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Electoral Cycles: Do They Really Fit The Data?

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Abstract

This paper provides a theoretical model of pre-electoral budget cycle and tests its empirical implications. When elections approach, incumbent policy-makers have an incentive to signal their competency by acting on economic variables. Rational voters incorporate the knowledge of such mechanisms in their decisions, evaluating governments on the basis of unexpected policy. Available data confirms the hypothesis that economies are manipulated during election years, but voters do not seem to behave as predicted. Alteration of fiscal variables may be due to an attempt on the incumbent's part at influencing economic growth performance as opposed to an experiment in direct signalling.

JEL Classification: D72, H30.

Key Words: Elections, Rationality, Budget Cycle, Popularity Function.

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1 Introduction

That policy-makers manipulate fiscal policy in the period preceding elections in order to enhance their chances of victory is often taken as a matter of fact.

From a theoretical point of view the existence of political budget cycles hinges on few hypotheses. Voters reappoint an incumbent on the basis of the welfare he is expected to deliver in the future and they infer these expectations considering the past economic performances. They dislike taxes and appreciate public spending. If voters are not rational the incumbent government systematically manipulates the budget by reducing taxes and increasing public expenditure and he is re-elected. With rational voters the electoral cycle is justified either by a problem of competence signaling (e.g. Rogoff and Sibert (1988), Rogoff (1990) or by a problem of moral hazard (e.g. Shi and Svensson (2000)).

So far empirical analyses have focused exclusively on one of the implications of the theory, policy-makers' manipulation of the economy before elections. The study of the impact of economic and fiscal policies on voters' behavior pertains to another field of research that is only partially influenced by the paradigm of rational expectation.

A systematic study of policy-makers' and voters' behavior appears to be missing. This paper aims at providing a theoretical model of the political budget cycle which is more realistic than its predecessors and testing its implications. In our model the cycle arises from a moral hazard problem of electoral competition. Drawing on Holmstrom's (1982) model, the relationship between politicians and voters can be seen as a principal-agent game. Since the principal (the voters) cannot know the real competence of the agent (the incumbent government), the former decides whether or not to reappoint the incumbent on the basis of past economic performance. Therefore the policy-maker has a strong incentive to manipulate the economy attempting to appear as competent as possible. Voters infer the policy-maker's competence on the basis of unexpected changes in taxes and public expenditure and the incumbent manipulates these variables in order to enhance his chance of winning. Unlike Shi and Svensson (2000) and like Rogoff (1990), in our model a cycle arises in both public expenditure and taxes, shrinking the gap between reality and theoretical modeling.

Our main task, however, is to test whether the model's predictions about the behavior of policy-makers and voters are consistent with empirical analysis. We found strong evidence in favor of pre-electoral manipulations of fiscal variables (budget cycle) and macroeconomics variables (business cycle). Yet analysis of the electoral outcome is not reconcilable with the models of the political cycles.

The paper is organized as follows. In Section 2 an overview of previous theoretical and empirical studies is presented. In the first part of Section 3 we introduce our model of the political budget cycle and its empirical implica-

tions. In the second part we briefly discuss the main hypotheses and empirical implications of the opportunistic and rational business cycle models. Following the structure of Section 3, in the first part of Section 4 we analyze fiscal policy outcomes in eighteen OECD countries in the period 1961-95 to assess the existence of pre-electoral cycles in tax revenues and public spending and thus in the budget balance as predicted by the model. In the second part we test for the presence of business cycles in GDP and inflation for the same sample. In Section 5 we analyze the hypothesis that voters use unexpected variations in economic policy to gauge the incumbent's talent and cast their vote accordingly for elections in the period 1961-95. A tentative explanation of our findings is presented in Section 6.

2 Review of the Literature

In this section theoretical models and empirical analyses are presented separately. The two parts are not symmetric, since, as stated above, empirical tests of the political cycle models have been focusing on one aspect only, the existence of pre-electoral cycles. We include a small selection of works that analyze the influence of economic variables on voting.

2.1 Theory

When reviewing the theory of pre-electoral manipulation of the economy it is immediate to draw a distinction between earlier models, based on non rational expectations, and more recent ones that show how the hypothesis of rationality does not prevent the political cycle.

The first models were developed in the mid '70s (e.g. Nordhaus (1975), Lindbeck (1976) and show how an incumbent policy-maker exploits the Phillips curve to increase output and/or employment before elections while inflationary consequences are observable only with a lag. Voters, who like high GDP growth and dislike inflation, observe the increased economic activity with stable inflation and reappoint the incumbent, since he is expected to be very talented. This framework can be easily extended to take into account pre-electoral loose fiscal policies (higher public expenditures and lower taxes) in order to temporarily increase voters' welfare. Tighter policies are postponed until after the elections.

The rational expectation revolution showed the inconsistency of these models: rational voters understand the policymaker's incentive to appear as competent as possible and do not reward them for the transitory manipulation of the economy.

The second strand of political cycle models appeared at the end of the '80s. Rogoff and Sibert (1988), Rogoff (1990), and Persson and Tabellini (1990) developed models consistent with rational expectations, in which the distortion

of the economy before elections is motivated by a signaling problem. It is assumed that policy-makers know their competence. A competent incumbent distorts the economy to a level which is not feasible by an incompetent one because the latter prefers to lose rather than produce a cycle that leads to low future welfare. To obtain this conclusion it is crucial to assume that politicians care not only about being in power but also about the national economic performance.

In Rogoff and Sibert (1988) the signal of competence is given by the choice between a lump-sum tax and seignorage; in Rogoff (1990), as in our model, the policy-maker increases public consumption and decreases taxes and public investment, whereas in Persson and Tabellini (1990) a competent incumbent creates an output boom before the election and wins, while an incompetent one generates a recession and loses. These models have been criticized because the conclusion that the most competent policy-makers are those who manipulate the economy most, seems to a higher degree implausible.

Recently two models (Lohmann (1998), Shi and Svensson (2000)) more realistically predict that all incumbents are engaged in some distortion of the economy. In these models, built on Holmstrom (1982), the incumbent does not know his competence and so, contrary to the previous models, he cannot signal it. He is willing to manipulate the economy in order to appear competent. In equilibrium, however, voters recognize the incumbent's incentive and do not take into account the expected distortion to infer the politician's competence. The policy-maker's optimal choice is to conform to voters' expectations. In conclusion, only unexpected changes in fiscal policy are used to infer competence.

Lohmann (1998) considers the trade-off between economic growth and inflationary consequences, while Shi and Svensson (2000) predict public expenditure and the deficit to increase before elections, holding taxes constant.

Compared to the latter, our model eliminates the hypothesis of constant taxes and shows that policy-makers both reduce taxes and increase public spending in the period prior to elections. In the case of no exogenous shocks, voters can determine exactly the incumbent's competence through the unexpected variations in fiscal policy.

