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Florian Dorn

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Telephone +49(0)89 9224 0, Telefax +49(0)89 985369, email ifo@ifo.de
www.ifo.de

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Abstract

Politicians are expected to influence policy outcomes in a way to gain electoral advantage. There is, however, a pending question whether efficiency in the provision of public goods and services is affected by strategic behavior. I examine how electoral cycles influence local government efficiency by using OLS fixed effects, event study, and instrumental variable estimations in a large balanced panel of around 2,000 municipalities in the German state of Bavaria. Cost efficiency is estimated by employing a fixed effects semi-parametric stochastic frontier analysis. The results show that electoral cycles increase government efficiency in election and pre-election years by around 0.75– 0.85 %. The effect is larger when executive and council electoral cycles coincide, and when incumbent mayors run for office again. My findings suggest an efficiency-enhancing effect of elections at given institutional conditions.

JEL Code: C14, C23, C26, D72, D73, H41, H70, H72, R15, R50
Keywords: Electoral cycle, efficiency, local government, stochastic frontier analysis (sfa), panel data, event study, instrumental variables

Florian Dorn
ifo Institute – Leibniz Institute for
Economic Research
at the University of Munich,
University of Munich, CESifo
Poschingerstr. 5
81679 Munich, Germany
dorn@ifo.de

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"Majorities rule often nicely,
If still concerned with public goods;
But even with all voting wisely
Irrational cycles swamp the books."
Bernholz (1980)

1 Introduction

Election cycle theories suggest that incumbents seeking re-election manipulate economic policies before elections (MacRae, 1977; Nordhaus, 1975; Rogoff, 1990; Rogoff and Sibert, 1988). Empirical evidence is mixed, but overall indicates that electoral cycles influence budgetary and political decisions (e.g., De Haan and Klomp, 2013; Dubois, 2016; Philips, 2016, for an overview). Electoral cycles have been shown to influence fiscal variables such as expenditure, budget composition, deficits, taxation, and fees at individual governmental layers.[1] Incumbents also increased the provision of public goods and services before elections. Evidence shows, for example, how electoral motives influence labor market policies (e.g., Mechtel and Potrafke, 2013), public employment and subsidies (e.g., Coelho et al., 2006; Dahlberg and Mörk, 2011; Tepe and Vanhuysse, 2009, 2013, 2014), or the quantity of decisions in public administration (e.g., Garmann, 2017a). While politicians are expected to allocate public resources in a manner to gain electoral advantage, a pending question is whether this allocation comes at the cost of wasteful public spending before elections.

I examine whether elections influence governments efficiency in the provision of public goods and services. Government efficiency measures a ratio which puts the overall provision of public goods and services (*output*) in relation to their costs (*input*). Using panel data for around 2,000 municipalities in the German state of Bavaria for the period 2007-2017, my findings do not show that politicians increase public spending in a wasteful way before elections. In contrast, electoral cycles in the executive branch increase cost efficiency by around 0.75 - 0.85 % in election and pre-election years. The results challenge the literature on electoral cycles.

This paper makes several contributions. First, examining how electoral cycles influence overall government efficiency is new. I contribute to the understanding of the role of

[1] For the national government level (e.g., Brender and Drazen, 2005; Potrafke, 2010, 2020; Reischmann, 2016; Schuknecht, 2000; Shi and Svensson, 2006), the state and regional level (e.g., Akhmedov and Zhuravskaya, 2004; Kauder et al., 2018, 2017; Kneebone and McKenzie, 2001; Sjahrir et al., 2013), or the local government tier (e.g., Aidt et al., 2011; Ashworth et al., 2006; Baleiras and da Silva Costa, 2004; Drazen and Eslava, 2010; Englmaier and Stowasser, 2017; Foremny and Riedel, 2014).

democratic institutions (in particular elections) for a cost-efficient use of public resources, and provide evidence whether re-election incentives give rise to (in)efficient policies.[2]

Second, studies examining electoral cycles often focus on single outcome variables. Because of several municipal responsibilities, however, it is not obvious which outcome variable is affected by the strategic behavior of incumbents prior to elections. Cost efficiency scores, by contrast, provide a composite approach and relate proxies for several output variables of the local government to an input variable used by the government to produce these outputs. I use the total net expenditure of the municipalities as input factor in the cost production function. Local governments which produce its multitude of tasks in the most economical way define the cost efficiency frontier. Deviations from the estimated best practice frontier represent cost inefficiency. The median value of cost inefficiency in my sample suggests that the local government in the median municipality can reduce expenditures by about 11 % to reach the efficiency frontier at a given output level. I use the inefficiency scores as the dependent variable and employ OLS fixed effects, event study and instrumental variable estimation approaches to examine how executive electoral cycles influence cost inefficiencies.

Third, several related studies calculate government efficiency — the dependent variable — by (*non-parametric*) deterministic approaches ignoring measurement errors, or by (*semi-parametric*) models without accounting for time-invariant heterogeneities across units. Ignoring time-invariant characteristics, which may affect the output but cannot be influenced by the government (e.g., geography), give rise to biased government efficiency estimates. I address the concerns by calculating cost inefficiency scores of municipalities based on a semi-parametric stochastic frontier analysis (SFA) including the true fixed effects specification by Greene (2005), which is innovative among empirical studies examining government efficiency. My estimation approach disentangles government inefficiencies from measurement errors, and from time-invariant factors to produce conditional and unbiased efficiency estimates.[3]

Finally, I investigate electoral cycles in the executive branch (*mayoral elections at the local government level*). Empirical studies examining the effects of executive cycles are scarce (e.g., Foremny et al., 2018; Garmann, 2017a,b; Hessami, 2018; Rose, 2006) because chief executives are oftentimes either not directly elected, or elections are held simultaneously in all units in the same year. Another reason occurs if executive (e.g., mayoral) and legislative (e.g., council) elections always coincide such that the effects on policy outcomes cannot be clearly attributed. Scholars show that the effect of electoral cycles may differ among both

[2]Related studies examine how electoral cycles affect corruption (e.g., Potrafke, 2019), or misallocation of public funds (e.g., Finan and Mazzocco, 2020).

[3]Asatryan and De Witte (2015) use another novel, non-parametric approach which is not deterministic and allows to calculate conditional efficiency including time-invariant factors.

governmental branches and when cycles overlap (e.g., Foremny et al., 2018). I disentangle executive electoral cycles from overlapping cycles in which mayoral and council elections coincide, while accounting for general annual effects. My results show that marginal effects of pre-election and election years on cost savings (at a given output level) are larger in overlapping than in individual executive election years. The results, moreover, suggest that effects are larger when the incumbent mayor runs for office again.

Identifying the effect of electoral cycles on government efficiency is challenging at the national or state level. Governments at higher tiers are often not comparable in size, institutions, rights or functions, and are affected by many confounding factors. By contrast, local governments within a single state operate under a more homogenous institutional framework than higher tiers of governments across states or countries. Studies using local data are thus less likely to suffer from unobserved heterogeneity. In addition, there are many more municipalities within one state, than (German) states or even countries. Exploiting variation at the local level thus increases both the sample size and the variation in electoral cycles which give rise to the power of the statistical tests.

I focus on the local level in the German state of Bavaria. The institutional setting of Bavarian municipalities provides some more advantages for examining the relationship of elections and efficiency. First, decentralization of responsibilities and fiscal autonomy are prerequisites for local politicians to influence the provision of public goods and services by own budgetary decisions.[4] Historically, the Bavarian municipalities have a high degree of autonomy in the provision of public goods and services and a high degree of fiscal autonomy. Bavarian municipalities are jointly governed by a council and a mayor (executive) who acts as head of the council and head of the municipal administration. The mayor is very powerful and can, for example, set the political agenda and can influence the duration of decision making processes and the implementation of outcomes. Decisions of the local government are time determinable and targetable and thus fulfill an important requirement for strategic behavior to promote re-election. Second, a high degree of transparency facilitates to better monitor activities of (local) politicians and for them to be punished and rewarded accordingly in direct elections (see Alt and Lassen, 2006a,b; Borge et al., 2008; Geys et al., 2010).[5] The on average small population size of

[4]Scholars have shown that (fiscal) decentralization and autonomy increase government performance (Barankay and Lockwood, 2007; Feld and Voigt, 2003; Geys et al., 2010; Hindriks and Lockwood, 2009; Kappeler and Välilä, 2008; Seabright, 1996).

[5]Empirical evidence suggests that transparency reduces expansionary public spending and budget deficits before elections (Akhmedov and Zhuravskaya, 2004; Alt and Lassen, 2006a,b; Montes et al., 2019), and increases accountability and government efficiency at the cross-country and local government level (Guillamón and Cuadrado-Ballesteros, 2020; Montes et al., 2019). Moreover, it is argued that communication and information increases citizen participation (Ebdon and Franklin, 2006; Lassen, 2005). In addition, related studies using samples of German municipalities show that mayors directly elected by voters are more effective in providing public goods than appointed mayors, and have more incentives to attract government grants in election years (Gaebler and Roesel, 2019; Hessami, 2018).

the Bavarian municipalities enables citizens to get involved in local government affairs (e.g., Asatryan and De Witte, 2015). Moreover, fiscal transparency makes the politicians accountable for their decisions. As council meetings on municipal budget plans are public, budgetary decisions and outcomes can be attributed to individual local politicians.[6] Given the institutional environment in Bavaria, electoral cycles are expected to increase the efforts of incumbents seeking re-election.

2 Theoretical background and related literature

From a theoretical perspective, it is not *a priori* clear whether electoral cycles change governments efficiency in providing public goods and services. Following the literature on electoral cycles, governments can influence fiscal aggregates and public policies around election years (see Section 1). On the one hand, expenditure changes may well coincide with analogous changes in the level of provided public goods and services. Electoral cycles may therefore increase both, public spending and public service provision without changing cost efficiency. On the other hand, electoral cycles are likely to give rise to a wasteful use of public resources if incumbent politicians seeking re-election inefficiently pursue expansionary policies. Electoral cycles, however, may also decrease inefficiencies. While voters may appreciate an extended provision of public goods and services, empirical evidence suggests that voters do not like to pay much for an extended provision of public goods and services — the latter supports the idea of a fiscally conservative voter (see Brender, 2003; Brender and Drazen, 2008; Drazen and Eslava, 2010; Feld and Matsusaka, 2003; Garmann, 2017b; Geys and Vermeir, 2008; Peltzman, 1992).[7] Therefore, "an efficient provision of public goods and services [...] is likely to win voters' hearts" (Kalb et al., 2012, p. 201), or as Asatryan and De Witte (2015, p. 59) emphasize, "voters arguably have much clearer positions against inefficient governments than regarding the level of its expenditures or taxes".

The relationship between elections and government efficiency may well be studied in a (nonmarket) principal-agent-setting in which the population (voters) acts as principal and the incumbent politicians (bureaucrats) act as agents. For a given level of fiscal costs, the population demands as many public goods and services as possible. The conflict of interests between the principal and the agent arises because the incumbents are expected to benefit from less efforts and less productive activities (e.g., rent-seeking, wasteful spending and

[6] In contrast, studies examining electoral cycles in the fiscal policies of German states may not be able to account for the state governments discretionary influence (e.g., Galli and Rossi, 2002; Schneider, 2010).

[7] Empirical evidence on the effect of public spending on electoral gains is ambiguous (see Brender, 2003; Brender and Drazen, 2008; De Haan and Klomp, 2013). Some studies find that incumbent politicians benefit from pursuing expansionary policies (e.g., Akhmedov and Zhuravskaya, 2004; Freier, 2015), while others show that in developed countries incumbents are more likely to be punished by voters for loose fiscal policies and deficit spending with strong democratic and fiscal institutions (e.g., Brender, 2003; Brender and Drazen, 2008).

over-employment) which increase cost inefficiency (Migué and Bélanger, 1974; Niskanen, 1968). Democratic institutions (e.g., elections) which ensure political competition and political participation by citizens, and which allow the citizens to monitor and reward or punish incumbent politicians accordingly, are expected to enhance the incumbents' incentives and efforts to prevent inefficiency in the use of public resources (see Leibenstein, 1966; Niskanen, 1975; Ostrom and Ostrom, 1971).

Empirical evidence on the effect of democratic institutions – and in particular elections – on government efficiency is, however, limited.[8] Some studies at the local level show that democratic participation and voter involvement (e.g., Borge et al., 2008; Geys et al., 2010), political competition (e.g., Ashworth et al., 2006; Geys et al., 2010; Kalb, 2010), and direct democratic institutions (e.g., Asatryan and De Witte, 2015; Matsusaka, 2009) improve the efficiency of the provision of public goods and services by local governments.[9] By contrast, Finan and Mazzocco (2020) use data in Brazil and find evidence that electoral incentives give rise to misallocation of public funds. They conclude that welfare effects of electoral cycles depend on the institutional framework of (local) governments.

Some scholars use the local level in Germany to elaborate on the relationship between democratic institutions and government efficiency. Geys et al. (2010) and Kalb (2010) show how political competition and voter involvement increase efficiency of municipalities in the state of Baden-Württemberg. The efficiency-enhancing effect of democratic institutions, however, is positively affected by the degree of the fiscal autonomy of local governments. Similarly, Asatryan and De Witte (2015) show that citizens' initiatives as an element of direct democracy give rise to greater efficiency of local governments in a cross-section of Bavarian municipalities.

Related studies also use the institutional setting at the local level in Germany to provide empirical evidence for electoral cycles in political decisions and fiscal outcomes. Scholars suggest that local incumbent politicians use their influence in public firms to ensure that voter-friendly firm decisions are made before elections, for example decisions on electricity prices by public energy providers (Englmaier et al., 2017) or the quantity of savings bank lending by public banks (Englmaier and Stowasser, 2017). Elaborating on large panels using West German municipalities, empirical evidence is shown for electoral cycles in local government fees (Krause, 2019), and on local tax growth rates around council election years (Foremny and Riedel, 2014; Furdas et al., 2015). However, results for the effect of council election cycles on expenditures are ambiguous (Foremny et al., 2018; Furdas

[8] In a cross-country study, Adam et al. (2011) find that democratic governments are more efficient than autocratic governments.

