.0054     | -0.0141 †      | -0.0054      | -0.0122     |
| Pre-election × Win. margin <sub>t-4</sub> |              |              | -0.0334 ***  | -0.0253 *** | -0.0349 ***    | -0.0349 ***  | -0.0271 *** |
| Dissimilarity                             |              |              | 0.0004 ***   |             | 0.0005 ***     | 0.0007 ***   | 0.0005 ***  |
| Election × Dissimilarity                  |              |              | -0.0008 ***  | -0.0004 *** | -0.0009 ***    | -0.0009 ***  | -0.0007 *** |
| Pre-election × Dissimilarity              |              |              | -0.0016 ***  | -0.0012 *** | -0.0017 ***    | -0.0016 ***  | -0.0014 *** |
| Change <sub>t-(t-4)</sub>                 |              |              | -0.3753 ***  |             | -0.3727 ***    | -0.4622 ***  | -0.3509 **  |
| Election × Change <sub>t-(t-4)</sub>      |              |              | 0.3947 ***   | 0.0193 ***  | 0.3919 ***     | 0.4474 ***   | 0.3562 **   |
| Pre-election × Change <sub>t-(t-4)</sub>  |              |              | 0.3159 ***   | -0.0595 *** | 0.3114 ***     | 0.3767 ***   | 0.2893 *    |
| Turnout                                   |              |              | -0.0189 *    |             | -0.0192 †      | -0.0641 **   | -0.0121     |
| Election × Turnout                        |              |              | 0.0112       | -0.0077     | 0.0130         | 0.0187 **    | 0.0083      |
| Pre-election × Turnout                    |              |              | 0.0271 ***   | 0.0082      | 0.0284 **      | 0.0323 ***   | 0.0286 ***  |
| Constant                                  | 2.4572 ***   | 4.4206 ***   | 4.9835 ***   |             | 4.8392 ***     |              | 14.8229 *** |
| No. of instruments                        | 189          | 191          | 202          |             | 133            | 198          |             |
| No. of observations                       | 3,246        | 3,246        | 3,041        |             | 3,041          | 2,819        |             |
| AR(1)                                     | -3.22 (0.00) | -3.43 (0.00) | -3.00 (0.00) |             | -3.02 (0.00)   | -4.05 (0.00) |             |
| AR(2)                                     | 0.00 (0.99)  | 0.17 (0.86)  | 0.44 (0.66)  |             | 0.41 (0.68)    | 0.91 (0.36)  |             |
| Hansen test                               | 203.7 (0.15) | 204.0 (0.15) | 203.3 (0.11) |             | 195.1 (0.00)   | 201.5 (0.10) |             |
| Diff-in-Hansen test for levels            | 2.86 (1.00)  | 3.47 (1.00)  | 4.30 (1.00)  |             | 5.84 (1.00)    |              |             |
| R <sup>2</sup> within                     |              |              |              |             |                |              | 0.44        |

Notes:  $z$ -value and  $\chi^2$  for AR processes and Hansen tests, respectively;  $p$ -value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.

The results in Table 5 show that electoral manipulation is more profound in case of capital expenditures. Column (2) shows that a municipality in general increases capital spending by CZK 970 per capita (17.2% of average capital spending) in electoral years and CZK 640 per capita (11.4%) in pre-electoral years. Estimated coefficients for pre-electoral years in column (1) in Table 4 and 5 are very close in its absolute value. Hence, higher capital spending replaces current

spending in pre-electoral year, while municipality has higher spending in total in electoral year.

Columns (3a) and (3b) represent the results when the total electoral effects are decomposed into several attributes which make manipulation more likely. Contrary to current spending, we robustly observe that ideology matters and left-wing parties tend to have lower capital spending in pre-electoral years, hence right-wing and non-parliamentary parties increase capital spending before elections more than left-wing parties. Concerning the strength of the government, if a mayor is strong, capital spending is lower in the electoral year: strong mayor is thus less likely to manipulate capital spending than other mayors. Results also reveal that municipalities where mayors are in office for the first time have higher capital spending before elections, hence novice mayors seem to push for higher capital spending much more before elections. However, later we will see that this effect is primarily driven by increased expenditures on water industry which are not as attractive to voters.

The change of mayor's party votes in parliamentary elections has similar effect as in case of current spending. However, the effect is robust and significant only in pre-electoral period. Positive effect of the change variable in electoral year observed in Table 4 is not significant here.

Table 5: Total capital expenditures

|  | System GMM   |              |              |                     | Difference GMM | OLS, FE      |             |
|--|--------------|--------------|--------------|---------------------|----------------|--------------|-------------|
|  | (1)          | (2)          | (3a)         | (3b)<br>Conditional | (4)            | (5)          | (6)         |
| Electoral year                           | 1.0307 ***   | 0.9675 ***   | 0.6750 ***   |                     | 0.7291 ***     | 0.5036 *     | 0.6825 ***  |
| Pre-electoral year                       | 0.5399 ***   | 0.6376 ***   | 0.6522 ***   |                     | 0.5634 **      | 0.6705 ***   | 0.5993 ***  |
| Capital expenditures <sub>t-1</sub>      | 0.2874 ***   | 0.2893 ***   | 0.2769 ***   |                     | 0.2582 ***     | 0.2558 ***   | 0.1839 ***  |
| Revenues                                 | 0.5159 ***   | 0.5480 ***   | 0.5797 ***   |                     | 0.5950 ***     | 0.6852 ***   | 0.5588 ***  |
| Youth                                    |              | 0.1978 ***   | 0.1521 *     |                     | 0.1662 *       | 0.5517 ***   | 0.3663 ***  |
| Elderly                                  |              | -0.1319 ***  | -0.1479 ***  |                     | -0.1478 ***    | -0.2431 ***  | -0.2545 *** |
| Population density                       |              | -0.0002      |              |                     |                |              |             |
| Left                                     |              |              | 0.2854       |                     | 0.3134         | 1.1061 **    | 0.3262 †    |
| Election × Left                          |              |              | 0.1502       | 0.4356              | 0.0742         | 0.1304       | -0.0341     |
| Pre-election × Left                      |              |              | -0.6433 *    | -0.3579 †           | -0.4873 †      | -0.5971 *    | -0.5384 †   |
| Strong                                   |              |              | 0.0524       |                     | -0.0053        | -0.5357 †    | -0.2201     |
| Election × Strong                        |              |              | -0.7422 **   | -0.6898 **          | -0.8127 **     | -0.6073 *    | -0.4977 †   |
| Pre-election × Strong                    |              |              | -0.1921      | -0.1397             | -0.1958        | -0.4061 †    | -0.2424     |
| New                                      |              |              | -0.1076      |                     | -0.1711        | -0.4053 †    | -0.2222 †   |
| Election × New                           |              |              | 0.7862 **    | 0.6786 **           | 0.7553 **      | 1.1146 **    | 0.6684 **   |
| Pre-election × New                       |              |              | -0.1073      | -0.2149             | -0.0592        | 0.0658       | -0.0106     |
| Change <sub>t-(t-4)</sub>                |              |              | 0.0674       |                     | 0.0531         | 0.0356       | 0.1025      |
| Election × Change <sub>t-(t-4)</sub>     |              |              | -0.0536      | 0.0139              | -0.0494        | -0.0541      | -0.1070     |
| Pre-election × Change <sub>t-(t-4)</sub> |              |              | -0.1037 †    | -0.0363 ***         | -0.0945 †      | -0.1113 †    | -0.1484     |
| Constant                                 | -5.3366 ***  | -6.8574 ***  | -6.5396 ***  |                     | -6.8474 ***    |              | -7.1835 *** |
| No. of instruments                       | 179          | 182          | 189          |                     | 130            | 177          |             |
| No. of observations                      | 3,246        | 3,246        | 2,857        |                     | 2,857          | 2,637        |             |
| AR(1)                                    | -5.11 (0.00) | -5.36 (0.00) | -4.90 (0.00) |                     | -5.06 (0.00)   | -5.20 (0.00) |             |
| AR(2)                                    | 0.13 (0.90)  | 0.16 (0.88)  | 0.72 (0.47)  |                     | 0.58 (0.56)    | 0.40 (0.69)  |             |
| Hansen test                              | 197.1 (0.11) | 194.6 (0.14) | 190.2 (0.14) |                     | 164.7 (0.00)   | 181.1 (0.11) |             |
| Dif-in-Hansen test for levels            | 12.89 (0.99) | 14.64 (0.99) | 17.68 (0.96) |                     | 18.37 (0.95)   | 50.55 (0.99) |             |
| R <sup>2</sup> within                    |              |              |              |                     |                |              | 0.42        |

Notes:  $z$ -value and  $\chi^2$  for AR processes and Hansen test, respectively;  $p$ -value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.

## 5.2 Expenditure groups: targeted and non-targeted spending

As we could see from Tables 4 and 5 and also from descriptive Table 1, the spending volume changes over the electoral term, capital expenditures increase significantly before elections, while current expenditures are depressed in the pre-electoral year. The following analysis studies which types of spending are subject to distorting opportunist behavior of local politicians and how this behavior is influenced by local governments' characteristics and other environmental factors. We analyze the following groups of spending: infrastructure (including also urban transportation), water industry, education, leisure activities (culture, religion, sports and recreation), housing, environmental protection, social services, public safety and administration.