2.2 Empirical Evidence

The search for political budget cycles can be traced back to Tufte's book (1978) that shows how precisely the timing and the amount of transfers for social security and to war veterans are influenced by the date of the US Presidential elections. Alesina et al. (1997) find a budget cycle in the level of public debt, but not in public spending and taxes, for a sample of eighteen OECD countries. On the contrary, Shi and Svensson (2000) claim that the higher deficits in the electoral years are due to both increased spending and lower taxes in 123 developed and developing countries.

The study of political cycles, for macroeconomic and fiscal variables, has always taken the influence of economic results on voting as a matter of fact that does not need to be verified. As far as we know, the only exception is Alesina, Londregan and Rosenthal (1993): voters' rationality is examined according to the rational opportunistic theory by Persson and Tabellini (1990) for the US context. A system of simultaneous equations is employed to take account of the presence of politically induced cycles in the growth of GDP and to analyze the voter's reaction to expected and unexpected growth. Yet the authors fail to detect evidence in favor of rational voting.

A separate branch of the literature, in which economic results are viewed as exogenous variables, studies the impact of economic conditions on voting.

The basis of the economic vote function is this simple proposition: an incumbent is more likely to be re-elected when the macroeconomic outcomes obtained during his legislature, are judged positively by voters. The basic vote function specification is:

$$\Delta Vote = \alpha + \beta' \vec{X} + \delta' \vec{Y} + \epsilon$$

where:

$\Delta Vote$ is the perceptual variation of the share of votes obtained by the incumbent government in respect to the previous election;

\vec{X} is a vector of economic indicators observed by the electorate;

\vec{Y} is a vector of political variables that influence the vote.

GDP growth, inflation and unemployment rates have been considered the most important economic indicators observed by voters.¹ Since the earlier studies,² the literature on economic voting distinguished between naive and rational voting. On one hand, the naive voting theory predicts that the electorate observes economic variables and casts its vote without filtering competence from luck. On the other hand, rational models of voting do not agree on the concept of voters' rationality. For instance, Peltzman (1990) claims that rational voters judge on the basis of the permanent level of personal income and the unexpected changes in the inflation rate, while Suzuki and Chappell (1996) test voter rationality by analyzing the impact of expected GDP growth on voting.

These formulations of voters' rationality are generally not consistent with the rational political cycle models described in the first part of Section 2, because they only partially consider politicians' incentives to manipulate the economy.

A rational electorate should distinguish between the expected and the unexpected components of economic variables. Following the theoretical model presented in Section 3 we maintain that rational voters consider only the unexpected change in economic policy as an indicator of the incumbent's competence. Their aim is to choose the most competent candidate. In order to

¹See Nannestad and Paldam (1994) for a review of the literature until that year.

²See for instance Stigler (1973)'s critique of the seminal work by Kramer (1971).

reach this goal they need to find some indicators of the policy-maker's competence and these indicators are represented by the unexpected changes in the economic results.

Cross-country analyses of the impact of macroeconomic variables on voting are rather uncommon.

Whitten and Palmer (1999) provide the most interesting paper for our purposes. For a sample of nineteen OECD countries over the period 1970-94 they show that voters reward and punish an incumbent government on the basis of unexpected variations in macroeconomic variables: the GDP growth rate and the inflation rate. This evidence supports the hypothesis of rational voting consistent with Persson and Tabellini (1990) and Lohmann (1998), although the authors do not explicitly refer to these works.

To the best of our knowledge, there does not exist any cross-country study of fiscal variables' influence on electoral results. However such studies do exist across American states. Peltzman (1992) claims that voters are fiscal conservatives after analyzing presidential, senatorial and gubernatorial elections from 1958 to 1990. They dislike increases in public expenditures regardless of the composition of spending, of the way expenditure is financed and of the incumbent's ideology. On a sample of state gubernatorial and legislative elections between 1968 and 1992, Lowry, Alt and Ferre (1998) show that Democrats are rewarded for small unexpected increases in the dimension of the public sector, while Republicans are punished for the same. Peltzman (1992) and Lowry et al. (1998)'s results are mutually exclusive. Moreover they are not compatible with the rational opportunistic models of the political budget cycle. The obvious conclusion is that there are no clear patterns in voters' behavior.

3 Models and Empirical Propositions

3.1 A Model of the Political Budget Cycle

In this section we present a model of the political budget cycle based on a moral hazard problem in which the distortion of fiscal policy is due to the incumbent's attempt to show his competence to the electorate. Like in Rogoff (1990) voters infer competence by observing not just the level of taxes or public consumption separately, but both of them simultaneously.

However, in Rogoff's framework the manipulation of the economy is motivated by the attempt by a highly talented incumbent to signal his competence. In that problem of adverse selection the competent policy-maker chooses a policy vector which is not feasible for an incompetent one. In our model, on the contrary, the budget cycle arises because of a problem of moral hazard similar to Lohmann (1998) and Shi and Svensson (2000): the incumbent, who does not know his competence, tries to manipulate the economy because voters expect him to do so. In this setting the incumbent faces a trade-off between the disutility given by the distortion of the economy and the desire of winning

motivated by the so-called "ego-rents". In equilibrium rational voters recognize the incentive to manipulate the economy and evaluate the incumbent's competence only on the basis of unexpected changes in fiscal policy.

Let us analyze the model in more analytical detail.

3.1.1 Preferences

For simplicity assume that the behavior of the voters can be described by one representative agent. His welfare in period t depends on private and public consumption (c and g respectively), and public investment (k) observed at time t .

The preference function of the representative voter over an infinite horizon is:

$$W_V = \sum_{t=1}^{\infty} \beta^{t-1} [U(g_t, c_t) + V(k_t)]$$

where $\beta \in (0, 1)$ is the discount rate, U and V are strictly concave functions respecting the Inada conditions, with $\frac{\partial U}{\partial g} = U_g$, $\frac{\partial U}{\partial c} = U_c$ and $\frac{dV}{dk} = V'$ all positive.

Politicians' preferences (W_P) over the economic variables are assumed to be the same. Moreover they give importance to being in office, because of the ego-rents (X) they receive from that. Thus we can write:

$$W_P = W_V + \sum_{t=1}^{\infty} \beta^{t-1} X_t^j = \sum_{t=1}^{\infty} \beta^{t-1} [U(g_t, c_t) + V(k_t) + X_t^j]$$

where

$$j = I(\text{incumbent}), O(\text{opponent})$$

$$X_t^I \text{ takes the normalized value of 1 and } X_t^O = 0.$$

3.1.2 Technology

Given a fixed amount of resources (y), the agent's private consumption (c) depends on the amount of a lump-sum tax (τ):

$$c_t = y - \tau_t \tag{1}$$

The production function of public investment at period t can be written as:

$$g_t + k_{t+1} = \tau_t + \epsilon_t^g + \epsilon_t^\tau \tag{2}$$

Tax revenues (τ) and public consumption (g) are immediately observed by voters, while public investments (k) are set at period t but enter into the utility function only in $t + 1$.

