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POLITICAL OPPORTUNISM AND COUNTERCYCLICAL FISCAL POLICY IN ELECTION-YEAR RECESSIONS

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Political budget cycles (PBCs) have been well documented in the literature, albeit not for all circumstances. Similarly, there is clear evidence on the positive effect of economic growth on electoral success. However, no work has been done on the impact of economic growth on the magnitude of PBCs. The theoretical model argues that a government has an incentive to increase fiscal manipulations when a recession is expected to hit and curtail reelection chances; this amounts to countercyclical policy for opportunistic rather than Keynesian motives. Very robust evidence for this behavior is found in Portuguese municipalities; in election years, budget deficits go up even more and significantly so, when a recession is expected. (*JEL* D72, E62, H62)

I. INTRODUCTION

It has been accepted as a stylized fact that political budget cycles (PBCs) are context-conditional,[1] that is, do not happen under all circumstances.[2] They do, however, occur in countries with fiscal or government intransparencies or lack of media freedom (Alt and Lassen 2006a, 2006b; Akhmedov and Zhuravskaya 2004; Veiga, Veiga, and Morozumi 2017), in developing countries (Block 2002; Schuknecht 1996, 2000; Shi and Svensson 2006 Vergne 2009), or in new democracies (Brender and Drazen 2005). They are also affected by the political system (Chang 2008; Streb, Lema, and Torrens 2009) and/or the electoral system (Aidt and Mooney 2014).

What has not been studied is the question of how opportunistic governments respond to the regular business cycle, in particular to expected changes in economic growth. Intuitively, we could think, for instance, of a different budget deficit response in election years versus off-election years. In off-election years the

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1. The term was coined by Franzese Jr. (2002). A survey of a growing literature is provided by de Haan and Klomp (2013). Meta-analyses obtain conflicting results: Mandon and Cazals (2018) question the existence of political budget cycles altogether; Philips (2016) finds support for context-conditionality.

2. Pelzman (1992) even argues that voters may actually be fiscally conservative and punish governments for overspending, instead of exonerating or even welcoming additional expenditure or transfers. There is also some evidence pointing in that direction, at least for Israel (Brender 2003) and for Germany (Hayo and Neumeier 2017).

ABBREVIATIONS

AR: Autoregressive
ARIMA: Autoregressive Integrated Moving Average
ARIMAX: Autoregressive Integrated Moving Average with additional explanatory variables
DGAL: Portuguese Directorate General of Local Authorities
FOC: First-Order Condition
GDP: Gross Domestic Product
IMF: International Monetary Fund
MA: Moving Average
MAE: Mean Absolute Error
ME: Mean Error
OECD: Organisation for Economic Co-operation and Development
OLS: Ordinary Least Squares
PBC: Political Budget Cycle
RMSE: Root Mean Squared Error
WEO: World Economic Outlook

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government might consider a fully blown Keynesian expansion on the one hand, or precautionary spending cuts or tax increases on the other hand (which would lead to a deficit reduction, if the negative growth expectations did not materialize). In election years, the incumbent is always worried about reelection chances. Brender and Drazen (2008) find that low growth affects reelection prospects at least in less-developed countries and new democracies. Lewis-Beck and Stegmaier (2000) find similar effects in some Organisation for Economic Co-operation and Development (OECD) democracies. One would think, therefore, that an expected recession in an election year would prompt the government to counteract or, at least, to limit the expected reduced reelection probability by increasing its fiscal manipulation.

This paper captures this idea in a career concerns model which makes use of earlier analytical models, but with significant modifications. It uses the insight of Rogoff (1990) and Rogoff and Sibert (1988) that voters want to vote for the politician with the higher expected competence in the future (which amounts to prospective voting when the government is opportunistic). As suggested by Lohmann (1998) voters are uninformed about the incumbent's competence which incumbents, too, can only judge once a new task has been tackled more or less successfully. Shi and Svensson (2006) use the same setting, but apply it to fiscal policy, in particular to the government's choice of the deficit level. The model in this paper extends their framework to allow for economic growth and inertia in voter perceptions of economic growth. It can be shown that the government's realistic forecast for a recession[3] prompts the government to expand its manipulation in election years, that is, to produce countercyclical policy. Since we can show it in a careers concern model which does not attribute any economic benefit to countercyclicality, the expansion cannot be the result of Keynesian policies, but must be caused by political opportunism.

The main finding of the theoretical model is supported by evidence from Portuguese municipalities. The empirical section shows that there is indeed a countercyclical policy effect when realistic forecasts predict negative growth or unusually low growth (below certain percentiles) in election years. The result is robust to using the primary deficit or the fiscal deficit as the dependent variable, to taking national government or International Monetary Fund (IMF) growth forecasts, to including or not a series of control variables, to controlling for time-specific effects in several alternative ways, to restricting the sample in different ways, and to clustering standard errors in alternative ways. Similar results are also obtained when forecasts of unemployment rates are used instead of growth forecasts.

The theoretical analysis incorporates the idea that voters do not have fully rational expectations. A reduction in growth is perceived, but underestimated. Voters will attribute cuts in expenditures, at least partially, to government incompetence rather than the dire economic conditions. Therefore, the government cannot cut expenditures one-for-one, if it does not want to damage its reelection chances too much. Hence the government countercyclically expands spending in recessionary election years for opportunistic reasons. The main countercyclicality result would only vanish under a very unlikely scenario; voters would have to show minimal growth perception and maximal deficit adjustment inertia, that is, they would have to be able to foresee the recession 100%, but would believe that this has absolutely no effect on the deficit. If either condition is violated, the countercyclicality result holds.

Our results are thus based on moving away from full rationality (in the sense of rational expectations). Instead, we postulate that voters' perception of economic developments lag behind.[4] Our claim is that voter beliefs are not fully responsive to economic forecasts, whereas the government is better able to make use of these forecasts. Although voters may be aware of the latest gross domestic product (GMP) growth forecasts released by the national government and/or by international agencies such as the

3. Henceforth, we use the word recession in a loose, nontechnical sense. In the theoretical model, it means negative growth (relative to trend output). In the empirical part, we use several specifications for the "recession" variable including negative growth (relative to the previous year).

4. There may be other behavioural assumptions that could potentially produce the countercyclicality result shown by the data. However, finding the most suited alternative behavioral assumption is beyond the scope of this paper. We do, however, note that our assumption has clear advantages over fully rational expectations. First, it does allow us to obtain our main result (Proposition 1), whereas rational expectations would not. Second, it is consistent with the well-established stylized fact that opportunistic behaviour increases the incumbent's reelection chances (see discussion thereof after equation 12); in Lohmann (1998) and Shi and Svensson (2006) type rational expectations models this is not so; in Rogoff (1990) and Rogoff and Sibert (1988), it is only competent politicians who can signal their competence and thereby increase their reelection chances. Third, it better captures inertia in voters' perception found in Portugal—as argued below.

TABLE 1
Descriptive Statistics on Expectation Inertia

Variables	Mean	Standard Deviation	Minimum	Maximum	Coefficient of Variation (Standard Deviation/Mean)
Real GDP growth (actual)	0.85	2.28	−4.03	4.79	2.67
Government's GDP growth forecast	1.36	1.48	−2.80	3.75	1.09
IMF's GDP growth forecast	1.29	1.37	−1.84	3.74	1.06
Consumer expectations regarding the economic situation of the country in the next 12 months	−21.78	16.98	−56.50	3.63	−0.78
Consumer Confidence Index	−23.73	12.26	−48.84	−3.45	−0.52

Source: INE (Statistics Portugal), Ministry of Finance, and IMF.

IMF, OECD, or European Commission, they are uncertain as to how those forecasts will affect their lives and public finances. In fact, they may have a greater tendency to expect things to remain as they are.

This is particularly relevant when thinking in terms of Portuguese municipalities. Since there are no regional or municipal growth forecasts, voters will find it hard to figure out how their local economy will perform and how municipal budget deficits will be affected. Given this uncertainty, we assume some inertia in voters' expectations. This assumption is also supported by Table 1, which reports descriptive statistics for actual GDP growth, government's growth forecasts for the following year (taken from the national budgets), IMF's growth forecasts, consumer expectations regarding the economic situation of the country in the next 12 months, and the Consumer Confidence Index,[5] from 1998 to 2015.

Table 1 clearly indicates that actual real GDP growth rates are considerably more volatile than government and IMF forecasts, and that these are, in turn, more volatile than consumer expectations. That is, Portuguese consumers/voters exhibit greater inertia in their expectations than the national government or the IMF, whose growth forecasts are already much smoother than actual real GDP growth rates.

The paper is structured as follows. Sections II and III lay out the analytical model. Section IV presents the propositions and discusses the results. Section V describes the data and the empirical model, while Section VI presents and discusses the empirical findings. Section VII concludes.

5. The Consumer Confidence Index is a composite measure based on the answers to five questions from the Portuguese Consumer Survey, implemented by Portugal's National Statistics Institute (INE). The consumer expectations for the next 12 months are also an index measure. Given the crises the Portuguese economy went through in the twenty-first century both variables register negative values during most of our sample period.

II. MODEL

The economy consists of n consumer-voters and two consumer-politicians who could be the running mayor and her challenger in Portuguese municipalities. Voters' expected utility depends on discounted period utility which, in turn, consists of additively separable economic utility from a function in private goods consumption c (with the standard concavity properties) and local public goods L as well as a political utility component (with weight α). θ could be interpreted as the voter's personal sympathy or ideological preference and is uniformly distributed over the interval $[-1,1]$; z takes the values $-\frac{1}{2}$, if government a (say left wing) is in power, or $\frac{1}{2}$, if government b (say right wing) is in power. A voter experiences a positive political utility, if her favourite party is in power; political utility is smaller for more centrist voters. As we can see later on, voters base their voting decision on prospective utility; more centrist voters may, therefore, be swayed to vote for the other party, if they expect a higher economic utility from it. β^i is voter i's discount factor. E is the expectations operator. Here is the voters' utility function:

$$(1)\quad U_t^i = \sum_{s=t}^{\infty} \left(\beta^i\right)^{s-t} E_t \left[u\left(c_s\right) + L_s + \alpha\theta^i z_s\right], \quad i = 1, \ldots, n.$$

There are only two parties (or possible coalitions) which are represented by an incumbent (say, from party a, without limiting the generality of the analysis) and a challenger b who run

for office every alternate period. Their utility consists of economic utility (analogous to the voter's utility) and an ego rent, if they are in office. β^j is party j's discount factor. Hence politicians are purely opportunistic:

$$V_t^j = \sum_{s=t}^{\infty} W_s^j = \sum_{s=t}^{\infty} \left(\beta^j\right)^{s-t} E_t\left[u\left(c_s\right) + L_s + \mathbf{I}_s X_s\right], \quad j = a, b;$$

$$\mathbf{I}_r = \begin{cases} 1 & \text{if in power in period } r; \\ 0 & \text{otherwise.} \end{cases} \tag{2}$$