Table 6 provides general results. According to autocorrelation, we included the second lag of spending among regressors for a few expenditure groups (instrument set starts with lag 3).<sup>10</sup>

**Capital expenditures** Expenditures on infrastructure, leisure activities and housing are targeted groups of spending, being perceived as attracting more votes, because they significantly increase before elections; spending on education increases much more in the pre-electoral year and partly replaces current expenditures; spending on social services increases only in the pre-electoral year, hence, even these groups of spending are targeted to some extent. Non-targeted expenditure groups (the least visible for voters) are water industry, public safety and environmental protection, where we could not observe any significant positive effect, or even negative effects were found. Interestingly, expenditures on administration increase right before elections despite being naturally non-targeted, local politicians seem to ensure their well-being for their office in advance just in case they are not in government next term.

**Current expenditures** Surprisingly, when the spending is decomposed into several groups, we do not identify such a decrease in spending in pre-electoral year as for total current spending in general; we observe just some savings on administration, education (in the pre-electoral year) and also leisure activities (in the electoral year—though current spending is to some extent crowded out by increased capital spending). Contrary to capital spending, we observe increased spending even for non-targeted groups such as water industry, environmental protection and public safety. Increase in current expenditures on water industry and public safety may reflect floods that hit the Czech Republic in electoral and pre-electoral years—the most severe floods occurred in pre-electoral years 1997, 2009 and 2013, and in all electoral years 1998, 2002, 2006, 2010.

## 5.3 Expenditure groups: effects of control variables

The following figures present control variables that increase/decrease spending before elections when different expenditure groups are analyzed. Tables A1 and A2 present the results in detail. The effects are displayed only in case that at least some effect (conditional, unconditional) is significant. The light-bluish bar represents the general effect of the variable (present in all years), white bar shows the general (pre-)electoral year effect (present in pre-electoral or electoral year for all municipalities), and the red bar shows the specific additional effect of the given variable in electoral and pre-electoral years.

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<sup>10</sup>We do not include any demographic variables in this specification; from Tables 4 and 5 we can see that coefficients of electoral and pre-electoral years do not differ too much in columns (1) and (2), where estimates from specifications with and without demographic variables can be compared.



Table 6: Expenditures groups: general results

| Capital expenditures                | Infrastructure | Water industry | Education    | Leisure      | Housing      | Environment  | Social services | Public safety | Administration | Total capital |
|-------------------------------------|----------------|----------------|--------------|--------------|--------------|--------------|-----------------|---------------|----------------|---------------|
| Electoral year                      | 0.230 ***      | 0.102 †        | 0.047 †      | 0.319 ***    | 0.237 ***    | -0.037 *     | 0.005           | 0.006         | 0.100 ***      | 1.031 ***     |
| Pre-electoral year                  | 0.171 ***      | 0.057          | 0.221 ***    | 0.177 ***    | 0.121 †      | -0.008       | 0.038 †         | 0.005         | -0.032         | 0.540 ***     |
| Capital expenditures <sub>t-1</sub> | 0.349 ***      | 0.326 ***      | 0.415 ***    | 0.284 ***    | 0.440 ***    | 0.243 ***    | 0.402 ***       | 0.156 ***     | 0.415 ***      | 0.287 ***     |
| Capital expenditures <sub>t-2</sub> | 0.041 ***      | 0.184 ***      | 0.040 ***    | 0.053 ***    | 0.108 ***    | 0.013 ***    | -0.078 **       | 0.004 ***     | -0.143 ***     | 0.516 ***     |
| Revenues                            | -0.244 *       | -2.767 ***     | -0.421 ***   | -0.446 **    | -1.137 *     | -0.055       | 0.017 ***       | -0.005        | 0.026 *        | -5.337 ***    |
| Constant                            | 189            | 189            | 189          | 189          | 189          | 189          | 185             | 189           | 187            | 179           |
| No. of instruments                  | 3,246          | 3,246          | 3,246        | 3,246        | 3,246        | 3,246        | 3,024           | 3,246         | 3,024          | 3,246         |
| No. of observations                 | -7.46 (0.00)   | -2.23 (0.026)  | -6.45 (0.00) | -4.35 (0.00) | -5.79 (0.00) | -3.63 (0.00) | -3.20 (0.00)    | -5.05 (0.00)  | -3.62 (0.00)   | -5.11 (0.00)  |
| AR(1)                               | 0.07 (0.94)    | -1.24 (0.21)   | 0.38 (0.71)  | -1.03 (0.30) | -1.56 (0.12) | -1.17 (0.24) | -1.22 (0.22)    | 1.03 (0.30)   | -0.91 (0.36)   | 0.13 (0.90)   |
| AR(2)                               | 192.4 (0.32)   | 200.6 (0.19)   | 199.0 (0.21) | 199.5 (0.21) | 201.0 (0.19) | 202.4 (0.17) | 202.5 (0.11)    | 199.3 (0.21)  | 200.2 (0.16)   | 197.1 (0.11)  |
| Hansen test                         | 15.46 (0.99)   | 13.64 (0.99)   | 23.90 (0.82) | 26.46 (0.70) | 12.22 (0.99) | 27.99 (0.67) | 14.88 (0.98)    | 26.34 (0.71)  | 12.54 (0.99)   | 12.89 (0.99)  |
| Diff-in-Hansen test                 |                |                |              |              |              |              |                 |               |                |               |
| Current expenditures                | Infrastructure | Water industry | Education    | Leisure      | Housing      | Environment  | Social services | Public safety | Administration | Total current |
| Electoral year                      | 0.039 ***      | 0.031 *        | 0.009        | -0.017 †     | 0.002        | 0.039 ***    | 0.046 ***       | 0.021 *       | -0.115 ***     | -0.119 **     |
| Pre-electoral year                  | 0.053 ***      | 0.004          | -0.041 ***   | 0.023 *      | 0.004        | 0.034 ***    | 0.011           | 0.033 ***     | -0.151 ***     | -0.567 ***    |
| Current expenditures <sub>t-1</sub> | 0.540 ***      | 0.400 ***      | 0.441 ***    | 0.709 ***    | 0.675 ***    | 0.768 ***    | 0.772 ***       | 0.478 ***     | 0.766 ***      | 0.489 ***     |
| Current expenditures <sub>t-2</sub> |                |                |              | 0.034        |              |              | -0.005          |               | -0.063 **      |               |
| Revenues                            | 0.018 ***      | 0.014 **       | 0.007 *      | 0.021 ***    | 0.033 ***    | 0.010 **     | 0.004 ***       | 0.015 ***     | 0.112 ***      | 0.115 **      |
| Constant                            | 0.066          | -0.174 *       | 0.622 ***    | 0.078 †      | -0.126 *     | 0.050        | 0.012           | -0.038        | -0.725 *       | 2.457 ***     |
| No. of instruments                  | 189            | 189            | 189          | 189          | 179          | 189          | 189             | 189           | 187            | 189           |
| No. of observations                 | 3,246          | 3,246          | 3,232        | 3,246        | 3,024        | 3,246        | 3,024           | 3,246         | 2,945          | 3,246         |
| AR(1)                               | -3.16 (0.00)   | -1.76 (0.08)   | -3.76 (0.00) | -5.36 (0.00) | -4.35 (0.00) | -3.60 (0.00) | -3.65 (0.00)    | -2.17 (0.03)  | -2.89 (0.00)   | -3.22 (0.00)  |
| AR(2)                               | 0.55 (0.58)    | -0.08 (0.94)   | 1.07 (0.29)  | -0.23 (0.82) | -1.30 (0.19) | 0.96 (0.34)  | -1.20 (0.23)    | -1.21 (0.23)  | 1.31 (0.19)    | 0.00 (0.99)   |
| Hansen test                         | 193.1 (0.31)   | 201.7 (0.18)   | 198.8 (0.22) | 197.2 (0.24) | 172.7 (0.49) | 195.2 (0.27) | 201.6 (0.16)    | 199.9 (0.20)  | 201.9 (0.14)   | 203.7 (0.15)  |
| Diff-in-Hansen test                 | 18.83 (0.96)   | 13.00 (0.99)   | 9.47 (1.00)  | 17.47 (0.98) | 17.07 (0.96) | 22.37 (0.87) | 17.05 (0.96)    | 9.81 (1.00)   | 4.48 (1.00)    | 2.86 (1.00)   |

Notes: z-value and  $\chi^2$  for AR processes and Hansen test, respectively; p-value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.

**Municipality size** Figure 1 illustrates that the municipality size matters when analyzing spending distortion due to political cycle.<sup>11</sup> Concerning targeted spending groups, while all municipalities were found to increase capital spending on infrastructure before elections, medium-sized municipalities were found to increase it even more. These municipalities together with the small ones increase also current spending on infrastructure.

Non-linear effects are found for capital expenditures on leisure activities. Big and small municipalities have higher expenditures per capita than medium-sized municipalities (extra small municipalities are too small to provide more cultural services; small municipalities provide these services, but it is very costly for them; medium-sized municipalities provide similar services as small municipalities, though the costs are lower per capita; big municipalities support many other cultural services – theaters and museums are usually located in big municipalities). However, contrary to small and extra small municipalities, big and medium-sized municipalities do not increase this spending even more before elections, as is illustrated by their negative (pre-)electoral-year effects balancing general (pre-)electoral-year effects.

