

**Electoral Cycles in Public Administration Decisions – Evidence
from German Municipalities**

Online Appendix

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1.Map of Hesse

Figure A1: Map of Hesse with municipal borders (in white)



2. Summary statistics

Table A1: Summary statistics

	Mean	Std. Deviation	Min	Max
<i>BL</i>	1.3611	1.2208	0	32.8330
<i>BL^{NR}</i>	0.4259	0.4092	0	5.8824
Election	0.0903	0.2316	0	1
Population Size	14270.15	37271.02	622	679664
Population density	341.56	394.24	20.75	2737.16
Proportion of old, 65+	19.44	2.81	11.5	31.8
Proportion of young, 0-15	14.96	1.61	9.1	21.6
Tax capacity	384.73	475.14	-421	9902
Seat share SPD	0.3920	0.1307	0	0.80
Seat share CDU	0.3535	0.1262	0	0.7333
Seat share Greens	0.0416	0.0493	0	0.2258
Seat share FDP	0.0344	0.0424	0	0.3514
SPD administrator	0.4167	0.4931	0	1
CDU administrator	0.2394	0.4268	0	1
Debt per capita	813.59	626.99	0	5586.98
Change in property tax B	0.0104	0.0384	-0.2231	0.5108
Change in business tax	0.0026	0.0198	-0.4055	0.3365
Divided Government	0.7256	0.4463	0	1

BL^{NR} = number of building licenses for non-residential buildings per 1000 inhabitants. Population density is defined as number of inhabitants per square km. The age structure of the population is denoted as percentages. Tax capacity is measured in Euro per inhabitant.

3. Robustness checks

Difference-vs. System GMM

It makes sense to examine whether the results change when the difference GMM model (see Arellano and Bond, 1991) instead of the system GMM model is estimated (Table A2).

Compared to the difference GMM model, the system GMM model uses an additional moment condition that could be violated when the lagged first differenced dependent variable is correlated with the municipality-fixed effects. Thus, the difference GMM model can be thought of as having more conservative identification assumptions than the system GMM model. However, both point estimates and inferences do not change with the difference GMM model.ⁱ

Excluding large municipalities

Municipalities with population size over 20000 were excluded from the sample (other cut-off points give similar results) to ensure that the results are not driven by large municipalities which might issue a disproportionately large number of licenses, for example because the stakes of winning elections might be larger in those municipalities. However, the results are unchanged (Table A3).

Heterogeneity with regard to a municipality's income level

It may be worthwhile to check whether there exists any heterogeneity in the effects with regard to the income level of the municipalities. It is likely that poor citizens cannot afford to build own houses, and that therefore granting building licenses might increase the vote share of the incumbent only through additional votes from relatively wealthy citizens. Administrators therefore might only extend the number of building licenses in relatively rich municipalities. To investigate whether this is the case, the following interaction model is estimated in which the proxy for municipal income is interacted with the election year variable:

$$BL_{it} = \beta_1 Election_{it} + \beta_2 Election_{it} TaxCapacity_{it} + \beta_3 TaxCapacity_{it} + \gamma BL_{it-1} + \eta_i + \lambda_t + u_{it}$$

Table A4 shows that the interaction term is virtually zero. Thus, it cannot be concluded that the electoral cycle in building licenses is conditional on the income level of a municipality.

Electoral cycle in expenditures

One argument for the existence of electoral cycles in public administration decisions was the limited discretion of the administrator over fiscal variables leading him to manipulate policies in those fields in which he has large power. Regarding fiscal variables, the administrator has some influence only on personnel expenditures and material spending. It is interesting to investigate whether there also exists a strong electoral cycle in these variables. Therefore, both expenditure types were also used as outcome variables in non-reported regressions. For personnel expenditures, the coefficients of interest were always virtually zero and far from being significant. For material spending, the election year effects were also mostly insignificant. Only in a few specifications, the coefficients were marginally significant at the 10%-level, but the coefficients were also quite small and close to zero, thus probably reflecting the limited discretion of the administrator over this expenditure type. This supports the argument that the administrator resorts primarily to manipulating public administration decisions before elections.

Parsimonious specifications

More parsimonious specifications in which the set of control variables was restricted to those that have reached statistical significance at least at the 10%-level in the baseline model (Table

1) were also estimated. However, the results were virtually the same which is why they are omitted here.