Everybody's expected consumption depends on expected after-tax income:

$$E_t^k\left[c_t\right] = E_t^k\left[(1-\tau)\,\varepsilon_t \bar{y}\right] = (\mathbf{1}-\boldsymbol{\tau})\,\boldsymbol{\varepsilon}_\mathbf{t}, \quad k = j, i. \tag{3}$$

Income deviates from trend output $\bar{y}$ (which could also be interpreted as previous period output or potential output) by a period-specific expected growth shock ε_t. With $\bar{y}$ normalized to 1, trend output is given by $\varepsilon_t = \bar{\varepsilon} = 1$; values of $\bar{\varepsilon}$ below 1 capture a recession, those above 1 a boom. The tax rate is assumed to remain unchanged in an election period.[6]

The provision of local public goods is obtained from the government budget constraint which depends on expected growth. The government expects to receive revenues on the basis of growth shock ε_t and decides on a definite choice of deficit level D_t which is the only government instrument in the model. The government has to repay previous period deficit D_{t-1} at interest rate r_{t-1} which is exogenous though not necessarily constant; it is known by everybody and does not change with the volume of the deficit (reflecting the situation of Portuguese municipalities that are not allowed to incur large debts). In addition, the magnitude of L is affected by government competence η_t^j.

$$L_t = \tau\varepsilon_t + D_t - \left(1 + r_{t-1}\right) D_{t-1} + \eta_t^j. \tag{4}$$

Today's competence η_t is made up of i.i.d. shocks for this period as well as last period. It captures the government's efficiency which is not known by the government prior to the local public goods provision. Shocks μ_t^j are modeled as random variables with mean 0, distribution function $F\left(\mu_t^j\right) = F(\bullet)$, and density function $f\left(\mu_t^j\right) = f(\bullet) = F'(\bullet)$ which is (weakly) monotonously increasing up to the mean.[7] Here is the MA(1) process for government competence:

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

The timing of events is shown in Table 2. At the beginning of election period t, voters and incumbent a observe the realizations of last period's skills shock μ_{t-1}^a and deficit D_{t-1}. In period t, the incumbent also observes the (estimate for the) growth shock ε_t which allows her to choose her optimal level for the deficit D_t, thereby providing quantity L_t of local public goods. Voters observe L_t, but have to form (distorted) expectations about the growth shock, $\widehat{\varepsilon_t}$, and the incumbent's optimal level for the deficit, $\widehat{D_t}$, because they exhibit belief inertia (which is discussed further down; see Equations (13) and (14)). On this basis, they determine their expectations of skills shock, $\widehat{\mu_t^a}$, which would influence the provision of local public goods in $(t+1)$, if the incumbent were reelected. Voters are prospective in that they base their voting decision in period t on a comparison of utilities to be expected from the incumbent and challenger in period $(t+1)$. Note that voters can make a mistake in their expectation of the incumbent's competence in $(t+1)$ because of two forms of inertia: (1) they do not fully anticipate the deficit policy by the incumbent and (2) they do not fully anticipate an economic slump or boom.

In period $(t+1)$, the winner of the election receives ego rent X. Policy in $(t+1)$ is no longer dependent on voting though; hence either policymaker will repay the costly deficit and cut the provision of local public goods. Voters anticipate this, but cannot prevent it. Also note that the voting decision in election period t does not encompass concerns for expected utility in $t+2$ because the MA(1) nature of the competence process makes incumbent and challenger indistinguishable then. Policymakers also do not include $t+2$ in their decision problem for choosing the optimal level of D_t because they cannot affect their

6. Increasing taxes in an election period is extremely unpopular. Increasing the provision of local public goods is more effective than decreasing taxes. In addition, territorial subdivisions like Portuguese municipalities often have limited influence on their total tax revenue. Ignoring tax rate increases could also be justified by making a formal argument as in Shi and Svensson (2006). They obtain the optimal tax rate for the "equilibrium without elections" and then use backward induction in the two-period election cycle to argue that the very same tax rate remains optimal.

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

TABLE 2
The Timing of Events

Voters and incumbent *a* observe:	**Voters:**	The winner of the period t elections takes office and receives an ego rent.
- last period's deficit D_{t-i} - the incumbent's last period skills μ^a_{t-1}	- observe local public goods L_t - form expectations of the incumbent's current period skills $\widehat{\mu}^a_t$	
	(because they are inert-rational and have beliefs on expected growth $\widehat{\varepsilon}_t$ and expected deficit $\widehat{D_t}$)	The winner repays the deficit of the previous period.
Incumbent *a*: - observes growth (estimate) ε_t - chooses deficit D_t - and provides local public goods L_t.	- and vote.	
	Period *t*	**Period *t* + *1***

incumbent	voters	winner
decides	vote	decides

own utility or reelection chances in $t+2$. Hence the model can be split into two-period cycles, each consisting of an election period (period t) and an off-election period (period $t+1$).

III. MODEL SOLUTION

The model is solved by maximizing the incumbent a's expected utility in t and $(t+1)$ which depends, for $(t+1)$, on the incumbent's chance of winning the election which, in turn, depends on all individuals' probability of voting for incumbent a. The logic of the solution is explained here and details are provided in the Appendix. Voters are prospective in that they vote for the politician who they expect to deliver a higher utility for them after the elections.[8] Any voter i expects average skills from the challenger ($\eta^b_{t+1}=0$), but has some idea of the incumbent's skills ($\eta^a_{t+1}=\mu^a_t+\mu^a_{t+1}$) because the incumbent's fiscal policy choice in period t influences voter i's expectations of the incumbent's current period skills shock $E^i_t\left[\mu^a_t\right]$. In Appendix A it is derived (and, i.e., in our view, close to reality) that a voter will vote for the incumbent, *either* if ideologies coincide and the challenger is not likely to do a better job ($E^i_t\left[\mu^a_t\right]\geq E^i_t\left[\mu^b_t\right]=0$) *or* if the voter's (positive) perception of government competence makes up for the "wrong" ideological orientation of the incumbent:

$$E^i_t\left[\mu^a_t\right]>\alpha\theta^i. \tag{6}$$

The incumbent's probability of winning can then be obtained as:

$$\text{Prob}\left\{\left[\frac{E^i_t\left[\mu^a_t\right]}{2\alpha}+\frac{1}{2}\right]\geq\frac{1}{2}\right\}. \tag{7}$$

The competence extraction mechanism, that is, how a voter obtains $E^i_t\left[\mu^a_t\right]$, is shown in Appendix B. The basis is the government's budget constraint (4), here solved for μ^a_t:

$$\mu^a_t=L_t-\tau\varepsilon_t-D_t+\left(1+r_{t-1}\right)D_{t-1}-\mu^a_{t-1}. \tag{8}$$

If voters knew everything, the provision of local public goods, output growth, and the government's deficit decision (plus the tax rate, debt repayment, and previous period skills), they could infer true competence. Voters can observe the provision of public goods, but do not know output growth and the government's deficit choice. Their perception of government competence $\widehat{\mu}^a_t$ is, therefore:

$$E_t\left[\mu^a_t\right]=\widehat{\mu}^a_t=L_t-\tau\widehat{\varepsilon}_t-\widehat{D}_t+\left(1+r_{t-1}\right)D_{t-1}-\mu^a_{t-1}$$

8. Prospective voting should not be confused with rational expectations (which typically incorporates specific behavior by politicians, for instance their partisanship in voting models). In this paper, voting is determined by expected competence which is affected by voters' subjective beliefs. Prospective voters only use their expectations of competence for evaluating the future consequence of their votes; there is no additional information about candidates because they are purely opportunistic.

$$= \underbrace{L_t - \tau\varepsilon_t - D_t + \left(1 + r_{t-1}\right) D_{t-1} - \mu^a_{t-1}}_{\mu^a_t \text{ from Equation (8)}} + \left[\tau\left(\varepsilon_t - \widehat{\varepsilon}_t\right)\right] + \left[D_t - \widehat{D}_t\right];$$

(9)

$$E_t\left[\mu^a_t\right] = \widehat{\mu^a_t} = \mu^a_t + \left[\tau\left(\varepsilon_t - \widehat{\varepsilon}_t\right)\right] + \left[D_t - \widehat{D}_t\right].$$

Note that voters credit the government with above average competence ($\widehat{\mu^a_t} > 0$), if the government can increase the deficit by more than what is expected by voters ($D_t - \widehat{D}_t > 0$). This is the standard manipulation argument. However, if they underestimate a recession ($\varepsilon_t < \widehat{\varepsilon}_t < 0$), they believe in lower competence. We can now rewrite the incumbent's probability of winning:

(10) $$\text{Prob}^{\text{win}} = \text{Prob}\left\{\left[\frac{\mu^a_t + \left[\tau\left(\varepsilon_t - \widehat{\varepsilon}_t\right)\right] + \left[D_t - \widehat{D}_t\right]}{2\alpha} + \frac{1}{2}\right] \geq \frac{1}{2}\right\}$$

(11) $$= \text{Prob}\left\{\mu^a_t \geq \left[\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right)\right] + \left[\widehat{D_t} - D_t\right]\right\}$$

(12) $$= 1 - F\left[\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right) + \widehat{D_t} - D_t\right].$$

If voters were modeled to have rational expectations (without belief inertia), the probability of winning could not be affected by government manipulations in equilibrium. That is, however, contradicted by evidence presented by, for instance, Aidt, Veiga, and Veiga (2011), Akhmedov and Zhuravskaya (2004), and Klomp and de Haan (2013) who argue that government manipulations do indeed positively affect reelection chances. In addition, Boylan (2008) and Aidt, Veiga, and Veiga (2011) find evidence that government manipulations increase, if the election is closely contested, what Boylan calls a "close election bias."

The incumbent's vote share is actually increased if the right-hand side in the brace of Equation (11) (i.e., the argument of the F function in Equation (12)) becomes smaller than zero. This happens if we incorporate in the model an important behavioral trait that we find in the real world; voters exhibit belief inertia, but are otherwise quite sensible. Such inert-rational voters could be described as follows[9]:

(13) $$E^i_t\left[\varepsilon_t\right] = \widehat{\varepsilon}_t = \varphi\overline{\varepsilon} + (1 - \varphi)\,\varepsilon_t, \quad 0 \leq \varphi \leq 1, \quad \text{for all } i.$$

(14) $$E^i_t\left[D_t\right] = \widehat{D_t} = \overline{D} + \gamma\tau\left(\overline{\varepsilon} - \widehat{\varepsilon}_t\right), \quad 0 \leq \gamma \leq 1, \text{ for all } i.$$

Parameter φ captures voter *growth perception inertia*, that is, to what degree voters foresee actual growth relative to growth of the previous period. $\overline{D}$ captures the historical deficit experience and is part of the deficit inertia. $\overline{D}$ can be interpreted as some kind of average of deficits of previous periods or, more specifically, the last period, that is, D_{t-1}. The overall expected government deficit is then adjusted by the expected revenue shortfall. Parameter $\gamma < 1$ depicts the *deficit adjustment inertia*. For $\gamma < 1$, this adjustment is incomplete, that is, there is additional belief inertia in the voter's expected deficit. Note that, in contrast, the government chooses the deficit and does not suffer from belief inertia about growth.[10]

Inserting Equations (13) and (14) into Equation (12) (see Appendix B) delivers

(15) $$\text{Prob}^{\text{win}} = 1 - F\left[\tau\left((1 - \gamma)\varphi + \gamma\right)\left(\overline{\varepsilon} - \varepsilon_t\right) + \overline{D} - D_t\right].$$

Here, we can see why the manipulation can increase the winning probability. If growth remains unchanged ($\overline{\varepsilon} = \varepsilon_t$), it suffices for the government to choose $D_t > \overline{D}$ in order to

9. The specification captures the effect of growth expectations on deficit expectations. One could argue that the interaction goes in both directions, that is, also from expected deficit to expected growth. If voters believed in more deficit spending, should they not also expect that there is an expansionary effect, that is, their growth expectations should go up? If a (linear) effect of deficit expectations on growth expectations (13) is also incorporated, the qualitative results do not change at all. Results can be obtained from the authors upon request.

