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"Political Budget Forecast Cycles"

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Political Budget Forecast Cycles

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Abstract

By forecasting overly optimistic revenues opportunistic governments can increase spending in order to appear more competent prior to elections. Ex post deficits emerge in election years, thereby producing political forecast cycles - as also found for US states in the empirical literature. In our theoretical moral hazard model we obtain three additional results which are tested with panel data for Portuguese municipalities. The extent of manipulations is reduced when (i) the winning margin is expected to widen; (ii) the incumbent is not re-running; and/or (iii) the share of informed voters (proxied by education) goes up.

JEL classification: D72, H68, E32

Keywords: opportunistic political cycles; political budget cycles; revenue forecasts; deficit; transfers; asymmetric information; political economy.

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1 Introduction

The motivation for this paper is twofold. First and more specifically, there is evidence that governments use revenue forecasts to expand their fiscal room for manoeuvre in election years in order to increase their chances of re-election. Boylan (2008) showed for 49 US states with constitutional balanced budget constraints for the period from 1988 to 2004 that the state revenue growth forecast error is 2.2 % higher in election years.[1] Second, and more generally, there is evidence that governments try to influence the international and domestic public's perception of fiscal conditions, especially during election years. Greece and other European countries cheated to hide "excessive" public debt and/or deficits so that they could gain access to the European Monetary Union and/or fulfill the criteria laid out by the European Stability and Growth Pact.

This paper presents a political economy model which focuses on an opportunistic government and a partially uninformed electorate. The incumbent government can manipulate revenue forecasts in order to be able to increase spending and, thereby expand its provision of public goods. This is a hidden effort because uninformed voters do not understand the reason for the expansion and attribute it to government competence, thereby raising the government's re-election chances.[2] Since forecasts and budgets are larger in election years, we obtain political forecast and budget cycles. Not only do we offer a theoretical mechanism which can explain the results found in the earlier empirical literature on forecast manipulation, but we also provide additional evidence in the same vein. Our own empirical analysis based on data from Portuguese municipalities for the period 1998-2017 confirms the existence of

[1] Election year forecast optimism is also found, for instance, by Heinemann (2006) with respect to (federal) deficit forecasts in Germany from 1969 to 2003; by Kauder et al. (2017) with respect to spending forecasts in election years by East German state governments; by Boukari and Veiga (2018) with respect to revenue and expenditure forecasts in France and Portugal from 1998 to 2015. Brück and Stephan (2006) argue that forecast optimism may have increased in the eurozone since the introduction of the Stability and Growth Pact.

[2] Earlier theoretical moral hazard papers in which a government can appear more competent by manipulating a (partially) uninformed electorate are Lohmann (1998), for political business cycles, and Shi and Svensson (2006) for political budget cycles) In Bohn (2019) the government uses its incumbent advantage to affect the beliefs of the electorate.

forecast manipulations in election years. An array of robustness tests suggests that the evidence is rather solid.

In addition, this paper investigates the factors that are conducive to increasing the forecast manipulation even further. In the theoretical model we obtain the following results. First, a larger ex ante expected winning margin allows the incumbent to reduce its revenue forecast which leads to a lower level of costly indebtedness. Second, if the government is not running, its own interest in winning the elections is reduced. Again, the motivation for high indebtedness is reduced. Third, if there are more uninformed voters, any manipulation is more effective. Hence the government will expand its effective tool and choose higher revenue forecasts. These findings are supported by the empirical analysis. The expected winning margin is proxied by the previous election winning margin. Uninformedness is captured by alternative education proxies. There is overwhelming evidence, both in the main results and in a battery of robustness tests, in support of our theoretical predictions.

The remainder of the paper is structured as follows. Section 2 outlines the model and its solution and presents Propositions 1 to 3. Details are given in the appendix. The empirical model is set out in Section 3 and the results are presented in Section 4. Additional robustness tests can be found in the appendix. Section 5 concludes.

2 Political Forecast Cycle Model

The model captures an incumbent government which has some leverage over its revenue forecasts. It can manipulate them in order to expand its public services with the hope of convincing voters of being more competent and, thereby, increasing its re-election chances. Voters can be informed or uninformed about the government forecasts. If they are informed they can use this information to deduce government competence. If they are uninformed they have to form expectations. Overall, the model is of the Shi and Svensson (2006) and Bohn (2018) type; it captures moral hazard of an opportunistic government thereby producing political cycles.

Preferences

Every alternate period two opportunistic politicians run for office, an incumbent a and a challenger b. Individual voter i's utility depends on economic and non-economic considerations:

$$U_t^i = \sum_{s=t}^{\infty} (\beta^i)^{s-t} E_s[u_s(c_s) + G_s^+ + \alpha \chi^i z_s] \qquad \text{with } \chi^i = \theta^i - \gamma. \tag{1}$$

The intertemporal utility function for any voter i comprises additively-separable utility from private consumption, $u_s(c_s)$, utility from public consumption G_s^+, with unity marginal utility (a simplification also used by Shi and Svensson, 2006), and a non-economic component $\chi^i z_s$, with relative weight α, in each period. Formally, discounting between periods is included here, but can be ignored later on because it does not contribute to substance nor exposition as will be seen further down. Utility derived from sympathy represents any attribute of the candidates that does not affect economic policies, be it their stance on societal issues or their good looks. It reflects more or less strong sympathy for one of the two candidates. Without limiting the generality of the analysis we assume that support for incumbent a is depicted by negative values of χ^i, support for challenger b by positive values. Sympathy utility is constrained to $\chi^i z_s \in [-\frac{1}{2} - \gamma, \frac{1}{2} - \gamma]$ since z_t is either $-\frac{1}{2}$ (when incumbent a is elected) or $+\frac{1}{2}$ (when challenger b is elected); the personal sympathy parameter θ^i is uniformly distributed over the interval $[-1, 1]$; and γ is a shift parameter.[3]

Both politicians $j = a, b$ face a utility function similar to the one for voters consisting, again, of an economic and, if the politician is in power, a non-economic component. The non-economic component is, however, different and includes both a political rent and political

[3] If voter i has somewhat more sympathies for incumbent a, say at $\chi^i = -\frac{1}{2}$, then her utility derived from sympathy is positive ($\frac{1}{4}$), if the incumbent is elected ($z_s = -\frac{1}{2}$); but it is negative ($-\frac{1}{4}$), if challenger b is elected ($z_s = \frac{1}{2}$). If $\gamma = 0$, incumbent and challenger have equal chances of being elected; with $\gamma > 0$, the incumbent has higher chances.

(reputation) costs:

$$V_t^j = \sum_{s=t}^{\infty} V_s^j = \sum_{s=t}^{\infty} (\beta^j)^{s-t} E_s[u_s(c_s) + G_s^+ \quad + \quad \mathbf{I}_s X_s - \mathbf{I}_{s-1}\mathbf{I}_s \xi_s D_{s-1}^2], j = a, b. \tag{2}$$

$$\mathbf{I}_r = \begin{cases} 1 & \text{if in power in period } r \\ 0 & \text{otherwise} \end{cases}$$

Both politicians are concerned about private and public consumption. In addition, politician a (in power) receives ego rent X_s and bears reputation costs ($\xi_s D_{s-1}^2$), if she was also in power in the previous period. Reputation costs rise overproportionally (squared) with the previous period deviation ($D_{s-1} > 0$) from a balanced budget[4] ($D_{s-1} = 0$).[5]

For voters and politicians alike, period t consumption c_t is modelled to depend upon trend output $\bar{y}$ and any deviation of output y_t^+. For simplification, the taxes (and expenditures) for trend output are not explicitly studied, but would not change the analysis; note, however, that deadweight loss and distributional effects are ignored. We only consider adjustments of taxes for deviations of output, hence each agent's additional net-of-tax income $(1-\tau)y_t^+$ in the consumption function:

$$c_t = \bar{y} + (1-\tau)y_t^+ = \bar{y} + (1-\tau)\frac{R_t^+}{\tau}. \tag{3}$$

The deviation from trend output, y_t^+, is a random variable with mean $E_t[y_t^+] = 0$ and variance σ^2. For a constant tax rate, it can also be expressed in terms of additional revenue the government receives, R_t^+, which is also a random variable with mean zero.

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[4] Alternatively, deviations from a prespecified deficit target $\bar{D}$ (i.e. $D_{s-1} > \bar{D}$) could also be modelled, but would produce the same qualitative results.

[5] Leaving reputation costs out would not contradict any of the findings of this paper, but would require the inclusion of subjective discount rates and a careful discussion of interest (debt repayment) versus discount rates. – The quadratic form is the simplest way of capturing how the government's trustworthiness and credibility are affected. The legislature and social groups the government has to deal with may "tolerate" small, but not large, deviations and dislike both surpluses and deficits.

Fiscal policy and competence

The planned government budget constraint is expressed in terms of additional public goods, G_t^+, supplied by the government:

$$G_t^+ = R_t^{+forec} - (1 + r_{t-1})(D_{t-1}) + \eta_t^j; \tag{4}$$

By making overly optimistic revenue forecasts, R_t^{+forec}, for random variable R_t^+ the incumbent can manipulate the amount of public goods she supplies to voters. The variable R_t^{+forec} is thus the incumbent's instrument and forms the basis for her budget calculations. To fulfill the balanced budget requirement (thereby avoiding a political cost next period) the government has to repay its previous period deficit D_{t-1} including interest at exogenous rate r_{t-1}.

The amount of public goods any government j can supply also depends on j's positive or negative competence shock, η_t^j. Competence could be interpreted, for instance, as tax collection efficiency or public goods provision efficiency. Competence η_t^j consists of a skills shocks for the current period and another one for the previous period:

$$\eta_t^j = \mu_t^j + \mu_{t-1}^j. \tag{5}$$

Hence competence persistence is modelled as an MA(1) process.[6] Each skills shock μ_t^j is a random variable with mean 0, distribution function $F(\mu_t^j) = F(\bullet)$ and density function $f(\mu_t^j) = f(\bullet) = F'(\bullet)$ which is (weakly) monotonously increasing up to the mean.[7] Past shocks are common knowledge, but current or future shocks are unknown to both politicians

[6] Limited persistence is a compromise. It allows some persistence while acknowledging that competence also changes over time as new tasks for politicians emerge. For persistence longer than 1 period, the model would not be easily solvable. Rogoff and Sibert (1988)'s and Rogoff (1990)'s suggestion of an MA(1) process is one of two conditions (the other being the assumption of debt being costly) for splitting the model into separate 2-period cycles as is common in this literature. Each cycle consists of an election period and an off-election period. The timing of events (page 6) and the role of these assumptions is outlined further down.

[7] For more unusual density functions (for instance, with $F''(\mu_t^a) < 0$ for some $\mu_t^a \leq 0$), we could get ambiguous results. However, the limiting case of $F''(\mu_t^a) = 0$ for some $\mu_t^a \leq 0$ or even over the entire range (uniform distribution) is acceptable.

and voters. Even the incumbent does not know her own current competence – an idea suggested by Shi and Svensson (2006) – because she always faces new tasks and challenges (like the financial crisis or the European refugee crisis) or wants to start new programmes and cannot foresee how efficiently she can manage them. Not knowing her own competence, any incumbent has an incentive to provide additional public goods in order to appear more competent and increase her re-election chances. Since politicians do not have an informational advantage, there is no signalling, only moral hazard.