Including the price of a building license as a control variable

In a robustness check, I have included a proxy for the price of a building license as an additional control variable. While there do not exist data on the exact price of a building license at the municipality level, I was able to collect data on the revenues generated by building licenses at the county level. With these revenues, I have calculated the average revenue for a building license as a proxy for the price of a building license.ⁱⁱ Although this variable could be subject to some endogeneity concerns (albeit these are attenuated because data at the county level are used), including this variable on the right-hand-side could be important. Table A5 shows the corresponding results. As can be seen, the price has – as one would expect – a significantly negative effect on the number of building licenses. However, the estimated election effect changes little and stays significant. Thus, the baseline estimates do not suffer from omitted variable bias regarding the price of the building licenses.

Varying the number of lags of the dependent variable

In the baseline model, I have used the specification with only one lag as suggested by the partial adjustment model. Here, I show that specifications that are more general come to similar conclusions as this specific one. Specifically, Table A6 shows results that were obtained by including all lags up to a certain maximum lag length. I have used a maximum lag length of 5 such that the most general specification covers one complete electoral cycle. As can be seen, except for the case where only the first two lags are included, all specifications show a significant effect. Even the most conservative estimate has a p-value of less than 0.15 and is economically large. Therefore, I can conclude that the general conclusions are quite insensitive to the chosen specification.

Comparison of system GMM with fixed-effects and pooled OLS specifications

Tables A7 and A8 compare the results from the simple fixed-effects estimator and from the pooled OLS model, respectively, with the results from the dynamic panel data model. Unbiased estimates for the lagged dependent variable in the system GMM model should lie between the estimates of the lagged dependent variables in the fixed-effects and the pooled OLS specification. This bracketing range therefore provides a natural specification check of the system GMM model: If the coefficients did not lie in this range, then there would be reason to worry about the model specification (see Bond, 2002). According to column 1 of tables A7 and A8, the coefficient of the lagged dependent variable must lie between 0.214 and 0.437. As can be seen from Table 1, these criteria are fulfilled such that the model seems to be well specified. Moreover, from Table A7 it can be seen that the bias of the simple fixed-effects specification compared to the system GMM model that takes the bias into account is enormous. This is because a panel data model with relatively short time horizon has been estimated.

Concurrently held elections

A concern could be that in a few cases, administrator elections in Hesse are held concurrently with higher-tier elections (state, national, or European elections) or local council elections. In this case, it is possible that the number of building licenses is not influenced by administrator elections, but rather by policies adopted by other government tiers shortly before their elections. Although the number of concurrently held elections is quite small, it might nonetheless make sense to capture concurrently held elections with dummies variables. As can be seen in the Table A9, the results do not change even when concurrent elections are controlled for.

Is the Effect Conditional on Whether the Administrator Runs for Re-Election?

The existence of an electoral cycle in building licenses might depend on whether the administrator stands for re-election. I have therefore estimated an interaction model in which I

have interacted the election variables with a dummy variable indicating whether the administrator re-runs for office. However, as can be seen in Table A10, the interaction term is insignificant and small. Thus, in the present setting there is no evidence that administrators re-running for office pursue different policies before elections with regard to building licenses than those that do not re-run.

Simple Election Year Dummies

The election year variables have been substituted by simple (pre-/post-)election year dummies in Table A11. The point estimates are now smaller, as should have been expected since the simple election year dummies should exhibit more measurement error than the variables used above. The coefficient of $Election_{it}$ nonetheless stays significant when no control variables are included, but is marginally insignificant in the specification with control variables. Thus, the measurement error problem explained in the article likely causes a downward bias in the estimates.

Divided Government

Furthermore, the election year effect might be conditional on whether the administrator is supported by a majority in the council. To test for this, I have interacted the election year variables with a dummy variable indicating whether the party of the administrator had an absolute majority in the council.ⁱⁱⁱ Table A12 shows that this is indeed important: The interaction term (Election*Divided Government) is significant and of a sizeable magnitude. Furthermore, the point estimate of the election year effect would be approximately zero when a divided government is in place, but would be almost three times larger than in the baseline specification when the party of the administrator has an absolute majority. This indicates that – possibly through informal arrangements – it is important for the administrator to be supported

by the council. For example, one might guess that the administrator is monitored less by the council when there is nothing like a “divided government”.