[9] Several studies examine determinants of government efficiency at the country level (e.g., Afonso et al., 2005), or the regional and local government tier (see Kalb et al., 2012; Narbón-Perpiñá and De Witte, 2018a,b, for surveys of empirical studies on local government efficiency).

et al., 2015). Evidence for the executive branch rather suggests that expenditures increase in post-election years (Foremny et al., 2018). Based on a sample of municipalities in the states of Baden-Württemberg and Bavaria, Foremny et al. (2018) show that the effect of electoral cycles is more pronounced when executive and council elections coincide and that it depends on the incumbent mayor's decision to run for office again.[10] Findings in a small sample of municipalities in the German state of Hesse show that incumbents rather decrease spending before elections when the electorate is fiscally conservative (Garmann, 2017b). By contrast, the number of building permits is increased by local public administrations in years in which executive elections are held (Garmann, 2017a).

3 Institutional background

Bavaria has a population size of around 13 million people living in 2,056 municipalities. This means that a municipality has an average of about 6,000 inhabitants, while half of all municipalities have a population of less than 2,800. The municipal level is the lowest layer of four governmental tiers in Germany.[11] Local governments in Bavaria act under a quite homogenous institutional framework, the same administrative and election laws, responsibilities and rights. All municipalities are influenced by the same federal and state government decisions, have access to the same capital market, and use quasi-identical labor and capital cost structures.[12]

Local constitution

Local governments have a high degree of autonomy in providing public goods and services and are responsible for approximately 46 % of public spending in the German state of Bavaria.[13] The high degree of autonomy of municipalities was first established by the Bavarian royal decree of 1818 (Gemeindeedikt, 1818). After World War II, German and

[10] Findings by Freier (2015) suggest that incumbents in municipalities of the German state of Bavaria over the period 1945-2010 gain an advantage in the next mayoral elections if they succeed in increasing public spending during the entire election term. He does, however, not disentangle the effects for electoral cycles and the timing of public spending.

[11] Germany has 16 federal states, about 300 counties and about 11,000 municipalities. In Bavaria, 25 of the 2,056 municipalities are consolidated and independent city-counties. That is, the independent city likewise fulfills responsibilities of municipalities and counties.

[12] Factor price differences are not a problem as labor and capital costs are largely the same in all Bavarian municipalities. Wages are quite homogenous because of collective labor agreements for the public sector and civil servants. The absence of differences in risk premia for German jurisdictions at the capital market is guaranteed by the federal government. Property prices may vary across municipalities. This, however, is captured by the fixed effects estimation approach.

[13] Gross expenditures, including budgets of the local governments and local public firms (Federal Statistical Office, 2020).

Bavarian constitutional laws reaffirmed the rights of municipalities to self-administration, including the direct election of the local government, personnel sovereignty and a high degree of financial autonomy.[14] Direct responsibilities of governments at the municipal level include, for example, child care provision, primary and secondary schools, investments in local infrastructure (e.g., buildings, municipal roads, public transport, and water supply), and tasks of public order (e.g., fire protection and municipal cleanliness).[15] Local governments, moreover, oversee local public firms, and have opportunities to promote culture (e.g. music schools and libraries), to provide infrastructure for recreation, or to invest in economic development. In addition, the local public administration fulfills some mandated tasks of higher governmental tiers such as several administrative activities (e.g., registry of population and building licenses), social welfare spending, or the local organization of elections. Local governments in Bavaria spend an average of around 3,600 Euros per capita, whereas about 1/3 of the budget were for child care provision and other social welfare spending.[16] However, local governments in Bavaria have an obligation to balance the annual budget, and to follow the "principles of economic and cost efficiency" (*minimum principle*).[17] Budget plans of the local governments are highly transparent and publicly available, and council meetings on budgetary decisions are public for citizens and media. To guarantee sustainable and transparent budgeting, local governments must publish a (*non-binding*) five-year plan on future investments and large expenditures each year.

Municipalities in Bavaria are governed in joint responsibility by a directly elected mayor (*executive branch*) and a directly elected council (*legislative branch*). The council is the legislative body of the government and makes budget and policy decisions by absolute majority. Council members also have an auditing function to control the implementation of decisions. The mayor, as executive, depends on council decisions and must implement the decisions accordingly.[18] The constitutional setting in Bavaria, however, historically grants the mayor a powerful position including far-reaching rights and duties following the South German Council Constitution (*Süddeutsche Ratsverfassung*).[19] The mayor automatically

[14] Art. 28 GG (*Grundgesetz der Bundesrepublik Deutschland*); Art. 11 BV (*Bayerische Verfassung*). See also Art. 1 GO (*Bayerische Gemeindeordnung*).

[15] See Art. 83 BV and Art. 57 GO.

[16] Corrected expenditure calculations show which expenses were finally necessary to fulfill the tasks in 2018 (Bavarian Statistical Office, 2018). Budget composition in 2018: social welfare (32.2 %); construction, housing and traffic (10.7 %); education and schools (10.5 %); general administration (10.3 %); public facilities and economic development (8.0 %); health, sports and recreation (4.3 %); public order and security (3.7 %).

[17] The minimum principle of the Bavarian regulation for municipalities requires to fulfill the given municipal tasks with lowest possible resources (= cost efficiency) (Art. 61 GO). In Germany, local governments have several sources to finance their policies and investments, including autonomy in several charges, fees, and taxation (e.g., business and property taxes), see Art. 106 GG.

[18] Studying overlapping electoral cycles in Bavaria is promising as the institutional setting leaves room for collusion between both branches of the local government.

[19] Many other states in Germany have constitutions with a less powerful mayor position. Bavaria thus provides a more promising institutional framework to examine executive election cycles.

becomes head of the council and all council committees, and has active voting and some veto rights. As principal-agenda-setter, the mayor is free to put topics on the agenda of the council meeting, executes the decisions of the council, and is thus able to influence the timing of fiscal decisions and implementation of policies to a significant extent. The constitution, moreover, puts the mayor as head of the municipal administration, and mandates the mayor with all personnel and day-to-day administrative and minor fiscal decisions.

Municipal elections

In Bavaria, both executive and council elections are held every six years, and usually on the same state-wide election day. The timing of local elections is regulated by state law and largely beyond control of the local government. Exceptions are made in some executive elections if a mayoral term of office ended prematurely. A mayor's term may end prematurely if a mayor dies, or resigns for personal (e.g., sickness or preferable outside options) or political reasons (e.g., lack of political support). In that case, the municipality starts a new independent six-year executive electoral cycle. The council and mayor are free to choose whether they want to return to an overlapping cycle, but this is not mandatory. By contrast, council elections do not deviate from the state-wide electoral cycle. Council elections occurred twice in the sample period, in 2008 and 2014.

Mayors are elected directly by voters in majoritarian elections. A second round of voting is required if no mayoral candidate achieves absolute majority (over 50 % of votes) in the first election. The second round is held as classical run-off election between the two leading candidates. Electoral campaigns of elections at the municipal level are usually focused on the individual candidates rather than the party affiliation. The accountability and the behavior of incumbents may therefore be decisive for electoral success and thus may lead to strategic behavior of the incumbent before elections. Incentives to get reelected are expected to be larger for mayors than for council members. Council members are usually part-time politicians, while the position of the mayor can be either full-time or part-time. However, the institutional setting give rise to incentives for the mayor to collude with council members, because the extent of the mayor's strategic influence on political decisions depends on the intensity of collaboration. Members of both governmental branches have a high degree of political exposure to one another, which is makes collaboration more likely. If electoral terms of mayors and councils overlap, it is a reasonable assumption that both governmental branches agree on large projects and investments at the beginning of the joint term of six years. Expenditure plans are transparent in the mandatory five-year financial plan, and the plans are not expected to change significantly during an overlapping electoral term.

4 Empirical strategy

The empirical analysis is based on a balanced panel of 2,012 Bavarian municipalities in the period 2007-2017. I collected the data on elections, political and municipality characteristics, fiscal outcomes and output indicators of local governments from the Bavarian Statistical Office. Summary statistics are shown in Table 1. The empirical analysis is based on a two-stage empirical approach: First, I employ a stochastic frontier model to estimate inefficiencies of local public governments. Second, I examine whether electoral cycles influence inefficiency scores across municipalities and time. In the following, I discuss the variables, data and model specifications in detail.

4.1 Efficiency frontier model

Local government efficiency is estimated by a relative comparison of the governments performance against a frontier consisting of best practice observations across time and other municipalities within the sample. Deviations from this best practice frontier represent inefficiency. Estimating efficiency first requires a selection of output indicators for public goods and services provided by the local government, as well as input indicators of the government to produce the output. The input-output combinations determine efficient behavior of the decision-making units in my model, namely the local governments which use the input in the most productive way.

The best practice frontier is estimated by using an efficiency model. The efficiency model is based on a semi-parametric, multi-output stochastic frontier analysis (SFA), following the seminal work of Aigner et al. (1977) and Meeusen and van Den Broeck (1977). Because of the Bavarian minimum principle (see Section 3), I employ the cost efficiency approach and relate multiple public policy outputs of local governments to the overall costs. The cost frontier model characterizes the minimum expenditure required to produce a fixed bundle of multiple outputs (given the input prices used in the production). Cost efficiency at the municipality level is estimated by a classical Cobb-Douglas production specification:

$$lnC_{it} = \alpha_i + \sum_{r=1}^{s}(\delta_r \times lnY_{rit}) + \rho \times \tau + \omega_{it} \tag{1}$$

Here, C_{it} indicates the input (costs) in municipality i in year t, Y_r indicates multiple outputs (r) of local governments, and s is the number of included outputs in the model. δ_r and ρ are the parameters to be estimated to determine the cost efficiency frontier. Moreover, the efficiency frontier model (1) accounts for the overall efficiency-enhancing time trend τ over

Table 1: Summary statistics

	Obs.	Mean	SD	Median	Min	Max
Dependent variable						
Cost inefficiency (%)	21935	13.446	9.161	10.86	1.61	152.17
Input variable (log)						
Real net expenditure	21935	15.369	1.065	15.25	11.78	22.49
Output variables (log)						
Population	21935	8.078	0.899	7.97	6.34	14.20
Pupil population, age 6-15	21935	5.686	0.878	5.59	3.18	11.56
Old age population, age>65	21935	6.409	0.952	6.28	4.39	12.47
Employed, place of work	21935	6.366	1.419	6.22	2.30	13.65
Kindergarten places	21935	4.888	0.905	4.74	2.48	11.34
Recreational area (hectare)	21935	2.309	1.125	2.21	-4.61	8.24
Baseline controls						
Population density	21935	192.269	291.362	104.00	6.00	4,713
Migration share (%)	21935	5.002	3.744	3.92	0.00	40.36
Unemployment share (%)	21935	2.574	1.067	2.37	0.35	9.51
Incumbent runs again	21935	0.494	0.500	0.00	0.00	1.00
Leftwing incumbent	21935	0.129	0.335	0.00	0.00	1.00
Leftwing council share	21935	0.126	0.147	0.06	0.00	0.68
Executive elections						
Pre-election year	21935	0.186	0.389	0.00	0.00	1.00
Election year	21935	0.182	0.386	0.00	0.00	1.00
Post-election year	21935	0.183	0.386	0.00	0.00	1.00
Election characteristics						
Joint pre-election year	21935	0.166	0.372	0.00	0.00	1.00
Joint election year	21935	0.167	0.373	0.00	0.00	1.00
Joint post-election year	21935	0.166	0.372	0.00	0.00	1.00
Pre-election year (incumbent)	21935	0.123	0.328	0.00	0.00	1.00
Election year (incumbent)	21935	0.122	0.328	0.00	0.00	1.00
Post-election year (incumbent)	21935	0.123	0.328	0.00	0.00	1.00
Joint pre-election year (incumbent)	21935	0.114	0.318	0.00	0.00	1.00
Joint election year (incumbent)	21935	0.115	0.319	0.00	0.00	1.00
Joint post-election year (incumbent)	21935	0.114	0.318	0.00	0.00	1.00
Regular election	21935	0.172	0.377	0.00	0.00	1.00
Instruments for incumbency						
Incumbent is pensionable	21935	0.283	0.451	0.00	0.00	1.00
Incumbent, age≥60	21935	0.280	0.449	0.00	0.00	1.00
Robustness test variables						
Population size	21935	6,308	34,689	2,881	565	1.46m
Real public debt (log)	19656	7.379	1.553	7.47	0.00	15.00
Independent municipality	21935	0.013	0.111	0.00	0.00	1.00
Full-time mayor	21934	0.567	0.495	1.00	0.00	1.00
CSU council share	21935	0.254	0.210	0.31	0.00	1.00

the years 2007-2017 (τ = 1 ,..., 11), for example due to technological progress, and uses robust standard errors clustered at the municipality level. The composed error term ω_{it} consists of the symmetric and idiosyncratic error term (v_{it}) and a one-sided non-negative component ($u_{it} \geq 0$) representing inefficiency.

$$\omega_{it} = v_{it} + u_{it} \tag{2}$$

The cost inefficiency values u_{it} are computed by using the estimator by Jondrow et al. (1982) and are assumed to follow a truncated normal distribution.[20] The latter assumption ensures that inefficiency values are larger than or equal to zero. The mean value for the point estimate u_{it} indicates to what extent inputs can be reduced without reducing current output levels.

The stochastic parametric estimation approach allows to distinguish the measurement error from inefficiency. The parametric SFA is preferable to non-parametric approaches. Non-parametric approaches are often deterministic in nature, interpreting all deviations from the efficiency frontier as inefficiency measures, ignoring measurement errors and outliers, and are therefore likely to produce biased estimates.[21] Non-parametric approaches have been used in several previous studies to estimate local public-sector efficiency (e.g., Afonso and Fernandes, 2006; Balaguer-Coll et al., 2007; De Borger and Kerstens, 1996; De Borger et al., 1994). Other scholars use SFA approaches in cross-sectional efficiency models, but do not account for time-invariant heterogeneity across municipalities (e.g., Geys, 2006; Geys et al., 2010; Grossman et al., 1999; Kalb, 2010; Kalb et al., 2012; Lampe et al., 2015). Municipalities may differ in many characteristics, for example due to natural (e.g., geography), structural (e.g., economic environment), or socio-economic (e.g., composition of population) reasons. These factors may affect the performance of the government, even though the local government cannot influence these factors in either the short or long run. Ignoring time-invariant factors within the sample period may give rise to a misspecification bias.[22]

By contrast, I use a panel data model and employ the "true fixed effects" stochastic frontier specification by Greene (2005), which uses a maximum-likelihood dummy variable (MLDV) estimation and allows to account for unobserved time-invariant heterogeneity among

[20] The estimator uses the mean value of the conditional distribution of u_{it}.