The government deficit is obtained residually because forecast revenues are committed according to Equation (4), but actual revenues deviate; we can also determine the expected deficit given $E_t^a[R_t^+] = 0$:

$$D_t \equiv R_t^{+forec} - R_t^+; \tag{6}$$

$$E_t^a[D_t] = R_t^{+forec}. \tag{7}$$

Since the incumbent hopes to facilitate augmented public services in order to increase re-election chances, she accepts (and expects) a positive deficit.

Timing of events

The timing of events is summarised in Table 1. In election period t, everybody observes last period's deficit D_{t-1} and past skills shock μ_{t-1}^a. On this basis, incumbent a chooses its forecast of additional revenue R_t^{+forec}, thus determining the amount of additional public goods G_t^+ it can provide according to Equation (4). All voting individuals observe G_t^+, but only informed voters can also observe and make use of the state government's policy choice of the forecast of additional revenue R_t^{+forec}. They can, therefore, deduce current skills μ_t^a, thereby extracting information about the future competence of the incumbent (since $\eta_{t+1}^a = \mu_{t+1}^a + \mu_t^a$). Uninformed voters can only form expectations of the incumbent's current skills, $\widehat{\mu_t^a}$ based on their perception of the government forecast of additional revenue, $\widehat{R_t^{+forec}}$. Then all voters cast their votes based on their different information sets and their

different beliefs of μ_t^a. What matters is that a share of voters is uninformed, even though they are rational in the end. If government policy could be correctly *observed* by all voters, the government would gain nothing from manipulating the forecast and from expanding public goods.

Table 1: **The Timing of Events.**

All voters and incumbent a observe: - last period's deficit D_{t-1} - the incumbent's last period skills μ_{t-1}^a **Incumbent a:** - chooses forecast of additional revenue R_t^{+forec} - and provides additional public goods G_t^+	**All voters observe:** - additional public goods G_t^+ **Informed voters observe:** - the incumbent's forecast of additional revenue R_t^{+forec}	**Informed voters:** - deduce the incumbent's current skills μ_t^a - and vote. **Uninformed voters:** - form expectations of the incumbent's current period skills $\widehat{\mu_t^a}$ (based on rational expectations of the incumbent's forecast of additional revenue $\widehat{R_t^{+forec}}$) - and vote.	The winner of the period t elections takes office and receives an ego rent. If the incumbent stays in office, she suffers a reputation loss for a period t budget deficit. The winner repays the deficit of the previous year.
Period t			**Period t+1**

In period $(t+1)$, the winner (incumbent or challenger) takes office and receives an ego rent. If the incumbent stays in office, she also suffers a reputation loss amounting to disutility $\xi_t D_{t-1}^2$ for not having achieved a balanced budget. A government found to have cheated may be in a weaker position in negotiations with the legislature and social groups. However, voters are no longer relevant for the politician's decision making in $(t+1)$ because they cannot vote in period $(t+1)$. Politicians have no incentive for manipulating their forecast of additional revenue R_t^{+forec}. They want to repay the previous period deficit because the deficit is costly[8] and voters cannot sanction the politician for producing a negative amount

[8] Repayment is guaranteed for two reasons. Firstly, because of the aforementioned reputation loss.

of additional public goods, thereby financing deficit repayment. Given that voters are only concerned about politicians' competence after the election it does not matter that voters anticipate in election period t that any politician will repay the deficit in the off-election period $(t+1)$. Note also that voters do not consider expected utility in $(t+2)$ in their voting decision in t, because even informed voters cannot distinguish between the incumbent and her challenger in $(t+2)$ (competence is an MA(1) process only). Politicians, too, are not concerned about the more distant future, because they have no instrument for affecting utility or re-election chances in $(t+2)$. The model can, therefore, be split in 2-period cycles consisting of an election period (period t) and an off-election period (period $t+1$). See also Footnote 6.

Incumbent's probability of winning

The incumbent maximises her expected utility in t and $t+1$ (whereby the discount rate can be set to 0 for simplicity). The $t+1$ utility depends on the probability of the incumbent of winning the election. First, we must, therefore, determine the probability that an individual agent votes for incumbent a. We assume prospective voting, i.e. voting depends on whether a voter expects the incumbent or the challenger to deliver a higher level of utility after the elections, i.e. in $t+1$. This depends on two components: (i) on the voter's sympathy $\chi^i = \theta^i - \gamma$ towards the candidates; and (ii) on who can deliver more public goods which, in turn, depends on the politicians' skills in periods t and $t+1$. Agents do not know future skills of incumbent or challenger; nor can they observe any skills of the challenger in period t. However, they may have expectations on the incumbent's skills ($E_t[\mu_t^a]$) based on her performance in office in period t. It is shown in Appendix A that an individual agent votes for incumbent a, if the following inequality holds: An individual agent votes for incumbent

Secondly, technically, because the marginal utility of additional deficit-financed public goods in t is 1 (if the subjective discount factor is set to 1 for simplicity), whereas its marginal cost and, therefore, the marginal disutility is $(1+r_t)$, i.e. greater than 1. The unity marginal public goods utility assumption is also used by Shi and Svensson (2006).

a, if the following inequality holds:

$$E_t[\mu_t^a] \quad > \quad \alpha(\theta^i - \gamma). \tag{8}$$

First, suppose shift parameter γ is zero, then ex ante incumbent and challenger have an equal chance of winning the election. However, even if incumbent a is expected to be (slightly) less skilled than average, i.e. $E_t[\mu_t^a] < 0$, a voter will vote for incumbent a, if the voter is sufficiently sympathetic towards the incumbent (remember that $\theta^i < 0$ indicates sympathy for incumbent a and α is a positive weight). Conversely, even if a voter is sympathetic towards the challenger ($\theta^i > 0$), the incumbent could still be chosen, if the incumbent is expected to exhibit sufficiently strong (above average) skills. Second, with shift parameter γ negative, it is easier for the incumbent to convince voters to vote for her; it requires a lower level of expected skill, $E_t[\mu_t^a] < 0$.

On this basis, we derive (in the appendix) the probability for the incumbent to win the election:

$$\text{Prob}\left\{ \underbrace{(1-\psi)\,[\frac{E_t^{inf}[\mu_t^a]}{2\alpha} + \frac{1+\gamma}{2}]}_{\text{informed}} + \underbrace{\psi\,[\frac{E_t^{uninf}[\mu_t^a]}{2\alpha} + \frac{1+\gamma}{2}]}_{\text{uninformed}} \quad \geq \quad \frac{1}{2} \right\}. \tag{9}$$

The probability depends on whether informed voters (share $(1-\psi)$) and uninformed voters (share ψ) think that the incumbent's skills are above average ($E_t[\mu_t^a] > 0$) or not. The difference for informed and uninformed voters occurs because informed voters have all the information for deducing μ_t^a from the period t planned government budget constraint (4); uninformed voters do not. Uninformed voters do not observe the forecast of additional revenue R_t^{+forec}; instead, they have to use their *perception* of the forecast of additional revenue $\widehat{R_t^{+forec}}$. Hence, their mistake amounts to $\widehat{R_t^{+forec}} - R_t^{+forec}$ – as shown in Appendix B. On this basis, we can derive the incumbent's probability of winning Prob^{win}:

$$\text{Prob}^{win} \quad = \quad \text{Prob}\left\{ \mu_t^a \quad \geq \quad \psi\,(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma \right\} \tag{10}$$

$$= \quad 1 \quad - \quad F\,[\,\psi\,(\widehat{R_t^{+forec}} - R_t^{+forec}) \;-\; \alpha\gamma]\,, \tag{11}$$

where $F(\bullet)$ is the distribution function of the skills shock. Note that this equation shows that, *in equilibrium*, the incumbent cannot increase her winning probability by using forecast manipulations, if we assume rational expectations. For $\gamma = 0$, we obtain $\text{Prob}^{win} = 1 - F[0] = \frac{1}{2}$ in equilibrium.

Incumbent's decision problem

To determine the governments policy choice, we maximise the incumbent's expected utility over any 2-period cycle, i.e. period t utility *plus* period $(t+1)$ utility in case of winning the election multiplied by the probability of winning (as determined in step 2) *plus* period $(t+1)$ utility in case of losing multiplied by the probability of losing:

$$
\begin{aligned}
max_{R_t^{+forec}}\ V \ &= \ max_{R_t^{+forec}}\ V_t^a \ + \ V_{t+1}^a \ = \\
max_{R_t^{+forec}} \qquad & E_t^a \ \{ \ u_t(\bar{y} + (1-\tau)\frac{R_t^+}{\tau}) + G_t^+ + X_t - \xi D_{t-1}^2 \ \} \\
& + \ E_t^a \ \{ \ \text{Prob}^{win} \ [u_{t+1}(\bar{y} + (1-\tau)\frac{R_{t+1}^+}{\tau}) + G_{t+1}^+ + X_{t+1} - \xi D_t^2] \ \} \\
& + \ E_t^a \ \{ \ (1 - \text{Prob}^{win}) \ [u_{t+1}(\bar{y} + (1-\tau)\frac{R_{t+1}^+}{\tau}) + G_{t+1}^+] \ \}. \qquad (12)
\end{aligned}
$$

See Appendix C for a more detailed exposition of Equation (12) and the following steps. The government's optimal choice of its forecast of additional revenue R_t^{+forec} can be characterised by the first order condition (FOC) given that the second order condition holds. Under rational expectations this becomes:

$$
-r_t + F'[-\alpha\gamma]\psi[X_{t+1} - \xi(R_t^{+forec})^2] - [1 - F[-\alpha\gamma]]2\xi R_t^{+forec} = 0, \qquad (13)
$$

The first term of rational expectations condition (13), $-r_t$, is the marginal direct effect of the government's forecast of additional revenue on the deficit, which is negative because deficit including repayment is costly. The (additional) revenue forecast is optimally chosen by the government, when the marginal direct effect on the deficit (first term) equals the

net effect on the expected return if the incumbent stays in power (second and third terms). The latter consists of countervailing effects. The second term depicts the positive marginal impact of higher forecasts on the perceived skills of the incumbent and thus on the voting probability of receiving the (given) expected net return ($X_{t+1} - \xi[R_t^{+forec}]^2$). The third term captures the negative marginal impact of increased forecasts on the punishment for the lost reputation (since the deficit will be increasing) given the chance of winning the elections.

Rational expectations condition (13) states that the government wants to increase its forecast of additional revenue until the marginal deficit cost together with the punishment effect (which is very small for low levels of forecast manipulation) exceeds the marginal benefit from spending on public goods which translates into a marginal benefit from increasing the chances of winning. In other words, the first key result of the paper is that there are *political forecast cycles*; forecasts are increased in election years. This also implies higher deficits which are repaid in off-election years. Hence, there is also a political budget cycle. The mechanism is similar to the one in the political budget cycle model by Shi and Svensson (2006). There is moral hazard because a hidden effort (deficit in Shi and Svensson; and forecasts here) is used by the government for expanding public goods and trying to improve re-election chances.

But how is the government's optimal choice of its forecast manipulation affected by exogenous aspects of the model? In particular, we would like to know (see next section) the effect of an increased winning margin (captured by a higher shift parameter γ; see Proposition 1), the consequences of an incumbent who is not re-running (embodied by a lower ego rent for the time after the elections, X_{t+1}; see Proposition 2), and the effect of increasing the share of uninformed voters (higher ψ; see Proposition 3).

Three testable propositions

Proposition 1 - The Winning Margin.