10. Obviously, this is a simplification. The idea is that governments have access to growth forecasts which are used because they give them an unbiased prediction of actual growth (whereas voters are not fully aware of such forecasts or do not fully incorporate them in their planning). In the empirical model, we assume that the local government uses estimated regional growth forecasts (based on national forecasts obtained from their own government and/or externally from the IMF). We can even show that deviations of forecasted and actual ex post growth rates do not significantly affect the government's choice of deficit (see the first set of results of Table E4 in Appendix E).

raise reelection chances. In case of a boom, this becomes easier; in case of a recession, more difficult.

Hence, the incumbent a's decision problem can be simplified as follows (see Appendix C for details; discount factor β can be ignored because it does not affect the qualitative properties of the model):

$$\begin{aligned}(16)\quad \max_{D_t} V_t^a &= \max_{D_t} V = \max_{D_t} W_t^a + W_{t+1}^a \\ &= \max_{D_t} u\left((1-\tau)\varepsilon_t\right) + L_t + X \\ &\quad + u\left((1-\tau)\varepsilon_{t+1}\right) + L_{t+1} \\ &\quad + \text{Prob}^{\text{win}} \quad X,\end{aligned}$$

where

$$L_t = \tau\varepsilon_t + D_t - \left(1+r_{t-1}\right)D_{t-1} + \eta_t^j;$$

$$L_{t+1} = \tau\varepsilon_{t+1} - \left(1+r_t\right)D_t + \eta_{t+1}^j.$$

The first-order condition (FOC) is:

$$\begin{aligned}(17)\quad & 1 - \left(1+r_t\right) + F'[\tau\left((1-\gamma)\varphi+\gamma\right) \\ & \left(\bar{\varepsilon} - \varepsilon_t\right) + \overline{D} - D_t^*]\, X = 0 \\ & \Longleftrightarrow r_t = F'[\bullet]\, X,\end{aligned}$$

Since the second-order condition for a maximum holds, the FOC fully characterizes the optimal deficit choice D_t^* by the government. The FOC is straightforward: the marginal loss from a deficit, that is, the interest rate, must equal the marginal gain, that is, the marginal increase in the (winning) chance for obtaining the ego rent. In other words, the government benefits from raising the deficit because it can impress upon voters that it is more competent and, thereby, raise its reelection chances so that it is more likely to enjoy the perks from staying in office.

Having confirmed the existence of a budget cycle, our main interest turns to studying the effect of a perturbation of ε_t on D_t^*, that is, the change in government manipulation, if a recession is looming in an election year. Note that ε_t is the actual recession which is, however, expected by the government. Furthermore, we are interested in how the government's optimal deficit response to a recession is influenced by the voters' growth perception inertia φ and deficit adjustment inertia γ. Some additional straightforward results are reported in Appendix D.

IV. PROPOSITION AND DISCUSSION

The following proposition suggests a reason for the incumbent to increase the magnitude of her manipulations:

PROPOSITION 1. **Recession (or Boom) Expectations.** *Imminent recession expectations (lower ε_t in Equation (16)) increase the government's optimal deficit at the equilibrium, albeit underproportionally. (Analogously, boom expectations decrease optimal deficits, albeit, again, underproportionally.) Hence, there is a countercyclical policy effect.*

$$0 \geq \frac{dD_t^*}{d\varepsilon_t} = -\tau\left((1-\gamma)\varphi+\gamma\right) > -1.$$

Proof. Appendix D. ■

Proposition 1 states the core result of the paper. Deficits are already higher in election years (normal PBC), but according to the proposition even higher when a recession is expected for an election year. If the incumbent government perceives an economic downturn, it expects lower revenues and will adjust its expenditures in order to limit its expected (costly) additional deficit. So, the deficit will not go up one-for-one with the expected revenue shortfall caused by the expected recession. Hence the "> -1" in the proposition. However, the government will not cut expenditures (for local public goods) one-for-one either, unless voters equally adjust their expectations. Hence the "$0 \geq$" in the proposition.[11] Here is the reason. With voter growth perception inertia ($\varphi > 0$), a reduction in growth is perceived, but underestimated. Therefore, voters will attribute cuts in expenditures, at least partially, to government incompetence rather than the dire economic conditions. As a consequence, the government cannot cut expenditures one-for-one, if it does not want to damage its reelection chances too

11. A more complicated model could capture the effect of the government's deficit policy on growth. If deficit had an expansionary effect, government revenues would go up and more public goods could be provided. Hence deficit would be more effective in convincing voters of government competence. Nonetheless, the government would still resort to deficit policies, especially in a recession when revenues are reduced. Inert-rational voters would still attribute cuts in public goods expenditures to incompetence, thus requiring the government to compensate by increasing the deficit. It would not have to be increased so much, but the mechanism would be the same.

much.[12] Higher growth perception inertia (higher φ) implies more government manipulation.

Voters' deficit adjustment inertia ($\gamma < 1$) works in the opposite direction and partially offsets the growth perception inertia effect. If voters think that the recession only has a limited effect on the deficit (high deficit inertia, i.e., low γ), they underestimate the deficit. Hence they attribute a better provision of local public goods to competence (rather than an increase in the deficit), which raises the incumbent's reelection chances. As a consequence, the government tends to limit its deficit in order to contain repayment costs. Higher deficit adjustment inertia (lower γ) implies less government manipulation. This intuition is formalized in Corollary 1.

COROLLARY 1. **Voter Inertia.** *The countercyclical policy effect in Proposition 1 is increased when the voter growth perception inertia goes up (φ up), but decreased when the voter deficit adjustment inertia goes up (γ down).*

$$(i)\quad \frac{d\frac{dD_t^*}{d\varepsilon_t}}{d'} = -\tau(1-\gamma) < 0, \qquad for\ \gamma < 1.$$

$$(ii)\quad \frac{d\frac{dD_t^*}{d\varepsilon_t}}{d\gamma} = -\tau(1-\varphi) < 0, \qquad for\ \varphi < 1.$$

Proof. This follows directly from Proposition 1. ■

The main countercyclicality[13] result would only vanish under a very unlikely scenario; voters would have to show minimal growth perception inertia ($\varphi = 0$) and maximal deficit adjustment inertia ($\gamma = 0$), that is, they would have to be able to foresee the recession 100%, but would believe that this has absolutely no effect on the deficit. If either condition is violated, the countercyclicality result holds.

V. DATA, INSTITUTIONAL SETTING, AND EMPIRICAL MODEL

The implications of the theoretical model are tested using financial, economic, and political data for all 308 Portuguese municipalities. Local finance data were obtained from the Portuguese Directorate General of Local Authorities (DGAL), information regarding local elections and mayors from the Ministry of Internal Affairs, and demographic and economic data from the National Statistics Institute (INE). Actual GDP data and GDP forecasts are not available at the municipal level (NUTS IV level); so we go to the second lowest level of disaggregation, the NUTS III level, whenever possible.[14]

Actual GDP data are available at the NUTS III level from 1991 to 2014. Given that there are no GDP growth rate forecasts at neither the municipal nor the regional levels, we use the 1-year-ahead forecasts from the national government's budget, which is approved by the Portuguese parliament in October, shortly before the municipalities must also approve their budgets for the following year. Since the formula-determined transfers that municipalities receive from the central government are indicated in the national budget, the latter must be taken into account when elaborating the municipal budgets. Then, the government's forecast of national real GDP growth, and information on their regions' current and past growth rates, can be used by mayors to form their expectations of next year's GDP growth rates in their regions.[15]

A. Regional GDP Growth Forecasts

Short-run forecasts are commonly generated using ARIMA and ARIMAX models (see Enders 2004). The former is a univariate time series model which uses autoregressive (AR) and moving average (MA) components of the dependent variable to explain or forecast its behavior. The latter uses those AR and MA

12. It is not straightforward how to incorporate fiscally conservative voters in a political budget cycle model. One possibility might be to include a punishment term for deficit in voters' utility function (1). However, that would have to be based on the voters' perception of the deficit. Would voters then make allowances for bad economic conditions? If not, any recession would make it harder for the government to be reelected (because a higher [expected] deficit would additionally be punished by fiscally conservative voters). That should actually induce the government to manipulate even more. In other words, modeling fiscal conservatism like that would strengthen our model results.

13. Note that countercyclicality refers to higher spending (for instance, on local public goods) during recessionary periods. It does not capture the Keynesian idea of stimulating the economy. If this were included in the model, the government's manipulation incentive would actually be augmented and the countercyclicality result would be even stronger.

14. 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.

15. In robustness tests, we also use 1-year-ahead GDP growth forecasts from the IMF's WEO, and unemployment rate forecasts from both the national budget and the WEO.

components jointly with a vector X of other explanatory variables. When the dependent variable is not stationary (i.e., it is integrated), it is necessary to take differences of it in the order of integration. The most appropriate model for the data at hand can then be selected using the strategy suggested by Box and Jenkins (1976).

In order to obtain 1-year-ahead regional forecasts, we estimate ARIMAX(2,0,1), that is, ARMAX(2,1),[16] models for the NUTS III GDP growth rates, employing the government's national GDP growth forecast as an explanatory variable. These estimated regional GDP growth forecasts can be used as a proxy for the mayors' growth expectations in their regions, as they incorporate national GDP forecasts, while accounting for regional economic conditions. The ARMAX(2,1) model for each region can be summarized as follows:

$$\begin{aligned}(18)\ \mathrm{RegGDP}_t &= \alpha_0 + \alpha_1 \mathrm{RegGDP}_{t-1} + \alpha_2 \mathrm{RegGDP}_{t-2} \\ &\quad + \alpha_3 \mathrm{ForecNatGDP}_t + \zeta_t + \alpha_4 \zeta_{t-1},\end{aligned}$$

where RegGDP_t is the real GDP growth rate for the region under scrutiny in year t, $\mathrm{ForecNatGDP}_t$ is the national real GDP growth forecast for year t (obtained from the national budget for year t), and ζ_t is a white noise error term. The predicted values from the estimation of Equation (20) for each of the 25 NUTS III regions are used in our empirical analysis as the regional growth forecasts.[17]

B. Institutional Setting

Local election dates are fixed exogenously from the perspective of the municipalities and they take place in all of them at the same time. The first municipal elections following the bloodless military coup of April 25, 1974 were held in December 1976. Since then, there were elections every 3 years until 1985, and every 4 years thereafter (in December until 2001, and in October since then). Other elections were never held at the same time; although local elections sometimes occurred in the same year as national elections, they were always at least three months apart.