Results uncover specific behavior of big municipalities; they seem to target education in electoral year (not increasing capital spending in pre-electoral year in such an extent), capital spending on environmental protection before elections while they decrease capital spending on water industry significantly.

As far as capital spending on administration is concerned, extra small municipalities have much higher spending per capita compared to municipalities of bigger size. While all the municipalities increase spending in electoral year, big or medium-sized municipalities increase it also in pre-electoral year. Concerning current spending on administration, big municipalities tend to have much lower per capita spending, but their pre-electoral saving in this area is not so significant compared to municipalities of smaller size.

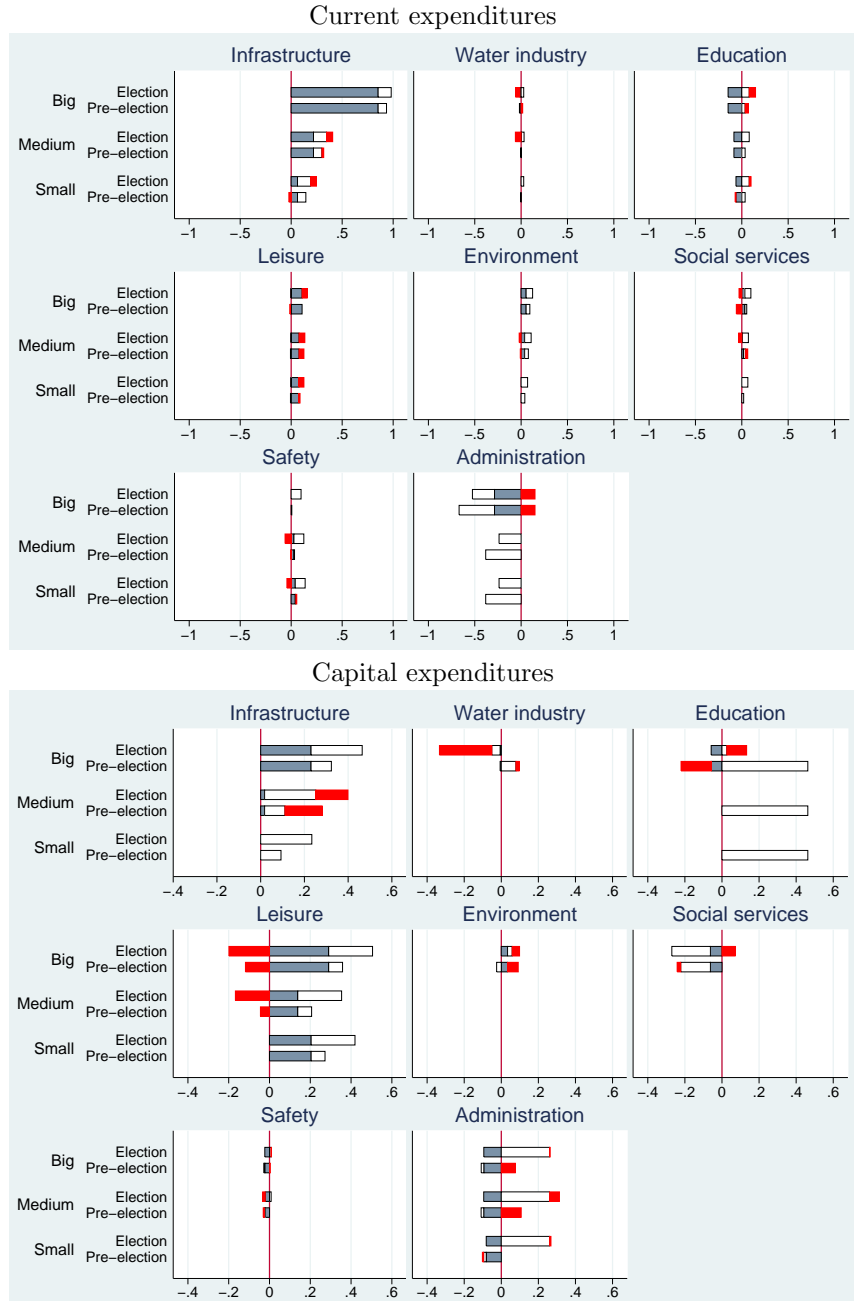
Hence, all municipalities increase spending on leisure activities, with bigger municipalities targeting mainly current expenditures and small municipalities capital expenditures. Big municipalities also increase capital spending on environment (good environment is more valuable in bigger cities) while decreasing capital spending on water industry (less visible), and medium-sized municipalities increase spending on infrastructure. Small municipalities tend to save on administration much more compared to other municipalities.

**Political party** Figure 2 shows how political affiliation of a mayor affects pre-electoral spending volumes. Concerning current expenditures, municipalities where mayors are affiliated with leftist parties tend to spend more on housing in general, but do not increase this spending as much as other municipalities in electoral year (a decrease is even observed in pre-electoral year). The same pattern is observed for capital expenditures on housing. Leftist municipalities have also higher current spending on environmental protection, social services and public safety in general and also in pre-electoral (environmental protection and public safety) and electoral year (social services). When pre-electoral manipulation of capital expenditures is considered, municipalities with leftist mayors feature lower spending on education.

In general, municipalities where mayors are affiliated with non-parliamentary parties have lower capital spending on leisure activities, but they increase it before elections; the increase in capital spending partly crowds out current spending in this area. These municipalities have also lower

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<sup>11</sup>Note that the effects are compared to extra small municipalities which are excluded from the estimation due to collinearity.

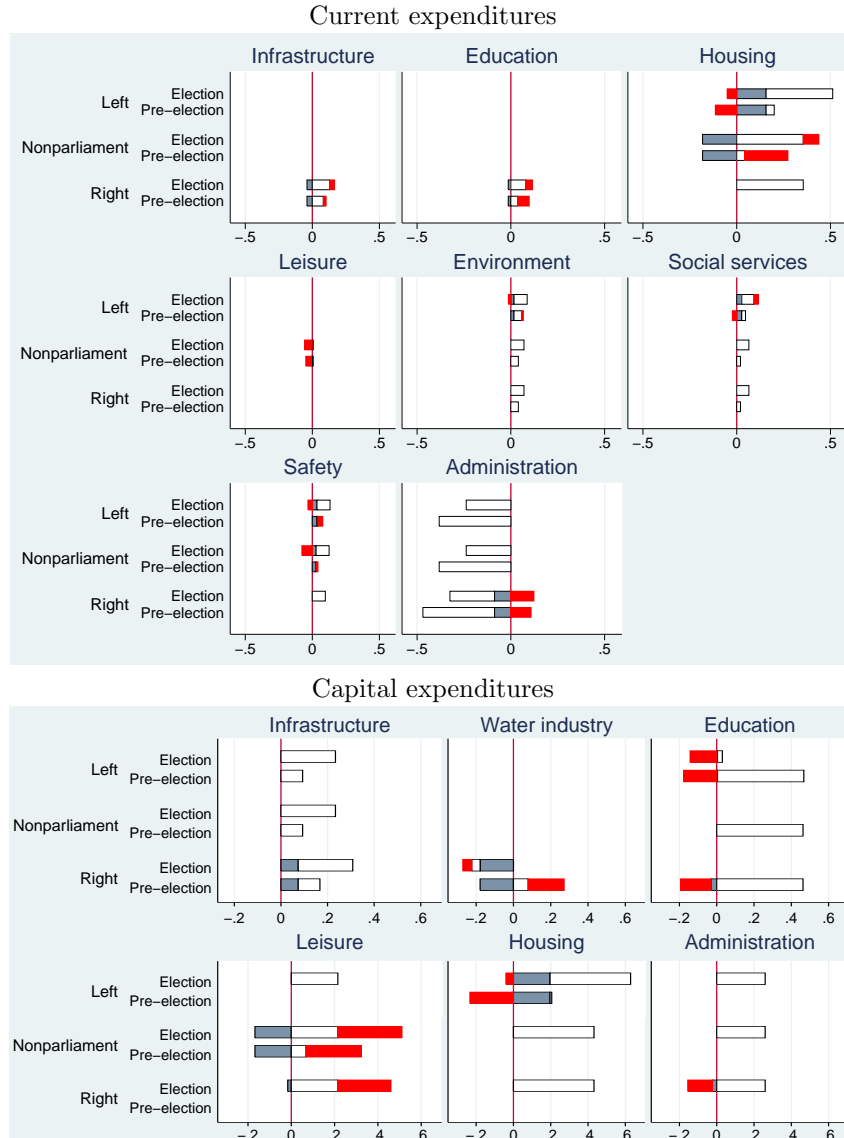


Notes: Light-bluish bar = the general effect of the variable, white bar = the general (pre-)electoral year effect, red bar = the specific additional effect of the variable in (pre-)electoral years.

Figure 1: Effects of municipality size

current spending on housing, which however also increases before elections. Additionally, they do not increase current spending in public safety as other municipalities do in electoral years.

Finally, when current expenditures are considered, municipalities where mayors are affiliated with rightist parties have lower spending on infrastructure and also administration, though the differences between this spending compared to other municipalities become insignificant before



Notes: Light-bluish bar = the general effect of the variable, white bar = the general (pre-)electoral year effect, red bar = the specific additional effect of the variable in (pre-)electoral years.