A larger winning margin γ decreases the optimal revenue forecast by the incumbent at the

equilibrium.

$$\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}\gamma} < 0.$$

Proof: See Appendix D.

A larger winning margin allows the government to avoid costly deficits both in terms of repayment and reputation costs.

Proposition 2 - When the Incumbent is not Re-running.
When the incumbent is not re-running (X_{t+1} reduced), the optimal revenue forecast by the incumbent is reduced at the equilibrium.

$$\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}X_{t+1}} > 0.$$

Proof: See Appendix D.

If the incumbent does not benefit from winning so much any more, winning becomes less important. No longer does it pay to incur high deficit repayment and reputation costs.

Proposition 3 - The Share of Uninformed Voters.
A larger share of uninformed voters ψ increases the optimal revenue forecast by the incumbent at the equilibrium.

$$\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}\psi} > 0.$$

Proof: See Appendix D.

Manipulation works because uninformed voters can be tricked. If more of them can be cheated, the manipulation instrument becomes more effective. Hence it is used more.

3 Data, Setting, and Empirical Model

This section describes the data, the institutional setting for Portuguese municipalities, and the empirical model which are used for testing the implications **(propositions)** obtained for the model of Section 2.

Data and Institutional Setting

Detailed fiscal data for the 308 municipalities was obtained from the Directorate General of Local Authorities (DGAL), information regarding the dates and results of local elections and on mayors' characteristics from the Ministry of Internal Affairs, and demographic and economic data from the National Statistics Institute (INE) and from Marktest's *Sales Index* database. Our dataset covers the period from 1998 to 2017, for which DGAL's data on municipal initial budgets is available. Five local elections took place during our sample period (2001, 2005, 2009, 2013, and 2017).

Municipalities are the highest subnational government level in mainland Portugal, and the second in the autonomous regions of Azores and Madeira, which have regional governments. All municipalities are subject to the same laws and regulations, have the same responsibilities for public service provision,[9] and have the same institutional structure. Regarding the latter, the Town Council (Câmara Municipal) holds the executive power, while the Municipal Assembly holds the deliberative power, approving, among other things, the municipal budgets and plans of activities. Voters elect the members of both chambers directly, by casting their votes on closed party or independent lists of candidates. The top candidate of the most voted list for the Town Council becomes the mayor, presides that chamber and plays a leading role in the executive, having substantial power and autonomy. Municipal elections are held every four years, in all municipalities at the same time, generally in October (they were held in December until 2001). Although other elections sometimes occurred in the

[9] Distribution of water, sewage, basic schooling, local health care, social housing, local transportation and communication, property maintenance, promotion of culture and science, recreation and sports facilities, environmental protection, and municipal policing.

same year, national, regional, or European elections were never concurrent with municipal elections.

Local governments have financial autonomy, not needing approval from a higher-ranked authority to elaborate and approve their own budgets and final accounts. Nevertheless, most of them heavily depend on grants from the central government or from the European Union (own revenues account, on average, for just one third of total effective revenues). The municipal budget is drafted by the mayor's team, analysed by the Town Council, and approved by the Municipal Assembly, in the last quarter of the year prior to the relevant fiscal year (which corresponds to the calendar year). Municipalities are allowed to run budget deficits, but there are legal limits to the stock of municipal debt.

Empirical Models

The theoretical model's main result is that there are political forecast cycles. Revenue forecasts are more optimistic in election years (see discussion of rational expectations condition 13 in Section 2). This is tested with the following empirical model (henceforth *baseline model*):

$$R_{i,t}^{+forec} = \beta_1 R_{i,t-1}^{+forec} + \beta_2 \mathbf{Elect}'_{i,t} + \beta_3 \mathbf{X}'_{i,t} + \nu_i + \sigma_t + \xi_{i,t}, \tag{14}$$

where $R_{i,t}^{+forec}$ is the forecast of additional revenue, here proxied by the difference between the revenue forecast for year t (taken from the initial municipal budget) and the average revenues of municipality i over the previous 4 years, in real euros (of 2015) per capita;[10] $\mathbf{Elect}_{i,t}$ is a vector of three electoral dummy variables (the year before the election, the election year, and the year after); $\mathbf{X}_{i,t}$ is a vector of control variables which may affect forecasted revenues; ν_i represents unobserved municipality-specific effects; σ_t represents time-specific effects;[11] and

[10] Average past revenues are publicly available information which may help (informed) voters assess whether the forecast for year t is above normal or not. One alternative would be to use forecast errors, but the problem is that the actual revenues of year t are not known at the time the forecast is made and announced (in $t-1$). Nevertheless, as shown in the robustness tests (see Table E.3 in Appendix E), the empirical results are practically the same when we use forecast errors in revenues as the dependent variable.

[11] Since the election-year dummy would be collinear with yearly dummy variables, we control for time effects using 4-year mandate dummies.

$\xi_{i,t}$ is the error term.

Based on the theoretical model, on previous empirical evidence of forecast manipulations (for instance, Boylan, 2008; Bischoff and Gohout, 2010), and on political budget cycles found for Portuguese municipalities (Veiga and Veiga, 2007; Aidt et al., 2011; Boukari and Veiga, 2018), we expect a positive β_2 for the election-year dummy. This means more optimistic forecasts in election years which, in turn, allow for greater expenditure.

The vector $\mathbf{X}_{i,t}$ includes the following control variables which may affect the degree of manipulation of revenue forecasts: a dummy variable for left-wing mayors, $MayorLeft$; a dummy variable, $Majority$, which takes the value of one when the mayor is supported by majorities in both the Town Council and the Municipal Assembly, and zero otherwise; the win-margin of the mayor's party in the previous election, $WinMargin$; a dummy variable, $RunReelect$, for mayors who run for reelection; the mayor's number of terms in office, $TermsMayor$; a dummy, $SameParty$, for when the mayor belongs to the main national government party; the municipal unemployment rate, $Unemp$; the regional (NUTS III) rate of GDP growth, $GDPgrowth$;[12] the rate of population growth, $PopGrowth$; a proxy for municipal financial autonomy, $FinAuton$, which corresponds to own revenues as a percentage of total effective revenues; and, the percentage of the municipal population above 14 years old with no formal education completed, $\%NoEduc$. All economic, demographic and education control variables are lagged one year, since their values for year t are not known at the time the revenue forecast for year t is made.

To test the propositions of the theoretical model, the empirical baseline model (14) is extended to check for interaction effects with political or educational variables. The following extension for political variables is used for testing Propositions 1 and 2:

$$R_{i,t}^{+forec} = \beta_1 R_{i,t-1}^{+forec} + \beta_2 ElY_{i,t} + \beta_3 Pol_{i,t} + \beta_4 (ElY_{i,t} * Pol_{i,t}) + \beta_5 \mathbf{X}'_{i,t} + \nu_i + \sigma_t + \xi_{i,t}, \quad (15)$$

[12] NUTS is the European Union nomenclature for territorial statistical units. Portugal is subdivided into three NUTS I regions (Mainland, Azores and Madeira), seven NUTS II regions, and 25 NUTS III regions. Each NUTS III region aggregates several municipalities, which correspond to the NUTS IV level. There is no GDP data at the municipal (NUTS IV) level.

where $ElY_{i,t}$ is a dummy variable which takes the value of 1 in an election year, and equals zero in off-election years; $Pol_{i,t}$ is a political variable for municipality i in year t; and the remaining variables are as described above. The political variables of interest include the margin of victory in the previous election, a dummy for when the mayor runs for reelection, and dummies for left-wing mayors, for majority governments, and for party similarity with the national government.

The extension of baseline model (14) to include educational interaction terms replaces the political variable $Pol_{i,t}$ in Equation (15) by education variable $Educ_{i,t}$. It is used for testing Proposition 3 according to which electoral opportunism is greater in municipalities with higher shares of uninformed voters (see also Shi and Svensson, 2006). Here is the modified model:

$$R_{i,t}^{+forec} = \beta_1 R_{i,t-1}^{+forec} + \beta_2 ElY_{i,t} + \beta_3 Educ_{i,t} + \beta_4 (ElY_{i,t} * Educ_{i,t}) + \beta_5 \mathbf{X}'_{i,t} + \nu_i + \sigma_t + \xi_{i,t}, \quad (16)$$

where $Educ_{i,t}$ is a proxy for the education level of the population of municipality i in year t, and the remaining variables are as described above. The models presented above are estimated for effective revenues (total revenues excluding loans), current revenues, and capital revenues (excluding loans), by fixed effects, with standard errors clustered by municipality. Descriptive statistics of the variables used in this paper are presented in Appendix E (Table E.1).

4 Empirical Results

Here, we present the results of the empirical analysis, which tests the main predictions of the theoretical model; we also discuss an array of robustness tests.

Baseline Model: Political Forecast Cycles

The results of the estimation of the baseline model of Equation (14) for the difference between forecasted and average past revenues (in real euros per capita), by fixed effects, with

standard errors clustered by municipality are reported in Table 2. Consistent with our model's main theoretical result embodied in the discussion of the rational expectations condition (13), there is evidence of more optimistic effective revenues (total revenues excluding loans) forecasts in election years. In Column 1, the dummy variable for the election year is positive and highly statistically significant, with the difference between forecasted effective revenues and average revenues of the previous four years increasing by 94.5 euros per capita in an election year when compared to the reference year (the second year of the 4-year term).

Current forecast revenues do not seem to change significantly in election years (Column 2). In contrast, they are decreased in the year before the election and increased afterwards, which is not consistent with opportunistic forecasting. The lack of opportunism in current revenue forecasts may be due to the fact that, for the vast majority of municipalities, central government formula-determined grants account for most of the current revenues. Since the amounts to be transferred are announced before municipalities elaborate their budgets, there is not much room for forecast manipulation in current revenues.

Although some capital grants are also formula-determined, a significant part of government and European capital transfers are based on project approval. Additionally, the sales of capital assets such as municipal buildings can in some years account for a large share of capital revenues. Since voters cannot easily obtain reliable forecasts for these capital revenue items, the margin of maneuvre for opportunistic forecasting is considerably larger for capital than for current revenues. This is consistent with the results reported in Column 3, where the election year dummy variable is positive and highly statistically significant. Therefore, the political forecast cycles found for total effective revenues in Column 1 seem to be mainly driven by cycles in capital revenue forecasts. The results also indicate that electoral manipulation of capital revenue forecasts starts in the year before the election (as also shown by Veiga and Veiga, 2007, for capital expenditures), although with a considerably smaller magnitude than in the election year.[13]

[13] Wald tests, not shown here, clearly reject the equality of the coefficients. Since the only year of the 4-year term for which an election dummy is not included is the second year after the election, this is the reference year against which the others are compared to.