Expression (2) is influenced by the policy-maker's competence ($\epsilon^g, \epsilon^\tau$). Competence can be defined as the capability of delivering the expected amount of public investment with the highest level of public consumption (ϵ^g) and the lowest level of taxes (ϵ^τ). It seems a reasonable hypothesis that the ability to deliver a high amount of public goods is not necessarily correlated with the ability to raise tax revenue with a low tax rate. Thus there can be two different kinds of competence, represented by ϵ^g and ϵ^τ . The more competent the incumbent is, the higher are ϵ^g and ϵ^τ . Competence is defined by a first order moving average process, MA(1):³

$$\begin{aligned}\epsilon_t^g &= \mu_t^g + \mu_{t-1}^g \\ \epsilon_t^\tau &= \mu_t^\tau + \mu_{t-1}^\tau.\end{aligned}\tag{3}$$

The shocks are normally distributed and uncorrelated:

$$\mu_t^g \sim N(0, \sigma_g^2) \quad \text{for all } t = 1, 2, \dots \text{ and } \mu_0^g = 0$$

$$\mu_t^\tau \sim N(0, \sigma_\tau^2) \quad \text{for all } t = 1, 2, \dots \text{ and } \mu_0^\tau = 0$$

$$\text{Cov}(\mu_t^g, \mu_t^\tau) = 0 \quad \text{for all } t = 1, 2, \dots$$

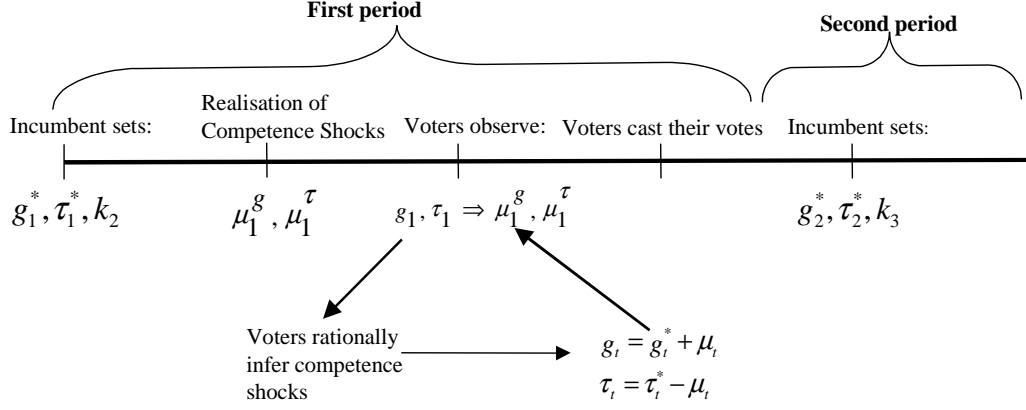
The assumption of a moving average process for competence is based on the idea that competence varies over time due to external factors such as different problems that a government faces and due to internal ones such as periodic turnovers within the government staff.

For simplicity we do not consider the presence of other exogenous shocks beyond government's control.

3.1.3 Timing and Strategy

The economy repeats itself every two periods and elections are held every other period ($t = 1, 3, 5, \dots$). At the generic time t the timing of the events is the following:

³If competence were not persistent, at least partially, over time, voters could not extract any useful information about their future expected welfare.



- i) The incumbent sets his optimal economic policy vector $(g_t^*, \tau_t^*, k_{t+1}^*)$, knowing only his competence shocks of the previous period $(\mu_{t-1}^g, \mu_{t-1}^\tau)$;
- ii) The most recent competence shocks are realized (μ_t^g, μ_t^τ) ; voters observe g_t and τ_t and they rationally infer the incumbent's true competence.
- iii) Elections are held when t is odd.

Since the most recent shocks are realized after the incumbent's decision, the policy-maker sets his desired policy vector $(g_t^*, \tau_t^*, k_{t+1}^*)$ at period t only on the basis of last period competence shocks μ_{t-1}^g and μ_{t-1}^τ . Observed taxes and public spending at time t differ from the values set by the policy-maker by a quantity equal to the competence shocks of period t , but public investments are not affected. Thus, we can write:

$$\begin{aligned} g_t &= g_t^* + \mu_t^g & (4) \\ \tau_t &= \tau_t^* - \mu_t^\tau \\ k_{t+1} &= k_{t+1}^* \end{aligned}$$

Using expression (4) we can explicitly write the production function of public investment:⁴

$$g_t^* + k_{t+1} = \tau_t^* + \mu_{t-1}^g + \mu_{t-1}^\tau \quad (5)$$

The representative voter makes his choice comparing the expected future utility given by the incumbent with that given by the opponent. The expected utility depends on the candidates' competence. Since competence is defined by an MA(1) process, the opponent's expected competence, not observable, is set to 0. On the other hand voters can infer the competence of the incumbent, $\mu_t^{g,V}$ and $\mu_t^{\tau,V}$, by observing the realised g_t and τ_t , and considering their beliefs on what the incumbent has set, $g_t^{*,V}$ and $\tau_t^{*,V}$.⁵

⁴We plugged (3) and (4) into expression (2). This equation clearly holds in equilibrium. Indeed government chooses g_t^* and τ_t^* and k_{t+1}^* is set by difference.

⁵The subscript V represents voter's beliefs on incumbent behaviour. It will become clear later that the voter's beliefs on incumbent behaviour form the voter's strategy set.

3.1.4 Solution

In order to solve this repeated game we will consider only the first two periods and we will work the solution out by backward induction. Indeed this setting could be thought of as the stage game for a repeated game. Since there is no state variable to affect the game in subsequent periods ($t = 3, 4..$), the equilibria derived for the two-periods game extend to Markov perfect equilibria for the multi-period game.⁶

Solution in Period 2 (No Elections) In period 2 the incumbent has no incentive to manipulate the economy because he does not face elections. Therefore he chooses the values of g_2^* , τ_2^* and, by difference, k_3^* that maximize his expected utility. The problem can be broken down into a sequence of static maximization problems:

$$\begin{aligned} \max_{g_2^*, \tau_2^*} Q &= E_1 [U(g_2, c_2) + \beta V(k_3)] = \\ &= E_1 [U(g_2^* + \mu_2^g, y_2 - \tau_2^* + \mu_2^\tau) + \beta V(\tau_2^* - g_2^* + \mu_1^\tau + \mu_1^g)] \end{aligned}$$