Figure 2: Partisan effects

elections. Infrastructure being more likely a targeted spending group, these municipalities tend to increase spending on infrastructure before elections. On the contrary, for non-targeted administrative spending, we can argue that while municipalities with rightist mayor save on administration in general, other municipalities save only before elections. These municipalities have higher spending on education before elections.

Municipalities with rightist mayors have generally higher capital spending on infrastructure (by around 9%) and lower capital expenditures on water industry (by 25%). Surprisingly, they do not increase expenditures on infrastructure even more before elections. On the contrary, they tend to decrease spending on water industry in electoral year, while increasing it in the pre-electoral year, i.e. the time profile of spending is distorted. These municipalities also save on capital spending

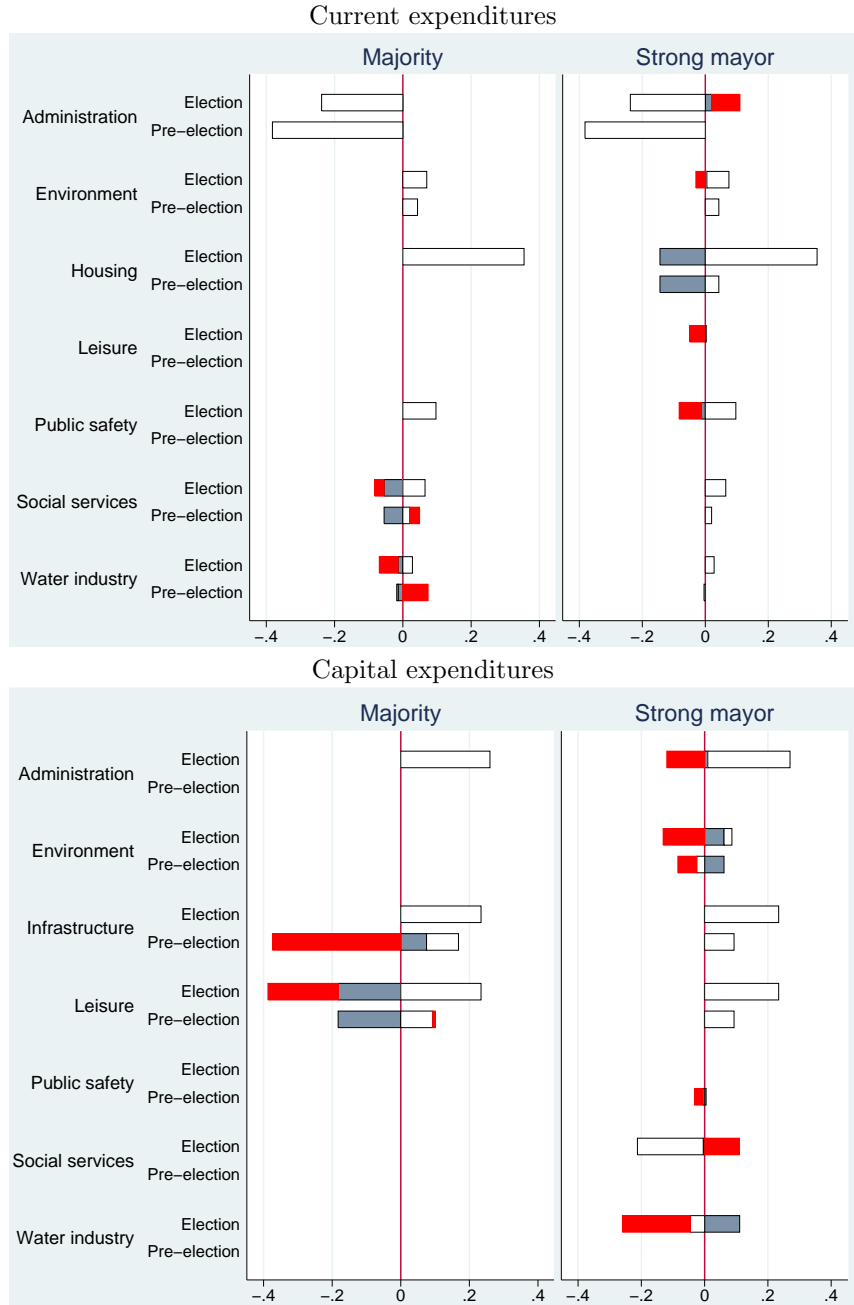
on education in the pre-electoral year compared to non-parliamentary parties and parliamentary parties that are in the middle of the political spectrum (current spending on education seems to crowd out capital spending on education in this case). Interestingly, we found that rightist municipalities target capital expenditures on leisure activities before elections (by almost 28%), while saving on capital expenditures on administration (by almost 54%) when compared to others.

To sum up, leftist governments tend to increase current spending on social services before elections; rightist governments target current spending on infrastructure and also capital spending on leisure (similarly to governments with mayors from non-parliamentary parties), while saving on administration. Additionally, governments with mayors from non-parliamentary parties increase current spending on housing.

**Political strength** The strength of local government is measured by two variables; the “strong mayor variable reflects cases when the mayor’s party has no opposition party in local government, the “majority” variable points to the situation when the mayor’s party received more than 50% of votes. The latter variable is limited only to few cases (1.9%) in our dataset, so the potential effect is rather minor. The Figure 3 demonstrates that municipalities where mayor’s parties are in majority have much lower capital spending on leisure activities and infrastructure before elections by 47% and 35%, respectively (for infrastructure, the effect is present only in the pre-electoral year), which illustrates the lower incentive to create local political cycle as these expenditures are targeted before elections. This finding is supported by results for current spending. Specific effects for municipalities with mayors being in majority are observed for social services (targeted group) and water industry, where a significant drop in the electoral year was found.

On the one hand, municipalities where mayors are strong do not engage in savings in current spending on administration as other municipalities before elections; on the other hand they have lower capital spending on administration in the electoral year, so they do not tend to extract resources from the office in the last moment. They have generally higher capital spending on environment, but in the electoral year, they decrease it together with current spending on environment more significantly compared to other municipalities. In electoral years, municipalities with strong mayors have 3% lower current spending on leisure which was found to be a targeted group. Nevertheless, they increase capital spending on social services by 50% (generally non-targeted group as far as capital spending is concerned). Hence, these municipalities also involve in political cycles when the main targeted spending groups are considered (general electoral year effects for capital spending on infrastructure, leisure, housing), but they save more on some non-targeted groups of spending and do not need to save on administration to such an extent as other municipalities.

**Political experience** Figure 4 reveals the effect of the mayor’s experience on local political cycle. We introduce a dummy variable for municipalities where mayors are in the office for the first time. Concerning current spending, these municipalities have generally higher spending on education and public safety; before elections, spending on education decreases while spending on public safety increases. Concerning capital groups, spending of municipalities with new mayors move in the opposite direction than expected for a few targeted spending groups. Their spending on leisure and education is lower in pre-electoral years compared to municipalities where mayors are more experienced, while spending on non-targeted groups such as public safety and water industry is higher in pre-electoral and electoral years, respectively. Local governments with mayors in office for the first time engage in political cycle to a limited extent compared to others, as the distortion