Table 2: PBCs in Revenue Forecasts - Baseline Results

	(1)	(2)	(3)
VARIABLES	Effective Revenues	Current Revenues	Capital Revenues
L.(Revenue forecast - Average revenues of previous 4 years)	0.520***	0.465***	0.543***
	(8.888)	(4.849)	(9.192)
Year before election	14.570	-13.694***	27.757**
	(0.948)	(-2.670)	(2.080)
Election year	94.497***	-0.459	93.767***
	(5.843)	(-0.090)	(6.396)
Year after election	11.423	16.056***	-5.745
	(0.664)	(3.117)	(-0.361)
Mayor left	-32.676	-6.613	-25.624
	(-1.426)	(-0.772)	(-1.303)
Majority	-39.491*	-13.985*	-24.750
	(-1.867)	(-1.762)	(-1.345)
Win margin (previous election)	0.646	0.408*	0.229
	(0.865)	(1.944)	(0.345)
Incumbent running for reelection	-25.395	-1.143	-23.436
	(-1.313)	(-0.171)	(-1.343)
Terms mayor	-4.993	0.212	-5.046
	(-0.856)	(0.112)	(-0.962)
Same party	20.372*	1.872	18.746*
	(1.815)	(0.470)	(1.857)
L.Unemployment rate	-19.654***	-0.874	-18.636***
	(-5.285)	(-0.688)	(-5.300)
L.GDP growth (NUTS III region)	6.985***	-1.320*	8.594***
	(3.816)	(-1.839)	(5.290)
L.Population growth	1.389	-5.586***	6.577***
	(0.497)	(-3.250)	(2.802)
L.Financial autonomy (Own revenues / Effective revenues)	0.805	-0.610	1.608*
	(0.734)	(-1.526)	(1.655)
L.% Population with no education level completed	27.811***	-3.045	29.299***
	(4.756)	(-1.376)	(4.958)
Observations	5,098	5,098	5,098
Municipalities	308	308	308
Adjusted R-squared	0.45	0.24	0.50

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The lagged dependent variable is always statistically significant, which indicates persistent differences between forecasts and average past revenues. A sample period of 20 years,

and an average of about 17 observations per municipality (due to missing values for some years), may not be long enough to completely avoid the so-called Nickell bias (Nickell, 1981), resulting from the correlation of the lagged dependent variable with the municipal fixed effects. One possibility is to estimate the model using a dynamic panel data method such as the System Generalized Method of Moments (System-GMM), of Arellano and Bover (1995) and Blundell and Bond (1998). But, when using this method, we encountered problems related to the validity of the instrument matrix.[14] Since this leads us to question the validity of the System-GMM results, we prefer to use the fixed effects estimator in our regressions.[15]

Regarding the control variables, there is some evidence that mayors supported by majorities in the Town Council and the Municipal Assembly make less optimistic forecasts. As expected, better economic performance (lower unemployment rates or higher regional GDP growth) leads to more optimistic forecasts. A less educated municipal population also seems to be associated with more optimistic forecasts. The remaining control variables are generally insignificant.[16]

Interactions with political variables

The results of the estimation of the model of Equation (15), which interacts the election-year dummy with several political variables, are reported in Table 3. To economize on space, we only report the results for the coefficients of the election-year dummy, for the political variable of interest, and for the interaction term. Since including several election dummies

[14] See the Hansen and Difference-Hansen test results in Table E.2 in Appendix E. When we use the Difference-GMM estimator of Arellano and Bond (1991), we also get Hansen test statistics that reject the validity of the instrument matrix. The results of Difference-GMM estimations, which are available upon request, are similar to those of System-GMM estimations.

[15] It is worth noting that the System-GMM results, reported in Table E.2 in Appendix E, are very similar to the fixed effects results of Table 2. In robustness tests (see Table E.5 in Appendix E), we use other methods that deal with dynamic panel data, such as Bias-Corrected Least Squares Dummy Variables (Bruno, 2005) and Bias-Corrected Fixed Effects (De Vos et al., 2015). Again, the results are very similar to those of the fixed effects estimations.

[16] The same happens to a dummy for independent mayors, when included, and with a dummy variable for when the mayor's party has a minority in both chambers (when included instead of the majority dummy). These results are not shown here, but are available from the authors upon request.

and their interactions would complicate the interpretation of the results, we only use the election-year dummy. In the first estimations we, therefore, replicate the baseline model of Equation (14), excluding the dummies for the years before and after the elections. Again, the results clearly indicate electoral opportunism in the form of more optimistic revenue forecasts in election years than in off-election years.

In the second set of estimations, we interact the election-year dummy with the win-margin of the mayor's party over the main opposition party in the previous elections. In the absence of data on voting intentions for most municipalities, the margin of victory in the previous election is our proxy for how close mayors expect the next elections to be.[17] As expected and consistent with Proposition 1, larger win-margins are associated with less optimistic forecasts for total and capital effective revenues. Figure 1 shows the average marginal effects of the election year, over the values of the win-margin (we omit values above 50, which are roughly the highest 1%). The marginal effects are decreasing, and become insignificant for win-margins close to or above 50 percentage points. That is, mayors may not feel the need to behave opportunistically when they won the last elections by a very large margin.

The third set of estimation results corroborates our Proposition 2 which claims that a reduced ego rent (whose proxy is a dummy for not running again) leads to less opportunistic behaviour. Obviously, forecast cycles would vanish, if the ego rent were to go away completely. This is actually what our empirical result suggests. Opportunistic (and optimistic) total and capital effective revenue *forecasts* happen only when the mayor runs for reelection. This is also consistent with the results of Veiga and Veiga (2007), who found that opportunism in *actual* capital and total expenditures is greater when the incumbent mayor runs for reelection than when her party has a different candidate. This does not seem to matter for current revenue forecasts.

Regarding the other estimations which test for interaction effects of other political control

[17]The correlation between the win-margins of the current and of the previous elections is 0.44. The win-margin of the previous election is also highly statistically significant in a probit model for the probability of reelection (results available upon request).

Table 3: Interactions with Political Variables

	(1)	(2)	(3)
VARIABLES	Effective Revenues	Current Revenues	Capital Revenues
Election year	84.868***	4.518	79.661***
	(6.509)	(0.724)	(7.328)
Election year	121.403***	2.877	118.156***
	(5.586)	(0.325)	(6.095)
Win-margin in the previous election	1.120	0.387*	0.732
	(1.482)	(1.753)	(1.059)
Election year * Win-margin in the previous election	-1.854**	0.083	-1.954***
	(-2.459)	(0.320)	(-2.746)
Election year	-1.975	17.631**	-20.127
	(-0.077)	(1.988)	(-0.855)
Incumbent running for reelection	-44.888***	2.378	-46.713***
	(-2.953)	(0.371)	(-3.467)
Election year * Incumbent running for reelection	108.948***	-16.450*	125.197***
	(3.977)	(-1.674)	(4.939)
Election year	95.485***	0.636	94.868***
	(4.647)	(0.069)	(5.970)
Mayor left	-27.884	-7.514	-19.602
	(-1.193)	(-0.812)	(-0.999)
Election year * Mayor left	-19.960	7.301	-28.596
	(-0.834)	(0.869)	(-1.471)
Election year	81.861**	-2.670	84.352***
	(2.253)	(-0.163)	(3.062)
Majority	-41.516*	-15.470	-25.147
	(-1.688)	(-1.551)	(-1.258)
Election year * Majority	3.727	8.915	-5.814
	(0.102)	(0.629)	(-0.201)
Election year	81.875***	-2.363	84.262***
	(4.635)	(-0.312)	(5.974)
Same party	18.589	-3.057	22.341**
	(1.578)	(-0.741)	(2.145)
Election year * Same party	7.045	16.214**	-10.835
	(0.296)	(2.421)	(-0.528)
Observations	5,098	5,098	5,098
Municipalities	308	308	308

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. All regressions include the full set of control variables of Table 2, except the dummies for the years before and after elections. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

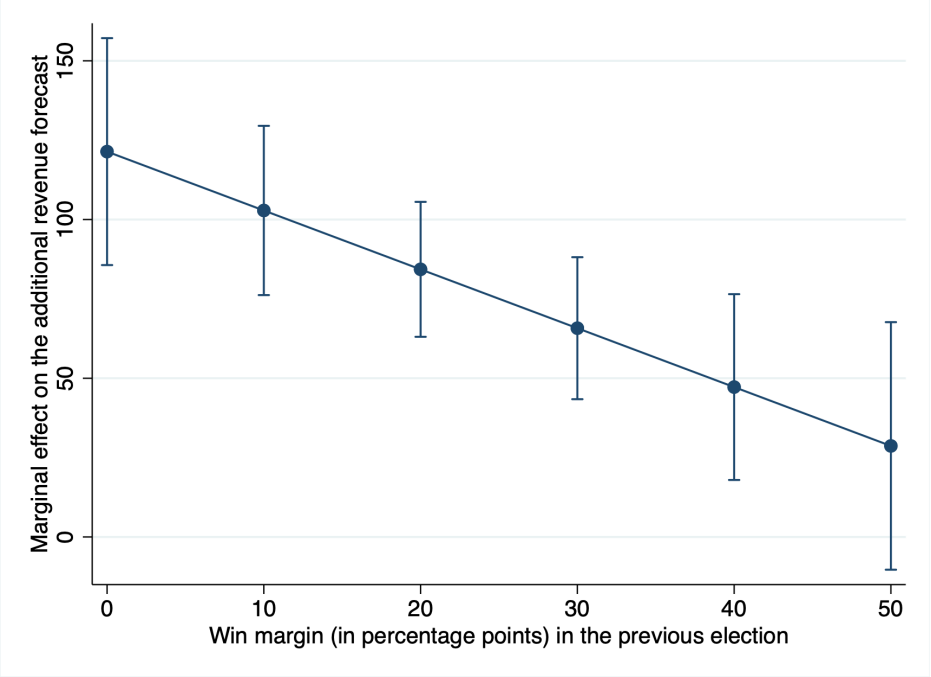

Figure 1: Effects of the Win-Margin on the Average Marginal Effects of the Election Year (vertical axis reports revenue forecast manipulation in real euros (of 2015) per capita)

variables, there is no robust indication that the ideology of the mayor, the support of majorities in the Town Council and Municipal Assembly, or party similarity between the mayor and the prime minister affect the magnitude of the opportunistic management of revenue forecasts.

Effects of Education on the Magnitude of PBCs

The estimation of the model of Equation (16) tests Proposition 3 by interacting the election year dummy with several proxies of the education level of the municipal population at least 15 years old. The results are reported in Table 4. To economize on space, we only report the coefficients for the election year, the education proxy, and its interaction. Four variables representing the education level of the municipal population are used: the percentage of the population with no formal education level completed; the percentage of the population with incomplete secondary education; the percentage of the population with at least completed

secondary education; and, the Marktest's Education Index.[18]

Table 4: Education and the Magnitude of Election-year Opportunism

	(1)	(2)	(3)
VARIABLES	Effective Revenues	Current Revenues	Capital Revenues
Election year	-32.577	-29.888***	-2.308
	(-1.128)	(-3.539)	(-0.087)
% Population with no education level completed	28.840***	1.959	25.318***
	(5.245)	(0.952)	(4.527)
Election year * % Population with	9.080***	2.797***	6.197***
no education level completed	(4.217)	(4.796)	(3.131)
Election year	-42.484	-28.010***	-13.551
	(-1.593)	(-2.845)	(-0.611)
% Population with incomplete secondary education	22.182***	1.325	19.591***
	(5.243)	(0.855)	(4.711)
Election year * % Population with	8.986***	2.591***	6.309***
incomplete secondary education	(4.700)	(4.967)	(3.728)
Election year	209.222***	58.725***	149.543***
	(7.429)	(6.211)	(6.106)
% Population with at least completed secondary education	-20.027**	3.027	-21.311***
	(-2.518)	(1.138)	(-3.106)
Election year * % Population with at least	-14.848***	-5.949***	-8.815***
completed secondary education	(-5.668)	(-5.131)	(-4.239)
Observations	5,098	5,098	5,098
Municipalities	308	308	308
Election year	70.358***	8.450	63.515***
	(5.221)	(1.563)	(6.222)
Education index	7.644**	2.770	4.402**
	(2.086)	(1.161)	(2.322)
Election year * Educcation index	-4.813***	-0.944***	-3.901***
	(-6.739)	(-3.574)	(-6.342)
Observations	4,698	4,698	4,698
Municipalities	278	278	278

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. All regressions include the full set of control variables of Table 2, except the dummies for the years before and after elections. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Regardless of the education proxy used, the results of Table 4 clearly support Proposition 3,

[18] When calculating the percentages of the population, we only consider people with at least 15 years old. We would prefer to consider the population old enough to vote (at least 18 years old), but there is no data for that age range. The Education Index (*Índice Geral de Ensino*), provided by the firm *Marktest*, is a weighted average of education variables.

indicating that lower education levels are associated with more optimistic revenue forecasts in election years. This is also consistent with the model of Shi and Svensson (2006), according to which opportunism is greater when there is a higher percentage of uninformed voters. Since the coefficients of interactions with continuous variables are sometimes difficult to interpret, we illustrate them in Figure 2, for the first and fourth education proxies.