The first order conditions are:

$$\begin{aligned} \frac{\partial Q}{\partial g_2^*} &= E_1 [U_g(g_2^* + \mu_2^g, y_2 - \tau_2^* + \mu_2^\tau) - \beta V'(\tau_2^* - g_2^* + \mu_1^\tau + \mu_1^g)] = 0 \\ \frac{\partial Q}{\partial \tau_2^*} &= E_1 [-U_c(g_2^* + \mu_2^g, y_2 - \tau_2^* + \mu_2^\tau) + \beta V'(\tau_2^* - g_2^* + \mu_1^\tau + \mu_1^g)] = 0 \end{aligned}$$

Thus the incumbent chooses \hat{g}_2^* and $\hat{\tau}_2^*$ such that

$$\begin{aligned} E [U_g(\hat{g}_2^* + \mu_2^g, y_2 - \hat{\tau}_2^* + \mu_2^\tau)] &= E [U_c(\hat{g}_2^* + \mu_2^g, y_2 - \hat{\tau}_2^* + \mu_2^\tau)] = \\ &= \beta E [V'(\hat{\tau}_2^* - \hat{g}_2^* + \mu_1^\tau + \mu_1^g)] \end{aligned}$$

The two realized competence shocks μ_1^τ and μ_1^g affect the incumbent's choices. The ability of the policy-maker makes it possible to deliver more public consumption and investment with lower taxes.⁷

The optimal values \hat{g}_2^* , $\hat{\tau}_2^*$ and \hat{k}_3^* therefore depend on $\mu_1^\tau + \mu_1^g$. Analytically, taking expression (5) for $t = 2$, we obtain:

$$\hat{g}_2^* + \hat{k}_3^* = \hat{\tau}_2^* + \mu_1^g + \mu_1^\tau \quad (6)$$

⁶Roughly speaking, perfect equilibria for the multi-period game are equilibria that depend only on present states of the market and not on past history.

⁷For instance, when a policymaker knows that for particular reasons tax revenues are likely to be high he may decide to increase public spending and decrease the tax burden, given the lower marginal costs in doing that.

Therefore, it is straightforward to see that:

$$\widehat{g}_2^* = G(\mu_1^g + \mu_1^\tau) \quad (7)$$

$$\widehat{\tau}_2^* = T(\mu_1^g + \mu_1^\tau) \quad (8)$$

$$\widehat{k}_3^* = K(\mu_1^g + \mu_1^\tau) \quad (9)$$

Expression (7) means that given \widehat{k}_3^* and $\widehat{\tau}_2^*$, the public expenditure set by the incumbent is increasing in past realised competence ($\mu_1^g + \mu_1^\tau$). Expressions (8) and (9) have similar interpretation.

Solution in Period 1 (Elections) The incentive to manipulate the economy arises only in the election period. The incumbent has an incentive to manipulate the economy in order to maximize his probability of re-election. He sets a higher level of public consumption and a lower level of taxes and public investment, because the latter is observable only after the elections. In doing so he faces a trade-off between the ego-rents given by re-election (*WIN*) and the loss of his own utility due to the distortion of the economy. The maximization problem is:

$$\begin{aligned} \max_{g_1^*, \tau_1^*} Q &= E_0 [U(g_1, c_1) + \beta V(k_2) + \beta(1 + \beta)X] = & (Pa) \\ &= E_0 [U(g_1^* + \mu_1^g, y - \tau_1^* + \mu_1^\tau) + \beta V(\tau_1^* - g_1^* + \mu_0^\tau + \mu_0^g) + \beta(1 + \beta)X] \end{aligned}$$

Representative Voter Behavior To better understand what are the real determinants of the probability of winning, let us analyze voters' behavior. Voters choose between the incumbent and the opponent comparing the future expected utility they will obtain in the two cases. They will vote for the incumbent if and only if the following condition is satisfied:⁸

$$E_1(W_V | I) \geq E_1(W_V | O)$$

where $E_1(W_V | I)$ and $E_1(W_V | O)$ are respectively the future expected utility of the voter at $t = 1$ if the incumbent is elected or if he is ousted.

If we analyze the expected utility of the representative voter in the election period ($t = 1$) in case the incumbent is reappointed, $E_1(W_V | I)$, and in case the opponent is elected, $E_1(W_V | O)$, it is easy to see that his expected utility in periods $t = 3, 4, 5, \dots$ are equal because all expected competencies are equal to zero in both cases ($E(\mu_{3,4..}^{g,I}) = E(\mu_{3,4..}^{\tau,I}) = E(\mu_{3,4..}^{g,O}) = E(\mu_{3,4..}^{\tau,O}) = 0$).⁹ Therefore, the representative voter can be seen to cast his vote using the competence

⁸We suppose for simplicity that if the representative voter is indifferent between incumbent and opponent politician he will vote for the incumbent.

⁹This is so because competence is taken to be a MA(1) process.

shocks of period 1 only, μ_1^g and μ_1^τ . More formally, the representative voter will vote for the incumbent if and only if:

$$E_1 \left(\mu_1^{g,I} + \mu_1^{\tau,I} \right) = \mu_1^{g,V} + \mu_1^{\tau,V} \geq E_1 \left(\mu_1^{g,O} + \mu_1^{\tau,O} \right) = 0 \quad (10)$$

The right hand side of expression (10) is equal to zero because voters do not have any information about the opponent; they can only use their prior belief on the distribution function of the competence shock, $\mu_t \sim N(0, \sigma^2)$. Instead, voters can infer the incumbent's competence (the left hand side of the expression above) by observing the realized g_1 and τ_1 and then calculating the rational expectation of $\mu_1^{g,I}$ and $\mu_1^{\tau,I}$.¹⁰

By (4) the higher is $\mu_1^{g,I} + \mu_1^{\tau,I}$ the higher will be g_1 and the lower will be τ_1 . The utility function is increasing in g and decreasing in τ . Thus it is straightforward to verify that incumbent will be re-elected if condition (10) is satisfied. For instance, a competent policy-maker will spend more since in this way he can offer more public goods (or public goods of higher quality) and then increase the voters' welfare.