[21] Scholars often use Data Envelope Analysis (DEA) and Free Disposal Hull (FDH) as non-parametric estimation approaches. By contrast, semi-parametric models may produce biased estimates if the functional form of the parametric assumptions on the cost frontier is misspecified.

[22] As this approach assumes the intercept α to be the same across all municipalities, time-invariant unobservable factors may affect the output. The effect may be captured by the inefficiency term and produce biased estimates, which result in an overestimation of the inefficiency term.

municipalities (α_i).[23] Notably, my panel on government efficiency is quite large compared to related studies. Most studies use cross-sectional data for single years or pooled data for a few years to calculate government efficiency and do not allow to examine within-variation of determinants over time.[24]

Input and output variables

Estimating inefficiencies by employing equations (1) and (2) requires the selection of input and output indicators of local governments in Germany. My selection of indicators is related to previous studies examining public sector efficiency in German municipalities (e.g., Asatryan and De Witte, 2015; Geys et al., 2010; Kalb, 2010; Kalb et al., 2012; Lampe et al., 2015). I employ municipality's *real government expenditure (as net of transfers)* as input C_{it} in the efficiency model (1). Cost efficiency is measured as a relative concept which relates the total expenditure of the municipality to several output variables which capture key tasks under the direct control of local authorities in the German state of Bavaria (see Section 3). As proxies for the provision of public goods and services provided by the local government, I cover as many output indicators as the data for the period 2007-2017 allow. I include five output variables in the vector term Y_r ($s = 5$) of model (1): (i) *population size* as an indicator for several administrative tasks which depend on the number of people living in a municipality; (ii) *pupil population aged 6-15 years*, and (iii) *kindergarten places*, both are indicators of the legal obligations of the local governments to provide child care, education (nursery/primary/secondary school), and public transport for children living in the municipality; (iii) *population older than 65* as an indicator for local public provision of services for senior citizens; the number of (iv) *employed people (paying social security contributions) at the workplace* captures the economic performance within a municipality and provides information on the role of the local government in providing infrastructure and services; and finally the share of (v) *recreational area* of the total land is used as an indicator for local public facilities for health, sport and leisure, as well as tourism. All input- and output indicators are used in their natural logarithm form.

[23] Greene (2005) shows that the MLDV is computational feasible for large samples ($N > 1000$), but an incidental parameters problem may occur for samples with large N and small T (Lancaster, 2000; Neyman and Scott, 1948). The MLDV approach, however, is appropriate for panel data models with $T \geq 10$ (Belotti et al., 2013; Belotti and Ilardi, 2018). The signal-to-noise ratio in the stochastic frontier specification does not suggest identification problems because of the distributional assumptions of the error components (Appendix, Table A1).

[24] See Kalb et al. (2012) for an overview. Some scholars use SFA and pooled data for a few years. Grossman et al. (1999), for example, employ four years to calculate inefficiency scores for a sample of 49 US cities, whereas Geys et al. (2010) and Lampe et al. (2015) both use three years in a sample of around 1,100 or 400 German municipalities. Only a few exceptions use large panels: Kalb (2010), for example, use around 1,100 German municipalities from 1990 to 2004 and examine the effect of intergovernmental and vertical grants on cost efficiency scores. Dorn et al. (2021) employ non-parametric DEA scores of county governments in a panel of 96 German counties for the 1995-2016 period to examine the effect of public accounting standards.

A criticism of efficiency frontier models is that efficiency scores are imperfect measures of local government performance, which are mainly due to data limitations. On the one hand, the output indicators only proxy key tasks of local authorities, but they may omit further relevant dimensions of the local provision of public goods and services that are under discretionary control of the local government. On the other hand, local governments may increase efficiency by producing either more or better public goods and services (quantity, quality, or both). For a full assessment of the efficiency of local governments, the (often unobservable) quality of the provision of public services needs to be considered (see Balaguer-Coll et al., 2007; Dorn et al., 2021; Fritzsche, 2019). However, quality indicators are often not available, or are only available for individual public services. As this study aims at examining the overall efficiency of local government in a composite approach, only quantitative proxies are included in the model to capture as many output indicators as possible.

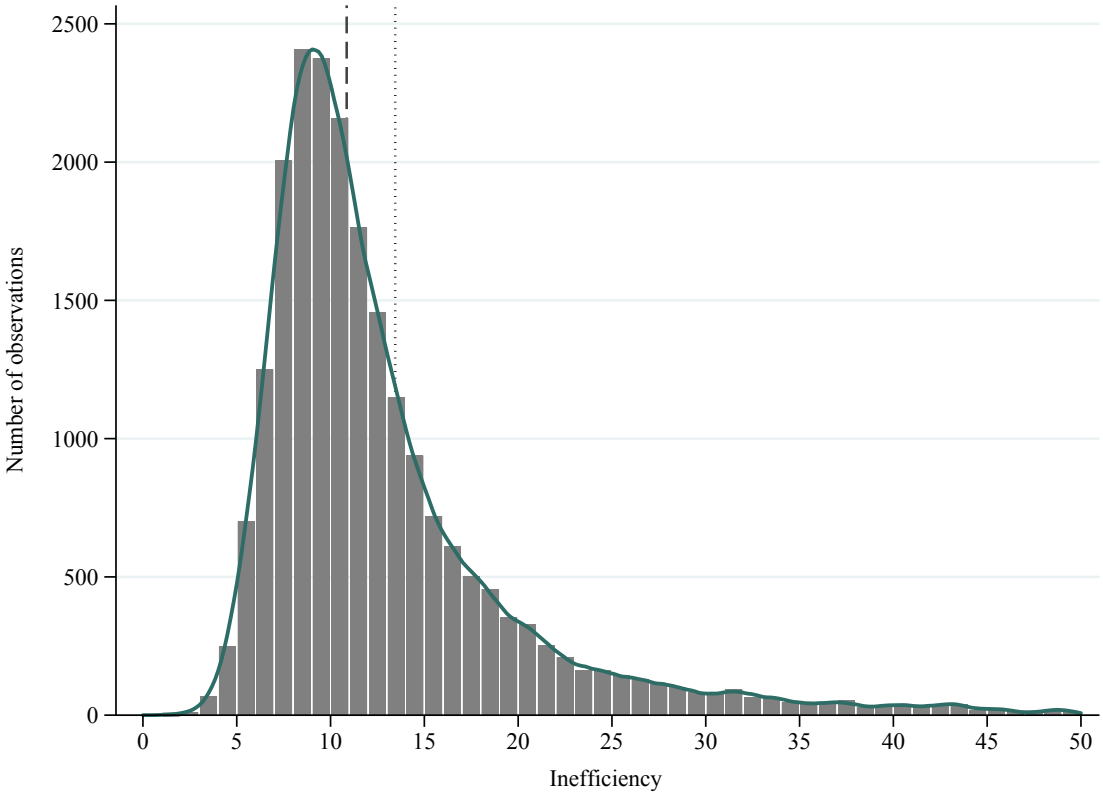
Inefficiency scores

The cost efficiency model of equations (1) and (2) yields inefficiency scores for all municipalities and years within the sample consisting of 21,935 observations (Table A1, column 1). The median value of cost inefficiency is 10.9 %, while the mean value relative to the efficiency frontier within the model is 13.4 % (see Table 1). That is, the efficiency of the provision of public goods and services in the Bavarian municipalities is on average approximately 13 % below the efficiency frontier. In other words, municipalities could reduce expenditures by about 13 % for a given output level. Figure 1 shows the distribution of all inefficiency scores of Bavarian municipalities between 2007 and 2017. The pattern is quite homogenous. About 40 % of the Bavarian municipalities could reduce costs by 5 to 10 %, whereas most observations show a cost inefficiency of 8-10 %.[25] Less than 2 % of the observations are close to the cost efficiency frontier with an inefficiency value of below 5 %. By contrast, only a few outliers in the sample have high inefficiency in the production of public goods and services; for example, around 4 % of all observations could reduce expenditures by more than 30 % at the given output level.

The baseline efficiency model estimates the cost inefficiency of local governments conditional on time trends and time-invariant factors (Appendix, Table A1, column 1). I regress inefficiency on several variables which may explain inefficiency differences between

[25]The semi-conditional inefficiency scores of the model are similar to cross-sectional results of previous studies on German municipalities. Kalb (2010) show an average inefficiency of about 17-20 % in an unconditional SFA model, and an average of 11-13 % once several control variables are included. Asatryan and De Witte (2015) employ a full conditional non-parametric model and show an average inefficiency of about 8.7 %. My baseline model relies on time trends and time-invariant factors. Once including further controls in the efficiency model, the mean inefficiency is 9.0 % (see Section 6.1 and Table A1, column 3 in the Appendix).

Figure 1: Cost inefficiency distribution among municipalities, 2007 – 2017



Notes: Deviations from zero represent cost inefficiency in percent. Outliers above an inefficiency score of 50 are not displayed. The green solid line shows the density function; the first vertical (dashed) line is the median value, the second vertical (dotted) line is the mean value.

municipalities (see Section 4.2). Previous studies have also included the controls (as *background variables*) in an one-step approach within the SFA frontier model (e.g., Geys et al., 2010; Kalb, 2010; Kalb et al., 2012). In robustness tests, I also examine one-step approaches (see Section 6.1).

4.2 Electoral cycle models

Baseline model

I assume that inefficiency is a function of exogenous variables such as municipality characteristics and political variables.[26] The inefficiency term (u_{it}) released from the

[26]The exogeneous variables are not inputs or outputs in the cost production function of the local public governments (Section 4.1), but are expected to affect relative performance of municipalities. An exception arises for the municipality fixed effects as the efficiency model (equation 1) already captures fixed effects to calculate unbiased cost inefficiency estimates. The control variable population density is also directly related to the output variable population(log) of the efficiency model (equation 1). Section 5 provides results including and excluding municipality fixed effects and controls.

stochastic frontier model (2) is used as the dependent variable. I examine how electoral cycles influence observable differences in inefficiency scores across local governments i and year t by using the following OLS panel fixed effects model:

$$u_{it} = \alpha_i + \boldsymbol{\beta} \times \boldsymbol{Elect'_{it}} + \boldsymbol{\Theta} \times \boldsymbol{Z'_{it}} + \gamma_t + \varepsilon_{it} \ , \tag{3}$$

where the vector $\boldsymbol{Elect'_{it}}$ includes dummy variables capturing (pre-, post-) executive election dates as

$$\boldsymbol{Elect'_{it}} = \begin{bmatrix} PreElection_{it} \\ Election_{it} \\ PostElection_{it} \end{bmatrix} \text{ and } \begin{cases} = 1 & \text{in pre-election years, 0 otherwise} \\ = 1 & \text{in election years, 0 otherwise} \\ = 1 & \text{in post-election years, 0 otherwise.} \end{cases} \tag{4}$$

As executive election years vary across municipalities and time, my approach is comparable to a difference-in-differences estimation in which municipalities with no election in a particular year serve as control group to identify the effect of electoral years in other municipalities. The summary statistics show that around 18 % of all observations in the sample are executive election years (Table 1). The parameter vector $\boldsymbol{\beta}$ captures the estimated effect of (pre-, post-) election years on local government inefficiency, respectively. By estimating OLS as fixed effects model, I exploit the within variation over time and eliminate all observable and unobservable municipality-specific time-invariant effects α_i. The term γ_t captures the year fixed effects of other confounding factors that simultaneously influence the municipalities in the German state of Bavaria (e.g. year specific shocks such as the financial crisis; federal and state policies; or simultaneous elections for the federal, state or county parliament, or the municipal council).[27] Standard errors are robust to heteroscedasticity and clustered at the municipality level. ε_{it} captures the idiosyncratic error term and $\boldsymbol{\Theta}$ is the vector of parameters of the control variables.

The vector $\boldsymbol{Z'_{it}}$ includes time-varying municipality characteristics (*population density*; *migration share*; *unemployment share*) and political variables (*incumbent(reelection)*; *council share(leftwing)*; *incumbent(leftwing)*) as baseline controls which could explain inefficiency differences among Bavarian municipalities (see Geys et al., 2010; Kalb, 2010; Kalb et al., 2012; Lampe et al., 2015). The first set of controls includes time-varying municipality characteristics and the socio-economic composition of the population: population density captures the urban-rural divide. Higher population density is expected to make the provision of public goods and services more cost-effective, but also to increase

[27] During the period of observation, three federal elections (2009, 2013, 2017), two Bavarian state elections (2008, 2013), and two council elections (2008, 2014) were held.

property prices and agglomeration problems of the municipality. Similarly ambiguous results are expected for the share of unemployed. Higher unemployment goes along with higher administrative efforts and higher spending on unemployment-related benefits. However, unemployed voters are expected to demand less expensive (lower quality) public goods and services (*as the demand for higher quality public goods is expected to increase with income*). Administrative tasks and services are moreover expected to increase with a higher migration share. The migration share in the sample is on average 5 %, whereas the maximum share is 40 % (Table 1). The average unemployment rate in the population is about 2.5 % and the maximum is around 9.5 %. The second set of controls include political characteristics of the incumbent mayor and the municipal council. The controls include the share of seats of leftwing parties in the municipal council (*council share(leftwing)*) and a dummy *incumbent(leftwing)* indicating whether the incumbent mayor belongs to one of the parties on the left of the ideological scale in Germany.[28] Around 13 % of seats and incumbents are left (Table 1). Leftwing governments are expected to favor higher spending (see Potrafke, 2017), though it is not clear whether higher spending affects efficiency. The dummy variable *incumbent(reelection)* takes the value one if the incumbent mayor seeks re-election in the next executive election, otherwise it takes the value zero. It is set at zero or one for the whole electoral term assuming that the incumbent considers to run for office again.[29] In the sample, the incumbent seeks re-election in around 49 % of all observations (Table 1).

Event study model

The event study model is based on a difference-in-differences approach and visualizes whether local governments perform differently during, before and after election years. The executive elections of the municipalities take place at different times. However, the design of an event study includes all electoral cycles in one parallel world, irrespective of the year in which the executive election takes place. Event studies therefore use all treated municipalities as counterfactuals for each other and account for common trends assumptions across municipalities in non-election years. The event study examines whether years within a full election cycle deviate from the common trend.