Municipalities are governed by the Town Council (Câmara Municipal), which holds the executive power, and by the Municipal Assembly, which holds the deliberative power and approves the municipal budgets and plans of activities. The members of both chambers are elected directly by citizens, who vote on closed party or independent lists of candidates. The top candidate of the list receiving most votes for the Town Council becomes the mayor, presides over that chamber, and plays a leading role in the executive, having substantial power and autonomy.

The municipal budget is drafted by the mayor's team, analyzed by the Town Council, and finally approved by the Municipal Assembly, in the last quarter of the year prior to the relevant fiscal year (which corresponds to the calendar year). A mayor will have more room of maneuver regarding the budget when her party holds a majority of deputies in both the Town Council and the Municipal Assembly. As shown in the descriptive statistics (Table E1 in Appendix E), this happens in 75% of the cases, implying that the approval of the municipal budget is generally easy. Thus, in practice, the mayor plays a decisive role in local fiscal policy.

All Portuguese municipalities are subject to the same laws and regulations, and have the same responsibilities. Regarding public service provision, they are responsible for sewage, the distribution of water, local transportation and communication, basic schooling, property maintenance, promotion of culture and science, recreation and sports facilities, local health care, social housing, environmental protection, and municipal policing. Municipalities are financially autonomous in the sense of being able to elaborate and approve their own budgets without needing approval from a higher-ranked authority. But, for the large majority of municipalities, most revenues come from grants from the central government or from the European Union. In fact, own revenues account, on average, for just one third of total effective revenues (excluding

16. Since regional growth rates were found to be stationary, there is no need to take first-differences of the series. The ARMAX(2,1) specification was the one found to be most appropriate for the majority of NUTS III regions.

17. Regarding the accuracy of these forecasts, the mean error (ME) is −0.13, the mean absolute error (MAE) is 2.26, and the root mean squared error (RMSE) is 3.19. The figures for the national forecasts from the government's budget are: ME = 0.44; MAE = 1.06; RMSE = 1.38. The smaller ME for regional forecasts indicates that positive and negative errors tend to compensate each other, leading to a smaller average bias. But, since the errors are larger (in absolute value) for regional forecasts, these have higher MAE and RMSE. Larger errors in regional forecasts are expected, since regional growth rates exhibit larger volatility than national growth rates (the standard deviations are, respectively, 2.28 and 4.38). Regarding the correlation between actual and forecasted values, it is 0.69 for regions and 0.83 at the national level. Overall, although national forecasts tend to be more accurate, the accuracy of the regional forecasts generated by the ARMAX models appear quite reasonable.

loans), while formula-related (unconditional) grants from the central government account for roughly 40%, and other transfers from the central government or from the European Union account for the remaining 27%.

Municipalities are allowed to run budget deficits, but the law which regulates municipal finances imposes limits to deficits and to the stock of gross debt. A municipality whose debt is above the legal limit is obliged to reduce the excess debt by 10% each year. Excessive debt accumulation is typically not a problem for municipalities; currently only 20 out of the 308 have to submit to a formal debt reduction regime.

C. Empirical Model

According to our theoretical model presented above (Proposition 1), expected recessions in election years create incentives to generate higher budget deficits. That is, in an election year, mayors will be unwilling to counter the negative effects of a recession on the budget balance by sufficiently raising revenues (through higher local taxes and fees) or cutting expenditures (lowering the level of local public goods provision), which results in higher budget deficits. This does not necessarily happen in off-election years, when mayors can behave in a more responsible (less opportunistic) manner. These implications are tested with the following empirical model:

$$D_{i,t} = \beta_1 \text{ElY}_{i,t} + \beta_2 \text{Exp.Recess}_{i,t} + \beta_3 (\text{ElY} * \text{Exp.Recess})_{i,t} + \mathbf{X}'_{i,t}\omega + \nu_i + \sigma_t + \xi_{i,t}, \quad (19)$$

where $D_{i,t}$ is the primary budget deficit[18] of municipality i in year t in real euros (of 2015) per capita; $\text{ElY}_{i,t}$ is a dummy variable that equals one in municipal election years, and zero otherwise; $\text{Exp.Recess}_{i,t}$ is our expected recession variable, based on the forecast of GDP growth for year t in the region to which municipality i belongs; $\mathbf{X}_{i,t}$ is a vector of control variables which may affect budget balances; ν_i represents unobserved municipality-specific effects; σ_t represents time-specific effects; and $\xi_{i,t}$ is the error term.[19]

Our expected recession variable, $\text{Exp.Recess}_{i,t}$, based on the estimated forecasts of the regional real GDP growth rate obtained in the ARMAX models of Equation (20), is defined in four alternative ways: (1) the forecast itself, with negative values corresponding to expected recessions; (2) an expected recession dummy variable, which takes the value of one when a negative growth rate is forecasted, and equals zero otherwise; (3) two dummy variables for expected unusually low growth, which equal one when the forecasted rate of real GDP growth is below the 25th or 33rd percentiles, respectively, of the past values of regional real GDP growth. $\text{Exp.Recess}_{i,t}$ is interacted with $\text{ElY}_{i,t}$, so that we can check if the effects of expected recessions in election years are different from those in the other years of the electoral cycle.

Given the theoretical model and the evidence of PBCs in Portuguese municipalities shown in previous studies (e.g., Aidt, Veiga, and Veiga 2011; Veiga and Veiga 2007), we expect a positive β_1, consistent with higher budget deficits in election years. Furthermore—and this is the focus of our study—an expected recession for an election year leads to a higher deficit according to Proposition 1 of our theoretical model. Therefore, a negative β_3 is expected when our expected recession variable is the forecasted growth rate (expected lower growth rates lead to higher deficits), and a positive β_3 is expected when $\text{Exp.Recess}_{i,t}$ corresponds to the dummies for negative growth or for unusually low growth rates (expected recessions lead to higher deficits). The overall election-year effect on the budget balance is given by $(\beta_1 + \beta_3 * \text{Exp.Recess}_{i,t})$.

The vector $\mathbf{X}_{i,t}$ includes a set of control variables which may affect budget balances. These are related to demographics (dependency ratio and population density),[20] the ideological orientation and the experience (years in office) of the mayor, and whether or not the mayor's party holds a majority in both the Town Council and the Municipal Assembly. Descriptive statistics of the variables used in this paper are presented in Appendix E (Table E1).

18. We use the primary deficit (i.e., excluding interest payments) since it is the budget deficit that mayors can best influence in practice. Nevertheless, as shown in several robustness tests reported in Appendix E, we obtain very similar results when using the fiscal deficit, that is, including interest payments.

19. Since the election-year dummy would be collinear with yearly dummy variables, we control for time effects using 5-year period dummies. In robustness tests, we also use 4-year mandate dummies and a cubic time trend.

20. The dependency ratio is the percentage of the population below 15 or above 65 years old. Population and population growth were never statistically significant when included, and sometimes caused problems of collinearity.

TABLE 3
Countercyclicality in PBCs

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Variable Forecast	(2) Expected Recession Dummy	(3) Forecast <25th Percentile of GDP Growth	(4) Forecast <33rd Percentile of GDP Growth
Election year	48.312***	20.225***	23.432***	17.750***
	(10.134)	(3.864)	(4.845)	(3.537)
Expected recession	4.631***	−21.288***	−26.993***	−19.412***
	(5.258)	(−3.452)	(−3.695)	(−3.574)
Election year * expected recession	−8.519***	50.749***	56.571***	50.676***
	(−5.178)	(5.495)	(5.420)	(5.640)
Dependency ratio	−1.078	−0.997	−1.301	−1.109
	(−0.753)	(−0.700)	(−0.911)	(−0.756)
Population density	0.063***	0.061***	0.061***	0.061***
	(4.018)	(3.900)	(4.262)	(3.909)
Mayor left	−18.710***	−18.557***	−18.606***	−18.663***
	(−3.080)	(−3.066)	(−3.022)	(−3.081)
Mayor independent	24.605	23.787	24.589	25.093
	(0.986)	(0.950)	(0.982)	(1.002)
Years mayor	−0.131	−0.188	−0.116	−0.184
	(−0.351)	(−0.504)	(−0.306)	(−0.496)
Majority	1.989	2.299	2.399	2.275
	(0.380)	(0.437)	(0.458)	(0.434)
Observations	7,022	7,022	7,022	7,022
R^2	.087	.086	.086	.086
Number of municipalities	308	308	308	308
Marginal effects of expected recession				
At election year = 1	−3.888**	29.461***	29.578***	31.264***
	(−2.57)	(3.47)	(3.35)	(3.93)

Notes: Expected recession variable defined as indicated in the respective column title. Municipal effects controlled for with municipal dummies and time effects with 5-year dummies. *T*-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

VI. EMPIRICAL RESULTS

The baseline empirical model of Equation (21) is estimated for a panel of 308 Portuguese municipalities, with data from 1992 to 2014, controlling for municipal fixed effects, and using bootstrap-corrected standard errors based on 1,000 replications.[21] The results are reported in Table 3. In the title of each column, we indicate the definition of the $\text{Exp.Recess}_{i,t}$ variable used. The marginal effects of the expected recession variable in election years are reported at the foot of the table.[22]

The election year dummy variable is always statistically significant with a positive sign, indicating that there is a tendency for higher primary deficits in election years which can be specified in terms of real euros per capita (base year 2015). Concretely, the primary deficit increases by between 17.8 and 48.3 euros per capita in election years relative to off-election years. These results confirm those of Aidt, Veiga, and Veiga (2011) and Veiga and Veiga (2007) regarding the existence of PBCs in Portuguese municipalities.

The interaction of the forecast variable with the election year dummy is also always statistically significant. As expected, and in accordance

21. Bootstrapping is used to obtain corrected standard errors, as the use of regional growth forecasts generated from Equation (20) can lead to *Generated Regressors* problems, biasing the standard errors of ordinary least squares (OLS) estimations. As shown in the robustness results of Table E2, the results of OLS estimations with robust standard errors clustered by NUTS III region and year, or by municipality, are practically the same, as standard errors are quite similar to those obtained with the bootstrap procedure. The same applies to clustering by region and by 4-year mandate dummies (results not shown). Clustering by municipality and year is not appropriate because only one observation per cluster would be available.