We are now ready to solve the maximization problem of the incumbent politician in the electoral period. The first order conditions of the problem *Pa*) are:

$$\begin{aligned} \frac{\partial Q}{\partial g_1^*} &= E_0 \left[U_g(g_1^* + \mu_1^g, y - \tau_1^* + \mu_1^\tau) - \beta V'(\tau_1^* - g_1^* + \mu_0^g + \mu_0^\tau) + \right. \\ &\quad \left. + \beta(1 + \beta) \frac{\partial \Pr(WIN | g_1^*, \tau_1^*)}{\partial g_1^*} X \right] = 0 \\ \frac{\partial Q}{\partial \tau_1^*} &= E_0 \left[-U_c(g_1^* + \mu_1^g, y - \tau_1^* + \mu_1^\tau) - \beta V'(\tau_1^* - g_1^* + \mu_0^g + \mu_0^\tau) + \right. \\ &\quad \left. + \beta(1 + \beta) X \frac{\partial \Pr(WIN | g_1^*, \tau_1^*)}{\partial \tau_1^*} \right] = 0 \end{aligned}$$

After having explained the representative voter behavior we need to see its implication on the strategic behavior of the incumbent. Ex-ante, a rational incumbent politician understands, considering voters' strategies, that his

¹⁰The representative voter observes the realized g_1 and τ_1 . Then he sets his strategy: he defines his belief on what the incumbent has set, $g_1^{*,V}$ and $\tau_1^{*,V}$. Hence, by difference he works out the incumbent's competence, $\mu_1^{g,V}$ and $\mu_1^{\tau,V}$. A rational voter will believe that the incumbent has manipulated the economy. Suppose instead the voter believes that the incumbent behaves as in the non-electoral period, $g_1^{*,V}$. Then the incumbent will have an incentive to set $g_1^{*,I} = g_1^{*,V} + \gamma$, with γ positive and small enough, and then fool the electorate. Indeed the voter will infer an higher incumbent competence compared to the real one:

$$\mu_1^{g,V} = g_1 - g_1^{*,V} = g_1^{*,V} + \gamma - g_1^{*,V} + \mu_1^g = \mu_1^g + \gamma$$

Clearly the probability that the incumbent will be re-elected increases. The same reasoning holds for τ . This process will continue until the marginal cost of manipulating the economy for the incumbent is equal to the marginal benefit of being re-elected.

probability of winning is:¹¹

$$\begin{aligned}
\Pr(WIN | g_1^*, \tau_1^*) &= \Pr \left[\mu_1^{g,V} + \mu_1^{\tau,V} \geq 0 | g_1^*, \tau_1^* \right] \\
&= \Pr \left[g_1 - g_1^{*,V} + \tau_1^{*,V} - \tau_1 \geq 0 | g_1^*, \tau_1^* \right] \\
&= \Pr \left[g_1^* + \mu_1^{g,I} - g_1^{*,V} + \tau_1^{*,V} - \tau_1^* + \mu_1^{\tau,I} \geq 0 \right] \\
&= \Pr \left[\mu_1^{g,I} + \mu_1^{\tau,I} \geq g_1^{*,V} - g_1^* + \tau_1^* - \tau_1^{*,V} \right] \\
&= 1 - F \left(g_1^{*,V} - g_1^* + \tau_1^* - \tau_1^{*,V} \right) \tag{11}
\end{aligned}$$

Using expression (11) and considering the rational expectations conditions we can easily derived the marginal increase of the probability of being re-elected:¹²

$$\begin{aligned}
\frac{\partial \Pr(WIN | g_1^*, \tau_1^*)}{\partial g_1^*} &= f \left(g_1^{*,V} - g_1^* + \tau_1^* - \tau_1^{*,V} \right) = f(0) \\
\frac{\partial \Pr(WIN | g_1^*, \tau_1^*)}{\partial \tau_1^*} &= -f \left(g_1^{*,V} - g_1^* + \tau_1^* - \tau_1^{*,V} \right) = -f(0)
\end{aligned}$$

As a consequence we can rewrite the first order conditions of the problem *Pa*) as follows:

$$\begin{aligned}
\frac{\partial Q}{\partial g_1^*} &= E_0 [U_g(g_1^* + \mu_1^g, y - \tau_1^* + \mu_1^\tau) - \beta V'(\tau_1^* - g_1^* + \mu_0^\tau + \mu_0^g)] + \beta(1 + \beta)Xf(0) = 0 \\
\frac{\partial Q}{\partial \tau_1^*} &= E_0 [-U_c(g_1^* + \mu_1^g, y - \tau_1^* + \mu_1^\tau) + \beta V'(\tau_1^* - g_1^* + \mu_0^\tau + \mu_0^g)] - \beta(1 + \beta)Xf(0) = 0
\end{aligned}$$

Therefore \hat{g}_1^* and $\hat{\tau}_1^*$ are such that:

$$\begin{aligned}
E_0 [U_g(\hat{g}_1^* + \mu_1^g, y - \hat{\tau}_1^* + \mu_1^\tau)] + \beta(1 + \beta)Xf(0) &= E_0 [U_c(\hat{g}_1^* + \mu_1^g, y - \hat{\tau}_1^* + \mu_1^\tau)] + \\
&+ \beta(1 + \beta)Xf(0) \\
&= \beta E_0 [V'(\hat{\tau}_1^* - \hat{g}_1^* + \mu_0^\tau + \mu_0^g)]
\end{aligned}$$

Since $\beta(1 + \beta)Xf(0) > 0$, then

$$E_0 [U_g(\hat{g}_1^* + \mu_1^g, y - \hat{\tau}_1^* + \mu_1^\tau)] = E_0 [U_c(\hat{g}_1^* + \mu_1^g, y - \hat{\tau}_1^* + \mu_1^\tau)] < \beta E_0 [V'(\hat{\tau}_1^* - \hat{g}_1^* + \mu_0^\tau + \mu_0^g)]$$

Let us compare this result to the maximization for period 2:

$$\begin{aligned}
E [U_g(\hat{g}_2^* + \mu_2^g, y - \hat{\tau}_2^* + \mu_2^\tau)] &= E [U_c(\hat{g}_2^* + \mu_2^g, y_2 - \hat{\tau}_2^* + \mu_2^\tau)] = \\
&= \beta E [V'(\hat{\tau}_2^* - \hat{g}_2^* + \mu_1^\tau + \mu_1^g)]
\end{aligned}$$

¹¹We assume that $\mu_1^g + \mu_1^\tau$ is distributed according a probability density function $f(\mu_1^g + \mu_1^\tau)$.

¹²The rational expectation hypothesis implies that in equilibrium $g_1^{*,V} = g_1^*$ and $\tau_1^{*,V} = \tau_1^*$.

The first derivatives Ug and Uc are decreasing in g and increasing in τ . Therefore in equilibrium $\hat{g}_1^* > \hat{g}_2^*$, $\hat{\tau}_1^* < \hat{\tau}_2^*$ and $k_2^* < k_3^*$. The incumbent sets a higher level of public consumption and lower taxes in order to appear more competent than its competitor. However, this behavior is completely anticipated by voters who can correctly extract the information required to assess the incumbent's competence.