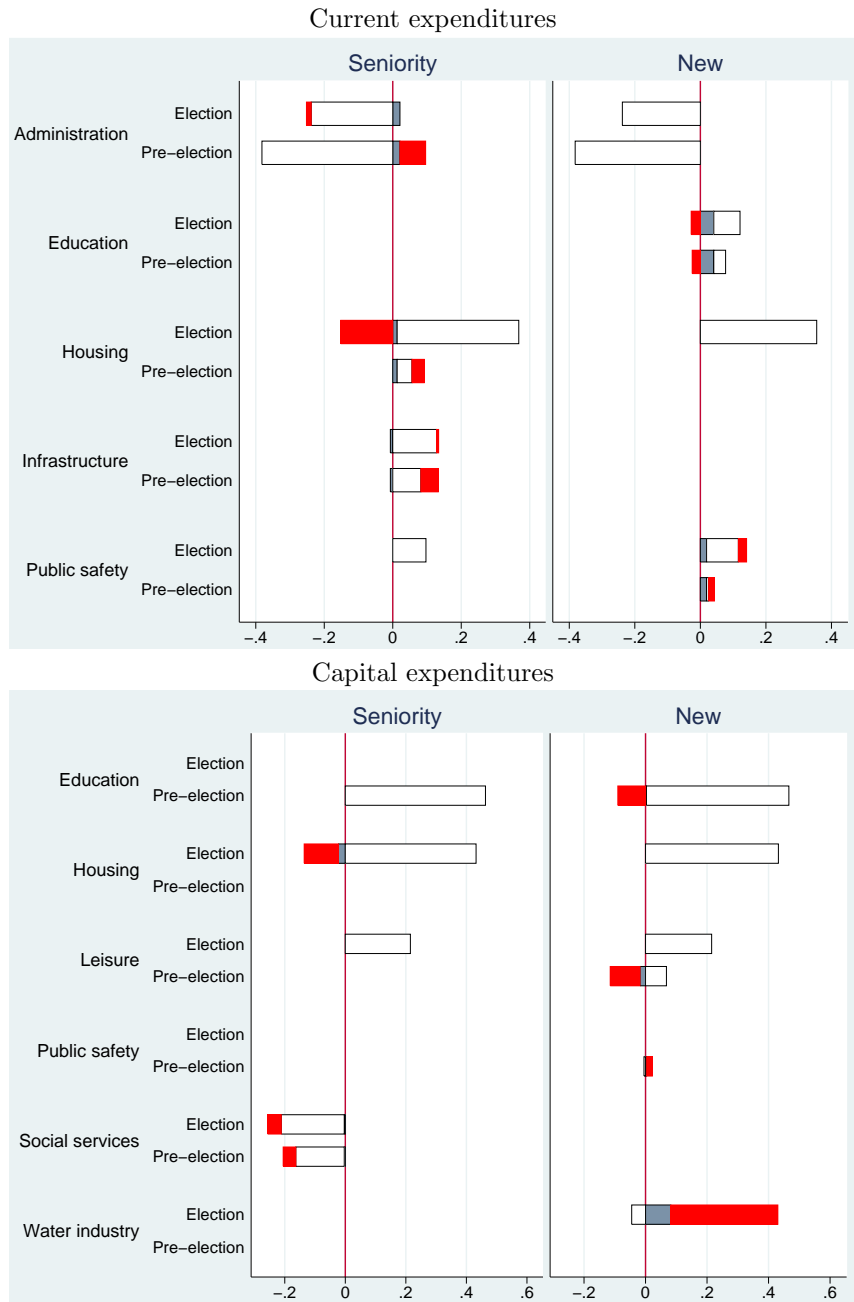


Notes: Light-bluish bar = the general effect of the variable, white bar = the general (pre-)electoral year effect, red bar = the specific additional effect of the variable in (pre-)electoral years.

Figure 3: Effect of strength

of some expenditures goes in the opposite direction than expected for opportunistic behavior (capital spending on education, leisure, water industry, public safety). These mayors may not be aware of the means of attracting votes, and/or may not have such an incentive for attracting votes because they still may have good alternative in the job market in case they fail in the elections.

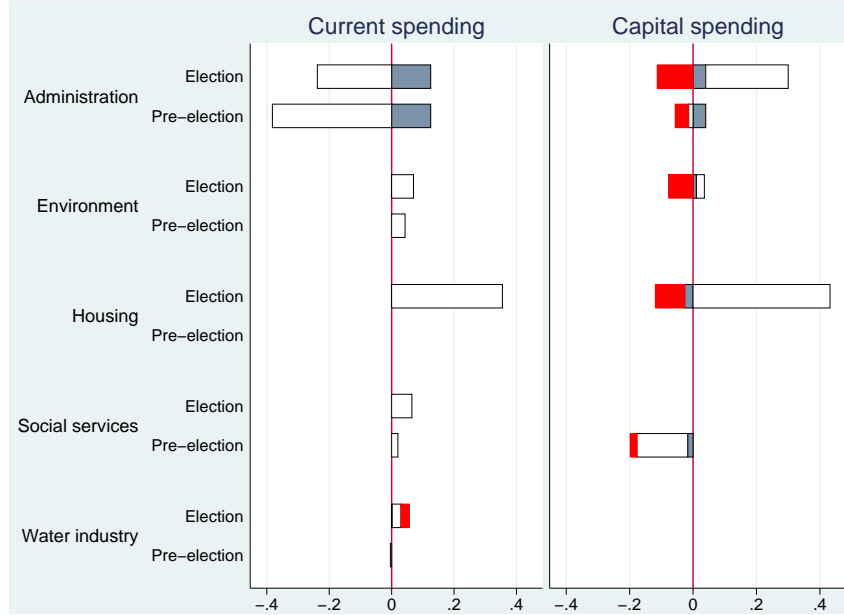
Additionally, we aim to find whether the number of terms in office may affect the way how



Notes: Light-bluish bar = the general effect of the variable, white bar = the general (pre-)electoral year effect, red bar = the specific additional effect of the variable in (pre-)electoral years.

Figure 4: Effect of experience

spending is distorted before election. On the one hand, more terms in office means more times a mayor got reelected in the past. Thus the mayors experience partly reflects his popularity and success and this effect should eliminate opportunistic behavior in current elections, because a more popular candidate gets higher voters' support compared to others. On the other hand, it may be more crucial for a mayor who has been in office for many years to stay in office and get reelected,



Notes: Light-bluish bar = the general effect of the variable, white bar = the general (pre-)electoral year effect, red bar = the specific additional effect of the variable in (pre-)electoral years.

Figure 5: Effect of dissimilarity

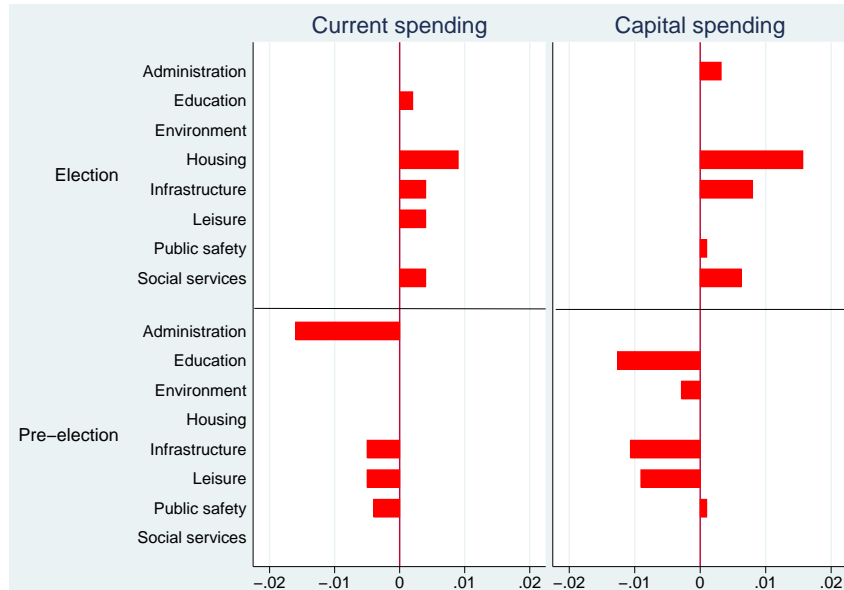
as his/her prospects on the job market are not so good. The results suggest that the first effect prevails; increasing number of terms in office decreases capital and current spending on housing in electoral years (housing being a targeted spending group), while it increases current spending on administration in the pre-electoral year (municipalities do not have to save on administration to expand other spending groups), and it also decreases capital spending on social services.

Hence, in general, local governments with more experienced mayors are more involved in political cycles compared to governments with newly elected mayors, but the more terms mayors are in office, the lower is the distortion of spending in favor of opportunistic behavior (at least for some specific spending groups).

**Dissimilarity** Figure 5 depicts the effect of average dissimilarity of results in national and local elections on distortion of spending composition before elections. More dissimilar results (representing higher voters' responsiveness to local policies and also involvement, or greater popularity of local-specific candidates) translate to lower increase (or even decrease for high dissimilarity values) in capital spending on administration (not extracting public resources in the last minute), housing (targeted group) and to decrease in capital spending on social services and environment (non-targeted groups). Concerning current spending, however, municipalities with higher dissimilarity spend more on administration in general (no significant savings are necessary) and more on water industry (non-targeted group). Hence, higher voters' involvement (represented by dissimilarity) is likely to decrease incentives of local politicians to distort spending before elections.

**Spillover from national elections** Finally, Figure 6 shows the conditional (pre-)electoral-year effects of the variable measuring change in support of mayor's party in parliamentary elections. The negative effect observed in pre-electoral year for total current and also capital expenditures





Notes: Only the (pre-)electoral year specific effects are plotted, because the variable is zero in post-electoral years. General (pre-)electoral year effects are not plotted as they are not directly comparable (the variable is continuous and not a dummy).

Figure 6: Spillover effect from national elections

is mainly assigned to education, infrastructure and leisure, which belong to the most targeted groups of spending before elections. Hence, if a mayor’s party expects improvement in national elections, it does not involve in such a distortion of spending in pre-electoral year (does not increase the spending on infrastructure, leisure and education as much as other municipalities). Surprisingly, we observe even greater decrease in current spending on administration. On the contrary, in electoral year, revealed improvement of mayor’s party in national elections translate to higher spending on housing, infrastructure, social services and leisure, as mayor’s party may receive (or expect to receive) higher transfers from closely politically aligned national government. Nevertheless, there can be an endogeneity bias and the effects may be overestimated (see above).

#### 5.4 Robustness check

As mentioned above, national parliamentary elections take place only 5 months before local elections. Hence, the local political cycle can be overestimated if the national political cycle affects municipal budget. Subsidies represent the most available mean how to affect local budgets from the centre.

Table 2 shows that state subsidies given to municipalities are higher in electoral years which may be assigned to either of the two effects: (i) the national government aims to increase its re-election prospects in parliamentary elections and provides higher amount of subsidies to municipalities, hence this increase is assigned to the national political cycle, or (ii) the municipal government makes a higher effort to get more subsidies in electoral year to increase spending before elections, and the increase emanates from the local political cycle. To test these hypotheses, we analyze a cyclical pattern of the net subsidies.<sup>12</sup>

<sup>12</sup>Net subsidies are total subsidies net of own transfers, net of specific purpose grants which represent mandatory

We introduce a new variable *national government*, which is a dummy variable equal to one if the ruling local party is at the same time the party in national government. Concerning the hypothesis (i), the national government supports only those municipalities where mayors are affiliated with the same political party.