[28]The share of leftwing parties in the council includes the seats of the Social Democrats (SPD), the Greens (Bündnis90/Die Grünen), and the Left Party (Die Linke).

[29]In robustness tests, further control variables are included in the model such as the natural logarithm of the municipality debt level, a dummy indicating whether the mayor is a full-time politician, or the council seat share of the CSU as the dominant party in Bavaria (see Section 6.1). For years without information on the next election, the dummy is set to zero. Robustness tests show the results for setting the dummy to one for unknown years.

I extend the baseline panel data model (3) by estimating dummy variables for all years before and after executive elections. My event window includes six years and illustrates individual year effects in a regular executive election cycle in the German state of Bavaria (see Section 3). The identifying assumption is that only election years deviate from the common trend of all municipalities. The event study regression takes the following form:

$$u_{it} = \alpha_i + \gamma_t + \sum_{T=t-2}^{T=t+3} \beta_T \times (\text{election year})_{it}^{T} + \boldsymbol{\Theta} \times \boldsymbol{Z_{it}'} + \varepsilon_{it} \quad , \tag{5}$$

where u_{it} describes inefficiency in municipality i in year t. Municipality and year fixed effects are captured by α_i and γ_t. $\boldsymbol{Z_{it}'}$ is the vector of control variables following equation (3), and ε_{it} denotes the idiosyncratic error term. $\sum \beta_T$ refers to the coefficients of interest and estimates the effect of election cycles from $t-2$ years before an executive election to $t+3$ years afterwards. The year $t+3$ is the midterm of the executive election cycle and corresponds equally to the effect $t-3$ years before the next executive election. The year $t-2$ serves as the reference year in the event study. The sample (of the event window) allows to include several election cycles for each municipality in a parallel world. It is, however, restricted to cycles without cross-elections of executive elections within a municipality. A year is defined as a cross-election year if (pre-, post-) executive election years overlap within the same municipality. This may occur if an executive election is held prior to its regular cycle of six years, for example if the post-election year of the previous executive election is also the pre-election year of the succeeding election. Cross-election years within one municipality would cause biased estimates in the event study approach and are therefore either excluded from the sample (see Section 5.2), or included as an additional control variable in the regression model (see Appendix, Table A2).

Interaction effects model

The effects of executive election cycles on efficiency may differ, depending on whether the years of executive and council elections overlap. On the one hand, the municipal council approves the municipal budget and investment plan and monitors the fiscal decisions of the local government. On the other hand, council members may have incentives to get re-elected in council election years. In addition, the effect of executive election cycles may depend on the incumbents decision to rerun for election. Incumbent mayors may pursue different policies when they seek re-election. To examine differences that may occur when election cycles overlap and when the incumbent seeks re-election, I include interaction terms in the estimation model (3) following the approach of Foremny et al. (2018).

First, I estimate interaction terms for joint (pre-, post-) executive and council election years to test whether effects of overlapping electoral cycles on local government efficiency differ from individual executive election effects. The interaction term effect $\boldsymbol{\phi} \times \boldsymbol{Joint}'_{it}$ is included in equation (3). The coefficient $\boldsymbol{\phi}$ estimates the difference between the effects of individual and joint elections on government efficiency. The dummy vector $\boldsymbol{Joint}'_{it}$ takes the value of one if (pre-, post-) election years overlap, and zero otherwise. With a few exceptions, the executive elections in the state of Bavaria are held at the same time as council elections. In the sample period from 2007 to 2017, 342 executive elections were held uncoupled from the council election year. I use these exceptions as source of variation to examine differences between the effects of individual executive and overlapping elections. In 2008 and 2014 the council elections in all Bavarian municipalities were held simultaneously. The interaction model allows to examine the effects of joint elections, although year fixed effects eliminate the identification of the effects of individual council elections.

Second, the incumbent mayor sought re-election in 2/3 of all executive elections in the sample. To separate the effects of efforts for re-election from the general effects of executive cycles in election years, I include the term $\boldsymbol{\varphi} \times \boldsymbol{Incumbent}'_{it}$ in equation (3). The dummy $\boldsymbol{Incumbent}'_{it}$ takes the value one in (pre-, post-) election years if the incumbent mayor seeks (sought) re-election, and has the value zero otherwise. $\boldsymbol{\varphi}$ is the parameter which estimates the difference.[30] To examine whether the effect of the incumbents decision to seek re-election on efficiency differs when council elections are held in the same year, I add triple interactions in the model. Triple interactions capture the effect of the incumbent's decision to seek re-election depending on whether elections are held individually or jointly. Similarly, triple interactions also capture the effect of overlapping elections on efficiency depending on the incumbent's decision to run for office again.

5 Results

5.1 Baseline results

Table 2 presents the baseline results when estimating the effect of executive election cycles on cost inefficiency following the OLS model in equation (3). Column (1) reports the unconditional relationship, and column (2) the coefficient estimates of the fixed effects model for the within variation in municipalities over time. The results in columns (3) - (4) show the coefficients conditional on time-variant municipality characteristics and political

[30]The baseline model already included a dummy for the incumbent's decision to seek re-election in the next election (equation 3). The interaction vector, however, explicitly separates the general effects of executive election years from effects of years in which the incumbent sought re-election.

Table 2: Baseline results – electoral cycles and cost inefficiency (OLS)

	Dependent variable: Cost inefficiency				
	(1)	(2)	(3)	(4)	(5)
Executive elections					
Pre-election year	-1.217***	-1.247***	-1.529***	-1.486***	-0.750**
	(0.165)	(0.166)	(0.172)	(0.173)	(0.355)
Election year	-0.877***	-0.914***	-0.936***	-0.851***	-0.848***
	(0.169)	(0.171)	(0.170)	(0.173)	(0.308)
Post-election year	-0.063	-0.092	-0.324*	-0.372**	-0.173
	(0.168)	(0.170)	(0.174)	(0.177)	(0.314)
Controls					
Population density			-0.012**	-0.012**	-0.015***
			(0.005)	(0.005)	(0.005)
Migration share (%)			0.201***	0.167***	0.023
			(0.047)	(0.048)	(0.057)
Unemployment share (%)			0.762***	0.832***	0.518**
			(0.144)	(0.144)	(0.210)
Incumbent runs again				-0.413**	-0.012
				(0.191)	(0.207)
Leftwing incumbent				0.222	0.195
				(0.454)	(0.456)
Leftwing council share				1.813	1.995
				(2.318)	(2.315)
Constant	13.844***	13.862***	13.208***	13.227***	17.190***
	(0.104)	(0.073)	(1.061)	(1.099)	(1.160)
Year fixed effects	No	No	No	No	Yes
Municipality fixed effects	No	Yes	Yes	Yes	Yes
Municipalities (cluster)	2012	2012	2012	2012	2012
Observations	21935	21935	21935	21935	21935

Notes: OLS FE model with standard errors clustered at the municipality level in parentheses. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Cost inefficiency estimates released from a true fixed effects multi-output stochastic frontier model. Cost inefficiency, unconditional mean value: 13.45 % (see Section 4.1).

control variables. Additionally the full model in column (5) captures year fixed effects which affect all municipalities simultaneously.

The results show that inefficiency in the provision of local public goods and services decreases in pre-election and election years. In executive election years, local governments reduce expenditures by 0.85 - 0.95 % at the given output level. The election year effect is statistically significant at the 1 % - level in all specifications. In the year prior to the executive election, local governments reduce cost inefficiencies by 1.2 - 1.5 % at the 1 % - significance level. The results, however, refer to estimates before year fixed effects are included in the

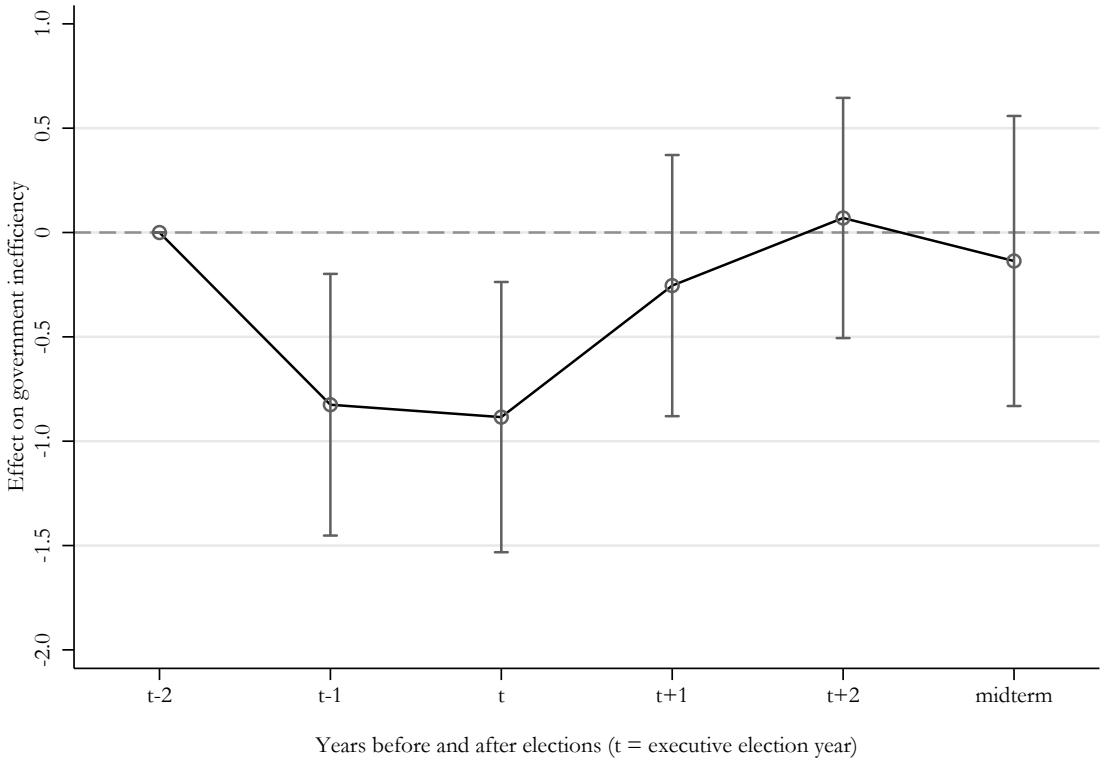
model. Once year fixed effects are captured, local government efficiency increases by 0.75 % at the significance level of 5 % in the pre-election year. Hence, local governments reduce costs by 0.75 % and 0.85 % in pre-election and election years without reducing the quantity of public goods and services according to the full baseline model results (column 5). The efficiency-enhancing effect of electoral cycles already seems to diminish in years following the elections. In the year after the executive election, the relationship is economically less pronounced and lacks statistical significance in the full model (column 5).

Table 2 also provides coefficient estimates for the baseline controls. The results show that local government efficiency increases with population density, suggesting positive agglomeration effects. In contrast, higher shares of unemployed and migrants in the population give rise to an inefficient use of municipal resources by local governments. Given a constant output in public goods and services (column 5), a one percentage point increase in the unemployment rate is associated with a 0.50 % increase in expenditures. The migration effect, however, drops in size and lacks statistical significance once year fixed effects are considered. This implies that a year specific shock such as the migration and refugee crises in 2015, has affected all local governments in Bavaria and gave rise to cost inefficiency. If the incumbent mayor seeks re-election, public resources seem to be used more efficiently. The rerun effect of the incumbent, however, lacks significance when controlling for year effects. Political ideology seems to play a minor role. Leftwing ideology of the incumbent and in the council are both positively correlated with cost inefficiency, but lack statistical significance in all specifications.

5.2 Event study results

The efficiency-enhancing effect of election cycles is confirmed by the results of the event study. Figure 2 shows the coefficient estimates of the event study model following equation (5); corresponding numerical difference-in-differences estimates are presented in Table A2 in the Appendix. Note that all estimates are conditional on baseline controls as well as municipality and year fixed effects. The event study shows how effects evolve over a full six-year window of an electoral cycle. The reference category is two years before an executive election ($t-2$). Each dot in the figure represents one point estimate, the vertical lines are 90 % confidence intervals. Local governments significantly reduce cost inefficiency in the pre-election year ($t-1$) and the election year compared to the reference ($t-2$). The point estimates suggest that local governments increase cost efficiency compared to the reference year by 0.80 - 0.90 % in both pre-election and election years. The estimated coefficients do not turn out to be statistically different from the refence year ($t-2$) in the years after the executive election — neither in the post-election year ($t+1$), nor two years

Figure 2: Event study results – electoral cycle and cost inefficiency



Notes: The dots represent the point estimates; the vertical lines indicate the 90 % confidence interval. The corresponding numerical numbers are shown in Appendix, Table A2, column (1).

after the election ($t + 2$), nor the midterm year ($t + 3$, $t - 3$). This finding suggests that the common trends assumption holds in non-election years.

5.3 Overlapping cycles and incumbency effects

Overlapping cycles

The baseline results show that the size and significance of some coefficients change when year fixed effects are considered. Year fixed effects include the effects of council elections which are held simultaneously in all Bavarian municipalities. It is not possible to test individual council election effects. The effect of executive elections, however, may differ depending on whether executive and council election years overlap. To test the effect of individual and joint elections, I augment the baseline model with interactions of a dummy indicating whether executive and council election years overlap (see Section 4.2 – Interaction

effects model).[31] Figure 3A highlights the marginal effects of the interaction model, while distinguishing between pre-election, election, and post-election years.

The results show that the efficiency of local governments increases by around 1.5 % in both, joint pre-election and election years (Figure 3A). Marginal effects are statistically significant at the 1 % level and are larger in size than the general effect of executive elections estimated in the baseline results (Table 2). The effect of individual executive elections in non-overlapping electoral cycles also decreases inefficiency in pre-election and election years. However, the effect of individual executive electoral cycles in non-overlapping years lacks statistical significance and is smaller than the marginal effect of joint elections (Figure 3A). The difference between the effect of individual and joint elections is larger and even significantly different from zero in pre-election years. The findings suggest that cost savings are larger in years in which elections overlap, while the output of the local government remains constant. The results for the post-election years, however, are not statistically significant.

Incumbency effects

Panel B in Figure 3 shows marginal effects of executive electoral cycles on local government inefficiency conditional on whether the incumbent seeks re-election. Cost inefficiency decreases in pre-election and election years irrespective on the incumbents decision to re-run for election. Coefficients are statistical significant in the pre-election year only when the incumbent seeks re-election. In the election years, however, coefficients are significant independent from the incumbents decision to re-run. The marginal effects are more pronounced if the incumbent mayor wants to be re-elected. Cost savings are 0.25 - 0.50 % lower in pre-election and election years if the incumbent mayor does not run for office again. The exact opposite holds for post-election years suggesting that the incumbent mayor behaves strategically during election years conditional on her decision to re-run for office. Differences are, however, not statistically different from zero.