The model predicts that the presence of elections induces the policy-maker to manipulate the economy. As we argued above this proposition hinges critically on the assumption that rational voters extract information about the incumbent's competence through the unexpected components of fiscal policy results. In other words, voters observe the realized fiscal variable (the real expenditure, g and the tax revenue, τ) and using their information they rationally infer the level of taxes and spending chosen by the incumbent (this is what the voters expect, g^* and τ^*) and by difference they obtain the incumbent's competence (that can be interpreted as the unexpected part, μ^g , μ^τ). Rather than taking this hypothesis as a matter of fact, an empirical analysis of voters' behavior needs be included in addition to the analysis of policy-makers' behavior.

The effect of elections on the citizens' welfare is ambiguous. On the one hand the distortion of the economy reduces the welfare; on the other hand electoral competition increases the voters' utility because it allows to select the more competent politician and therefore to benefit from better future economic performance, *ceteris paribus*.

3.1.5 Empirical Implications to Be Tested

1. On average, public consumption is higher and tax revenues are lower in the period preceding elections (Section 4).
2. The higher the unexpected increase in the level of public consumption before elections, the higher the probability of the incumbent being re-elected. The higher the unexpected decrease in the level of taxes before elections, the higher the probability of the incumbent being re-elected (Section 5).

3.2 Political Business Cycles

In this section we will briefly summarize the main assumptions and the main implications of the Business Cycle Models.

As stated in the introduction we distinguish between the Traditional and the Rational Opportunistic Business Cycle Models. In both voters are "retrospective", but in the former voters heavily discount the past economic performance (adaptive expectations), while in the latter voters use all the past information and rationally infer the incumbent competence (rational expectations).

3.2.1 Traditional Opportunistic Model vs Rational Opportunistic Model

The main assumptions of the two models are summarized in Figure 2.

Business cycle models	
<ul style="list-style-type: none"> • Opportunistic Cycle • H 1: We consider an economy with an expectation-augmented Philips curve. • H 2: Voters infer expected inflation using adaptive expectation • H 3: Politician preferences are the same. Their task is to be rewarded and benefit by the honour to be in charged. • H 4: Every election period we have just two politicians: the Incumbent and the Opposite candidate. • H 5: Voters have the same preference on economic performance. More formally they like growth and employment while they dislike inflation. Voters are retrospective and heavily discount the past. • H 6: The policymaker has a deterministic control on policy related to aggregate demand. • H 7: Election date is exogenously fixed. 	<ul style="list-style-type: none"> • Rational Cycle • H 1: We consider an economy with an expectation-augmented Philips curve characterised by a competence term. Moreover we assume that incumbent knows this parameter value while voters do not (they know its distribution function). • H 2: Voters infer expected inflation using rational expectation. • H 3: Voters have the same preference on economic performance and they cast their vote by maximising their expected utility function. • H 6: Policymaker controls inflation directly. • H 4, H 5, H 7, do not change

All of these models predict the incentive of the incumbent policy-maker to use monetary and fiscal policy in order to create a boom in the economy before elections are held. But while in the first generation of models the cycle arises mainly because of voter myopia (H_2 and H_5), in the rational model the cycle arises because of the asymmetric information present in the economy (H_1).

A political framework with naive voters allows the incumbent to stimulate the economy immediately before each election and then to eliminate the resulting inflation with a post-electoral downturn or recession. The voters reward this behaviour because they do not understand how the economy works and therefore they do not take into account the trade-off between inflation and unemployment. This outcome disappears when we apply the standard notion of rational behaviour to voters' expectations. Rational Opportunistic Cycle Models try to reconcile the first generation of models with this hypothesis. Assuming rationality of voters implies the following: the electorate casts its vote by maximising expected welfare (H_3) and forms expectations optimally, given the information available (H_2). Generally these models stress the idea of competence, interpreted as the ability to create growth without inflation,

in combination with the asymmetric information (H_1). These signalling models result in opportunistic behaviour on the side of policy-makers, leading to economic fluctuations. However, the introduction of rationality in voters' behaviour reduces the magnitude and the frequency of these cycles.

The difference in the nature of the electoral cycles predicted by the two types of Political Cycle Models leads to some relevant welfare and policy implications. If we agree on the naive voters assumption then the strong incentive for politicians to manipulate the economy (due by the short memory of the voters) suggest policy prescriptions like central bank independence. On the other hand, if voters have strong information processing skills then the electoral cycles will allow voters to extract the "real" incumbent's quality and therefore electoral cycles may even be tools to achieve efficiency.¹³

3.2.2 Empirical Implications

Traditional Opportunistic Model:

1. The incumbent manipulates the economy by creating regular cycles in growth and employment in the year before the elections. The opposite policy will be implemented after elections.
2. Inflation increases just after elections.
3. Naive voters evaluate the incumbent competence by looking at the GDP growth, employment and inflation in the period preceding elections.

Rational Opportunistic Model

1. There is no systematic cycle on GDP growth and unemployment before the elections.
2. Inflation increases just after elections.
3. Rational voters observe the past economic outcome and cast their votes on the basis of the unexpected performance of the economy.

4 Empirical Evidence of Politically-Induced Cycles

4.1 Political Budget Cycles

¹³This reasoning stems from the standard principal-agent literature. Roughly speaking, given a typical moral hazard problem in a principal-agent framework, the more the valuable informations used by the principal to extract the agent real effort, the more efficient the final outcome in the economy.

In this section we search for the existence of pre-electoral cycles in fiscal variables for eighteen OECD countries over the period 1961-95. Public spending and deficits are expected to be higher and tax revenues are expected to be lower in the electoral years.

Conceptually, the choice between spending increases and tax reductions is ambiguous. According to our model, one force that drives this choice is the incumbent's competence and therefore the nature of the budget cycle should vary across different elections. Another force that influences this choice will be the voters' preferences over private consumption and public spending. Finally, from a statistical point of view, the ratios of government spending and revenues over GDP are highly persistent; this property could hide the presence of budget cycle on revenues and public spending.

Considering these caveats, the pooled specification adopted to test for the presence of political budget cycles is:¹⁴

$$X_{it} = \alpha_0 + \alpha_1 X_{i,t-1} + \alpha_2 GDP_{it} + \alpha_3 \Delta UN_{it} + \alpha_4 INF_{it} + \alpha_5 ELE_{it} + \epsilon_{it}$$

where X is the fiscal variable considered, GDP is the growth rate of real GDP, ΔUN is the change in the unemployment rate, INF is the inflation rate, ELE is a dummy variable which takes value 1 in an electoral year and 0 otherwise, the subscript i denotes the country and t denotes the period.

Data about fiscal variables are obtained by the World Bank and the Government Financial Statistics by IMF. The variables employed (expressed as share of the GDP) are: central government overall deficit (-) or surplus (+) (SUR), central government current expenditure on goods and services (EX), central government total expenditure (EXP) and central government tax revenues (TR). The data for EXP , SUR and TR spans from 1961 to 1995 for almost every country, whereas the series EX runs from 1970 to 1995. Summary statistics and data description are presented in Table 1.