Table A2: Difference GMM Estimator

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.223** (2.525)	0.190** (2.235)
BL_{it-1}	0.318*** (5.492)	0.272*** (3.726)
Observations	4260	3834
Controls	NO	YES
Number of clusters	426	426
Number of instruments	32	46
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.681	0.778
Hansen J test p-value	0.076	0.101
Difference J test p-value	-	-

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses.

*Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A3: Including only municipalities with population size below 20000

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.213** (2.196)	0.240** (2.471)
BL_{it-1}	0.342*** (5.029)	0.356*** (5.696)
Observations	3675	3675
Controls	NO	YES
Number of clusters	370	370
Number of instruments	35	49
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.719	0.749
Hansen J test p-value	0.179	0.380
Difference J test p-value	0.404	0.471

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A4: Interaction between income and electoral cycles

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.184 (1.546)	0.183 (1.538)
Election*Tax capacity	0.000 (0.738)	0.000 (0.720)
Tax capacity	0.000 (0.053)	0.000 (0.026)
BL_{it-1}	0.337*** (5.191)	0.346*** (5.477)
Observations	4260	4260
Controls	NO	YES
Number of clusters	426	426
Number of instruments	45	58
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.741	0.715
Hansen J test p-value	0.518	0.540
Difference Hansen J test	0.898	0.861

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A5: Including the price of a building license as an additional control

VARIABLES	(1) BL_{it}
Election	0.191** (2.148)
BL_{it-1}	0.323*** (4.853)
Price of a building license	-0.00003*** (-5.691)
Observations	4001
Controls	YES
Number of clusters	407
Number of instruments	50
AR(1) test p-value	0.000
AR(2) test p-value	0.812
Hansen J test p-value	0.185
Difference J test p-value	0.930

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level

Table A6: More general specifications

VARIABLES	(1) Lags 1-2 included	(2) Lags 1-3 included	(3) Lags 1-4 included	(4) Lags 1-5 included
Election	0.163 (1.451)	0.167* (1.702)	0.192** (1.993)	0.177* (1.864)
BL_{it-1}	0.318*** (4.247)	0.295*** (4.732)	0.329*** (5.583)	0.347*** (6.060)
BL_{it-2}	0.050 (0.886)	0.046 (1.177)	0.053 (1.205)	0.068 (1.615)
BL_{it-3}		-0.050*** (-2.740)	-0.037** (-2.080)	-0.030 (-1.635)
BL_{it-4}			0.009 (0.551)	0.011 (0.669)
BL_{it-5}				0.017 (1.279)
Observations	4260	4260	4260	4260
Controls	YES	YES	YES	YES
Number of clusters	426	426	426	426
Number of instruments	50	51	52	53
AR(1) test p-value	0.000	0.000	0.000	0.000
AR(2) test p-value	0.850	0.585	0.660	0.620
Hansen J test p-value	0.405	0.576	0.434	0.566
Difference J test p-value	0.683	0.865	0.547	0.661

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A7: Fixed-effects specification

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.048 (0.800)	0.045 (0.736)
BL_{it-1}	0.214*** (3.748)	0.213*** (3.415)
Observations	4260	4260
Controls	NO	YES
Number of clusters	426	426

t-statistics based on standard errors clustered at the municipality level in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A8: Pooled OLS specification

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.062 (1.005)	0.063 (1.026)
BL_{it-1}	0.437*** (10.628)	0.401*** (8.736)
Observations	4260	4260
Controls	NO	YES
Number of clusters	426	426

t-statistics based on standard errors clustered at the municipality level in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level

Table A9: Controlling for concurrently held elections

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.207** (2.411)	0.194** (2.220)
Pre-Election	0.044 (0.633)	0.043 (0.604)
Post-Election	-0.019 (-0.263)	-0.012 (-0.176)
BL_{it-1}	0.354*** (5.696)	0.359*** (5.750)
Concurrent European Election	0.089 (0.321)	0.069 (0.250)
Concurrent Federal Election	-0.108 (-0.699)	-0.103 (-0.666)
Concurrent State Election	0.053 (0.456)	0.060 (0.505)
Concurrent Local Council Election	-0.360 (-1.578)	-0.345 (-1.482)
Observations	4260	4260
Controls	NO	YES
Number of clusters	426	426
Number of instruments	66	80
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.686	0.669
Hansen J test p-value	0.063	0.043
Difference J test p-value	0.539	0.398

t-statistics based on standard errors clustered at the municipality level in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A10: Is the Effect Conditional on Whether the Administrator Runs for Re-Election?