22. The marginal effects in off-election years are given by the estimated coefficient of Exp.Recess. It is worth noting that the overall marginal effect of Exp.Recess (not shown) is always statistically significant.

with Proposition 1 of our theoretical model, an expected recession leads to an even higher primary deficit in an election year. Local governments will not want to bear the electoral costs of reducing the provision of local public goods in order to compensate for the lower tax revenues. The marginal effect for an election year reported at the foot of column 1 indicates that a 1 standard deviation (see Table E1) reduction in the forecasted growth rate increases the primary deficit by 10.8 (= − 2.78*[−3.888]) euros per capita,[23] and the results of column 2 indicate that the effect of an expected recession in an election year is 29.5 (=50.749−21.288) euros per capita, again a positive effect. This is the countercyclical policy effect predicted in Proposition 1.

Conversely, the effect of an expected recession in an off-election year is procyclical. The significant coefficients for expected recessions in columns 2–4 are negative, in column 1 positive, indicating that primary deficits are reduced in nonelection years when the economy is expected to slow down. This could be interpreted as precautionary fiscal policy. The flip side of this is that an *expected* expansion creates desires for needs and voraciousness. In column 1, a 1 standard deviation reduction in the forecasted growth rate decreases the primary deficit by 12.9 euros per capita (= − 2.78*4.631), and according to column 2, the primary deficit is reduced by 21.3 euros per capita when a recession is forecasted for an off-election year. These negative effects are opposite to the automatic countercyclical response one would expect of an *actual* recession.

Regarding the control variables, greater population density seems to lead to higher primary deficits, eventually due to costs of congestion. The results also indicate that left-wing mayors produce lower deficits than their right-wing counterparts.[24] The other control variables do not seem to significantly affect primary budget balances.[25]

A. *Robustness Checks*

Overall, the results of Table 3 provide evidence for the implications of our theoretical model, as the interaction of the election year dummy with the expected recession variable is always statistically significant with the expected sign. The robustness of these empirical results is first checked by implementing several specification changes: excluding the control variables of vector $\mathbf{X}_{i,t}$; controlling for time-specific effects in two alternative ways—with mandate dummies (one for each 4-year term), and with a cubic time trend; and by using robust standard errors clustered in two alternative ways—by NUTS III region and year, and by municipality—instead of bootstrapping. As shown in Appendix E (Table E2) the results regarding the election year dummy variable and its interaction with the expected recession variable remain qualitatively and robustly the same.[26]

A second set of robustness checks evaluates the sensitivity of the results to several sample restrictions: excluding the 30 municipalities of the islands of Azores and Madeira, in order to work with a more homogeneous data set of 278 mainland municipalities; excluding the 100 municipalities for which average formula-determined grants are above 50% of

23. Note that the expectation of a boom would cause a reduction in the primary deficit. For example, a 1 standard deviation increase in the forecasted growth rate in an election year would lead to a reduction of the primary deficit by 10.8 euros per capita.

24. Veiga and Veiga (2007) obtain a similar result. Although the purpose of the present paper is not to explain partisan differences in deficits, we checked whether smaller deficits by left-wing mayors could be caused by greater transfers from the central government (because there was a prevalence of left-wing national governments during the sample period). This does not seem to have happened, as average transfers for left- and right-wing municipalities were very similar, with a slightly higher amount given to the latter. This applies to both election and off-election years. Party similarity between the mayor and the prime minister does not seem to have mattered either. It is possible that the ideological distance between the mayor's party and the opposition affects fiscal policy outcomes, but we cannot check that possibility since there is no ideology index placing mayors or their parties on a left-right scale. But, given that most mayors (75%) are supported by a majority of deputies in both the Municipal Council and the Municipal Assembly, and do not need to negotiate with the opposition, ideological differences may not be very relevant in Portuguese municipalities anyway.

25. We also tested for the effects of majority and years in office on the degree of opportunistic deficit manipulation. That is, we checked if the effects are lower when the mayor's party does not hold a majority, due to greater difficulty to approve the budget, or for mayors who have been longer in office, as voters learn about their skills. We found no robust evidence of heterogeneous effects in any of these cases. The inclusion of a dummy for coalition governments, or of a variable indicating the number of parties in the government coalition, does not affect the results, and these variables are not statistically significant. This may be due to the fact that coalition governments are quite rare (only 3.67%). Finally, defining the election variable using Franzese Jr.'s (2002) approach leads to very similar results. These results, and all others that are not shown in the paper, are available upon request.

26. Including the lagged primary deficit as an explanatory variable leads to very similar results. The lagged primary deficit is not statistically significant when included and Wald tests allow for its exclusion from the model.

average revenues, so that only more financially autonomous municipalities are considered; restricting the sample period to mandates during which no mayors were term-limited (1992–2009)[27]; and, excluding all term-limited mayors, keeping only reelection eligible mayors during the entire sample period (1992–2014).[28] As reported in Appendix E (Table E3), the results are again consistent with the existence of PBCs and with our theoretical model's conclusion that an expected recession leads to even higher election-year primary deficits.

The third set of robustness tests (see Table E4 in Appendix E) starts by checking if differences between forecasted and actual regional growth rates affect the primary deficit. The results indicate that they do not. Then we check if results differ when the fiscal deficit is used as dependent variable, instead of the primary deficit. Again, the results remain essentially the same. Finally, we generate regional growth forecasts using World Economic Outlook (WEO-IMF) national forecasts, instead of those of the Portuguese government. As shown in the last two panels of Table E4, the results obtained for the primary deficit and for the fiscal deficit are very similar to those reported in Table 3.

B. Controlling for Time Effects with Year Dummies

Although the results shown in Table 3 are quite robust and present clear evidence supporting our theoretical model, the fact that elections occur in all municipalities at the same time poses a problem to the estimation of the election-year effect. That is, the election-year dummy variable may also capture the effects on primary deficits of other events common to all municipalities, which happened in election years. Effects common to all municipalities could be captured by annual dummy variables, but their inclusion in the baseline model of Equation (21) was unfeasible because they would be collinear with the election-year dummy variable. For that reason, we controlled for time effects using 5-year period dummies.

However, it is possible that period dummies (or time trends) do not solve the aforementioned problem. Thus, in the estimations whose results are reported in Table 4 we control for time effects using year dummies. As in Table 3, the interaction of the election-year dummy with the expected recession variable is always statistically significant, with the correct sign. The simple expected recession effect is only significant for the growth forecast specification, but that does not matter. The overall effect of an expected recession in an election year is, again, very strong, thus providing further evidence in favor of our hypothesis that election-year recession expectations lead to higher budget deficits, that is, the predicted countercyclical policy effect. Regarding the year dummies, those corresponding to election years (1993, 1997, 2001, 2005, 2009, and 2013) are generally statistically significant, with the expected positive sign, and with higher estimated coefficients than those of the previous years of the same electoral cycle.[29]

In order to make the results more comparable to those of Table 3, we compute the averages of the estimated coefficients for election and nonelection years, and test the significance of the difference between those averages. As shown at the bottom of Table 4, that difference (Election year − Non-election year) is always statistically significant, with a positive sign, and with a magnitude that is similar to that of the estimated coefficients for the election-year dummy in Table 3. Therefore, these results provide further support for the implications of our theoretical model.

As a robustness check to these results, we interacted the expected recession variable with dummies for each election year, instead of with a single dummy variable for all election years. The results shown in Appendix E (Table E5) are consistent with our theoretical model, as for all election years except 2001, the interaction of the expected recession variable with the

27. Until the 2009 elections, all mayors could run for reelection, regardless of how long they had been in office. The limit of three consecutive terms as mayor of a specific municipality became binding in the 2013 elections, in which 160 mayors could not run for reelection. Of the mayors elected in 2013, 41 cannot run for reelection in 2017. Since not being able to stand for reelection may alter the incentives of mayors, it would have been possible that our baseline results were affected by the presence of lame ducks.

28. Lax and Phillips (2012) argue that term limits enhance responsiveness which would imply less opportunism. The electoral impact of term limits discussed by Gilmour and Rothstein (1994) is, however, not scrutinized in the empirical part of our paper.

29. The exceptions are 1993, which is only statistically significant in column 1, and 2013, which is only marginally significant, with a negative sign, in column 3. It is, however, worth noting that 2011 and 2012 have larger negative coefficients than 2013, indicating that the primary deficit increased (or the primary surplus decreased) in 2013 relative to the previous 2 years, which is consistent with the presence of PBCs and opportunistic behavior of mayors. In the same vein, 1993 has a smaller negative coefficient than the following years.

TABLE 4
Countercyclicality in PBCs (Using Year Dummies)

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Growth Forecast	(2) Expected Recession	(3) Forecast <25th Percentile of GDP Growth	(4) Forecast <33rd Percentile of GDP Growth
Expected recession	3.461***	−8.791	−12.424	−4.880
	(3.059)	(−1.243)	(−1.459)	(−0.783)
Election year * expected recession	−4.813**	27.370**	35.259***	25.127**
	(−2.306)	(2.145)	(2.611)	(2.266)
1993 (election year)	20.590***	−5.808	−6.616	−7.513
	(2.673)	(−0.507)	(−0.676)	(−0.721)
1994	−2.177	−9.051	−10.071	−9.306
	(−0.302)	(−1.288)	(−1.453)	(−1.329)
1995	−22.468***	−25.572***	−25.539***	−26.223***
	(−3.186)	(−3.622)	(−3.654)	(−3.736)
1996	−13.304*	−12.416*	−12.602*	−12.666*
	(−1.874)	(−1.744)	(−1.774)	(−1.778)
1997 (election year)	45.264***	28.156***	27.797***	27.160***
	(4.556)	(3.477)	(3.431)	(3.350)
1998	32.239***	35.050***	35.152***	34.687***
	(3.982)	(4.289)	(4.316)	(4.242)
1999	6.328	8.646	8.483	8.517
	(0.867)	(1.180)	(1.162)	(1.158)
2000	44.309***	44.186***	44.495***	43.728***
	(4.585)	(4.582)	(4.619)	(4.522)
2001 (election year)	70.215***	51.409***	52.350***	51.190***
	(6.490)	(5.055)	(5.202)	(5.019)
2002	49.713***	44.859***	43.193***	43.947***
	(5.489)	(5.023)	(4.886)	(4.909)
2003	22.217***	16.410*	16.469*	16.219*
	(2.598)	(1.942)	(1.951)	(1.917)
2004	1.233	−6.660	−7.414	−6.450
	(0.153)	(−0.863)	(−0.961)	(−0.825)
2005 (election year)	44.495***	28.195***	28.061***	26.348***
	(4.159)	(3.256)	(3.237)	(3.054)
2006	−0.013	−8.777	−9.531	−8.527
	(−0.002)	(−1.084)	(−1.197)	(−1.016)
2007	−21.802**	−28.056***	−28.367***	−29.077***
	(−2.389)	(−3.135)	(−3.188)	(−3.236)
2008	20.530**	14.477	13.554	13.871
	(1.964)	(1.422)	(1.329)	(1.358)
2009 (election year)	79.186***	56.223***	57.815***	53.490***
	(6.026)	(3.989)	(4.435)	(4.124)
2010	16.685	8.837	6.053	8.052
	(0.942)	(0.493)	(0.349)	(0.481)
2011	−27.158**	−35.001***	−35.052***	−38.115***
	(−2.491)	(−3.041)	(−3.289)	(−3.220)
2012	−50.880***	−71.902***	−68.228***	−75.798***
	(−3.816)	(−6.512)	(−5.831)	(−7.227)
2013 (election year)	2.619	−22.304	−22.014	−24.357*
	(0.200)	(−1.476)	(−1.513)	(−1.699)
2014	−66.895***	−74.645***	−75.763***	−75.693***
	(−4.911)	(−5.328)	(−5.714)	(−5.429)
Election year - Off-election year	44.443***	28.871***	29.472***	28.105***
	(9.843)	(4.482)	(5.325)	(4.808)
Observations	7,022	7,022	7,022	7,022
R^2	.100	.100	.100	.100
Number of municipalities	308	308	308	308