Table 7 proves that subsidies are greater in electoral year, but local governments with lower incentives to manipulate spending before elections (left-wing governments and governments having majority) receive lower amount of subsidies in electoral year. This finding support the hypothesis (ii) that higher subsidies originate from the local political cycle. In addition, we have not found a significant increase in subsidies before elections for local governments where a mayors' party is at the same time a national-government party. These results suggest that the national political cycle is unlikely to affect municipal budgets in a large extent and hence, our findings above entirely originate from the local political cycle.<sup>13</sup>

Table 7: Net subsidies per capita

|                                    | System GMM   |               | Difference GMM |
|------------------------------------|--------------|---------------|----------------|
|                                    | (1)          | (2)           | (3)            |
| Electoral year                     | 0.727 ***    | 0.697 ***     | 0.759 ***      |
| Pre-electoral year                 | -0.114       | -0.191 †      | 0.005          |
| Subsidies <sub>t-1</sub>           | 0.401 ***    | 0.400 ***     | 0.440 ***      |
| Population density                 | -2.85E-04 ** | -2.86E-04 **  | -0.018 ***     |
| Big                                | -0.248 *     | -0.246 *      | 0.758          |
| Medium                             | -0.248 **    | -0.248 **     |                |
| Extra small                        | 0.381 ***    | 0.381 ***     | -0.617         |
| Left                               | 0.048        | 0.048         | 0.171          |
| Election × Left                    | -0.493 *     | -0.505 †      | -0.607 *       |
| Majority                           | -0.182       | -0.183        | -0.684         |
| Election × Majority                | -1.476 **    | -1.479 **     | -1.780 **      |
| National government                |              | 0.001         | 0.110          |
| Election × National government     |              | 0.077         | 0.274          |
| Pre-election × National government |              | 0.180         | 0.084          |
| Constant                           | 1.310 ***    | 1.313 ***     |                |
| No. of instruments                 | 14           | 17            | 14             |
| No. of observations                | 2,459        | 2,459         | 2,254          |
| AR(1)                              | -5.00 (0.00) | -5.00 (0.00)  | -5.13 (0.00)   |
| AR(2)                              | 0.06 (0.951) | -0.12 (0.905) | -0.02 (0.987)  |
| Hansen test                        | 5.07 (0.076) | 5.09 (0.078)  | 0.21 (0.664)   |
| Diff-in-Hansen test for levels     | 4.72 (0.030) | 4.74 (0.029)  |                |

Notes:  $z$ -value and  $\chi^2$  for AR processes and Hansen tests, respectively;  $p$ -value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.

## 6 Conclusions

We have analyzed electoral cycle in public expenditures for 205 municipalities in the Czech Republic over the period of 1997–2013, featuring four electoral years and five pre-electoral years. We estimated the effects using the difference and the system GMM developed by Arellano and Bond (1991) and Blundell and Bond (1998).

In general, municipalities were found to decrease current expenditures and increase capital expenditures before elections; the increase of capital spending in pre-electoral years tends to

social payments, payments per student transferred directly to schools and net of costs on elections' organization.

<sup>13</sup>The system GMM method generates a significant Hansen statistics suggesting the use of invalid instruments. The results from the system GMM are however robust when compared to the difference GMM except the effect of the municipality size.

crowd out current spending. Increased capital spending (investments) is in line with most of the literature (Veiga and Veiga 2007; Drazen and Eslava 2010; Furdas et al. 2015), crowding out of current spending was also found in a previous study on the Czech municipalities by Sedmihradská et al. (2011). In electoral years, capital spending increases on average by around 17%; this increase is primarily attributed to an increase in expenditures on leisure, infrastructure and housing, these groups being the most targeted before elections. Moreover, in pre-electoral years we observed significant increase in capital expenditures on education, since the effects of this spending are usually seen with some delay. The decrease in current expenditures (around 6% in pre-electoral years) is attributed to huge savings in administration and lower expenditures in education which are crowded out by capital expenditures (savings outweigh increased current spending on social services). The findings are very similar to Kneebone and McKenzie (2011) who found increased pre-electoral spending in highly visible areas such as education, roads, recreation and culture in Canadian provinces. In our case, spending on education has however a different time profile (targeted only in pre-electoral year).

We aimed to find characteristics of local governments which make manipulation before elections more/less likely. Concerning the municipality size, we found that big municipalities target also capital expenditures on environmental protection, this issue being appreciated by voters especially in big cities. On the contrary, bigger municipalities decrease spending on water industry as it is much less visible than in smaller municipalities. In addition, small municipalities tend to save on administration much more than other municipalities.

Furthermore, electoral cycles are also affected by local government's ideology. Contrary to Veiga and Veiga (2007), leftist governments were found to decrease capital spending before elections (on education and housing). They tend to increase current spending on social services before elections, while rightist governments target more capital spending on leisure (together with governments with mayors from non-parliamentary parties) and save on administration. Rightist governments have also higher capital spending on infrastructure in general, with no additional increase before elections. Moreover, governments with mayors from non-parliamentary parties increase current spending on housing.

The strength of local governments is also important. Municipalities where the mayor's party received the majority of votes in previous elections have much lower incentive to create electoral cycle (opposite effect was found for Portuguese municipalities in Veiga and Veiga 2007), while municipalities with strong mayors (the opposing ideological block being not in local government) are involved in political cycles when the main targeted spending groups are considered (significant general electoral year effects for capital spending on infrastructure, leisure, housing), but they save more on some non-targeted spending groups and do not need to save on administration to such an extent compared to other municipalities. These results are in line with Geys (2007) who found that less fragmented governments tend to involve in political cycles less.

Local governments with more experienced mayors get more involved in a political cycle compared to governments when mayors are newly elected, but the more terms mayors are in office, the lower is the distortion of spending in favor of opportunistic behavior (at least for some specific groups of spending).

Finally, we aimed to uncover the impact of voters' responsiveness to local politics on the electoral cycle. We measured voters' responsiveness by the dissimilarity in results of national elections and local elections. If the dissimilarity is large, capital spending on housing (targeted group), environment and social services (non-targeted groups) and administration is lower before

elections. The explanation is twofold: (i) politicians have lower incentive to distort spending when voters are more responsive and also more involved in local policies; (ii) larger dissimilarity is observed for strong and local-specific popular mayors, who do not need to involve in opportunism to such an extent (and to extract resources from the office before elections – decrease in capital spending on administration).

Last but not least, we tried to cope with national shocks, as national results of parliamentary elections may affect local electoral cycle. In pre-electoral years, if the mayor's party expects success (failure) in national elections, it tends to have lower (higher) spending on infrastructure, leisure and education (targeted groups of spending), so there is some spillover effect from national to local elections. The effect is, however, opposite in electoral years. During the 5-month period after parliamentary elections but before local elections, mayors affiliated with parties in newly-elected national government may receive higher revenues from national bodies (or expect to receive them in future), and therefore they increase the spending (primarily on housing, infrastructure, social services and leisure).

Our analysis contributes to the literature on local political cycles, but due to the unique and detailed dataset, the analysis is very comprehensive and illustrates the need of analyzing different expenditure groups separately as effects of various characteristics of local governments differ across expenditure groups. Exploiting the fact that national elections take place in the same year as local elections, we introduced two novel variables; one measuring voters' responsiveness to local policies and the other one uncovering spillover effect from national elections to local electoral cycle.