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.139 (0.452)	0.140 (0.447)
Election*Runs for Re-Election	0.029 (0.055)	0.017 (0.032)
Pre-Election	0.050 (0.137)	0.088 (0.248)
Pre-Election*Runs for Re-Election	0.037 (0.080)	-0.019 (-0.043)
Post-Election	-0.083 (-0.609)	-0.104 (-0.763)
Post-Election*Runs for Re-Election	-0.019 (-0.103)	0.017 (0.095)
Runs for Re-Election	-0.008 (-0.144)	-0.017 (-0.299)
BL_{it-1}	0.300*** (4.196)	0.304*** (4.354)
Observations	4117	4117
Controls	NO	YES
Number of clusters	426	426
Number of instruments	71	85
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.860	0.846
Hansen J test p-value	0.240	0.236
Difference J test p-value	0.816	0.744

t-statistics based on standard errors clustered at the municipality level in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A11: Simple Election Year Dummies

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.066* (1.712)	0.054 (1.382)
Pre-election	0.053 (1.121)	0.032 (0.690)
Post-election	0.007 (0.174)	-0.008 (-0.225)
BL_{it-1}	0.340*** (6.828)	0.337*** (4.714)
Population size		-0.000 (-1.043)
Proportion of old, 65+		-0.034*** (-3.540)
Proportion of young, 0-15		0.023 (1.188)
Population density		-0.000 (-0.789)
Tax capacity		0.000 (0.206)
Seat share CDU		0.824*** (2.953)
Seat share FDP		0.800 (1.490)
Seat share Green		0.904 (1.448)
Seat share Others		0.266 (1.263)
CDU administrator		-0.059 (-1.132)
Other administrator		-0.007 (-0.155)
Debt per capita		-0.000 (-1.308)
Change in property tax B		-0.619 (-1.049)
Change in business tax		0.280 (0.349)
Observations	4260	4260
Number of clusters	426	426
Number of instruments	47	60
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.622	0.716
Hansen J test p-value	0.001	0.001
Difference J test p-value	0.261	0.071

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

Table A12: Divided Government

VARIABLES	(1) BL_{it}	(2) BL_{it}
Election	0.518** (2.322)	0.446** (1.972)
Election*Divided Government	-0.497* (-1.768)	-0.429 (-1.504)
Pre-Election	0.362 (1.114)	0.443 (1.285)
Pre-Election*Divided Government	-0.377 (-0.981)	-0.473 (-1.167)
Post-Election	-0.001 (-0.005)	0.024 (0.124)
Post-Election*Divided Government	0.041 (0.182)	0.017 (0.072)
Divided Government	-0.297* (-1.908)	-0.191 (-1.129)
BL_{it-1}	0.313*** (4.845)	0.315*** (4.616)
Observations	4260	4260
Controls	NO	YES
Number of clusters	426	426
Number of instruments	102	115
AR(1) test p-value	0.000	0.000
AR(2) test p-value	0.784	0.770
Hansen J test p-value	0.402	0.144
Difference J test p-value	0.713	0.438

t-statistics based on robust two-step standard errors with Windmeijer (2005) correction in parentheses. *Significant at the 10 percent level, **Significant at the 5 percent level, ***Significant at the 1 percent level.

References

- Arellano, M. and S. Bond** (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations, *Review of Economic Studies*, 58(2), 277-297.
- Bond, S.** (2002). *Dynamic Panel Data Models: A Guide To Micro Data Methods and Practice*, Working Paper, Institute For Fiscal Studies.

ⁱ Note that in most robustness checks in this appendix, I report results from specifications without the pre- and post-election year variables, because these have been insignificant in the baseline specification. Results would stay unchanged if these variables were included.

ⁱⁱ This is a crude proxy for the price of a building license. For example, it does not capture that in Germany, the price of a license strongly varies across different building types. Moreover, note that for a very small number of county-year combinations, there were missing values in the revenues from building licenses. Therefore, Table A5 uses a slightly lower number of observations than the baseline specification.

ⁱⁱⁱ Note that as it is not observable which coalitions in municipal councils are built, I can only rely on such a crude proxy for divided government.