Conditional effects

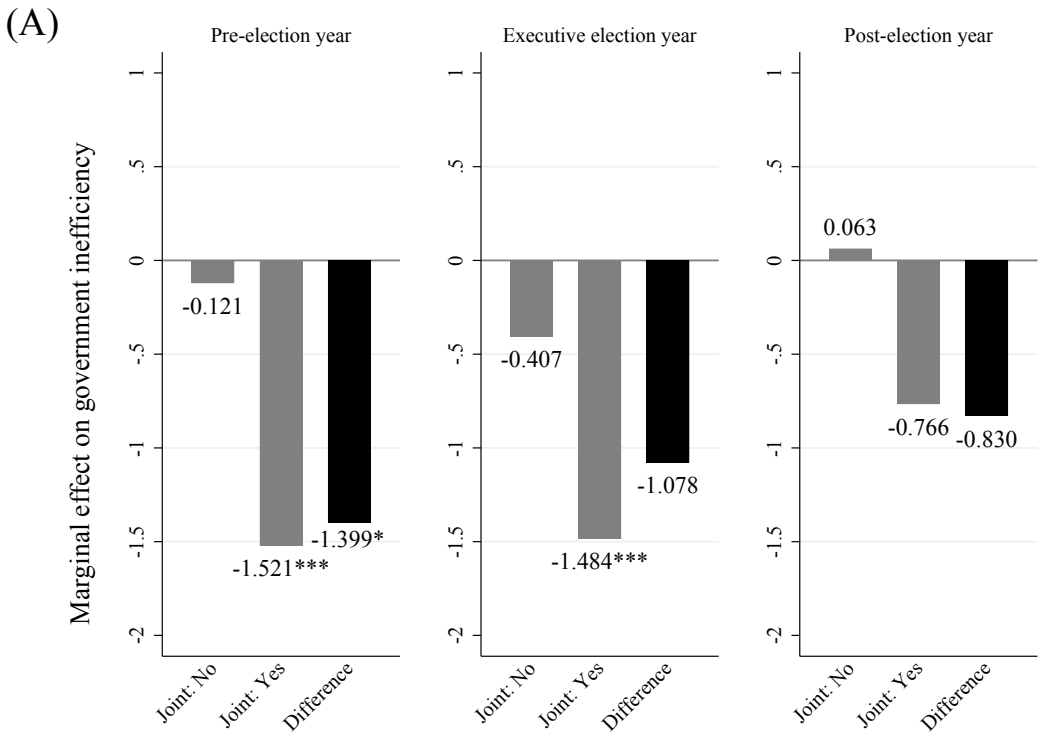
To explore underlying mechanisms in more detail, I examine triple interactions of the dummies for the executive election years, the incumbents decision to run for re-election, and dummies whether executive and council elections overlap (see Section 4.2 – Interaction effects model).[32]

[31] Year fixed effects control for individual council effects.

[32] Appendix Table A3, column (3) presents all combined effects in detail.

Figure 3: Marginal effects of electoral cycles on cost inefficiency – conditional on overlapping elections and incumbent's decision to seek re-election

(a) Executive and overlapping cycles (Joint election: No / Yes)



(b) Incumbent seeks re-election (Rerun: No / Yes)

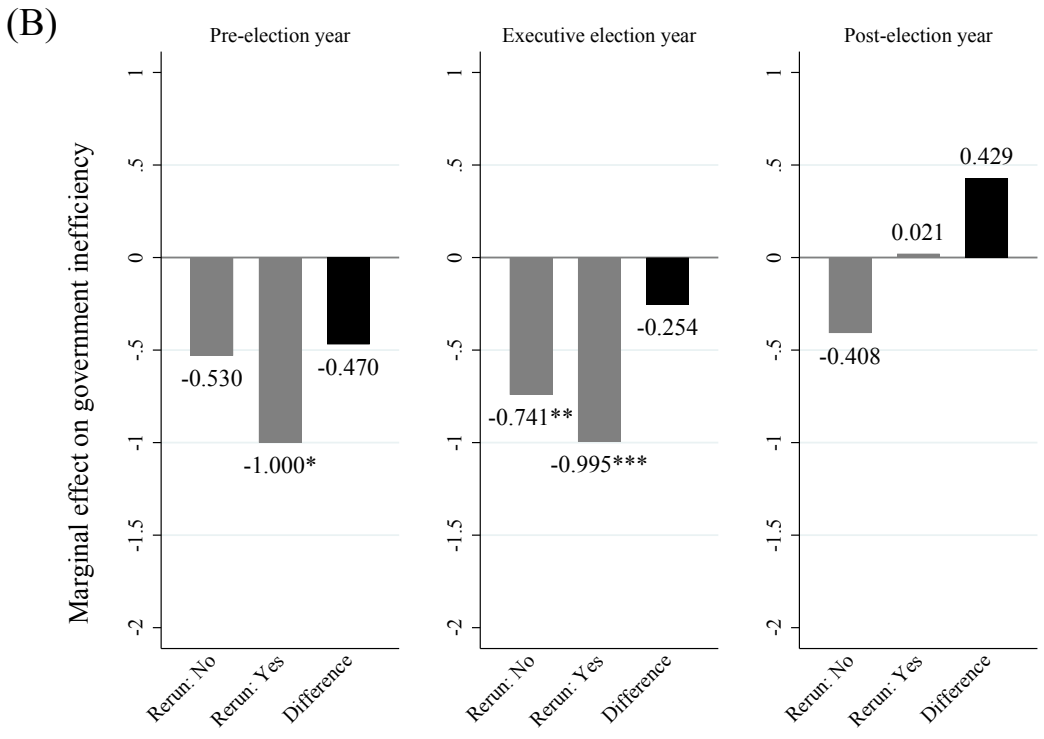
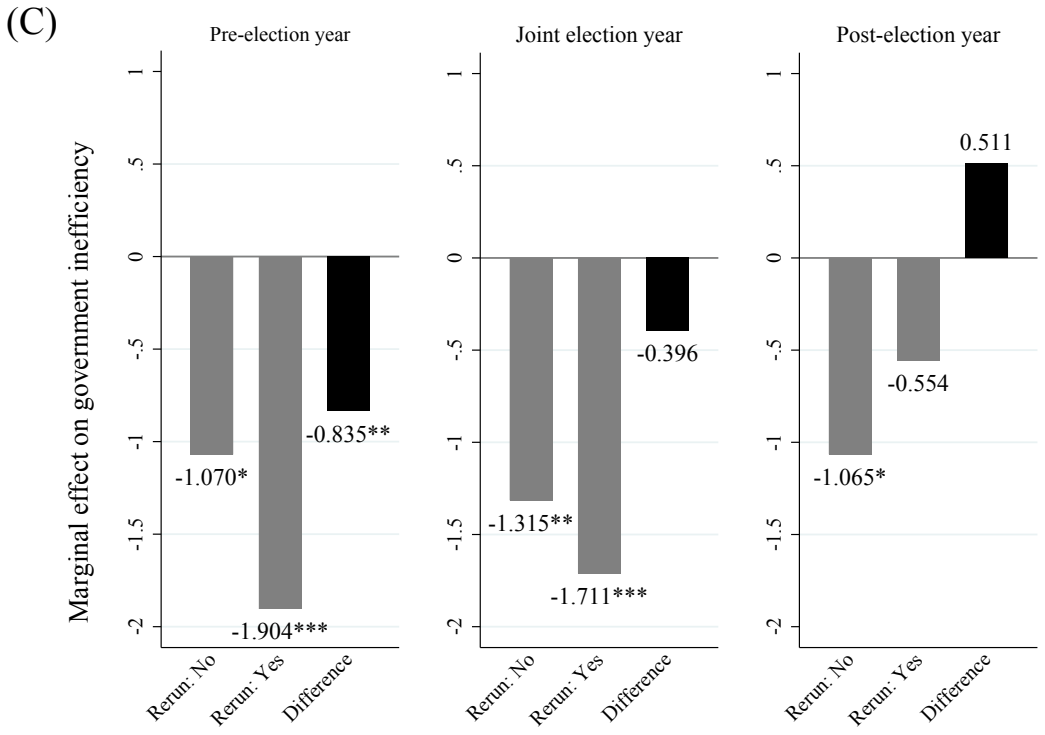
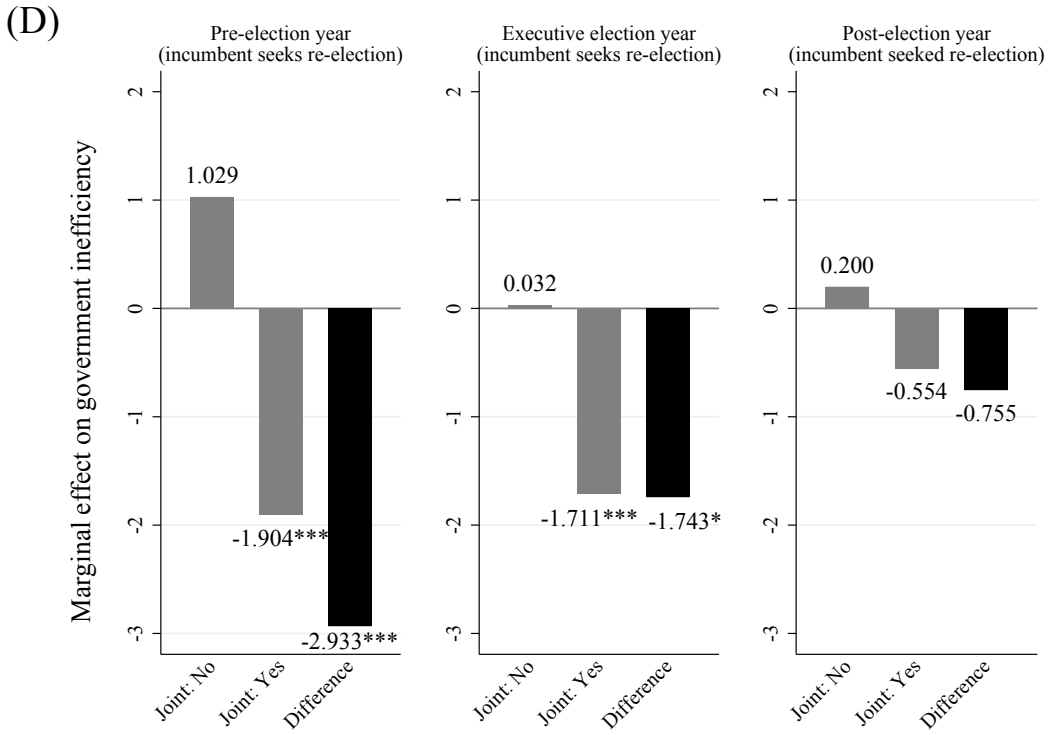


Figure 3: continued

(c) Rerun in overlapping cycles (Rerun: No / Yes)



(d) Incumbent seeks re-election (Joint election: No / Yes)



Notes: Marginal effects of executive electoral cycles and interaction terms. Corresponding marginal effects are shown in the Appendix, Table A3. Panel (A) refers to column (1). Panel (B) refers to column (2). Results for panels (C) and (D) are shown in column (3).

Figure 3C highlights the effects of joint elections conditional on the incumbents decision to seek re-election. The results show that effect of joint elections are statistically significant in pre-election and election years, irrespective of the incumbents decision to run for office again. However, the efficiency-enhancing effect of overlapping electoral cycles is more pronounced when the incumbent mayor runs for re-election. If the incumbent does not seek re-election, local governments reduce costs at a given output level by about 1.3 % in joint election years and by about 1.1 % in the year before the joint elections. The cost savings are 1.7 % (election year) and 1.9 % (pre-election year) if the incumbent decides to run for office again. In contrast, in post-election years cost-savings are less pronounced if the incumbent mayor sought re-election. This suggests that the incumbent mayor's decision to seek re-election leads to agreements on cost-saving policies between the mayor and the council before and during joint election years, and that decisions on cost-intensive investments are postponed to the post-election period. In contrast, incumbents who do not run for office again may be more likely to press for some costly or even unpopular and luxurious investments to be finalized before the end of their term in office. Nonetheless, the difference in coefficients for effects of joint elections which are conditional on the incumbents decision to re-run for election is only statistically significant different from zero in pre-election years (Figure 3C).

Panel D in Figure 3 presents the effects of electoral cycles when the incumbent re-runs for office, conditional on whether executive and council elections overlap. Again, the effect of joint elections on local government inefficiency is economically sizeable and significant at the 1 % level in pre-election and election years (as discussed in panel C). However, if the incumbent mayor runs for office in non-overlapping election years, inefficiency increases (Figure 3D). Cost inefficiency is about 2.9 % larger in pre-election years and about 1.7 % larger in election years than in joint election years. Differences between years of joint and individual executive elections are statistically different from zero and are even larger than the difference between joint elections and individual executive elections discussed in Figure 3A. The findings suggest that incumbent mayors only reduce cost inefficiencies in elections in which they can collude with the council.[33]

[33]The calculations for the incumbency effect in non-overlapping years are based on 162 sample observations. Therefore, the point estimate of the marginal effect should be interpreted with caution.

6 Extensions

6.1 Robustness checks

First, I include additional control variables in the full baseline model of equation (3). The public debt of a municipality may affect fiscal constraints and cost inefficiency of local governments. Scholars moreover show that the party alignment with the state government as well as political competition may influence local government expenditure and efficiency (e.g., Ashworth et al., 2006; Geys et al., 2010; Kalb, 2010). I use the seat share of the CSU in the municipal council as an indicator for the degree of local political competition and alignment with the state government.[34] Table A4 in the Appendix shows estimation results when including the natural log of real public debt (column 3) and the CSU seat share (column 4). Both higher public debt and a higher CSU cseat share significantly increase local government inefficiency. Inferences about the effects of the executive electoral cycles, however, do not change after including additional controls.

Second, I exclude the 25 independent city-counties from the baseline sample of 2012 clusters (Appendix Table A4, column 2). Independent municipalities have more political responsibility in the state of Bavaria as they take on tasks of the local and county governments. Inferences about the effect of executive cycles on inefficiency do not change when independent cities are excluded.