Notes: Expected recession variable defined as indicated in the respective column title. The control variables of Table 3 are included. *T*-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

TABLE 5
Using Forecasts for Unemployment Rates

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Unemployment Rate Forecast	(2) Forecast >66th Percentile of Past Unemployment Rates	(3) Forecast >50th Percentile of Past Unemployment Rates
Municipal forecasts based on the government's forecasts of national unemployment rates			
Election year	2.299	40.175***	33.973***
	(0.141)	(6.305)	(4.674)
Expected recession	−6.244***	−19.405**	−19.339***
	(−3.459)	(−2.493)	(−2.943)
Election year * expected recession	6.863***	21.877*	26.792**
	(2.893)	(1.850)	(2.520)
Observations	5,205	5,205	5,205
R^2	.098	.095	.096
Municipal forecasts based on IMF's forecasts of national unemployment rates			
Election year	3.051	40.768***	34.475***
	(0.178)	(5.940)	(4.402)
Expected recession	−6.494***	−18.245**	−19.498***
	(−3.516)	(−2.321)	(−2.962)
Election year * expected recession	6.855***	22.202*	27.085**
	(2.793)	(1.828)	(2.431)
Observations	5,222	5,222	5,222
R^2	.097	.095	.096

Notes: The baseline model of Table 3 was used in all estimations. It includes a vector of control variables, municipal fixed-effects, 5-year period dummies. Recession variable defined as indicated in the respective column title. *T*-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.
*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

election year dummy is statistically significant, with the correct sign.[30] The *p* values of Wald tests presented in the last row indicate that we can always reject the hypothesis that the interactions are jointly equal to zero. We interpret this as further corroborating evidence for the theoretical prediction that recessions expected in election years lead to increases in primary deficits.

C. Using Forecasts for the Municipal Unemployment Rate

The use of regional GDP growth forecasts is due to the fact that GDP data is not available at the municipal level. But, when using regional forecasts to represent mayors' expectations of municipal economic performance, we implicitly assume that the municipalities of each NUTS III region are somewhat homogeneous. Although a region's economic growth obviously impacts on the performance of its municipalities, the latter do not necessarily react in the same way. Therefore, it is desirable to check if our results are robust to the use of an economic variable correlated with GDP for which municipal level data is available. One such variable is the unemployment rate, for which there is municipal data since 1997.

ARMAX models, such as those of Equation (20), were estimated for each of the 308 municipalities to generate 1-year ahead forecasts of municipal unemployment rates. Two sets of forecasts were produced, one using the government's forecasts[31] of the national unemployment rate as an explanatory variable, and the other using the WEO-IMF forecasts. Table 5 shows the results obtained when the expected recession variable is based on municipal unemployment rates. The results are slightly weaker than those obtained for GDP forecasts and the election year dummy is not statistically significant in column 1. Nonetheless, the expected recession variable and its interaction with the election year dummy are always

30. The interactions for 2005 could not be estimated in columns 2 and 3 because, in 2005, there were no regions for which the expected recession dummy or the dummy for forecasts below the 25th percentile of past growth rates were equal to one.

31. When the budget elaborated by the national government does not include a forecast for the unemployment rate, the WEO-IMF forecast is used instead.

significant, with the expected signs.[32] Concretely, expected higher unemployment rates or values above the 50th or the 66th percentiles in election years lead to higher primary deficits compared to election years with lower expectations for unemployment.[33]

Overall, the results obtained when using forecasts for municipal unemployment rates corroborate those of the previous tables, in which regional GDP growth forecasts were used, and provide further support for the implications of our theoretical model.

VII. CONCLUSION

This paper studies the impact of expected recessions on the PBC. As shown in the theoretical model, budget manipulations allow the incumbent to increase her reelection chances, even in a recession. This is, however, only possible if electoral manipulations in recessionary times go beyond the manipulations an incumbent employs in ordinary election years (with no recession). The latter result is predicted in the theoretical part and supported by a plethora of evidence presented in the empirical part.

Two innovations have been made to the PBC literature in order to be able to obtain the aforementioned theoretical results. First, based on conventional wisdom and on the empirical specifics in Portugal we argued that consumer-voters should exhibit belief inertia, that is, lag behind to some degree with their willingness or ability to update their expectations. This assumption alone suffices to produce a theoretical prediction for what has long been established empirically, but could not be explained satisfactorily by rational expectations models (see also Footnote 4). Akhmedov and Zhuravskaya (2004), Aidt, Veiga, and Veiga (2011), and Klomp and de Haan (2013) present empirical evidence that government manipulations are actually successful in increasing the incumbent's reelection chances.

Second, voters and politicians can respond to changes in the economic environment because economic growth is included in our theoretical model. If voters lag behind politicians in the perception of a growth decline, they judge the implied reduction in the provision of public goods more harshly, that is, attribute a lower level of competence to the incumbent, which reduces her reelection chances. An optimizing opportunistic government will increase its deficit so that it can raise the provision of public goods, thereby trading off higher deficit repayment costs for an increased chance of receiving next period's ego rent. The increased manipulation works, if voters do not fully adjust their expectations of the increase in the budget deficit caused by the government's response to the recession; a lower perception of the deficit amounts to a hidden effort by the government which voters attribute to the incumbent's competence and hence increases reelection chances. This is the main prediction of the theoretical part: recessions in election years amplify the PBC.

The empirical results obtained for a sample comprising all 308 Portuguese municipalities, from 1992 to 2014, provide ample evidence for the core finding of the theoretical model; fiscal manipulations increase in expected recessions. This amounts to countercyclical policy, all for the wrong reason of opportunistic behavior rather than Keynesian stabilization policy. In particular, we find strong evidence that budget deficits go up in election years far beyond normal manipulations when a recession or unusually low growth is expected. We use an array of regression specifications. Among many others, we also control for time effects with year dummies and use forecasts for the municipal unemployment rate.

This work could be extended in three directions. First, our prediction should be tested with other data sets, both for regional/municipal data and country data. Second, our prediction could also be tested in totally different settings, for instance in an optimizing New Keynesian model as suggested by Milani (2010). Third, we have not checked, if the countercyclical effects work for boom periods to the same degree. Considering the interaction of the forecast variable with the election year dummy for Column (1) (which refers to the growth forecasts) in all tables, it seems that the effect goes in the opposite direction for expected booms. However, we are not certain that the results remain equally robust, if above average boom periods are scrutinized. It is not certain that incumbents would, analogously, like to reduce their deficits while accepting a less increased reelection chance. It is also not

32. Part of the difference in results may be due to the smaller sample for unemployment rates; the number of observations drops by around 1,800, as the sample period starts 6 years later and the crisis years get a relatively larger weight in the overall sample.

33. Essentially the same results are obtained for the fiscal deficit or when clustering standard errors in different ways (not shown, but, again, available upon request).

certain that belief inertia is equally strong in both directions. Hence, there is a lot more work to be done on the effect of economic fluctuations on the PBC.

APPENDIX A

The Appendix presents indications for the model solution in Section III and for the derivation of the propositions in Section IV. It also presents additional analytical results, descriptive statistics, and additional empirical results.

First, we consider an individual who votes prospectively, that is, she would prefer the politician who can deliver the highest level of expected overall utility in $(t+1)$. It consists of utility from consumption, utility from the provision of local public goods, and utility from the ideological alignment with the politician. She votes for incumbent a, if

$$\underbrace{E_t\left[u\left(c^a_{t+1}\right)+L^a_{t+1}+\alpha\theta^i\left(-\frac{1}{2}\right)\right]}_{\text{exp. utility when } a \text{ in power}} \tag{A1}$$
$$> \underbrace{E_t\left[u\left(c^b_{t+1}\right)+L^b_{t+1}+\alpha\theta^i\left(+\frac{1}{2}\right)\right]}_{\text{exp. utility when } b \text{ in power}}.$$

Obviously, voters differ in their preference for party a and b. Expected consumption is identical for both politicians, whereas the expected provision of local public goods is affected by the policymakers' competence and individuals' expectations thereof:

$$E^i_t\left[u\left(c^a_{t+1}\right)\right]=E^i_t\left[u\left(c^b_{t+1}\right)\right]=E^i_t\left[u\left((1-\tau)\epsilon_{t+1}\right)\right]; \tag{A2}$$

$$E^i_t\left[L^j_{t+1}\right]=E^i_t\left[\tau\varepsilon_{t+1}-\left(1+r_t\right)D_t+\eta^j_{t+1}\right],\qquad j=a,b. \tag{A3}$$

Equation (A3) says that voters base their expectation of the provision of public goods in period $(t+1)$ on their belief of tax revenue in $(t+1)$. The period t deficit is repaid in period $(t+1)$ because it is costly. The policymaker will try not to borrow in period $(t+1)$ because there is no election at the end of that period and a nonbalanced budget carries a repayment cost. Individuals have no idea about the skills shock of either potential policymaker 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 fiscal policy to draw conclusions about her skills shock in period t. The expected level of local public goods of the challenger differs from what is know of the incumbent:

$$E_t\left[L^b_{t+1}\right]=E_t\left[\tau\varepsilon_{t+1}-\left(1+r_t\right)D_t\right]; \tag{A4}$$

$$E_t\left[L^a_{t+1}\right]=E_t\left[\tau\varepsilon_{t+1}-\left(1+r_t\right)D_t\right]+E_t\left[\mu^a_t\right]. \tag{A5}$$

Combining Equations (A1)–(A5) we can obtain a condition for an individual to vote for incumbent a (which corresponds to condition (6) in the main text):

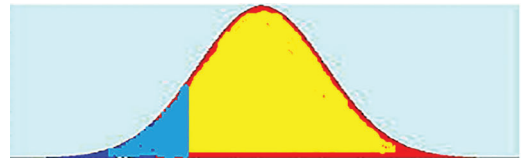
$$E_t\left[\mu^a_t\right]>\alpha\theta^i. \tag{A6}$$

Using the distribution of the skills shock we can determine the probability (Pr) of any voter to vote for incumbent a:

$$\Pr\left[E_t\left[\mu^a_t\right]-\alpha\theta^i\geq 0\right]=\frac{E_t\left[\mu^a_t\right]-(-\alpha)}{\alpha-(-\alpha)}=\frac{E_t\left[\mu^a_t\right]}{2\alpha}+\frac{1}{2}. \tag{A7}$$