As can be seen in the graphs on the left hand side, the marginal effect of the election year becomes positive for total effective and capital revenues when the percentage of the population at least 15 years old which did not complete any formal education level is close to or above 15 percent. On the right-hand-side graphs, we see that lower values of the education index are associated with higher marginal effects of the election year, that is, with greater opportunism.

Robustness Tests

The robustness of our empirical results is checked in several ways.[19] First, we use two alternative definitions of the dependent variable: (1) the difference between the forecasted revenues for year t and the average revenues of the last eight years (instead of the last four years); and (2), the forecast error, that is, the difference between the forecasted and the actual revenues for year t. The results of these robustness checks, reported in Table E.3 of Appendix E, are very similar to those of Tables 2, 3 and 4, providing further support for our theoretical model's main result and for the three propositions.

Second, we check if the results are sensitive to two sample restrictions: (1) excluding the 30 municipalities of the archipelagos of Azores and Madeira, as they have regional governments; and (2), excluding term-limited mayors from the sample (term limits only became binding in the 2013 elections), as they have smaller incentives to behave opportunistically in election years. The results, reported in Table E.4, are again very similar to those of the main tables.

[19] The robustness tests' results are shown in tables only. Nevertheless, the respective figures are similar to those shown above; they are available from the authors upon request.

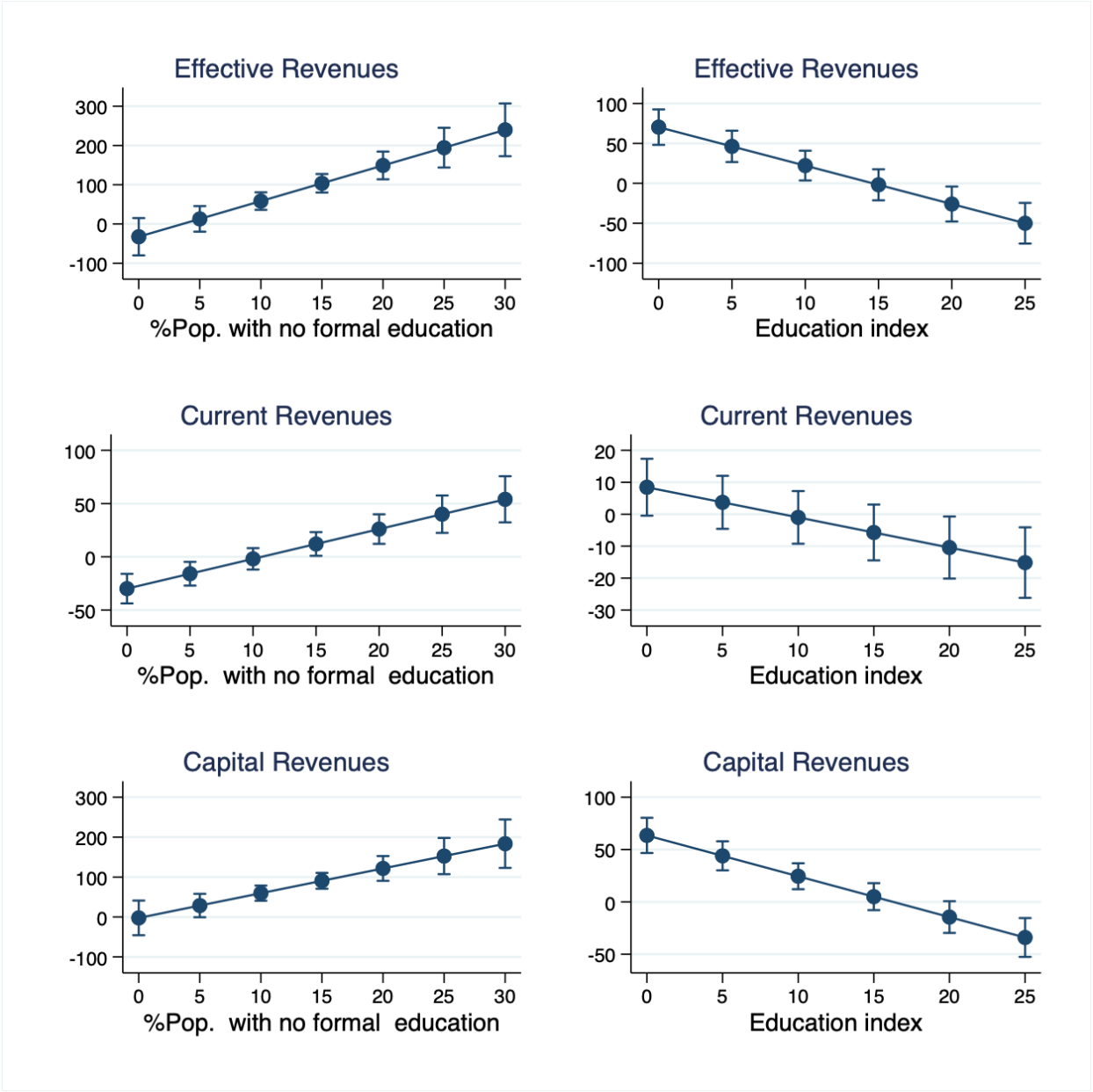

Figure 2: Effects of Education on the Average Marginal Effects of the Election Year (vertical axis reports revenue forecast manipulation in real euros per capita)

Third, we check if the results hold for two estimation methods/models designed for dynamic panel data: the Bias-Corrected Least Squares Dummy Variables (BC-LSDV) estimators, developed by Bruno (2005); and the Bias-Corrected Fixed Effects, of De Vos et al. (2015). These are good alternatives to System-GMM, especially for unbalanced data such as ours. Again, as shown in Table E.5 of Appendix E, the results are very similar to those of Tables 2, 3 and 4, which indicates that our results are not sensitive to the estimation method/model

chosen.[20]

Fourth, we test our three propositions at the same time, rather than in separate regressions. That is, the three interactions with the dummy variable for the election year were included simultaneously in the list of explanatory variables. In fact, we do this for two different education proxies. As shown in Table E.6, the results again support all three propositions, indicating that it does not matter whether we test them separately or jointly.

Finaly, we control for time effects using year dummy variables, instead of 4-year mandate dummies. This change has the drawback of forcing the exclusion of the dummy variable for the election year, but has the advantage of accounting for other events that may have happened in specific election years. In Table E.7, we report the results for the baseline regressions. Except for 2013, the coefficients of the year dummies in election years are always higher than for the previous years of the same electoral term in the estimations for total and capital effective revenues. At the bottom of the table, we report the average effects in election and non-election years, with the former always being higher than the latter. In fact, the difference in the averages is always statistically significant with a positive sign, providing additional support for the hypothesis that there are Political Budget Cycles in revenue forecasts. The results for the interactions with political and education variables are reported in Table E.8. They support the findings of Tables 3 and 4, thereby indicating that a larger win margin in the previous election reduces opportunism, while it increases for greater shares of the municipal population with no education level completed. However, there is no longer support for the hypothesis of increased opportunism when the incumbent mayor is running for reelection.

[20] We also estimated a static Fixed Effects model, excluding the lagged dependent variable from the list of explanatory variables. The results, not shown here but available upon request, are again very similar to those of the main tables.

5 Conclusion

This paper presents a political economy model which is consistent with the evidence (Boylan, 2008; Heinemann, 2006; Boukari and Veiga, 2018) indicating that governments use overly optimistic revenue forecasts to expand their fiscal room for manoeuvre in election years in order to increase their chances of re-election. Besides offering a theoretical mechanism which can explain the results found in the aforementioned studies, this paper also investigates the factors that affect the magnitude of the forecast manipulation. The three propositions derived from the model indicate that: (1) a larger ex ante expected winning margin allows the incumbent to reduce its revenue forecast; (2) when the incumbent government is not running, its own interest in winning the elections is reduced, and so is the opportunistic manipulation; and, (3) if there are more uninformed voters, any manipulation is more effective.

These theoretical findings are supported by an empirical analysis based on data from Portuguese municipalities for the period 1998-2015. In fact, we find evidence supporting our theoretical predictions, both in the main results and in a battery of robustness tests. That is, our results clearly indicate that there is revenue forecast manipulation in election years and that the manipulation is smaller for a higher win margin at the previous elections (our proxy for the expected win margin), when the incumbent mayor does not run for re-election, and for a lower education level of the municipal population (our proxy for the percentage of uninformed voters).

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Appendix and Indications for the Referees

The appendix presents indications for the model solution and the derivation of the propositions in Section 2. It also presents descriptive statistics and additional empirical results.

A Probability of individual agent to vote for the incumbent

First, we consider an individual voter, no matter if informed or uninformed. She votes for incumbent a, if

$$\underbrace{E_t[u_{t+1}(c^a_{t+1}) + {G^+_{t+1}}^a + \alpha(\theta^i - \gamma)(-\frac{1}{2})]}_{\text{exp. utility when } a \text{ in power}} \geq \underbrace{E_t[u_{t+1}(c^b_{t+1}) + {G^+_{t+1}}^b + \alpha(\theta^i - \gamma)(+\frac{1}{2})]}_{\text{exp. utility when } b \text{ in power}} \quad \text{(A.1)}$$

Depending on who is in power in $(t+1)$, the additional provision of public goods in Equation (A.1) will typically differ because of differences in politicians' competence and voters' expectations thereof:

$$E_t[{G^+_{t+1}}^j] = -E_t[(1+r_t)D_t] + E_t[\eta^j_{t+1}], \quad j = a, b. \quad \text{(A.2)}$$

The equation says that the period t deficit must be repaid in period $(t+1)$. However, the politician will be expected not to borrow in period $(t+1)$ because there is no election at the end of that period.[21] The best revenue forecast for the incumbent in $(t+1)$ is, therefore, $({R^+_{t+1}}^{forec})^j = E_t[(R^+_{t+1})^j] = 0$. Overall, there are probably no additional public goods in $(t+1)$; instead public goods are likely to be reduced corresponding to deficit repayment modulo the effect of the politician's competence. Agents have no idea about the skills shock of either potential politician in $t+1$. Nor do they know the skills shock of the challenger in period t, and, therefore, expect 0. However, they can use the incumbent's period t public goods provision policy to draw conclusions about her period t skills shock, μ^a_t. (How this is done is not shown here, but further down; the difference between informed and uninformed voters will then be exploited.)

$$E_t[{G^+_{t+1}}^b] = -E_t[(1+r_t)D_t]; \quad \text{(A.3)}$$

$$E_t[{G^+_{t+1}}^a] = -E_t[(1+r_t)D_t] + E_t[\mu^a_t]; \quad \text{(A.4)}$$

[21] Note that they will probably end up with a deficit or surplus though because the actual additional revenue depends on the deviation from trend output, y^+_t, which is a random variable. See also the discussion on the timing of events on page 6.