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## Appendix

Table A1: Current expenditures – groups: detailed results

|                                     | Infrastructure |       | Water industry |       | Education    |       | Leisure      |       | Housing      |       | Environment  |       | Social services |       | Public safety |       | Administration |       |
|-------------------------------------|----------------|-------|----------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|-----------------|-------|---------------|-------|----------------|-------|
|                                     | Uncond.        | Cond. | Uncond.        | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.         | Cond. | Uncond.       | Cond. | Uncond.        | Cond. |
| Electoral year                      | 0.128          |       | 0.028 †        |       | 0.080        |       | -0.001       |       | 0.355 *      |       | 0.070 ***    |       | 0.065 ***       |       | 0.097 ***     |       | -0.238 **      |       |
| Pre-electoral year                  | 0.082          |       | -0.004         |       | 0.036        |       | -0.007       |       | 0.043        |       | 0.043 ***    |       | 0.020 †         |       | 0.006         |       | -0.382 ***     |       |
| Current expenditures <sub>t-1</sub> | 0.421 ***      |       | 0.395 ***      |       | 0.419 ***    |       | 0.583 ***    |       | 0.496 ***    |       | 0.771 ***    |       | 0.766 ***       |       | 0.439 ***     |       | 0.712 ***      |       |
| Current expenditures <sub>t-2</sub> |                |       |                |       |              |       |              |       | 0.002        |       |              |       | -0.002          |       |               |       | -0.057         |       |
| Revenues                            | 0.023 ***      |       | 0.013 **       |       | 0.005 †      |       | 0.019 ***    |       | 0.132 ***    |       | 0.008 *      |       | 0.006 ***       |       | 0.014 ***     |       | 0.117 ***      |       |
| Youth                               | -0.012 †       |       |                |       | 0.010 ***    |       | -0.042 ***   |       | 0.086 ***    |       | -0.010 ***   |       | 0.009 **        |       | -0.002        |       | -0.034 ***     |       |
| Elderly                             |                |       | -0.006 *       |       |              |       |              |       | -0.054 ***   |       |              |       |                 |       |               |       |                |       |
| Prod. age                           |                |       | 0.000 †        |       |              |       |              |       |              |       |              |       |                 |       |               |       | 0.000 *        |       |
| Pop. density                        | 0.853 ***      |       | -0.014         |       | -0.148 ***   |       | 0.107 **     |       | 0.054 ***    |       |              |       | 0.000 †         |       | 0.000 ***     |       | 0.000 *        |       |
| Big                                 |                |       | -0.046 **      |       | 0.068 †      |       | -0.080 †     |       | 0.157 ***    |       |              |       | 0.033 †         |       | -0.030 †      |       | -0.287 ***     |       |
| El. Big                             |                |       | 0.017          |       | 0.035        |       | -0.112 **    |       | 0.100 *      |       |              |       | 0.003           |       | -0.059 *      |       | 0.150 **       |       |
| Pre-el. Big                         |                |       | 0.004          |       | -0.085 ***   |       | 0.077 **     |       | 0.038 **     |       |              |       | 0.006           |       | 0.027 †       |       | 0.150 **       |       |
| Medium                              | 0.219 ***      |       | 0.004          |       |              |       |              |       |              |       |              |       |                 |       | 0.027 †       |       | 0.150 **       |       |
| El. Medium                          | 0.060 †        |       | 0.279 ***      |       | -0.058 ***   |       | 0.057 †      |       | 0.133 ***    |       | 0.017        |       | -0.034 †        |       | -0.060 *      |       | -0.033         |       |
| Pre-el. Medium                      | 0.018          |       | 0.237 ***      |       | 0.000        |       | 0.048 †      |       | 0.125 ***    |       | -0.009       |       | 0.019           |       | -0.003        |       | 0.024          |       |
| Small                               | 0.062 †        |       | -0.004         |       | -0.063 **    |       | 0.076 **     |       |              |       |              |       | 0.040 *         |       | 0.040 *       |       | -0.002         |       |
| El. Small                           | 0.058 †        |       | 0.120 **       |       | 0.020        |       | -0.043 †     |       | 0.125 ***    |       |              |       | -0.042          |       | -0.042        |       | -0.002         |       |
| Pre-el. Small                       | -0.023         |       | 0.039          |       | -0.009       |       | -0.072 **    |       | 0.086 *      |       |              |       | 0.009           |       | 0.009         |       | 0.049 *        |       |
| Right                               | -0.040 †       |       |                |       | -0.014       |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| El. Right                           | 0.038          |       | -0.002         |       | 0.035 †      |       | 0.020        |       |              |       |              |       |                 |       |               |       |                |       |
| Pre-el. Right                       | 0.021          |       | -0.019         |       | 0.062 ***    |       | 0.048 **     |       |              |       |              |       |                 |       |               |       |                |       |
| Left                                |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| El. Left                            |                |       |                |       |              |       |              |       | 0.157 †      |       | 0.017        |       | 0.027 †         |       | 0.035 *       |       | -0.087 †       |       |
| Pre-el. Left                        |                |       |                |       |              |       |              |       | -0.051       |       | 0.105        |       | 0.023           |       | -0.033        |       | 0.002          |       |
| Nonparliamentary                    |                |       |                |       |              |       |              |       | -0.114       |       | 0.043        |       | -0.023          |       | 0.037         |       | 0.073 †        |       |
| El. Nonparl.                        |                |       |                |       |              |       |              |       | -0.182 †     |       | -0.099       |       | 0.028 **        |       | 0.028 **      |       | -0.050 †       |       |
| Pre-el. Nonparl.                    |                |       |                |       |              |       |              |       | 0.083        |       | 0.047        |       | 0.008           |       | 0.036 **      |       | 0.021          |       |
| Strong mayor                        |                |       |                |       |              |       |              |       | 0.230 †      |       | 0.047        |       | -0.078 **       |       | -0.012        |       | 0.021          |       |
| El. Strong                          |                |       |                |       |              |       |              |       | -0.144 †     |       | 0.005        |       | -0.071 **       |       | -0.083 **     |       | 0.047          |       |
| Pre-el. Strong                      |                |       |                |       |              |       |              |       | -0.024       |       | -0.168       |       | -0.030 †        |       | -0.089 †      |       | 0.109 *        |       |
| Majority                            |                |       |                |       |              |       |              |       | -0.015       |       | -0.159       |       | -0.003          |       | -0.012        |       | 0.068          |       |
| El. Majority                        |                |       |                |       |              |       |              |       | -0.013       |       | -0.138 *     |       | -0.055 ***      |       | -0.027 †      |       | 0.123 **       |       |
| Pre-el. Majority                    |                |       |                |       |              |       |              |       | 0.036        |       | 0.050        |       | 0.029           |       | -0.026        |       | 0.108 †        |       |
| Winning margin                      |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| El. Winning                         | 0.001          |       | 0.001          |       | -0.003 **    |       | -0.002 †     |       | 0.000        |       | 0.000        |       | 0.002 *         |       | 0.002 *       |       | 0.000 *        |       |
| Pre-el. Winning                     | -0.006 **      |       | -0.005 *       |       | -0.002 *     |       | -0.001       |       | -0.003 ***   |       | -0.003 ***   |       | 0.000           |       | 0.000         |       | 0.002          |       |
| Recandidacy                         | -0.007         |       |                |       | -0.002 *     |       | 0.002 †      |       | 0.000        |       | 0.000        |       | -0.001          |       | -0.001        |       | 0.001          |       |
| El. Recand.                         | 0.006          |       | -0.001         |       |              |       |              |       | 0.013        |       | -0.138 *     |       | 0.019 †         |       | 0.019 †       |       | 0.021          |       |
| Pre-el. Recand.                     | 0.051 ***      |       | 0.044 ***      |       |              |       |              |       | -0.152 *     |       | 0.050        |       | 0.025           |       | 0.025         |       | -0.014         |       |
| New                                 |                |       |                |       |              |       |              |       | 0.036        |       |              |       | 0.018           |       | 0.018         |       | 0.075 **       |       |
| El. New                             |                |       |                |       |              |       |              |       |              |       |              |       | 0.044           |       | 0.044         |       | 0.095 ***      |       |
| Pre-el. New                         |                |       |                |       |              |       |              |       |              |       |              |       | 0.036 †         |       | 0.036 †       |       |                |       |
| Turnout                             |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| El. Turnout                         | -0.003         |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Pre-el. Turnout                     | -0.003         |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Dissimilarity                       | -0.002         |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| El. Dissimilarity                   |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Pre-el. Dissimilarity               |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Change                              | 0.025 ***      |       | 7E-05 †        |       | 0.004        |       | -0.020 ***   |       | -0.145 ***   |       |              |       | 0.000           |       | -0.006 †      |       | -0.041 **      |       |
| El. Change                          | -0.022 **      |       | 2E-05          |       | -0.002       |       | 0.002 *      |       | 0.155 ***    |       | 0.009 †      |       | 0.004 †         |       | 0.004 ***     |       | 0.039 **       |       |
| Pre-el. change                      | -0.030 ***     |       | -0.005 **      |       | -0.005       |       | -0.001       |       | 0.141 ***    |       | -0.004       |       | 0.001           |       | 0.002         |       | 0.025 †        |       |
| Constant                            | 0.270          |       | 0.260 †        |       | 0.659 ***    |       | 0.883 ***    |       | -2.165 **    |       | 0.221 *      |       | -0.170 **       |       | -0.051        |       | -0.083         |       |
| No. of instruments                  | 198            |       | 199            |       | 198          |       | 186          |       | 196          |       | 182          |       | 196             |       | 201           |       | 197            |       |
| AR(1)                               | 3.041          |       | 3.041          |       | 3.027        |       | 2.857        |       | 2.842        |       | 3.062        |       | 3.024           |       | 2.857         |       | 2.786          |       |
| AR(2)                               | -3.11 (0.00)   |       | -1.74 (0.08)   |       | -4.89 (0.00) |       | -4.96 (0.00) |       | -5.09 (0.00) |       | -4.05 (0.00) |       | -3.58 (0.00)    |       | -2.10 (0.04)  |       | -2.64 (0.01)   |       |
| Hansen test                         | 0.29 (0.77)    |       | -0.21 (0.84)   |       | 0.73 (0.46)  |       | -0.20 (0.84) |       | -0.90 (0.37) |       | 0.55 (0.59)  |       | -1.26 (0.21)    |       | -1.29 (0.20)  |       | -1.18 (0.24)   |       |
| Diff-in-Hansen test                 | 188.1 (0.16)   |       | 198.5 (0.17)   |       | 189.7 (0.14) |       | 169.7 (0.27) |       | 184.1 (0.27) |       | 178.1 (0.20) |       | 189.7 (0.18)    |       | 188.3 (0.15)  |       | 196.1 (0.11)   |       |
|                                     | 22.16 (0.85)   |       | 15.60 (0.99)   |       | 11.48 (0.99) |       | 19.4 (0.93)  |       | 29.47 (0.44) |       | 22.86 (0.85) |       | 17.83 (0.95)    |       | 21.32 (0.88)  |       | 8.66 (1.00)    |       |

Notes: z-value and  $\chi^2$  for AR processes and Hansen test, respectively; p-value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.