FIGURE B1

Bell-Shaped Competence Density Function as an Example



APPENDIX B

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 mass 1 of voters, that is, all voters, times their individual probability Pr to vote for incumbent a (as determined in Equation (A7)) is greater or equal to $\frac{1}{2}$. The probability for the incumbent to win the election—Equation (7) in the main text—is repeated here:

$$\text{Prob}\left\{\left[\frac{E_t\left[\mu^a_t\right]}{2\alpha}+\frac{1}{2}\right]\geq\frac{1}{2}\right\}. \tag{B1}$$

Competence extraction mechanism. Voters' expectation of government competence μ^a_t can be obtained by studying the voters' perception of the government budget constraint (4) from the main text which is repeated here (with Equation (5) inserted):

$$L_t=\tau\varepsilon_t+D_t-\left(1+r_{t-1}\right)D_{t-1}+\mu^a_t+\mu^a_{t-1}. \tag{B2}$$

The true competence is:

$$\mu^a_t=L_t-\tau\varepsilon_t-D_t+\left(1+r_{t-1}\right)D_{t-1}-\mu^a_{t-1}. \tag{B3}$$

Voters can observe the level of local public goods L_t, previous period deficit D_{t-1}, previous period competence μ^a_{t-1}, interest rate r_{t-1} and the tax rate τ. Their perception of government competence is, however, also affected by their expectation of growth and the government deficit policy (which can be concealed, for instance, by using special government funds and accounting tricks). Hence we obtain what corresponds to Equation (9) in the main text:

$$\begin{aligned}E_t\left[\mu^a_t\right]=\hat{\mu}^{\hat{a}}_t&=L_t-\tau\hat{\varepsilon}_t-\hat{D}_t+\left(1+r_{t-1}\right)D_{t-1}-\mu^a_{t-1}\\&=\underbrace{L_t-\tau\varepsilon_t-D_t+\left(1+r_{t-1}\right)D_{t-1}-\mu^a_{t-1}}_{\mu^a_t \text{ from Equation (8) or (B3)}}\\&\quad+\left[\tau\left(\varepsilon_t-\hat{\varepsilon}_t\right)\right]+\left[D_t-\hat{D}_t\right];\end{aligned} \tag{B4}$$

Hence the incumbent's probability of winning becomes (Equations (10)–(12) in the main text):

$$\text{Prob}^{\text{win}}=\text{Prob}\left\{\left[\frac{\mu^a_t+\left[\tau\left(\varepsilon_t-\hat{\varepsilon}_t\right)\right]+\left[D_t-\hat{D}_t\right]}{2\alpha}+\frac{1}{2}\right]\geq\frac{1}{2}\right\}$$

(B5)
$$= \text{Prob}\left\{\mu_t^a \geq \left[\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right)\right] + \left[\widehat{D_t} - D_t\right]\right\}$$
(B6)
$$= 1 - F\left[\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right) + \widehat{D_t} - D_t\right],$$

where $F(\bullet)$ is the distribution function of the skills shock.

The marked area toward the right (light grey or yellow [if in colour]) under the density function depicted in Figure B1 corresponds to the probability described by Equation (B5) and by the distribution function representation in Equation (B6). Expected competence overall is greater than actual competence, if, in case of a recession, the government's deficit makes up for the voters' underestimation of the shortfall in tax revenue ($\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right) < 0$), plus the voters' expected deficit $\widehat{D_t}$ (deficit bias). Then the probability (see Equation (B6) or the light grey [or yellow] area under the density function) is always greater than $\frac{1}{2}$ and the government's chance to be reelected is increased. The competence perception of voters would also be increased if voters fully knew of and believed in the forecasted recession or did not have a deficit bias.

Inert-rational voters are described in Equations (13) and (14) in the main text which are reproduced here:

(B7)
$$E_t^i\left[\varepsilon_t\right] = \widehat{\varepsilon}_t = \varphi\overline{\varepsilon} + (1-\varphi)\,\varepsilon_t, \quad 0 \leq \varphi \leq 1, \quad \text{for all } i.$$
(B8)
$$E_t^i\left[D_t\right] = \widehat{D_t} = \overline{D} + \gamma\tau\left(\overline{\varepsilon} - \widehat{\varepsilon}_t\right), \; 0 \leq \gamma \leq 1, \; \text{for all } i.$$

On this basis, we can derive Equation (15) in the main text:

$$\begin{aligned}
\text{Prob}^{\text{win}} &= 1 - F\left[\tau\left(\widehat{\varepsilon}_t - \varepsilon_t\right) + \overline{D} + \gamma\tau\left(\overline{\varepsilon} - \widehat{\varepsilon}_t\right) - D_t\right], \\
&= 1 - F\left[\tau\left((1-\gamma)\,\widehat{\varepsilon}_t + \gamma\overline{\varepsilon} - \varepsilon_t\right) + \overline{D} - D_t\right], \\
&= 1 - F\left[\tau\left((1-\gamma)\left(\varphi\overline{\varepsilon} + (1-\varphi)\,\varepsilon_t\right) + \gamma\overline{\varepsilon} - \varepsilon_t\right)\right. \\
&\qquad \left. + \overline{D} - D_t\right], \\
&= 1 - F\left[\tau\left((1-\gamma)\,\varphi + \gamma\right)\left(\overline{\varepsilon} - \varepsilon_t\right) + \overline{D} - D_t\right]. \qquad \text{(B9)}
\end{aligned}$$

APPENDIX C

Prior to elections, incumbent a would like to maximize her utility over periods t and $(t+1)$ by choosing D_t (see the timing of events on page 14). Period $(t+1)$ utility is the sum of the utilities for winning and losing the election weighted by the probability determined previously. Hence, incumbent a's decision problem:

$$\begin{aligned}
\max_{D_t} \; V_t^a &= \max_{D_t} V = \max_{D_t} \; W_t^a + W_{t+1}^a \\
&= \max_{D_t} E_t^a \; \left\{u\left((1-\tau)\,\varepsilon_t\right) + L_t + X\right\} \\
&\quad + E_t^a\left\{\text{Prob}^{\text{win}}\left[u\left((1-\tau)\,\varepsilon_{t+1}\right) + L_{t+1} + X\right]\right\} \\
&\quad + E_t^a\left\{\left(1 - \text{Prob}^{\text{win}}\right)\left[u\left((1-\tau)\,\varepsilon_{t+1}\right) + L_{t+1}\right]\right\} \qquad \text{(C1)} \\
&= \max_{D_t} u\left((1-\tau)\,\varepsilon_t\right) + L_t + X \\
&\quad + u\left((1-\tau)\,\varepsilon_{t+1}\right) + L_{t+1} + \text{Prob}^{\text{win}} \quad X, \qquad \text{(C2)}
\end{aligned}$$

where

$$L_t = \tau\varepsilon_t + D_t - \left(1 + r_{t-1}\right) D_{t-1} + \eta_t^j;$$
$$L_{t+1} = \tau\varepsilon_{t+1} - \left(1 + r_t\right) D_t + \eta_{t+1}^j.$$

The FOC is:

$$\begin{aligned}
&1 - \left(1 + r_t\right) \\
&+ F'\left[\tau \;\; \left((1-\gamma)\,\varphi + \gamma\right) \;\; \left(\overline{\varepsilon} - \varepsilon_t\right) + \overline{D} - D_t^*\right] \;\; X = 0; \\
&\iff r_t = F'\left[\bullet\right] \;\; X. \qquad \text{(C3)}
\end{aligned}$$

The second-order condition for a well-behaved maximization problem is satisfied because the manipulation pushes the critical value of the F function below mean 0 (see also Footnote 7). So the FOC determines the government's optimal deficit D_t^*.

APPENDIX D

The Implicit Function Theorem is used for obtaining perturbation results, both for Proposition 1 in Section IV and for the straightforward results referred to at the end of Section III.

Derivatives with respect to any variable x of the FOC around the optimal value D_t^* will be denoted $\frac{\mathrm{d}\left.\frac{\mathrm{d}V}{\mathrm{d}D_t}\right|_{D_t^*}}{\mathrm{d}x} =: V_{D_tx}$. The derivations of the marginal effect of changes in exogenous variables *on* the equilibrium value of the government's optimal choice of deficit D_t^* are specified below.

For Proposition 1:

$$\begin{aligned}
\frac{\mathrm{d}D_t^*}{\mathrm{d}\varepsilon_t} &= -\frac{V_{D_t\varepsilon_t}}{V_{D_tD_t}} = -\frac{\tau \;\; \left((1-\gamma)\,\varphi + \gamma\right) F''\left[\bullet\right] X}{F''\left[\bullet\right] X} \\
&= -\tau \;\; \left((1-\gamma)\,\varphi + \gamma\right) > -1. \qquad \text{(D1)}
\end{aligned}$$

For the straightforward results referred to at the end of Section III:

1. Government Cost Effect: Higher repayment costs r_t reduce the optimal government deficit at the equilibrium

$$\text{(D2)} \qquad \text{(i)} \qquad \frac{\mathrm{d}D_t^*}{\mathrm{d}r_t} = -\frac{V_{D_tr_t}}{V_{D_tD_t}} < 0.$$

2. Government Benefit Effect: A higher ego rent X increases the optimal government deficit at the equilibrium

$$\text{(D3)} \qquad \text{(ii)} \qquad \frac{\mathrm{d}D_t^*}{\mathrm{d}X} = -\frac{V_{D_tX}}{V_{D_tD_t}} > 0.$$

3. Leverage Effect: A higher tax rate τ decreases the optimal government deficit at the equilibrium if there is a boom, but increases it in case of a recession

$$\text{(D4)} \qquad \text{(iii)} \qquad \frac{\mathrm{d}D_t^*}{\mathrm{d}\tau} = -\frac{V_{D_t\tau}}{V_{D_tD_t}} < 0 \qquad \text{if } \varepsilon_t > 0;$$

$$\text{(D5)} \qquad \text{(iv)} \qquad \frac{dD_t^*}{d\tau} = -\frac{V_{D_t\tau}}{V_{D_tD_t}} > 0 \quad \text{if } \varepsilon_t < 0.$$

As for result (i), if the cost of manipulating the government deficit increases, the government will be more careful in expanding fiscal latitude in order to gain an electoral advantage. The effect of increasing the social costs of deficits is captured in the different setting of the Shi and Svensson (2006) model, though not explicitly. As for result (ii), the incumbent is willing to increase the manipulation if there is a larger benefit from being reelected. This implies that the government

accepts additional costs of producing a deficit. Despite the model differences, such an effect of ego rents on manipulations is also confirmed by Shi and Svensson (2006). Consider now the last part of the aforementioned results ((iii) and (iv)). As tax rate τ increases, the effect of an output shock is magnified. If there is a recession ($\varepsilon_t < 0$), the government optimally increases the deficit in order to offset the loss in fiscal latitude; in case of a boom, the deficit is reduced. This leverage effect is not captured in either Shi and Svensson (2006) or Lohmann (1998).

APPENDIX E

This subsection presents the descriptive statistics of the variables used in the empirical tests and some additional empirical results, including those of robustness checks.