Third, the size of municipalities in Bavaria varies. In my sample, the smallest municipality has 565 inhabitants, whereas Munich as the largest city has 1.46 million inhabitants (see Table 1). I split the sample at the median size of 2,881 inhabitants and examine whether effects differ in small and large municipalities (Appendix, Table A5). The pre-election effect is larger in small municipalities. When including year fixed effects, cost inefficiency in small municipalities decreases by 2.2 % (at the 5 % significance level) in the pre-election year, whereas the effect vanishes in the sample of larger municipalities. In the election year, however, local governments in small and larger municipalities reduce costs by about 0.7 %. Differences between small and large municipalities are also related to the type of mayor. Smaller municipalities are often governed by part-time mayors rather than full-time politicians.[35] Political competition and incentives for strategic behavior to get re-elected are more pronounced among full-time mayors since the remuneration and expected pension entitlements are higher. In another robustness test, I therefore distinguish between municipalities with full-time and part-time mayors. The results show that electoral cycles decrease inefficiency in both groups, whereas the efficiency-enhancing effects of

[34] The CSU was by far the most dominant party in Bavaria during the sample period and is in power of the state government since 1957.

[35] About 57 % of the municipalities in the sample employ full-time mayors (see Table 1).

pre-election and election years are larger in the sample of municipalities with part-time mayors (Appendix, Table A6).

Fourth, I employ a two-step estimation approach in my baseline models. Scholars discuss that two-step approaches may give rise to biased estimates (Simar and Wilson, 2007; Wang and Schmidt, 2002), for example, when election procedures influence municipal resources and consequently efficiency outcomes. Serial correlation among estimated efficiency scores may particularly arise in non-parametric estimation approaches without a coherent data generating process. Biased estimates are less likely in my efficiency frontier model (1) which is based on a semi-parametric form. In a robustness test, however, I implement simultaneous estimations to avoid potential biased estimates which arise from a two-step approach. I follow related studies and employ the maximum likelihood estimations in the SFA model without fixed effects using the model specifications by Battese and Coelli (1995) (see Geys et al., 2010; Kalb et al., 2012). Inferences do not change. Results are shown in 1 (columns 4 and 5).[36]

6.2 Endogeneity tests and instrumental variable

An important condition for identifying effects of electoral cycles is the exogeneity of election dates. In Bavaria, election dates are set exogenously and are regulated by state law. Municipal executive elections are held every six years after a complete mayoral term. Municipalities and the incumbent mayor do not even have influence on the election date within an election year, or only very limited influence within a short time window in the election year.[37] Politicians therefore adjust their strategic behavior given the exogenous election dates.

Endogeneity, however, may be an issue if a mayoral term ends prematurely. This may be the case if (1) the incumbent mayor dies or resigns because of sickness (which is arguably exogenous), or if (2) the mayor resigns for other (personal or politically) motivated reasons (which could arguably be endogenous). In a robustness test, I exclude all (649) observations in the sample with incomplete - prematurely terminated - electoral cycles from the baseline model to avoid endogenous timing of the election dates. The results of the reduced sample are highly significant and are consistent with the baseline results before including year fixed effects (Appendix, Table A7). If year fixed effects are included, the coefficient estimate of the

[36] I use the model extensions in Stata's sfpanel command as suggested by Belotti et al. (2013). In addition, I employ a translogarithmic frontier model (Christensen et al., 1973) by using the model of Battese and Coelli (1995). I also test efficiency results by excluding individual output variables in the stochastic frontier model (e.g., recreational area). Inferences do not change. Results for the translogarithmic approach and efficiency estimates excluding individual output indicators are provided upon request.

[37] Executive elections oftentimes coincide with the dates of the state-wide council elections. In these years, the dates of the executive elections are set.

reduced sample is slightly smaller (than in the full sample), and lacks statistical significance in the pre-election year. The effect remains robust in size and significance in the election year across all specifications.

Another endogeneity concern may arise in the decision of the incumbent mayor to run for office again. A self-selection problem could particularly be relevant if the decision is directly linked to the fiscal and political situation in the municipality which also affects cost efficiency. To deal with potential endogeneity of the incumbency re-run variable (*incumbent runs again*), I employ an instrumental variable approach following Foremny et al. (2018). The institutional design in Bavaria allows to construct two instrumental variables (IV) for the decision of the incumbent mayor seeking re-election. The first instrument is a dummy that takes the value one if the incumbent mayor is entitled to a public pension (*Incumbent is pensionable*). In the German state of Bavaria, mayors are eligible if they have served as civil servant for at least 10 years.[38] The instrument is exogenous by institutional design because no direct link arguably exists between cost efficiency of local governments and the threshold for pension eligibility in the state law. The second instrument is a dummy variable that takes the value one if the incumbent mayor is above the threshold of 60 years in the year of the election (*Incumbent, age* $\geq$ *60*). The threshold is based on the retirement regulations for full-time civil servants in Bavaria, and the average retirement age in Germany.[39] While the retirement regulations of the state law are again exogenous by design, it cannot be ruled out that the incumbents age has effects on political decisions. Foremny et al. (2018) provide sensitivity tests on the age threshold and do not find that the age of Bavarian mayors and expenditure of municipalities are correlated. Nevertheless, I provide estimation approaches using one or the other or both instruments.

In the first stage regression, I regress the incumbency re-run dummy on the full set of baseline controls and one year lags of the instruments.[40] Both instruments are statistically significant at the 1 % - level and are highly relevant for explaining the incumbents decision to seek re-election (Appendix, Table A8, first stage results).[41] Incumbents have fewer incentives to re-run for office if they are above the age of 60 and/or are entitled a civil servant pension. When the instrumented variable (*incumbent runs again*) is included in the (baseline) model as control, the results of the election year dummies do not change (Appendix, Table A8).

[38] See Art.21 KWBG (*Bavarian law on local elections and civil servants*).

[39] Full-time mayors are not allowed to run for office again if they would be at the age of 67 when the new term begins (see Art 39 GLKrWG *Gemeinde- und Landkreisgesetz*).

[40] Employing one-year lags of both instruments is useful for two reasons: First, the pre-election situation is likely decisive for the incumbent's decision to run for office again. Second, detailed information on the incumbents decision for the election year is missing in the data when the incumbent loses in the election or when she does not re-run for office. Both indicators are set equal to zero/one for the full term of office.

[41] Overidentification and weak instrument tests support the credibility of the IV approach.

I use predicted values for the instrument of the first stage regression and construct interaction dummies of the predicted values variable with the (pre-, post-) election years, respectively (see Foremny et al., 2018). I include the instrumented variable in the interaction model to account for endogeneity caused by the incumbents decision to seek re-election (Section 4.2 – Interaction effects model). The results do not suggest that the coefficients of the pre-election and election years are statistically different from zero depending on the incumbents decision to seek re-election (Appendix, Table A9). The results confirm the previous finding that inefficiency is higher in post-election years when the incumbent sought re-election.

7 Conclusion

Principal-agent-theories suggest that democratic institutions (e.g., elections) enhance politicians' incentives and efforts to constrain wasteful public spending and to increase efficiency. Electoral cycle theories, in contrast, predict that incumbent politicians seeking re-election are more likely to pursue expansionary policies to get reelected. There is, however, no empirical evidence whether this comes at the cost of wasteful public spending. This paper is the first approach examining whether electoral cycles influence government efficiency in the overall provision of public goods and services. I used a large panel of German municipalities and employed cost efficiency as an indicator to measure performance. Local government cost efficiencies are computed using a multi-output stochastic frontier approach which takes into account the heterogeneity beyond the control of local governments.

Interestingly, estimation results do not suggest that politicians increase wasteful spending before elections. In contrast, my results show that electoral cycles rather increase cost efficiency in the provision of public goods and services before and in election years. The findings are consistent with empirical studies suggesting that democratic institutions and political participation increase performance at the local government level (e.g., Asatryan and De Witte, 2015; Borge et al., 2008; Feld and Kirchgässner, 2001; Geys et al., 2010; Hessami, 2018; Matsusaka, 2009).

The positive effect of elections on efficiency in the executive branch is more pronounced when the incumbent mayor re-runs for office, suggesting that mayors increase their efforts and avoid (wasteful) spending in election and pre-election years to improve their chances for re-election. Another interesting finding is that the efficiency-enhancing effect of elections is pronounced in years in which mayoral and municipal council elections overlap, indicating that both governmental branches collude. Given the Bavarian institutional framework, it

is likely that the council and the mayor both agree on new projects and investments at the beginning of their joint six-year electoral term — which might be reinforced by the obligation that both have to agree on transparent five-year financial plans. Wasteful spending at the end of the electoral term — and consequently before elections — is therefore less likely. My findings suggest that the widespread view that democratic politicians seek electoral gain at the cost of welfare needs some qualification.

I conclude that elections increase government efficiency given the institutional framework in the German state of Bavaria. The provision of public services and the fiscal autonomy are highly decentralized. A high degree of (fiscal) transparency moreover enables citizens to monitor local political and budget decisions. Direct mayoral elections allow voters to reward and punish efforts of incumbents accordingly. In addition, budget rules limit the possibilities for unsustainable budgeting, and citizens in Bavaria are considered to be fiscally conservative. In a referendum in 2013, for example, about 89 % of voters supported the introduction of a debt brake for the state government in the Bavarian constitution. Incumbent politicians seeking re-election in Bavaria are thus forced to place more emphasis on an economic use of public money than on (wasteful) expansionary local policies (see Garmann, 2017b).

Clearly, it would be interesting to investigate whether more cost-efficient politicians enjoy electoral advantage. The institutional context, however, might describe the preconditions for efficiency-enhancing effects of electoral cycles. An avenue for future research would be to examine how electoral cycles influence government efficiency within other institutional settings, and on different governmental layers.

References

Adam, A., Delis, M. D., and Kammas, P. (2011). Are democratic governments more efficient? *European Journal of Political Economy*, 27(1):75–86.

Afonso, A. and Fernandes, S. (2006). Measuring local government spending efficiency: Evidence for the Lisbon region. *Regional Studies*, 40(1):39–53.

Afonso, A., Schuknecht, L., and Tanzi, V. (2005). Public sector efficiency: An international comparison. *Public Choice*, 123(3-4):321–347.

Aidt, T. S., Veiga, F. J., and Veiga, L. G. (2011). Election results and opportunistic policies: A new test of the rational political business cycle model. *Public Choice*, 148(1-2):21–44.

Aigner, D., Lovell, C. K., and Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics*, 6(1):21–37.

Akhmedov, A. and Zhuravskaya, E. (2004). Opportunistic political cycles: Test in a young democracy setting. *Quarterly Journal of Economics*, 119(4):1301–1338.

Alt, J. E. and Lassen, D. D. (2006a). Fiscal transparency, political parties, and debt in OECD countries. *European Economic Review*, 50(6):1403–1439.

Alt, J. E. and Lassen, D. D. (2006b). Transparency, political polarization, and political budget cycles in OECD countries. *American Journal of Political Science*, 50(3):530–550.

Asatryan, Z. and De Witte, K. (2015). Direct democracy and local government efficiency. *European Journal of Political Economy*, 39:58–66.

Ashworth, J., Geys, B., and Heyndels, B. (2006). Determinants of tax innovation: The case of environmental taxes in Flemish municipalities. *European Journal of Political Economy*, 22(1):223–247.

Balaguer-Coll, M. T., Prior, D., and Tortosa-Ausina, E. (2007). On the determinants of local government performance: A two-stage nonparametric approach. *European Economic Review*, 51(2):425–451.

Baleiras, R. N. and da Silva Costa, J. (2004). To be or not to be in office again: An empirical test of a local political business cycle rationale. *European Journal of Political Economy*, 20(3):655–671.

Barankay, I. and Lockwood, B. (2007). Decentralization and the productive efficiency of government: Evidence from Swiss cantons. *Journal of Public Economics*, 91(5-6):1197–1218.

Battese, G. E. and Coelli, T. J. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, 20(2):325–332.

Bavarian Statistical Office (2018). *Kommunalfinanzen in Bayern. Rechnungsergebnisse 2018*. Bayerisches Landesamt fr Statistik und Datenverarbeitung. Statistische Berichte.

Belotti, F., Daidone, S., Ilardi, G., and Atella, V. (2013). Stochastic frontier analysis using Stata. *Stata Journal*, 13(4):719–758.

Belotti, F. and Ilardi, G. (2018). Consistent inference in fixed-effects stochastic frontier models. *Journal of Econometrics*, 202(2):161–177.

Bernholz, P. (1980). Public Choice. *Public Choice*, 35(1):121–121.

Borge, L.-E., Falch, T., and Tovmo, P. (2008). Public sector efficiency: The roles of political and budgetary institutions, fiscal capacity, and democratic participation. *Public Choice*, 136(3-4):475–495.

Brender, A. (2003). The effect of fiscal performance on local government election results in Israel: 1989–1998. *Journal of Public Economics*, 87(9-10):2187–2205.

Brender, A. and Drazen, A. (2005). Political budget cycles in new versus established democracies. *Journal of Monetary Economics*, 52(7):1271–1295.

Brender, A. and Drazen, A. (2008). How do budget deficits and economic growth affect reelection prospects? Evidence from a large panel of countries. *American Economic Review*, 98(5):2203–20.

Christensen, L. R., Jorgenson, D. W., and Lau, L. J. (1973). Transcendental logarithmic production frontiers. *Review of Economics and Statistics*, 55(1):28–45.

Coelho, C., Veiga, F. J., and Veiga, L. G. (2006). Political business cycles in local employment: Evidence from Portugal. *Economics Letters*, 93(1):82–87.

Dahlberg, M. and Mörk, E. (2011). Is there an election cycle in public employment? Separating time effects from election year effects. *CESifo Economic Studies*, 57(3):480–498.

De Borger, B. and Kerstens, K. (1996). Cost efficiency of Belgian local governments: A comparative analysis of FDH, DEA, and econometric approaches. *Regional Science and Urban Economics*, 26(2):145–170.

De Borger, B., Kerstens, K., Moesen, W., and Vanneste, J. (1994). Explaining differences in productive efficiency: An application to Belgian municipalities. *Public Choice*, 80(3-4):339–358.

De Haan, J. and Klomp, J. (2013). Conditional political budget cycles: A review of recent evidence. *Public Choice*, 157(3-4):387–410.