Table A2: Capital expenditures – groups: detailed results

|                                     | Infrastructure |       | Water industry |       | Education    |       | Leisure      |       | Housing      |       | Environment  |       | Social services |       | Public safety |       | Administration |       |
|-------------------------------------|----------------|-------|----------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|-----------------|-------|---------------|-------|----------------|-------|
|                                     | Uncond.        | Cond. | Uncond.        | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.      | Cond. | Uncond.         | Cond. | Uncond.       | Cond. | Uncond.        | Cond. |
| Electoral year                      | 0.234***       |       | -0.045         |       | 0.026        |       | 0.215†       |       | 0.432*       |       | 0.025        |       | -0.208          |       | 0.008         |       | 0.260**        |       |
| Pre-electoral year                  | 0.093**        |       | 0.070          |       | 0.463***     |       | 0.068        |       | 0.006        |       | -0.025       |       | -0.100***       |       | -0.005        |       | -0.014         |       |
| Capital expenditures <sub>t-1</sub> | 0.331***       |       | 0.312***       |       | 0.407***     |       | 0.277***     |       | 0.428***     |       | 0.274***     |       | 0.414**         |       | 0.121**       |       | 0.428***       |       |
| Capital expenditures <sub>t-2</sub> |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Revenues                            | 0.036***       |       | 0.203***       |       | 0.043***     |       | 0.052***     |       | 0.132***     |       | 0.014***     |       | 0.017***        |       | 0.002***      |       | 0.030*         |       |
| Young                               | -0.060***      |       | 0.087***       |       | 0.022†       |       | -0.033†      |       | 0.123***     |       | 0.014*       |       | 0.017***        |       | -0.006***     |       | 0.030*         |       |
| Old                                 | -0.014**       |       | 0.023*         |       |              |       | -0.023**     |       | -0.047***    |       |              |       | -0.014***       |       | -0.003**      |       | -0.014**       |       |
| Pop. density                        |                |       |                |       |              |       |              |       |              |       |              |       |                 |       |               |       |                |       |
| Big                                 | 0.230**        |       | -0.006         |       | -0.058       |       | 0.290**      |       |              |       | 0.000***     |       | 0.000**         |       | -0.023**      |       | -0.094**       |       |
| El. Big                             |                |       | -0.282*        |       | 0.107        |       | -0.199       |       | 0.091        |       | 0.034        |       | 0.074†          |       | 0.001         |       | 0.004          |       |
| Pre-el. Big                         |                |       | 0.017          |       | -0.163**     |       | -0.118       |       | 0.172†       |       | 0.040        |       | 0.071           |       | 0.009         |       | 0.076†         |       |
| Medium                              | 0.018          |       |                |       |              |       | 0.139*       |       |              |       | 0.058†       |       | -0.019          |       | -0.082†       |       | -0.019         |       |
| El. Medium                          | 0.147†         |       |                |       |              |       | -0.167       |       | -0.029       |       |              |       |                 |       | 0.004         |       | 0.076†         |       |
| Pre-el. Medium                      | 0.170**        |       |                |       |              |       | -0.044       |       | 0.094        |       |              |       |                 |       | -0.021***     |       | -0.095***      |       |
| Small                               |                |       |                |       |              |       | 0.204***     |       |              |       |              |       |                 |       | 0.013         |       | 0.054          |       |
| El. Small                           |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | -0.005        |       | 0.108          |       |
| Pre-el. Small                       | 0.074*         |       | -0.179*        |       | -0.030       |       | -0.016       |       |              |       |              |       |                 |       | -0.005        |       | -0.081**       |       |
| Right                               |                |       | -0.048         |       | -0.029       |       | 0.245†       |       | 0.228†       |       |              |       |                 |       | 0.004         |       | 0.004          |       |
| El. Right                           |                |       | 0.193*         |       | -0.163**     |       | 0.122        |       | 0.106        |       |              |       |                 |       | 0.004         |       | 0.076†         |       |
| Pre-el. Right                       |                |       |                |       | 0.004        |       |              |       |              |       |              |       |                 |       | -0.021***     |       | -0.095***      |       |
| Left                                |                |       |                |       | -0.142       |       | -0.138†      |       |              |       |              |       |                 |       | 0.013         |       | 0.054          |       |
| El. Left                            |                |       |                |       | -0.177†      |       | -0.173†      |       | 0.196*       |       |              |       |                 |       | -0.005        |       | -0.026**       |       |
| Pre-el. Left                        |                |       |                |       |              |       |              |       | -0.040       |       |              |       |                 |       | 0.004         |       | 0.008          |       |
| Nonparliamentary                    |                |       |                |       |              |       |              |       | -0.233†      |       |              |       |                 |       | -0.023**      |       | -0.094**       |       |
| El. Nonparl.                        |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.004          |       |
| Pre-el. Nonparl.                    |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.004          |       |
| Strong mayor                        |                |       | 0.111          |       |              |       | 0.128        |       |              |       |              |       |                 |       | 0.004         |       | 0.076†         |       |
| El. Strong                          |                |       | -0.215†        |       |              |       | 0.255**      |       |              |       |              |       |                 |       | 0.004         |       | 0.076†         |       |
| Pre-el. Strong                      |                |       | -0.135         |       |              |       | 0.087        |       |              |       |              |       |                 |       | -0.021***     |       | -0.019         |       |
| Majority                            | 0.075          |       |                |       |              |       |              |       |              |       |              |       |                 |       | -0.021***     |       | -0.019         |       |
| El. Majority                        | -0.096         |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.004         |       | 0.008          |       |
| Pre-el. Majority                    | -0.373†        |       |                |       |              |       |              |       |              |       |              |       |                 |       | -0.021***     |       | -0.019         |       |
| Winning margin                      |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.004         |       | 0.008          |       |
| El. Winning                         |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | -0.012        |       | -0.009         |       |
| Pre-el. Winning                     |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.019†        |       | 0.022*         |       |
| Recandidacy                         |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.000         |       | 0.004          |       |
| El. Recand.                         |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.007*        |       | 0.008**        |       |
| Pre-el. Recand.                     |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.007**       |       | 0.007**        |       |
| New                                 | 0.082          |       | 0.348*         |       | 0.038        |       | 0.041        |       |              |       |              |       |                 |       | 0.000         |       | 0.004          |       |
| El. New                             |                |       | -0.140         |       | -0.090**     |       | -0.087***    |       |              |       |              |       |                 |       | 0.000         |       | 0.004          |       |
| Pre-el. New                         |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | -0.012        |       | -0.009         |       |
| Turnout                             |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.019†        |       | 0.022*         |       |
| El. Turnout                         |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.000         |       | 0.008*         |       |
| Pre-el. Turnout                     |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.007**       |       | 0.007**        |       |
| Dissimilarity                       |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.007**       |       | 0.007**        |       |
| El. Dissimilarity                   |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.000         |       | 0.003**        |       |
| Pre-el. Dissimilarity               |                |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.002**        |       |
| Change                              | 0.041***       |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.002**        |       |
| El. Change                          | -0.033**       |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.002**        |       |
| Pre-el. change                      | -0.052***      |       |                |       |              |       |              |       |              |       |              |       |                 |       | 0.001         |       | 0.002**        |       |
| Constant                            | 0.923**        |       | -4.745***      |       | -0.798**     |       | 0.363        |       |              |       |              |       |                 |       | 0.000         |       | 0.004          |       |
| No. of instruments                  | 177            |       | 182            |       | 190          |       | 189          |       | 188          |       | 181          |       | 202             |       | 185           |       | 198            |       |
| No. of observations                 | 3,041          |       | 3,062          |       | 3,041        |       | 3,246        |       | 3,041        |       | 2,857        |       | 2,842           |       | 2,857         |       | 2,842          |       |
| AR(1)                               | -7.16 (0.00)   |       | -2.19 (0.03)   |       | -6.37 (0.00) |       | -4.35 (0.00) |       | -5.65 (0.00) |       | -4.14 (0.00) |       | -3.63 (0.00)    |       | -4.87 (0.00)  |       | -3.60 (0.00)   |       |
| AR(2)                               | -0.13 (0.90)   |       | -1.36 (0.17)   |       | 0.12 (0.90)  |       | -1.03 (0.30) |       | -1.51 (0.13) |       | -0.83 (0.41) |       | -1.21 (0.23)    |       | 0.59 (0.55)   |       | -0.63 (0.53)   |       |
| Hansen test                         | 180.2 (0.12)   |       | 180.0 (0.17)   |       | 192.1 (0.11) |       | 199.5 (0.21) |       | 188.2 (0.15) |       | 178.6 (0.14) |       | 193.5 (0.14)    |       | 184.4 (0.11)  |       | 190.4 (0.14)   |       |
| DIF-in-Hansen test                  | 25.10 (0.72)   |       | 24.33 (0.80)   |       | 31.66 (0.38) |       | 26.46 (0.70) |       | 13.64 (0.99) |       | 36.50 (0.19) |       | 16.62 (0.96)    |       | 32.81 (0.33)  |       | 14.95 (0.99)   |       |

Notes:  $z$ -value and  $\chi^2$  for AR processes and Hansen test, respectively;  $p$ -value in parentheses. \*\*\*, \*\*, \* denote statistical significance at 1%, 5% and 10% level, respectively. † denotes statistical significance at 10% level on one-tail.



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