TABLE E1
Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Fiscal deficit (real euros per capita)	7,022	19.16	148.33	−1,301.34	3,955.61
Primary deficit (real euros per capita)	7,022	1.31	144.54	−1,310.23	3,616.92
Election year	7,022	0.26	0.44	0.00	1.00
GDP forecast (regional)	7,022	1.35	2.78	−9.46	8.98
Expected recession dummy	7,022	0.28	0.45	0.00	1.00
Forecast <25th percentile	7,022	0.19	0.39	0.00	1.00
Forecast <33th percentile	7,022	0.33	0.47	0.00	1.00
Dependency ratio	7,022	35.67	4.08	26.14	51.83
Population density	7,022	285.91	815.26	4.41	7,865.82
Mayor left	7,022	0.52	0.50	0.00	1.00
Mayor independent	7,022	0.01	0.11	0.00	1.00
Years mayor	7,022	8.38	6.41	1.00	37.00
Majority	7,022	0.75	0.43	0.00	1.00
GDP Forecast (regional)—IMF	7,022	1.58	3.02	−9.21	13.45
Unemployment rate forecast – Gov	5,205	6.51	2.68	−0.22	18.65
Unemployment rate forecast—IMF	5,222	6.51	2.68	−0.28	18.94

Sources: DGAL, Ministry of Finance, Ministry of Internal Affairs, INE, and IMF.

TABLE E2
Robustness Tests

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Growth Forecast	(2) Expected Recession Dummy	(3) Forecast <25th Percentile of GDP Growth	(4) Forecast<33rd Percentile of GDP Growth
Without the control variables of vector X				
Election year	48.349***	19.898***	23.277***	17.536***
	(10.392)	(3.928)	(4.701)	(3.616)
Election year * expected recession	−8.596***	51.216***	57.027***	50.822***
	(−5.301)	(5.428)	(5.608)	(5.720)
Observations	7,031	7,031	7,031	7,031
R^2	.083	.083	.083	.083
Controlling for time effects with 4-year mandate dummies				
Election year	44.231***	25.827***	25.916***	24.733***
	(8.909)	(5.147)	(5.370)	(5.153)
Election year * expected recession	−5.905***	31.956***	48.049***	29.687***
	(−3.492)	(3.208)	(4.520)	(3.183)
Observations	7,022	7,022	7,022	7,022
R^2	.085	.083	.085	.082
Controlling for time effects with a cubic time trend				
Election year	51.277***	25.936***	28.186***	24.170***
	(10.860)	(5.200)	(5.883)	(5.034)
Election year * expected recession	−8.440***	44.033***	53.686***	42.803***
	(−5.162)	(4.747)	(5.295)	(4.732)
Observations	7,022	7,022	7,022	7,022
R^2	.085	.081	.082	.081
Standard errors clustered by NUTS III region and year				
Election year	48.312***	20.225***	23.432***	17.750***
	(9.829)	(3.634)	(4.368)	(3.111)
Election year * expected recession	−8.519***	50.749***	56.571***	50.676***
	(−4.257)	(5.207)	(5.039)	(5.260)
Observations	7,022	7,022	7,022	7,022
R^2	.087	.086	.086	.086
Standard errors clustered by municipality				
Election year	48.312***	20.225***	23.432***	17.750***
	(9.257)	(3.926)	(4.645)	(3.261)
Election year * expected recession	−8.519***	50.749***	56.571***	50.676***
	(−4.881)	(5.475)	(5.158)	(5.196)
Observations	7,022	7,022	7,022	7,022
R^2	.087	.086	.086	.086

Notes: For each estimation, we indicate what differs relative to the baseline model of Table 3, which includes municipal fixed-effects, a vector of control variables, 5-year period dummies, and bootstrap-corrected standard errors (based on 1,000 replications). Recession variable defined as indicated in the respective column title. *T*-statistics are in parentheses.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

TABLE E3
Sensitivity Analysis and Placebo Test

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Growth Forecast	(2) Expected Recession Dummy	(3) Forecast <25th Percentile of GDP Growth	(4) Forecast <33rd Percentile of GDP Growth
Excluding 30 municipalities of Azores and Madeira				
Election year	49.653***	22.437***	26.625***	20.286***
	(10.713)	(4.953)	(5.859)	(4.367)
Election year * expected recession	−8.064***	51.640***	54.279***	50.867***
	(−5.399)	(5.999)	(5.296)	(6.028)
Observations	6,332	6,332	6,332	6,332
R^2	.091	.092	.091	.091
Excluding 100 municipalities for which average formula-determined grants are greater than 50% of total revenues				
Election year	41.157***	11.354***	14.976***	10.700**
	(8.925)	(2.644)	(3.530)	(2.397)
Election year * expected recession	−8.432***	52.800***	56.281***	51.403***
	(−5.681)	(5.946)	(5.279)	(6.073)
Observations	4,734	4,734	4,734	4,734
R^2	.090	.090	.089	.090
Excluding observations after 2009 (period with binding term limits)				
Election year	43.075***	19.085***	21.163***	16.380***
	(8.201)	(3.933)	(4.473)	(3.482)
Election year * expected recession	−7.467***	34.089***	44.115***	40.713***
	(−3.953)	(3.179)	(3.296)	(4.076)
Observations	5,482	5,482	5,482	5,482
R^2	0.084	0.082	0.082	0.083
Excluding term-limited mayors				
Election year	46.544***	21.573***	22.701***	18.657***
	(9.395)	(4.172)	(4.563)	(3.794)
Election year * expected recession	−7.915***	39.446***	50.839***	43.423***
	(−4.421)	(4.000)	(4.191)	(4.721)
Observations	6,369	6,369	6,369	6,369
R^2	.095	.092	.093	.093
Placebo test (using lagged expected recession)				
Election year	42.458***	40.664***	40.467***	40.814***
	(8.244)	(7.710)	(7.783)	(7.603)
Election year * expected recession	−1.588	−8.211	−8.870	−8.834
	(−1.019)	(−0.722)	(−0.717)	(−0.819)
Observations	6,729	6,729	6,729	6,729
R^2	.085	.083	.083	.084

Notes: The baseline model of Table 3 was used in all estimations. It includes a vector of control variables, municipal fixed-effects, 5-year period dummies, and standard errors are clustered by region and year. Recession variable defined as indicated in the respective column title. The sample restriction applied is indicated above the respective estimation results. *T*-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

TABLE E4
Additional Results

Dependent Variable: Primary or Fiscal Deficit	(1) Growth Forecast	(2) Expected Recession Dummy	(3) Forecast <25th Percntile of GDP Growth	(4) Forecast <33rd Percentile of GDP Growth
Primary deficit—Including the difference between actual and forecasted growth rates				
Election year	48.334***	20.256***	23.425***	17.892***
	(10.150)	(3.837)	(4.644)	(3.533)
Election year * expected recession	−8.547***	50.670***	56.595***	50.382***
	(−5.106)	(5.451)	(5.492)	(5.554)
GDP growth (forecast-actual)	0.060	−0.034	0.009	−0.170
	(0.119)	(−0.069)	(0.017)	(−0.341)
Observations	7,022	7,022	7,022	7,022
R^2	.087	.086	.086	.086
Using the fiscal deficit as dependent variable instead of the primary deficit				
Election year	49.493***	22.964***	26.390***	20.514***
	(10.249)	(4.248)	(5.149)	(3.963)
Election year * expected recession	−8.086***	47.834***	51.501***	48.110***
	(−4.885)	(5.088)	(4.992)	(5.233)
Observations	7,022	7,022	7,022	7,022
R^2	.095	.094	.094	.095
Regional GDP growth forecasts based on the IMF's forecasts of national GDP growth				
Primary deficit				
Election year	51.856***	20.841***	25.215***	19.189***
	(9.471)	(4.518)	(5.745)	(4.209)
Election year * expected recession	−8.768***	54.007***	59.991***	52.649***
	(−5.584)	(5.346)	(4.497)	(5.562)
Observations	7,022	7,022	7,022	7,022
R^2	.086	.086	.086	.086
Regional GDP growth forecasts based on the IMF's forecasts of national GDP growth				
Fiscal deficit				
Election year	53.069***	22.770***	27.595***	21.228***
	(9.506)	(5.004)	(6.287)	(4.678)
Election year * expected recession	−8.388***	53.451***	57.219***	51.778***
	(−5.471)	(5.344)	(4.354)	(5.456)
Observations	7,022	7,022	7,022	7,022
R^2	.095	.095	.095	.095

Notes: The dependent variable used is indicated above the respective estimation results. The baseline model of Table 3 was used in all estimations. It includes a vector of control variables, municipal fixed-effects, 5-year period dummies, and standard errors clustered by region and year. Recession variable defined as indicated in the respective column title. *T*-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

TABLE E5
Interactions for Individual Election Years

Dependent Variable: Primary Deficit (in Real Euros p.c.)	(1) Growth Forecast	(2) Expected Recession Dummy	(3) Forecast <25th Percentile of GDP Growth	(4) Forecast<33rd Percentile of GDP Growth
Expected recession	8.181***	−40.285***	−51.208***	−35.978***
	(11.806)	(−7.869)	(−8.631)	(−7.183)
1993 * Expected recession	−7.120**	46.261***	64.498***	41.872***
	(−2.395)	(4.076)	(5.813)	(3.479)
1997 * Expected recession	−9.845***	16.005	28.166	36.956*
	(−4.088)	(0.934)	(1.608)	(1.958)
2001 * Expected recession	2.650	20.282	13.762	17.805
	(0.521)	(0.822)	(0.401)	(0.711)
2005 * Expected recession	−14.008***			105.238***
	(−3.071)			(3.475)
2009 * Expected recession	−21.745**	79.353***	89.057***	57.373***
	(−2.294)	(3.257)	(3.565)	(2.660)
2013 * Expected recession	−13.020*	74.888***	94.502***	73.318***
	(−1.828)	(2.832)	(3.893)	(2.639)
1993	31.477***	3.746	1.347	3.427
	(6.137)	(0.451)	(0.199)	(0.378)
1997	52.740***	27.565***	29.334***	25.677***
	(6.391)	(3.895)	(4.146)	(3.623)
2001	41.385***	54.676***	56.407***	54.109***
	(3.051)	(5.511)	(6.027)	(5.469)
2005	62.857***	24.606***	26.483***	17.855**
	(4.375)	(3.254)	(3.530)	(2.372)
2009	79.744***	39.557**	49.171***	47.458***
	(7.075)	(2.196)	(3.325)	(3.379)
2013	7.709	−34.583	−32.553	−38.351
	(0.521)	(−1.511)	(−1.636)	(−1.544)
Observations	7,022	7,022	7,022	7,022
R^2	.077	.069	.071	.068
Wald p-value (interactions = 0)	.0156	.000182	1.48e-06	.00110

Notes: The models include a vector of control variables, municipal fixed effects, year dummies (only the coefficients of those that correspond to election years are shown), and standard errors are clustered by region and year. Recession variable defined as indicated in the respective column title. T-statistics based on bootstrap-corrected standard errors (using 1,000 replications) are in parentheses.

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

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