Dorn, F., Gaebler, S., and Roesel, F. (2021). Ineffective fiscal rules? The effect of public sector accounting standards on budgets, efficiency, and accountability. *Public Choice*, 186(3-4):387–412.

Drazen, A. and Eslava, M. (2010). Electoral manipulation via voter-friendly spending: Theory and evidence. *Journal of Development Economics*, 92(1):39–52.

Dubois, E. (2016). Political business cycles 40 years after Nordhaus. *Public Choice*, 166(1-2):235–259.

Ebdon, C. and Franklin, A. L. (2006). Citizen participation in budgeting theory. *Public Administration Review*, 66(3):437–447.

Englmaier, F., Roider, A., Stowasser, T., and Hinreiner, L. (2017). Power politics: Electoral cycles in German electricity prices. *Working Paper, mimeo*.

Englmaier, F. and Stowasser, T. (2017). Electoral cycles in savings bank lending. *Journal of the European Economic Association*, 15(2):296–354.

Federal Statistical Office (2020). *Rechnungsergebnisse der Kern- und Extrahaushalte des Öffentlichen Gesamthaushalts 2011. Neue Aufbereitung unter Einbezug der Extrahaushalte*. Statistisches Bundesamt. Finanzen und Steuern, Fachserie 14, Reihe 3.1.

Feld, L. P. and Kirchgässner, G. (2001). The political economy of direct legislation: Direct democracy and local decision–making. *Economic Policy*, 16(33):330–367.

Feld, L. P. and Matsusaka, J. G. (2003). Budget referendums and government spending: Evidence from Swiss cantons. *Journal of Public Economics*, 87(12):2703–2724.

Feld, L. P. and Voigt, S. (2003). Economic growth and judicial independence: Cross-country evidence using a new set of indicators. *European Journal of Political Economy*, 19(3):497–527.

Finan, F. and Mazzocco, M. (2020). Electoral incentives and the allocation of public funds. *Journal of the European Economic Association, forthcoming*.

Foremny, D., Freier, R., Moessinger, M.-D., and Yeter, M. (2018). Overlapping political budget cycles. *Public Choice*, 177(1-2):1–27.

Foremny, D. and Riedel, N. (2014). Business taxes and the electoral cycle. *Journal of Public Economics*, 115:48–61.

Freier, R. (2015). The mayor's advantage: Causal evidence on incumbency effects in German mayoral elections. *European Journal of Political Economy*, 40:16–30.

Fritzsche, C. (2019). Analyzing the efficiency of county road production – Evidence from Eastern German counties. *German Economic Review*, 20(4):e415–e435.

Furdas, M. D., Homolkova, K., and Kis-Katos, K. (2015). Local political budget cycles in a federation: Evidence from West German cities. *IZA Discussion Paper*, 8798.

Gaebler, S. and Roesel, F. (2019). Do direct elections matter? Quasi-experimental evidence from Germany. *International Tax and Public Finance*, 26(6):1416–1445.

Galli, E. and Rossi, S. P. (2002). Political budget cycles: the case of the Western German Länder. *Public Choice*, 110(3-4):283–303.

Garmann, S. (2017a). Electoral cycles in public administration decisions: Evidence from German municipalities. *Regional Studies*, 51(5):712–723.

Garmann, S. (2017b). Political budget cycles and fiscally conservative voters. *Economics Letters*, 155:72–75.

Gemeindeedikt (1818). *Königliche Verordnung: Die künftige Verfassung und Verwaltung der Gemeinden im Königreich*. Gesetzblatt für das Königreich Bayern, May 1818.

Geys, B. (2006). Looking across borders: A test of spatial policy interdependence using local government efficiency ratings. *Journal of Urban Economics*, 60(3):443–462.

Geys, B., Heinemann, F., and Kalb, A. (2010). Voter involvement, fiscal autonomy and public sector efficiency: Evidence from German municipalities. *European Journal of Political Economy*, 26(2):265–278.

Geys, B. and Vermeir, J. (2008). The political cost of taxation: New evidence from German popularity ratings. *Electoral Studies*, 27(4):633–648.

Greene, W. (2005). Reconsidering heterogeneity in panel data estimators of the stochastic frontier model. *Journal of Econometrics*, 126(2):269–303.

Grossman, P. J., Mavros, P., and Wassmer, R. W. (1999). Public sector technical inefficiency in large US cities. *Journal of Urban Economics*, 46(2):278–299.

Guillamón, M. D. and Cuadrado-Ballesteros, B. (2020). Is transparency a way to improve efficiency? An assessment of Spanish municipalities. *Regional Studies, forthcoming*.

Hessami, Z. (2018). Accountability and incentives of appointed and elected public officials. *Review of Economics and Statistics*, 100(1):51–64.

Hindriks, J. and Lockwood, B. (2009). Decentralization and electoral accountability: Incentives, separation and voter welfare. *European Journal of Political Economy*, 25(3):385–397.

Jondrow, J., Lovell, C. K., Materov, I. S., and Schmidt, P. (1982). On the estimation of technical inefficiency in the stochastic frontier production function model. *Journal of Econometrics*, 19(2-3):233–238.

Kalb, A. (2010). The impact of intergovernmental grants on cost efficiency: Theory and evidence from German municipalities. *Economic Analysis and Policy*, 40(1):23–48.

Kalb, A., Geys, B., and Heinemann, F. (2012). Value for money? German local government efficiency in a comparative perspective. *Applied Economics*, 44(2):201–218.

Kappeler, A. and Välilä, T. (2008). Fiscal federalism and the composition of public investment in Europe. *European Journal of Political Economy*, 24(3):562–570.

Kauder, B., Krause, M., and Potrafke, N. (2018). Electoral cycles in MPs' salaries: Evidence from the German states. *International Tax and Public Finance*, 25(4):981–1000.

Kauder, B., Potrafke, N., and Schinke, C. (2017). Manipulating fiscal forecasts: Evidence from the German states. *Finanz-Archiv/Public Finance Analysis*, 73(2):213.

Kneebone, R. D. and McKenzie, K. J. (2001). Electoral and partisan cycles in fiscal policy: An examination of Canadian provinces. *International Tax and Public Finance*, 8(5-6):753–774.

Krause, M. (2019). Communal fees and election cycles: Evidence from German municipalities. *ifo Working Paper*, 293.

Lampe, H. W., Hilgers, D., and Ihl, C. (2015). Does accrual accounting improve municipalities efficiency? Evidence from Germany. *Applied Economics*, 47(41):4349–4363.

Lancaster, T. (2000). The incidental parameter problem since 1948. *Journal of Econometrics*, 95(2):391–413.

Lassen, D. D. (2005). The effect of information on voter turnout: Evidence from a natural experiment. *American Journal of Political Science*, 49(1):103–118.

Leibenstein, H. (1966). Allocative efficiency vs. "X-efficiency". *American Economic Review*, 56(3):392–415.

MacRae, C. D. (1977). A political model of the business cycle. *Journal of Political Economy*, 85(2):239–263.

Matsusaka, J. G. (2009). Direct democracy and public employees. *American Economic Review*, 99(5):2227–46.

Mechtel, M. and Potrafke, N. (2013). Electoral cycles in active labor market policies. *Public Choice*, 156(1-2):181–194.

Meeusen, W. and van Den Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions with composed error. *International Economic Review*, 18:435–444.

Migué, J.-L. and Bélanger, G. (1974). Toward a general theory of managerial discretion. *Public Choice*, 17:27–51.

Montes, G. C., Bastos, J. C. A., and de Oliveira, A. J. (2019). Fiscal transparency, government effectiveness and government spending efficiency: Some international evidence based on panel data approach. *Economic Modelling*, 79:211–225.

Narbón-Perpiñá, I. and De Witte, K. (2018a). Local governments' efficiency: A systematic literature review – part I. *International Transactions in Operational Research*, 25(2):431–468.

Narbón-Perpiñá, I. and De Witte, K. (2018b). Local governments' efficiency: A systematic literature review – part II. *International Transactions in Operational Research*, 25(4):1107–1136.

Neyman, J. and Scott, E. L. (1948). Consistent estimates based on partially consistent observations. *Econometrica*, 16(1):1–32.

Niskanen, W. A. (1968). The peculiar economics of bureaucracy. *American Economic Review*, 58(2):293–305.

Niskanen, W. A. (1975). Bureaucrats and politicians. *Journal of Law and Economics*, 18(3):617–643.

Nordhaus, W. D. (1975). The political business cycle. *Review of Economic Studies*, 42(2):169–190.

Ostrom, V. and Ostrom, E. (1971). Public choice: A different approach to the study of public administration. *Public Administration Review*, 31(2):203–216.

Peltzman, S. (1992). Voters as fiscal conservatives. *Quarterly Journal of Economics*, 107(2):327–361.

Philips, A. Q. (2016). Seeing the forest through the trees: A meta-analysis of political budget cycles. *Public Choice*, 168(3-4):313–341.

Potrafke, N. (2010). The growth of public health expenditures in OECD countries: Do government ideology and electoral motives matter? *Journal of Health Economics*, 29(6):797–810.

Potrafke, N. (2017). Partisan politics: The empirical evidence from OECD panel studies. *Journal of Comparative Economics*, 45(4):712–750.

Potrafke, N. (2019). Electoral cycles in perceived corruption: International empirical evidence. *Journal of Comparative Economics*, 47(1):215–224.

Potrafke, N. (2020). General or central government? Empirical evidence on political cycles in budget composition using new data for OECD countries. *European Journal of Political Economy, forthcoming*.

Reischmann, M. (2016). Creative accounting and electoral motives: Evidence from OECD countries. *Journal of Comparative Economics*, 44(2):243–257.

Rogoff, K. (1990). Equilibrium political budget cycles. *American Economic Review*, 80:21–36.

Rogoff, K. and Sibert, A. (1988). Elections and macroeconomic policy cycles. *Review of Economic Studies*, 55(1):1–16.

Rose, S. (2006). Do fiscal rules dampen the political business cycle? *Public Choice*, 128(3-4):407–431.

Schneider, C. J. (2010). Fighting with one hand tied behind the back: Political budget cycles in the West German states. *Public Choice*, 142(1-2):125.

Schuknecht, L. (2000). Fiscal policy cycles and public expenditure in developing countries. *Public Choice*, 102(1-2):113–128.

Seabright, P. (1996). Accountability and decentralisation in government: An incomplete contracts model. *European Economic Review*, 40(1):61–89.

Shi, M. and Svensson, J. (2006). Political budget cycles: Do they differ across countries and why? *Journal of Public Economics*, 90(8-9):1367–1389.

Simar, L. and Wilson, P. W. (2007). Estimation and inference in two-stage, semi-parametric models of production processes. *Journal of Econometrics*, 136(1):31–64.

Sjahrir, B. S., Kis-Katos, K., and Schulze, G. G. (2013). Political budget cycles in Indonesia at the district level. *Economics Letters*, 120(2):342–345.

Tepe, M. and Vanhuysse, P. (2009). Educational business cycles. *Public Choice*, 139(1-2):61–82.

Tepe, M. and Vanhuysse, P. (2013). Cops for hire? The political economy of police employment in the German states. *Journal of Public Policy*, 33:165–199.

Tepe, M. and Vanhuysse, P. (2014). A vote at the opera? The political economy of public theaters and orchestras in the German states. *European Journal of Political Economy*, 36:254–273.

Wang, H.-J. and Schmidt, P. (2002). One-step and two-step estimation of the effects of exogenous variables on technical efficiency levels. *Journal of Productivity Analysis*, 18(2):129–144.

Appendix

Table A1: Stochastic frontier estimation results

	(1)	(2)	(3)	(4)	(5)
I. Stochastic frontier model	Cobb-Douglas cost production function				
Output variables (log)					
Population	0.539***	0.583***	0.363***	0.689***	0.714***
	(0.110)	(0.112)	(0.120)	(0.090)	(0.081)
Pupil population, age 6-15	-0.027	-0.041	-0.052	0.073	-0.020
	(0.037)	(0.038)	(0.039)	(0.53)	(0.049)
Old age population, age>65	0.263***	0.267***	0.243***	-0.132***	-0.038
	(0.067)	(0.069)	(0.071)	(0.049)	(0.044)
Employed, place at work	0.131***	0.128***	0.129***	0.235***	0.233***
	(0.022)	(0.023)	(0.023)	(0.012)	(0.011)
Kindergarten places	-0.013	-0.018	-0.024	0.150***	0.122
	(0.019)	(0.020)	(0.020)	(0.023)	(0.021)
Recreational area	-0.011	-0.006	-0.009	0.011	0.014**
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Time trend					
Year	0.020***	0.018***	0.020***	0.017***	0.011***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
II. Inefficiency model	Dependent variable: Cost inefficiency				
Executive elections					
Pre-election year		Decrease***	Decrease***	Decrease***	Decrease**
Election year		Decrease***	Decrease***	Decrease***	Decrease**
Post-election year		Decrease**	Decrease***	Decrease***	Decrease
Controls					
Population density			Decrease**		Increase*
Migration share			Increase***		Increase***
Unemployment share			Increase***		Decrease***
Incumbent runs again			Decrease		Decrease
Leftwing incumbent			Increase		Increase
Leftwing council share			Increase		Decrease*
Year fixed effects	No	No	No	No	Yes
Municipality fixed effects	Yes	Yes	Yes	No	No
Municipalities (cluster)	2012	2012	2012	2015	2015
Observations	21935	21935	21935	21938	21938
Inefficiency					
Mean	13.446	15.283	8.981	31.753	24.058
Median	10.865	13.713	8.352	26.788	18.014
Model	TFE	TFE	TFE	BC95	BC95
λ	26.269***	1.066***	0.004	1.723***	2.810***
σ_ϑ	5.028***	0.213***	0.001	0.426***	0.735***
σ_u	0.191***	0.200***	0.233***	0.247***	0.261***

Notes: Multi-output stochastic frontier models: TFE (true fixed effects) by Greene (2005), BC95 model by Battese and Coelli (1995). λ provides the signal-to-noise ratio. Standard errors clustered at the municipality level in parentheses. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A2: Event study results