Since overestimation of additional revenue has no effect in an off-election year, private consumption in Equation (A.1) is the same irrespective of the politician in power:

$$E_t[u_{t+1}(c^a_{t+1})] = E_t[u_{t+1}(c^b_{t+1})]. \tag{A.5}$$

Combining Equations (A.1) and (A.3) to (A.5) we can obtain a condition for an individual to vote for incumbent a (which corresponds to Condition (8) in the main text):

$$E_t[\mu^a_t] \quad \geq \quad \alpha(\theta^i - \gamma). \tag{A.6}$$

Using the distribution of the skills shock we can determine the probability (Pr) of any voter, be she informed or uninformed, to vote for incumbent a:

$$Pr[E_t[\mu^a_t] - \alpha(\theta^i - \gamma) \geq 0] = \frac{E_t[\mu^a_t] - \alpha(-1-\gamma)}{\alpha(1-\gamma) - \alpha(-1-\gamma)} = \frac{E_t[\mu^a_t]}{2\alpha} + \frac{1+\gamma}{2}. \tag{A.7}$$

B Probability of incumbent to win

Now, we can determine the probability $Prob$ that incumbent a obtains 50% of the votes in the period t elections. It is the probability that the number of voters times their individual probability Pr to vote for incumbent a (as determined in Equation A.7) is greater or equal to $\frac{1}{2}$. However, the individual probability Pr is different for informed and uninformed voters because their expectations of period t skills, $E_t[\mu^a_t]$, differ. The probability for the incumbent to win the election – Equation (9) in the main text – is repeated here:

$$\text{Prob}\left\{ \underbrace{(1-\psi)\,[\frac{E^{inf}_t[\mu^a_t]}{2\alpha} + \frac{1+\gamma}{2}]}_{\text{informed}} + \underbrace{\psi\,[\frac{E^{uninf}_t[\mu^a_t]}{2\alpha} + \frac{1+\gamma}{2}]}_{\text{uninformed}} \quad \geq \quad \frac{1}{2} \right\}. \tag{B.1}$$

So why is there a difference in expectations for informed and uninformed voters? Rewrite the government budget constrain (4) for period t:

$$G^+_t = R^{+forec}_t - (1+r_{t-1})(D_{t-1}) + \mu^a_t + \mu^a_{t-1}. \tag{B.2}$$

For informed voters we obtain:

$$E^{inf}_t[\mu^a_t] = \mu^a_t = G^+_t - R^{+forec}_t + (1+r_{t-1})D_{t-1} - \mu^a_{t-1}. \tag{B.3}$$

Additional public goods G_t, previous period deficit D_{t-1}, previous period skills μ^a_{t-1}, and interest rate r_{t-1} can be observed by everybody. The point is that informed voters can determine $E^{inf}_t[\mu^a_t]$ deterministically, because they can also observe the incumbent's revenue forecast, R^{+forec}_t. By contrast, uninformed voters must form an estimate of the incumbent's skills, $\widehat{\mu^a_t}$, based on their *perception* of the government's revenue forecast $\widehat{R^{+forec}_t}$:

$$\begin{aligned} E^{uninf}_t[\mu^a_t] = \widehat{\mu^a_t} &= G^+_t - \widehat{R^{+forec}_t} + (1+r_{t-1})D_{t-1} - \mu^a_{t-1} \\ &= \underbrace{G^+_t - R^{+forec}_t + (1+r_{t-1})D_{t-1} - \mu^a_{t-1}}_{\mu^a_t \text{ from (B.3)}} + (R^{+forec}_t - \widehat{R^{+forec}_t}); \\ E^{uninf}_t[\mu^a_t] &= \mu^a_t + (R^{+forec}_t - \widehat{R^{+forec}_t}). \end{aligned} \tag{B.4}$$

Uninformed voters overestimate the incumbent's skills by $R^{+forec}_t - \widehat{R^{+forec}_t}$. Using Equations (B.3) and (B.4) we can now determine the probability Prob^{win} that incumbent a receives 50% of the votes in period t:

$$\begin{aligned} \text{Prob}^{win} &\equiv \text{Prob}\left\{ (1-\psi)\,[\frac{\mu^a_t}{2\alpha} + \frac{1+\gamma}{2}] \quad + \quad \psi\,[\frac{\mu^a_t + R^{+forec}_t - \widehat{R^{+forec}_t}}{2\alpha} + \frac{1+\gamma}{2}] \quad \geq \quad \frac{1}{2} \right\} \\ &= \text{Prob}\left\{ \frac{\mu^a_t}{2\alpha} \quad + \quad \psi\,\frac{R^{+forec}_t - \widehat{R^{+forec}_t}}{2\alpha} \quad + \quad \frac{1+\gamma}{2} \quad \geq \quad \frac{1}{2} \right\}; \\ \text{Prob}^{win} &= \text{Prob}\left\{ \mu^a_t \quad \geq \quad \psi\,(\widehat{R^{+forec}_t} - R^{+forec}_t) - \alpha\gamma \right\} \end{aligned} \tag{B.5}$$

$$= 1 \quad - \quad F\,[\,\psi\,(\widehat{R^{+forec}_t} - R^{+forec}_t) \;-\; \alpha\gamma]\,, \tag{B.6}$$

where $F(\bullet)$ is the distribution function of the skills shock. Equations (B.5) and (B.6) are identical to Equations (10) and (11)in the main text.

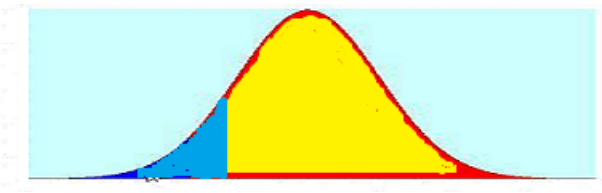

Figure 1: Bell-shaped skills density function as an example

The marked area towards the right (light grey or yellow [if in colour]) under the density function depicted in the figure corresponds to the probability described by Equation (B.5)

and by the distribution function representation in Equation (B.6). If the ex ante winning chances are the same for incumbent and challenger (shift parameter $\gamma = 0$), then the expected skills overall (combine Equations B.3 and B.4) is always greater than the actual skills, if the government's revenue estimate perceived by uninformed voters is smaller than the actual government revenue estimate ($\widehat{R_t^{+forec}} < R_t^{+forec}$). Then the probability (see Equation (B.6) or the light grey [or yellow] area under the density function) is always greater than $\frac{1}{2}$. An overly optimistic (manipulated) revenue forecast increases the government's chance to be re-elected. (A similar effect occurs, if uninformed voters were to reduce their perception of the government revenue forecast for some reason.) If the ex ante winning changes for incumbent a are larger ($\gamma < 0$), the government needs less forecast manipulation to achieve the same effect.

C Incumbent's maximisation problem

Now, we can maximise incumbent a's utility over the entire election cycle, i.e. periods t and $t+1$. Period $t+1$ utility is the sum of the utilities for winning and losing the election weighted by the probability determined in the previous step. A condensed version of the following equation is also found as Equation 12 in the main text.

$$
\begin{aligned}
max_{R_t^{+forec}}\ V \;&=\; max_{R_t^{+forec}}\ V_t^a \;+\; V_{t+1}^a \;= \\
max_{R_t^{+forec}} \quad & E_t^a\{u_t(\bar{y} + (1-\tau)\frac{R_t^+}{\tau}) + \underbrace{R_t^{+forec} - (1+r_{t-1})(D_{t-1}) + \eta_t^a}_{G_t^+ \text{ (eq. 4)}} + X_t - \xi D_{t-1}^2\} \\
&+\; E_t^a\{\underbrace{[1 - F[\psi(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma]]}_{\text{prob. incumbent wins}} \\
&\qquad [u_{t+1}(\bar{y} + (1-\tau)\frac{R_{t+1}^+}{\tau}) + \underbrace{(R_{t+1}^{+\ forec})^a - (1+r_t)D_t + \eta_{t+1}^a}_{G_{t+1}^a} + X_{t+1} - \xi D_t^2]\} \\
&+\; E_t^a\{\underbrace{[F[\psi(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma]]}_{\text{prob. incumbent loses}} \\
&\qquad [u_{t+1}(\bar{y} + (1-\tau)\frac{R_{t+1}^+}{\tau}) + \underbrace{(R_{t+1}^{+\ forec})^b - (1+r_t)D_t + \eta_{t+1}^b}_{G_{t+1}^b}]\}. \qquad \text{(C.1)}
\end{aligned}
$$

Next, substitute in for the expected current debt ($E_t^a[D_t] = R_t^{+forec}$); simplify expectations when they are zero (expectations of the additional revenue shocks, $E_t^a[R_t^+] = E_t^a[R_{t+1}^+] = 0$; and expectations of the optimal future additional revenue forecast, $E_t^a[({R_{t+1}^+}^{forec})^a] = E_t^a[({R_{t+1}^+}^{forec})^b] = 0$); and acknowledge that the incumbent knows her past, but not her present and future skills, nor the skills shocks of the challenger ($E_t^a[\eta_t^a] = E_t^a[\mu_{t-1}^a] + E_t^a[\mu_t^a] = E_t^a[\mu_{t-1}^a] + 0$; and $E_t^a[\eta_{t+1}^a] = E_t^a[\eta_{t+1}^b] = 0$). Now, the maximisation problem looks as follows:

$$max_{R_t^{+forec}} \quad c_t(\bar{y}) + c_{t+1}(\bar{y}) + R_t^{+forec} - (1 + r_{t-1}D_{t-1} + \mu_{t-1}^a + X_t - \xi D_{t-1}^2 - (1 + r_{t-1})(R_t^{+forec})$$

$$+ \quad [1 - F[\psi(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma]]\ [X_{t+1} - \xi(R_t^{+forec})^2]. \tag{C.2}$$

Having verified the second order condition for a well-behaved maximisation problem we can work from the following first order condition:

$$-r_t + F'[\psi(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma]\psi[X_{t+1} - \xi(R_t^{+forec})^2]$$

$$-[1 - F[\psi(\widehat{R_t^{+forec}} - R_t^{+forec}) - \alpha\gamma]]2\xi R_t^{+forec} = 0, \tag{C.3}$$

where $F'[\bullet] = f[\bullet]$ refers to the probability density function. In equilibrium, this becomes rational expectations condition (13) in the main text which is repeated here:

$$-r_t + F'[-\alpha\gamma]\psi[X_{t+1} - \xi(R_t^{+forec})^2] - [1 - F[-\alpha\gamma]]2\xi R_t^{+forec} = 0, \tag{C.4}$$

D Perturbation Results for Propositions

The propositions at the end of Section **??** are obtained by using the Implicit Function Theorem. The derivations of the marginal effect of changes in exogenous variables *on* the equilibrium value of the government's optimal choice of the revenue forecast $(R_t^{+forec})^*$ are given here:

Proposition 1:

$$\begin{aligned}
\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}\gamma} &= -\frac{V_{R_t^{+forec}\gamma}}{V_{R_t^{+forec}R_t^{+forec}}} \\
&= -\frac{-\alpha F''[\bullet]\psi[X_{t+1}-\xi(R_t^{+forec})^2]-\alpha F'[\bullet]2\xi R_t^{+forec}}{-\psi F''[\bullet]\psi[X_{t+1}-\xi(R_t^{+forec})^2]-2\psi F'[\bullet]2\xi R_t^{+forec}-(1-F[\bullet])2\xi} \\
&< 0. \qquad \text{(D.1)}
\end{aligned}$$

Proposition 2:

$$\begin{aligned}
\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}X_{t+1}} &= -\frac{V_{R_t^{+forec}X_{t+1}}}{V_{R_t^{+forec}R_t^{+forec}}} \\
&= -\frac{F'[\bullet]\psi}{-\psi F''[\bullet]\psi[X_{t+1}-\xi(R_t^{+forec})^2]-2\psi F'[\bullet]2\xi R_t^{+forec}-(1-F[\bullet])2\xi} \\
&> 0. \qquad \text{(D.2)}
\end{aligned}$$

Proposition 3:

$$\begin{aligned}
\frac{\mathrm{d}(R_t^{+forec})^*}{\mathrm{d}\psi} &= -\frac{V_{R_t^{+forec}\psi}}{V_{R_t^{+forec}R_t^{+forec}}} \\
&= -\frac{\Delta R F''[\bullet]\psi[X_{t+1}-\xi(R_t^{+forec})^2]+F'[\bullet][X_{t+1}-\xi(R_t^{+forec})^2]+\Delta R F'[\bullet]2\xi R_t^{+forec}}{-\psi F''[\bullet]\psi[X_{t+1}-\xi(R_t^{+forec})^2]-2\psi F'[\bullet]2\xi R_t^{+forec}-(1-F[\bullet])2\xi} \\
&> 0; \qquad \text{where } \Delta R \equiv (\widehat{R_t^{+forec}} - R_t^{+forec}) = 0 \text{ under rational expectations.} \qquad \text{(D.3)}
\end{aligned}$$

E Descriptive Statistics and Robustness Tests

This subsection presents the descriptive statistics and the results of several robustness tests.

Table E.1: Descriptive Statistics

VARIABLES	Observ.	Mean	St.Dev.	Min.	Max.
Forecasted effective revenues minus the average of the last 4 years	5,098.00	574.40	608.43	-1,238.08	7,338.58
Forecasted current revenues minus the average of the last 4 years	5,098.00	162.34	212.45	-341.71	4,627.03
Forecasted capital revenues minus the average of the last 4 years	5,098.00	411.79	505.82	-1,843.98	7,083.89
Year before elections	5,098.00	0.29	0.45	0.00	1.00
Election year	5,098.00	0.29	0.45	0.00	1.00
Year after elections	5,098.00	0.19	0.39	0.00	1.00
Mayor left (PS, PCP, or BE)	5,098.00	0.54	0.50	0.00	1.00
Majority (in the Town Hall and Municipal Assembly)	5,098.00	0.81	0.39	0.00	1.00
Win margin (in percentage points) in the previous election	5,098.00	19.72	14.03	0.02	75.75
Run for reelection	5,098.00	0.77	0.42	0.00	1.00
Terms mayor	5,098.00	2.37	1.71	0.00	10.00
Same party (mayor and prime minister)	5,098.00	0.44	0.50	0.00	1.00
Unemployment rate	5,098.00	6.87	2.81	0.64	18.48
GDP growth (NUTS 3 region)	5,098.00	1.09	3.67	-15.65	25.94
Population growth rate	5,098.00	-0.30	2.15	-21.56	24.98
Financial autonomy (own revenues as % of effective)	5,098.00	35.91	19.17	1.14	124.75
% Population with no education level completed	5,098.00	13.89	5.39	2.21	37.58
% Population with less than complete secondary education	5,098.00	13.84	5.70	0.51	38.60
% Population with complete secondary education	5,098.00	9.02	3.39	1.96	23.52
Education index	4,698.00	3.59	7.38	0.16	109.04

Sources: Directorate General for Local Authorities (DGAL), Ministry of Internal Affairs (MAI), National Statistics Institute (INE), and Marktest's *Sales Index* database.

Table E.2: PBCs in Revenue Forecasts - Baseline Results (Using System-GMM)

VARIABLES	(1) Effective Revenues	(2) Current Revenues	(3) Capital Revenues
L.(Forecast - Average of 4 Previous Forecasts)	0.728***	0.530***	0.674***
	(6.850)	(3.853)	(8.937)
Year before election	26.407	-17.716***	19.976
	(1.156)	(-2.860)	(1.337)
Election year	93.680***	21.453***	58.425***
	(3.923)	(4.054)	(3.292)
Year after election	16.616	24.269***	-11.574
	(1.094)	(3.638)	(-0.913)
Mayor left	-23.132	4.955	-25.961*
	(-1.157)	(0.538)	(-1.656)
Majority	1.259	-3.676	1.208
	(0.054)	(-0.383)	(0.065)
Win margin (previous election)	-0.414	0.087	-0.452
	(-0.649)	(0.308)	(-0.860)
Run for reelection	-2.823	0.112	-11.854
	(-0.141)	(0.012)	(-0.735)
Terms mayor	3.037	-0.824	-0.819
	(0.467)	(-0.286)	(-0.165)
Same party	11.395	1.576	8.542
	(0.862)	(0.340)	(0.748)
L.Unemployment rate	-17.501*	-8.294**	-15.977**
	(-1.860)	(-2.288)	(-2.054)
L.GDP growth (NUTS III region)	11.058*	1.090	6.250
	(1.723)	(1.015)	(1.179)
L.Population growth	9.137	-30.722***	25.343***
	(0.902)	(-7.379)	(3.092)
L.Financial autonomy (Own revenues / Effective revenues)	-0.611	0.368	-0.907*
	(-0.732)	(1.015)	(-1.664)
L.% Population with no education level completed	9.454**	2.193***	9.214***
	(2.499)	(2.704)	(3.569)
Observations	5,098	5,098	5,098
Municipalities	308	308	308
No. of instruments	24.00	24.00	24.00
Arellano-Bond AR(1), p-value	0.00	0.00	0.01
Arellano-Bond AR(2), p-value	0.40	0.36	0.37
Hansen, p-value	0.00	0.00	0.00
Diff Hansen 1, p-value	0.03	0.00	0.01
Diff Hansen 2, p-value	0.01	0.00	0.00

Notes: System-GMM estimations for dynamic panel data models. Constant and time dummies are not shown for brevity. The dependent variable and the economic and demographic control variables were treated as endogenous. Only one lag was used as an internal instrument to reduce the number of instruments. Robust standard errors are in parentheses. Diff-Hansen 1 tests the exogeneity of the instruments used in the level part (of the system) as a whole. Diff-Hansen 2 tests the exogeneity of the lagged level of the dependent variable used as an instrument in the level part. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table E.3: Robustness tests - Alternative Definitions of the Dependent Variable

	Difference to 8-year average revenues			Forecast Errors in Revenues		
	(1)	(2)	(3)	(4)	(5)	(6)
	Effective	Current	Capital	Effective	Current	Capital
VARIABLES	Revenues	Revenues	Revenues	Revenues	Revenues	Revenues
Year before election	20.631	-10.048*	30.218**	39.723***	2.552	37.347***
	(1.335)	(-1.902)	(2.274)	(2.841)	(0.479)	(3.043)
Election year	103.497***	5.172	96.971***	96.806***	-0.939	98.365***
	(6.400)	(1.002)	(6.684)	(6.579)	(-0.226)	(7.267)
Year after election	15.660	16.813***	-2.326	18.142	-4.958	21.117
	(0.919)	(3.116)	(-0.150)	(1.145)	(-1.073)	(1.547)
Election year	131.168***	8.477	122.801***	116.041***	3.307	113.787***
	(6.100)	(0.992)	(6.452)	(5.863)	(0.425)	(6.472)
Win margin (previous election)	1.577**	0.489**	1.091	1.462**	0.417*	1.056*
	(1.992)	(2.134)	(1.514)	(2.078)	(1.738)	(1.664)
Election year * Win margin	-2.101***	-0.025	-2.126***	-2.236***	-0.245	-2.002***
(previous election)	(-2.812)	(-0.096)	(-3.041)	(-3.290)	(-0.859)	(-3.125)
Election year	1.818	13.222	-12.335	3.328	-25.934***	31.410
	(0.073)	(1.434)	(-0.543)	(0.134)	(-2.725)	(1.513)
Incumbent running for reelection	-41.846***	-0.508	-40.993***	-32.233**	-7.256	-24.007**
	(-2.854)	(-0.078)	(-3.206)	(-2.403)	(-1.159)	(-2.156)
Election year * Incumbent running	110.345***	-6.564	116.997***	86.130***	30.616***	53.870**
for reelection	(4.133)	(-0.706)	(4.769)	(3.310)	(2.736)	(2.556)
Election year	-29.007	-15.969*	-11.993	-21.230	-22.519**	3.591
	(-0.984)	(-1.857)	(-0.453)	(-0.786)	(-2.512)	(0.150)
% Population with no education	31.180***	-1.221	30.635***	21.822***	0.147	21.066***
level completed	(5.328)	(-0.501)	(5.034)	(4.400)	(0.084)	(4.487)
Election year * % Population with no	9.181***	1.966***	7.065***	6.983***	1.552**	5.317***
education level completed	(4.183)	(3.408)	(3.494)	(3.382)	(2.534)	(2.795)
Observations	5,088	5,088	5,088	5,098	5,098	5,098
Municipalities	308	308	308	308	308	308

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is defined as indicated in the first row (measured in real euros per capita). All regressions include the full set of control variables used in Tables 2, 3, and 4. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.4: Robustness tests - Restricted Samples

	Excluding Azores and Madeira			Excluding Term-Limited Mayors		
	(1)	(2)	(3)	(4)	(5)	(6)
	Effective	Current	Capital	Effective	Current	Capital
VARIABLES	Revenues	Revenues	Revenues	Revenues	Revenues	Revenues
Year before election	20.632	-14.435***	34.003***	10.015	-17.178***	26.627*
	(1.548)	(-2.659)	(3.090)	(0.623)	(-3.517)	(1.880)
Election year	92.573***	-3.147	92.967***	111.447***	-3.183	112.848***
	(5.983)	(-0.573)	(6.587)	(6.701)	(-0.521)	(7.472)
Year after election	21.387	15.693***	6.086	-22.271	3.876	-28.267
	(1.577)	(2.775)	(0.519)	(-0.977)	(0.603)	(-1.322)
Election year	105.861***	1.445	102.585***	125.317***	3.290	121.099***
	(5.316)	(0.152)	(5.945)	(5.769)	(0.322)	(6.255)
Win margin (previous election)	0.598	0.332	0.270	0.356	0.265	0.087
	(0.946)	(1.371)	(0.487)	(0.409)	(1.209)	(0.107)
Election year * Win margin	-1.431**	0.052	-1.501**	-0.862	0.136	-1.009
(previous election)	(-1.973)	(0.187)	(-2.235)	(-1.136)	(0.498)	(-1.390)
Election year	-31.212	10.609	-43.900*	84.364**	25.763**	57.883*
	(-1.353)	(1.199)	(-1.968)	(2.494)	(2.291)	(1.894)
Incumbent running for reelection	-45.901***	1.373	-45.874***	-14.305	5.140	-18.934
	(-3.065)	(0.206)	(-3.650)	(-0.495)	(0.639)	(-0.645)
Election year * Incumbent running	136.230***	-10.165	146.283***	27.530	-22.141*	49.203
for reelection	(5.080)	(-1.042)	(5.696)	(0.784)	(-1.676)	(1.526)
Election year	-84.720***	-33.460***	-51.384**	-9.585	-32.510***	22.514
	(-3.370)	(-3.681)	(-2.267)	(-0.336)	(-3.250)	(0.856)
% Population with no education	24.205***	0.189	20.479***	27.103***	1.621	23.465***
level completed	(5.657)	(0.082)	(5.485)	(4.291)	(0.610)	(3.536)
Election year * % Population with no	12.061***	2.873***	9.017***	8.705***	2.876***	5.768***
education level completed	(5.850)	(4.631)	(4.754)	(3.964)	(5.250)	(2.798)
Observations	4,708	4,708	4,708	4,172	4,172	4,172
Municipalities	278	278	278	308	308	308