In the search for the presence of budget cycles a few control variables are employed, in accordance to the existing literature.¹⁵ To control for the economic cycle, the growth rate of the economy, the annual variation in the unemployment rate, and the inflation rate are included.¹⁶

It is useful to summarize the expected effect of these control variables. In general economic growth has two main effects: on the one hand, it reduces the ratios of the fiscal variables to the gross domestic product by increasing the denominator, on the other hand good economic performances should be associated with lower budget deficits, given for instance the lower expenditure on unemployment subsidies and the higher tax revenues. Annual variation in the unemployment rate is included following similar considerations: the expected

¹⁴Considering the same specification with the dependent variable in first difference leads to similar empirical outcomes. The results are available upon request.

¹⁵See for instance De Haan and Strum (1994).

¹⁶The source is OECD.

sign of the coefficient is negative when ΔTR and SUR are the dependent variable and positive with ΔEXP and ΔEX . Finally, inflation is supposed to have a strong effect on tax revenues due to the progressivity of tax rates, while its effects on the other variables are more uncertain. The inclusion of variables like the degree of openness of the economy, the percentage of old and young population and the change in real per person disposable income proved not to be significant. As we lose observations by adding these additional controls we leave them out of the basic specification.

The Feasible Generalized Least Squares method is employed given the presence of heteroskedasticity. The hypothesis of equal country-dummies is not rejected and so a single intercept is adopted for all the regressions.¹⁷ The obtained residuals do not present serial correlation.

The results are shown in Table 2. All the control variables except three are significant. The dummy ELE is statistically highly significant and with the expected sign for: SUR , TR , EX , while it is not statistically significant for EXP . Deficits are higher in election years by almost 0.22% if compared to off-election years.

The non-significance for EXP is not entirely surprising. The assumption of voters rationality implies that the electorate will take into account the economic variables that reflect the government's actions and they will ignore the economic variables that reflects influences outside the politician's control. The variable EXP includes components like the interests on debt that cannot be related to the incumbent's competence.

It is important to ascertain whether this budget cycle is driven mostly by the reduction of taxes (TR) or by increased spending (EX). The results confirm that both are significant, the latter effect being weaker than the former. On average the reduction in tax revenues to GDP accounts for 0.28%, a value that more than offsets the mean tax increase in the considered sample, which is 0.22%. The electoral rise in spending, though smaller, is not negligible: expenditures on goods and services are 0.09% higher in election years.

We ran some regressions adopting different estimation methods to check the robustness of our findings. As mentioned above, we used the FGLS method given the presence of panel heteroskedasticity. We obtained basically the same results qualitatively and quantitatively, with two different methods, the White Heteroskedasticity correction and Ordinary Least Squares.¹⁸

We also added to the basic specification a dummy variable to investigate the presence of post electoral budget cycles. The results confirmed the presence

¹⁷The results for the test are presented in Table 2.

¹⁸Roughly speaking, the main difference between FGLS and the White Heteroskedasticity correction is that the latter does not assume any particular specification on the nature of the heteroskedasticity while the FGLS method does. In this panel data study we think that the presence of heteroskedasticity depends on differences in the institutional structures and the history of different countries. OLS estimates are consistent but not efficient in presence of heteroskedasticity. Therefore we consider the FGLS method as the most appropriate method.

of pre-electoral cycles on fiscal variables while we did not find any evidence of fiscal adjustment until after the election. This result is in line with a recent work of Persson and Tabellini,¹⁹ where a difference is shown in the features of the electoral budget cycles between presidential and parliamentary democracies for a sample of 61 countries. More in detail, they find strong evidence for a post electoral cycle in parliamentary regimes and only a pre-electoral cycle in presidential regimes. Following the classification of the two authors, our sample is composed by 15 parliamentary countries and 3 presidential countries. Clearly, the structure of our sample does not allow us to investigate the presence of a specific institutional effect on the electoral cycle. However, repeating the analysis described in this section considering only the 15 parliamentary countries and a post electoral dummy leads substantially to the same results. Then, we confirm the presence of pre-electoral budget cycles and the absence of post-electoral cycles in the parliamentary regimes.

Proposition 1 of our model (Section 3.1.5) is thus verified: incumbent policy-makers engage in budget manipulations before elections. In particular public spending is higher and tax revenues are lower, resulting in higher deficits.

4.2 Political Business Cycles

In this section we test for the existence of pre- and post-electoral cycles in *GDP* growth rate (*GDP*) and in the inflation rate (*INF*) for 18 OECD countries on the period 1961-1995 using quarterly data.²⁰

The pooled specification adopted to investigate the presence of business cycles is:

$$\begin{aligned} GDP_{it} &= \alpha_0 + \alpha_1 GDP_{i,t-1} + \dots + \alpha_n GDP_{i,t-n} + \beta PREele_{it} + \gamma POSTele_{it} + \varepsilon_{it} \\ INF_{it} &= \alpha_0 + \alpha_1 INF_{i,t-1} + \dots + \alpha_n INF_{i,t-n} + \beta PREele_{it} + \gamma POSTele_{it} + \varepsilon_{it} \end{aligned}$$

where *PREele* is a dummy variable which takes value 4 in the quarter when elections are held, values 3, 2, 1, respectively in the previous quarters and zero otherwise. *POSTele* is a dummy variable that takes value 4 in the first quarter after the elections, values 3, 2, 1 respectively in the following three quarters and zero otherwise. This dummy should be able to capture a deviation from the natural trend in a better way than the dummy employed by, for instance, Alesina et al. (1997) which takes the same value in all the period preceding and following an election.

The task of this analysis is to test which one of the two models, summarized in Section 3.2, fits better the data. The opportunistic cycle model with naive

¹⁹T.Persson and G. Tabellini, July 2000. "Political Institution and Policy Outcomes: What are the Stylized Facts?"

²⁰The same test for the variable *UN* did not give significant results.

voters predicts an increasing economic activity during the electoral period, while the rational model does not. Anyway, both models predict an inflationary effect postponed after the elections.

The results are shown in Table 3.²¹ The dummies *PREele* and *POSTele* are statistically significant at a 5% level for *GDP*. Moreover the cycle in *GDP* is followed by increasing prices (*POSTele* for *INF* is positive and significant). The interpretation of this outcome supports the opportunistic cycle model with naive voters.

5 The Vote Function

In this section we want to test the hypothesis of voters' rationality.

We will start in Section 5.1 by investigating the influence of macroeconomic variables such as the *GDP* growth rate, the inflation and the unemployment rate on voting. Although this research is primarily concerned with the impact of fiscal variables on voting, we think that it is necessary to start by analyzing the effects of the aforementioned macroeconomic variables for two reasons. They have been used in previous works, and they are likely to be the most important source of information for the electorate. According to the rational opportunistic model, we should expect voters to distinguish expected and unexpected components of these variables and use only the latter to evaluate the incumbent's competence, whereas the traditional opportunistic model does not predict this sophistication.