	(1) Executive elections	(2) Executive elections	(3) Joint elections
t-2: Reference year	0	0	0
t-1: Pre election year	-0.803**	-0.801**	-1.382**
	(0.384)	(0.378)	(0.683)
t: Election year	-0.879**	-0.873**	-1.367**
	(0.393)	(0.391)	(0.545)
t+1: Post election year	-0.248	-0.231	-0.593
	(0.382)	(0.381)	(0.584)
t+2: Two years later	0.0617	0.0683	0.302
	(0.350)	(0.348)	(0.518)
Midterm (t+3, t-3)	-0.144	-0.135	0.114
	(0.423)	(0.421)	(0.710)
Excluded years from cycle		-0.870	0.380
		(1.177)	(0.783)
Constant	17.29***	17.31***	16.95***
	(1.236)	(1.232)	(1.339)
Controls for excl. cycle years	excl.	Yes	Yes
Baseline controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes
Municipalities(cluster)	2012	2012	2012
Observations	21888	21935	21935

Notes: Estimations use the event study model (5). Standard errors clustered at the municipality level in parentheses. Column (1) refers to Figure 2. Cross-elections (several pre-, post-, election years within one year) are not included in the event study cycle years of column (1); columns (2) and (3) control for the excluded years in the estimation model. Column (3) shows event study results for overlapping executive and council electoral cycles (joint elections). Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A3: Marginal effects - overlapping cycles and incumbent seeks re-election

	Dependent variable: Cost inefficiency		
	(1)	(2)	(3)
Overlapping elections (no=0 / yes=1)			*(incumbent=0)*
(A) Pre-election year (joint=0)	-0.121		-0.931
	(0.492)		(0.586)
(B) Pre-election year (joint=1)	-1.521***		-1.070
	(0.592)		(0.605)
Difference (B-A)	**-1.399***		-0.139
	(0.830)♯		(0.831)
(C) Executive election year (joint=0)	-0.407		-0.770
	(0.497)		(0.615)
(D) Executive election year (joint=1)	-1.484***		-1.315**
	(0.529)		(0.575)
Difference (D-C)	-1.078		-0.544
	(0.824)		(0.899)
(E) Post-election year (joint=0)	0.063		-0.027
	(0.508)		(0.580)
(F) Post-election year (joint=1)	-0.766		-1.065*
	(0.541)		(0.593)
Difference (F-E)	-0.830		-1.038
	(0.846)		(0.898)
Executive elections			
× incumbent runs again (no=0 / yes=1)			*(joint=0)*
(G) Pre-election year (incumbent=0)		-0.530	-0.931
		(0.388)	(0.586)
(H) Pre-election year (incumbent=1)		-1.000	1.029
		(0.416)	(0.831)
Difference (H-G)		-0.470	**1.959***
		(0.371)	**(1.010)**♯
(I) Executive election year (incumbent=0)		-0.741**	-0.770
		(0.367)	(0.615)
(J) Executive election year (incumbent=1)		-0.995***	0.032
		(0.360)	(0.727)
Difference (J-I)		-0.254	0.802
		(0.381)	(0.906)
(K) Post-election year (incumbent=0)		-0.408	-0.027
		(0.351)	(0.580)
(L) Post-election year (incumbent=1)		0.021	0.200
		(0.365)	(0.818)
Difference (L-K)		0.429	0.227
		(0.347)	(0.969)
Overlapping elections (yes=1)			
X incumbent runs again (no=0 / yes=1)			
(M) Joint election year (incumbent=0)			-1.070*
			(0.605)
(N) Joint election year (incumbent=1)			-1.904***

Continued on next page

Table continued	(1)	(2)	(3)
			(0.605)
Difference (N-M)			**-0.835****
			(0.399)♯♯
(O) Joint election year (incumbent=0)			-1.315**
			(0.575)
(P) Joint election year (incumbent=1)			-1.711***
			(0.560)
Difference (P-O)			-0.396
			(0.408)
(Q) Joint post-election year (incumbent=0)			-1.065*
			(0.593)
(R) Joint post-election year (incumbent=1)			-0.554
			(0.558)
Difference (R-Q)			0.511
			(0.365)
Incumbent runs again (yes=1)			
× overlapping elections (no=0 / yes=1)			
(S) Incumbent pre-election year (joint=0)			1.029
			(0.831)
(T) Incumbent pre-election year (joint=1)			-1.904***
			(0.605)
Difference (T-S)			**-2.933*****
			(1.126)♯♯♯
(U) Incumbent election year (joint=0)			0.032
			(0.727)
(V) Incumbent election year (joint=1)			-1.711***
			(0.560)
Difference (V-U)			**-1.743***
			(1.009)♯
(W) Incumbent post-election year (joint=0)			0.200
			(0.818)
(X) Incumbent post-election year (joint=1)			-0.554
			(0.558)
Difference (X-W)			-0.755
			(1.083)

Notes: Results correspond to Figure 3 and the interaction effects model described in section 4.2. Marginal effects of interaction terms computed conditional on whether elections coincide and whether the incumbent runs for reelection. Own calculations based on Stata command *lincom*. Robust clustered standard errors in parentheses. Coefficients are bold if the difference of marginal effects is statistically different from zero. Significance levels: * p <0:10, ** p < 0:05, *** p < 0:01.

Table A4: Robustness (I) – Baseline including additional controls, and excluding independent city-counties

	Dependent variable: Cost inefficiency			
	(1)	(2)	(3)	(4)
Executive elections				
Pre-election year	-0.750**	-0.734**	-0.652*	-0.735**
	(0.355)	(0.364)	(0.354)	(0.354)
Election year	-0.848***	-0.839***	-0.551*	-0.856***
	(0.308)	(0.318)	(0.290)	(0.307)
Post-election year	-0.173	-0.122	-0.021	-0.186
	(0.314)	(0.323)	(0.293)	(0.313)
Additional controls				
Real public debt (log)			0.815***	
			(0.171)	
CSU council share				3.293*
				(1.948)
Constant	17.190***	17.114***	11.297***	16.247***
	(1.160)	(1.310)	(1.622)	(1.265)
Independent city-counties included	Yes	No	Yes	Yes
Municipality controls	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Municipalities (cluster)	2012	1987	1948	2012
Observations	21935	21660	19656	21935

Notes: OLS FE model with standard errors clustered at the municipality level in parentheses. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A5: Robustness (II) – Heterogeneity by population size

	Dependent variable: Cost inefficiency			
	Below median size (<2881)		Above median size (≥2881)	
	(1)	(2)	(3)	(4)
Executive elections				
Pre-election year	-2.398***	-2.151**	-0.558***	0.093
	(0.275)	(0.851)	(0.211)	(0.388)
Election year	-1.392***	-0.718	-0.307	-0.680**
	(0.284)	(1.050)	(0.195)	(0.283)
Post-election year	-0.736**	-0.616	-0.025	0.038
	(0.294)	(0.969)	(0.195)	(0.310)
Constant	11.201***	14.866***	12.840***	16.241***
	(1.500)	(1.532)	(1.646)	(1.620)
Municipality controls	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes
Year fixed effects	No	Yes	No	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Municipalities (cluster)	1042	1042	1032	1032
Observations	10965	10965	10970	10970

Notes: OLS FE model with standard errors clustered at the municipality level in parentheses. Significance levels: ***p < 0.01; **p < 0.05; *p < 0.1.

Table A6: Robustness (III) – Heterogeneity by mayor type

	Dependent variable: Cost inefficiency			
	Full time mayor		Part time mayor	
	(1)	(2)	(3)	(4)
Executive elections				
Pre-election year	-0.791***	-0.019	-2.465***	-3.120***
	(0.201)	(0.363)	(0.292)	(1.201)
Election year	-0.456**	-0.459	-1.387***	-2.795**
	(0.191)	(0.299)	(0.311)	(1.395)
Post-election year	-0.019	0.117	-0.856***	-1.312
	(0.199)	(0.294)	(0.313)	(1.501)
Constant	13.091***	16.633***	12.658***	16.387***
	(1.533)	(1.605)	(1.108)	(1.216)
Municipality controls	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes
Year fixed effects	No	Yes	No	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Municipalities (cluster)	1186	1186	965	965
Observations	12442	12442	9492	9492

Notes: OLS FE model with standard errors clustered at the municipality level in parentheses. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A7: Robustness (IV) – Regular elections

	Dependent variable: Cost inefficiency				
	(1)	(2)	(3)	(4)	(5)
Executive elections					
Pre-election year	-1.197***	-1.230***	-1.498***	-1.447***	-0.526
	(0.170)	(0.170)	(0.177)	(0.179)	(0.395)
Election year	-0.909***	-0.942***	-0.958***	-0.853***	-0.730**
	(0.172)	(0.174)	(0.173)	(0.176)	(0.309)
Post-election year	-0.028	-0.054	-0.283	-0.340*	-0.089
	(0.175)	(0.176)	(0.181)	(0.184)	(0.347)
Constant	13.846***	13.863***	13.219***	13.309***	17.128***
	(0.104)	(0.072)	(1.083)	(1.119)	(1.172)
Municipality controls	No	No	Yes	Yes	Yes
Political controls	No	No	No	Yes	Yes
Year fixed effects	No	No	No	No	yes
Municipality fixed effects	No	Yes	Yes	Yes	Yes
Municipalities (cluster)	2012	2012	2012	2012	2012
Observations	21286	21286	21286	21286	21286

Notes: OLS FE model with standard errors clustered at the municipality level in parentheses. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A8: Robustness (V) – Baseline using instrumented variable for rerun decision (2SLS)

	Dependent variable: Cost inefficiency						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Second stage results							
Executive elections							
Pre-election year	-0.478	-0.475	-0.481	-0.478	-0.474	-0.480	-0.457
	(0.344)	(0.347)	(0.347)	(0.345)	(0.347)	(0.347)	(0.342)
Election year	-1.051***	-1.049***	-1.052***	-1.051***	-1.049***	-1.052***	-1.040***
	(0.311)	(0.312)	(0.312)	(0.311)	(0.312)	(0.312)	(0.309)
Post-election year	-0.349	-0.353	-0.346	-0.349	-0.353	-0.346	-0.374
	(0.315)	(0.323)	(0.316)	(0.315)	(0.323)	(0.316)	(0.311)
Instrumented variable							
Incumbent runs again	0.216	0.192	0.236	0.217	0.193	0.236	0.068
	(0.471)	(0.603)	(0.520)	(0.473)	(0.604)	(0.521)	(0.233)
Municipality controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipalities (cluster)	2012	2012	2012	2012	2012	2012	2012
Observations	19956	19956	19956	19956	19956	19956	19956
First stage results							
Excluded instruments							
Incumbent is pensionable (lag)	-0.296***	-0.423***		-0.296***	-0.422***		
	(0.010)	(0.009)		(0.010)	(0.009)		
Incumbent, age≥60 (lag)	-0.318***		-0.422***	-0.317***		-0.422***	
	(0.009)		(0.008)	(0.009)		(0.008)	
Estimation approach	xtivreg2	xtivreg2	xtivreg2	2-step	2-step	2-step	OLS
Cragg-Donald Wald F statistic	4260.76	4696.15	5491.52				
Kleibergen-Paap rk Wald F statistic	1757.31	1990.99	2502.84				
Hansen J statistic (overidentification)	0.005	0.000	0.000				

Notes: 2SLS model estimations with standard errors clustered at the municipality level in parentheses. The control variable of incumbent's decision to seek re-election (*Incumbent runs again*) is instrumented. Columns (1)-(3) are based on Stata's *xtivreg2* command. Columns (4)-(6) show results using separate first stage and second stage regressions. Column (7) shows baseline OLS FE results for comparison. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A9: Robustness (VI) – Marginal effects conditional on incumbent's decision to seek re-election (2SLS)

	Dependent variable: Cost inefficiency					
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)
Executive elections x incumbent runs again (no=0 / yes=1)						
(A) Pre-election year (incumbent=0)	-0.585	-0.721	-0.654	-0.326	-0.489	-0.303
	(0.457)	(0.482)	(0.484)	(0.638)	(0.673)	(0.680)
(B) Pre-election year (incumbent=1)	-0.273	-0.082	-0.238	-0.481	-0.452	-0.467
	(0.512)	(0.529)	(0.552)	(0.364)	(0.362)	(0.370)
Difference (B-A)	0.312	0.639	0.415	-0.155	0.037	-0.164
	(0.682)	(0.735)	(0.769)	(0.658)	(0.694)	(0.728)
(C) Executive election year (incumbent=0)	-1.301***	-1.691***	-0.929	-1.442**	-2.073***	-0.771
	(0.505)	(0.547)	(0.564)	(0.675)	(0.730)	(0.795)
(D) Executive election year (incumbent=1)	-0.875**	-0.610	-1.118***	-0.974***	-0.847**	-1.099***
	(0.379)	(0.388)	(0.413)	(0.342)	(0.345)	(0.360)
Difference (D-C)	0.426	1.081	-0.189	0.468	1.226	-0.328
	(0.614)	(0.682)	(0.737)	(0.743)	(0.809)	(0.911)
(E) Post-election year (incumbent=0)	-1.055**	-0.408	-1.168**	-0.985	-0.667	-1.078
	(0.532)	(0.351)	(0.584)	(0.668)	(0.698)	(0.756)
(F) Post-election year (incumbent=1)	-0.073	-0.160	0.052	-0.316	-0.349	-0.310
	(0.373)	(0.385)	(0.403)	(0.337)	(0.341)	(0.354)
Difference (F-E)	0.982	0.805	**1.220**	0.669	0.318	0.767
	(0.623)	(0.670)	**(0.737)**$^{\sharp}$	(0.711)	(0.753)	(0.846)
Municipality controls	Yes	Yes	Yes	Yes	Yes	Yes
Political controls	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Municipalities (cluster)	2012	2012	2012	2012	2012	2012
Observations	19940	19940	19940	19940	19940	19940
Excluded instruments						
Incumbent is pensionable (lag)	Yes	Yes	No	Yes	Yes	No
Incumbent, age≥60 (lag)	Yes	No	Yes	Yes	No	Yes
Assumption on unknown rerun decision	no rerun	no rerun	no rerun	all rerun	all rerun	all rerun

Notes: 2SLS model estimations with standard errors clustered at the municipality level in parentheses. The incumbent's decision to seek re-election (*Incumbent runs again*) is instrumented in the interaction effects model. All estimations are based on Stata's *xtivreg2* command. Assumptions when rerun decision in the next election is unknown: Columns (1a)-(1c) assume "no rerun" in all unknown years, while Columns (4)-(6) label all unknown years as "rerun" — assuming that the incumbent mayor runs again in the next election. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.