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. All regressions include the full set of control variables used in Tables 2, 3, and 4.. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.5: Robustness Tests - Dynamic Panel Models

	Bias Corrected - LSDV			Bias-Corrrected Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
	Effective	Current	Capital	Effective	Current	Capital
VARIABLES	Revenues	Revenues	Revenues	Revenues	Revenues	Revenues
Year before election	17.586	-13.134	30.101	1.131	-22.832***	24.004
	(0.793)	(-1.548)	(1.560)	(0.072)	(-3.419)	(1.596)
Election year	98.309***	0.348	96.619***	85.137***	1.008	84.972***
	(4.313)	(0.040)	(4.873)	(4.853)	(0.199)	(4.896)
Year after election	4.156	15.891*	-12.751	8.391	12.719**	-5.091
	(0.186)	(1.840)	(-0.659)	(0.444)	(2.120)	(-0.291)
Election year	125.922***	2.645	122.664***	130.811***	12.415*	119.023***
	(4.370)	(0.239)	(4.893)	(6.407)	(1.673)	(4.755)
Win margin (previous election)	1.110	0.402	0.707	0.659	0.301	0.335
	(1.309)	(1.235)	(0.959)	(1.067)	(1.360)	(0.477)
Election year * Win margin	-1.898	0.088	-2.000*	-2.443***	-0.120	-2.308***
(previous election)	(-1.559)	(0.188)	(-1.891)	(-2.828)	(-0.396)	(-2.613)
Election year	1.663	18.092	-17.161	-29.800	22.432*	-51.298**
	(0.044)	(1.245)	(-0.525)	(-0.950)	(1.737)	(-2.007)
Incumbent running for reelection	-41.848*	1.935	-43.194**	-48.152***	-3.883	-44.916***
	(-1.739)	(0.209)	(-2.066)	(-2.806)	(-0.608)	(-2.942)
Election year * Incumbent running	108.919***	-17.196	125.937***	143.641***	-15.771	159.417***
for reelection	(2.658)	(-1.089)	(3.543)	(4.093)	(-1.223)	(5.422)
Election year	-23.310	-28.995*	5.782	-24.400	-43.808***	20.609
	(-0.555)	(-1.797)	(0.158)	(-0.697)	(-3.401)	(0.655)
% Population with no education	26.377***	1.421	23.351***	22.471***	6.631***	16.068***
level completed	(3.338)	(0.478)	(3.374)	(3.858)	(3.881)	(2.736)
Election year * % Population with no	8.656***	2.718***	5.859***	9.193***	4.805***	4.379*
education level completed	(3.770)	(3.068)	(2.937)	(3.373)	(6.166)	(1.795)
Observations	5,098	5,098	5,098	4,018	4,018	4,018
Municipalities	308	308	308	308	308	308

Notes: The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. All regressions include the full set of control variables used in Tables 2, 3, and 4.. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.6: Robustness tests - Joint Test of the Three Propositions

VARIABLES	(1) Effective Revenues	(2) Current Revenues	(3) Capital Revenues	(4) Effective Revenues	(5) Current Revenues	(6) Capital Revenues
Election year	-69.058	-15.943	-52.278	-3.437	17.086*	-17.848
	(-1.589)	(-1.392)	(-1.266)	(-0.113)	(1.794)	(-0.600)
Win margin (previous election)	1.089	0.426*	0.658	0.727	0.395	0.329
	(1.428)	(1.908)	(0.946)	(0.953)	(1.643)	(0.491)
Election year * Win margin	-1.663**	0.002	-1.680**	-1.299*	0.075	-1.392*
(previous election)	(-2.156)	(0.007)	(-2.289)	(-1.770)	(0.273)	(-1.967)
Incumbent running for reelection	-39.738***	3.544	-42.799***	-46.032***	1.432	-45.224***
	(-2.635)	(0.561)	(-3.190)	(-3.105)	(0.216)	(-3.570)
Election year * Incumbent running	94.720***	-19.489**	113.975***	125.155***	-12.728	136.998***
for reelection	(3.470)	(-2.055)	(4.460)	(4.461)	(-1.286)	(5.099)
% Population with no education	28.889***	1.945	25.382***			
level completed	(5.253)	(0.945)	(4.539)			
Election year * % Population with no	8.626***	2.911***	5.630***			
education level completed	(4.083)	(5.070)	(2.907)			
Education index				7.578**	2.781	4.330**
				(2.058)	(1.164)	(2.224)
Election year * Education index				-5.102***	-0.920***	-4.215***
				(-6.641)	(-3.508)	(-6.214)
Observations	5,098	5,098	5,098	4,698	4,698	4,698
Municipalities	308	308	308	278	278	278
Adjusted R-squared	0.45	0.24	0.50	0.50	0.23	0.58

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. All regressions include the full set of control variables used in Table 2. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.7: Robustness Tests - Baseline Results with Year Dummies

VARIABLES	(1) Effective Revenues	(2) Current Revenues	(3) Capital Revenues
L.(Revenue forecast - Average revenues of previous 4 years)	0.514***	0.462***	0.540***
	(8.977)	(4.798)	(9.270)
Mayor left	-34.504	-5.589	-28.337
	(-1.512)	(-0.644)	(-1.465)
Majority	-40.577*	-13.114*	-26.583
	(-1.927)	(-1.652)	(-1.465)
Win margin (previous election)	0.691	0.384*	0.295
	(0.930)	(1.809)	(0.446)
Incumbent running for reelection	-22.216	-1.208	-20.218
	(-1.159)	(-0.181)	(-1.174)
Terms mayor	-5.388	0.292	-5.527
	(-0.913)	(0.153)	(-1.042)
Same party	22.867**	3.425	19.721**
	(2.049)	(0.875)	(1.974)
L.Unemployment rate	-7.240*	-2.234	-4.598
	(-1.834)	(-1.578)	(-1.255)
L.GDP growth (NUTS III region)	2.804	1.269*	1.738
	(1.342)	(1.881)	(0.899)
L.Population growth	-0.922	-4.470**	3.232
	(-0.311)	(-2.489)	(1.329)
L.Financial autonomy (Own revenues / Effective revenues)	-0.257	-0.649	0.584
	(-0.235)	(-1.590)	(0.615)
L.% Population with no education level completed	27.676***	-2.489	28.443***
	(4.748)	(-1.125)	(4.859)
2000	95.390***	15.067	80.746***
	(2.868)	(0.868)	(3.552)
2001 (election year)	182.526***	6.319	175.312***
	(6.936)	(0.767)	(7.335)
2002	2.065	-9.736	5.160
	(0.061)	(-1.196)	(0.162)
2003	75.857**	-25.765***	99.192***
	(2.241)	(-3.001)	(3.129)
2004	129.865***	-3.335	127.972***
	(4.045)	(-0.347)	(4.519)
2005 (election year)	212.563***	-3.238	209.402***
	(6.241)	(-0.311)	(6.774)
2006	145.689***	-27.853**	162.495***
	(3.185)	(-2.442)	(3.667)
2007	135.613***	-1.133	125.250***
	(3.069)	(-0.082)	(2.938)
2008	168.661***	8.018	151.875***
	(4.238)	(0.597)	(3.935)
2009 (election year)	362.261***	68.096***	286.401***
	(7.607)	(4.342)	(6.488)

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	(1)	(2)	(3)
VARIABLES	Effective Revenues	Current Revenues	Capital Revenues
2010	282.591***	31.450*	242.948***
	(5.952)	(1.902)	(5.603)
2011	210.529***	-31.687**	233.223***
	(3.372)	(-2.142)	(3.925)
2012	173.746***	-22.229	184.080***
	(2.892)	(-1.250)	(3.330)
2013 (election year)	46.924	22.480	12.379
	(0.718)	(1.113)	(0.199)
2014	45.003	18.637	19.428
	(0.817)	(0.858)	(0.395)
2015	90.996	36.790*	50.228
	(1.579)	(1.724)	(0.949)
2016	33.934	-42.316*	73.357
	(0.576)	(-1.821)	(1.348)
2017 (election year)	184.016***	-62.892***	241.340***
	(2.998)	(-2.698)	(4.189)
Election years (average)	197.658***	6.153	184.967***
	(4.858)	(0.447)	(4.811)
Non-election years (average)	122.303***	-4.161	119.689***
	(3.242)	(-0.359)	(3.389)
(Election years - Non-election years)	75.355***	10.314*	65.278***
	(5.788)	(1.841)	(6.107)
Observations	5,098	5,098	5,098
Municipalities	308	308	308
Adjusted R-squared	0.47	0.27	0.52

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is the difference between the revenue forecast for year t and the average revenues of the previous four years, in real euros per capita. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table E.8: Interactions with Political Variables and Education (using Year Dummies)

VARIABLES	(1) Effective Revenues	(2) Current Revenues	(3) Capital Revenues
Election years - Non-election years	75.655***	10.298*	65.587***
	(5.808)	(1.828)	(6.154)
Election years - Non-election years	101.649***	11.325	90.875***
	(4.580)	(1.396)	(4.638)
Win margin (previous election)	1.000	0.404*	0.592
	(1.334)	(1.844)	(0.864)
Election year * Win margin (previous election)	-1.316*	-0.052	-1.280*
	(-1.760)	(-0.211)	(-1.829)
Election years - Non-election years	80.231***	17.831**	63.299***
	(3.171)	(2.281)	(2.704)
Incumbent running for reelection	-11.164	0.806	-11.222
	(-0.728)	(0.126)	(-0.834)
Election year * Incumbent running for reelection	-5.787	-9.529	2.892
	(-0.210)	(-0.958)	(0.116)
Election years - Non-election years	-1.199	-2.116	3.753
	(-0.029)	(-0.200)	(0.102)
% Population with no education	30.161***	0.435	28.059***
level completed	(5.107)	(0.201)	(4.707)
Election year * % Population with no education level	5.897**	1.004	4.698*
completed	(1.995)	(1.540)	(1.739)
Observations	5,098	5,098	5,098
Municipalities	308	308	308

Notes: Fixed effects regressions with standard errors clustered by municipality and robust to heteroskedasticity. The dependent variable is defined as indicated in the first row (measured in real euros per capita). All regressions include the full set of control variables used in Tables 2, 3, and 4. Time effects are controlled for with year dummies. T-statistics are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *"Election years - Non-election years"* stands for the difference between the averages of the coefficients of year dummies for election years (2001, 2005, 2009, 2013, and 2017) and for non-election years.

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