In Section 5.2 the vote function is enriched with the fiscal variables. Our model predicts that prior to the elections voters observe fiscal results and rationally infer the incumbent's true competence by the unexpected component. The higher the unexpected increase in public consumption before elections, the higher the probability the incumbent is re-elected, and the higher the unexpected decrease in taxes before elections, the higher the probability the incumbent is re-elected.

When implementing this analysis, two empirical problems arise. First we need to define what the expected and the unexpected of the independent variables are. The adopted methodology will be discussed in detail in Appendix C. Here it suffices to say that given the small number of observation available over time the unexpected component is determined as the residual from an autoregressive process for each series. Second, fiscal variables are collected on annual basis, consequently they are less precise than the data on *GDP* growth, inflation and unemployment, available on quarterly basis.

²¹As in the previous section the Feasible Generalized Least Squares method is employed, given the presence of cross-sectional heteroskedasticity. The hypothesis of equal country-dummies is not rejected and so a single intercept is adopted for all the regressions. The obtained residuals do not present serial correlation.

5.1 The Vote Function: Macroeconomic Variables

In order to test for the effects of the macroeconomic variables on voting, we run the following regressions:

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{it} + \alpha_2 NOP_{it} + \alpha_3 GDP_{it} + \alpha_4 UN_{it} + \alpha_5 INF_{it} + \varepsilon_{it} \quad (\text{Eq.1})$$

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{it} + \alpha_2 NOP_{it} + \alpha_3 GDP_{it}^{ex} + \alpha_4 GDP_{it}^{unex} + \alpha_5 UN_{it}^{ex} + \alpha_6 UN_{it}^{unex} + \alpha_7 INF_{it}^{ex} + \alpha_8 INF_{it}^{unex} + \varepsilon_{it} \quad (\text{Eq.2})$$

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{it} + \alpha_2 NOP_{it} + \alpha_3 GDP_{it} + \alpha_4 UN_{it} + \alpha_5 INF_{it}^{unex} + \varepsilon_{it} \quad (\text{Eq.3})$$

where:

$Vote$ is the share of votes obtained by the incumbent government;

$PVote$ is the share of votes obtained by the incumbent government in the previous election;²²

NOP is the number of parties in government;

GDP^{ex} , INF^{ex} , UN^{ex} are respectively the expected components of GDP , INF and UN ;

GDP^{unex} , INF^{unex} , UN^{unex} are respectively the unexpected components of GDP , INF and UN .

We insert the share of votes obtained by the incumbent government in the previous election ($PVote$), and the number of parties (NOP). Previous support is a good proxy of the electoral outcome; therefore we expect the relative coefficient to be positive and close to one. On the other hand, the number of ruling parties is the only political variables that reaches statistical significance.²³

The tests suggested to adopt a model with Feasible Generalized Least Squares and fixed effects. The results are shown in Table 4. The first regression represents a typical vote function based on the assumption of naive voters. We expect the coefficient of GDP to be positive and those of INF and UN to be negative. Voters reward high GDP growth, while they dislike unemployment. Also the political variables $PVote$ and NOP are significant and with the expected sign. The only variable which is not significant is INF .

In the second column we consider both the expected and the unexpected components of the macroeconomic variables. Voters do not seem to take account of the unexpected part of GDP and UN . This could be judged as supportive to the idea of naive voters. But, on the other hand, the significance

²²The methodology adopted to construct the electoral variables, $Vote$ and $PVote$, is described in Appendix B.

²³Following the literature, we used a dummy for minority government, various indexes to take account of the clarity of responsibility, and dummies to differentiate governments according to their average ideology without any appreciable result.

of the unexpected inflation suggests that, at least partially, voters elaborate economic information while casting their vote. It is not surprising that this behavior is emphasized only for INF , being that inflation is the variable most likely to be heavily influenced by external factors such as oil shocks, which voters try to discount. Moreover, the decomposition between the expected and unexpected part has a great impact in the personal financial situation in case of price changes. In a rational world, long-term economic relationship should be adjusted according to the expected price dynamics, therefore expected inflation should not have real effects on personal wealth.

These results are confirmed in column 3 of Table 4, where GDP , UN and INF^{unex} are significant and with the expected sign also if we exclude the insignificant variables of column 2.

5.2 The Vote Function: Fiscal Variables

In order to test for the effects of fiscal variables we will maintain in the regression GDP , UN and INF^{unex} , and we will introduce the unexpected part of public expenditure, EXP^{unex} , of tax revenues, TR^{unex} , and of surplus, SUR^{unex} .

Formally, we run the following regressions:

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{it} + \alpha_2 NOP_{it} + \alpha_3 GDP_{it} + \alpha_4 UN_{it} + \alpha_5 INF_{it}^{unex} + \alpha_6 SUR_{it}^{unex} + \varepsilon_{it} \quad (\text{Eq.4})$$

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{i,t} + \alpha_2 NOP_{it} + \alpha_3 GDP_{it} + \alpha_4 UN_{it} + \alpha_5 INF_{it}^{unex} + \alpha_6 EXP_{it}^{unex} + \alpha_7 TR_{it}^{unex} + \varepsilon_{it} \quad (\text{Eq.5})$$

$$Vote_{it} = \alpha_i + \alpha_1 PVote_{it} + \alpha_2 NOP_{it} + \alpha_3 UN_{it} + \alpha_4 INF_{it}^{unex} + \alpha_5 EXP_{it}^{unex} + \alpha_6 TR_{it}^{unex} + \varepsilon_{it} \quad (\text{Eq.6})$$

The results are shown in Table 5.²⁴ In all three regressions the unemployment is highly significant, as well as the unexpected inflation in columns 3 and 4, while GDP growth is never significant. The coefficients of these variables have the expected signs in all regressions.

More important, the fiscal variables are also statistically significant, but with the "wrong" sign. In the electoral period voters reward the incumbent for an unexpected increase in the government surplus and in the tax revenues, while they punish him for an unexpected increase of the public expenditure.

²⁴We have also estimated equations 4, 5 and 6 using the overall fiscal variables (SUR , EX and TR) instead of their unexpected parts. We basically obtained the same results for the political variables and for GDP, unemployment and unexpected inflation, whereas we did not find any statistically significant evidence for the fiscal variables. The results are available upon request.

This outcomes strongly contradict our model based on the assumption of rational voting.

The results concerning the vote function seem to be robust. Starting from the basic specification we added different political variables that could be theoretically relevant in this specification(see note 20). However these additional variables are not statistically significant and do not alter the previous results on the variables of interest.

6 Conclusion

The starting point of this research was the attempt to examine the dynamic interaction between politicians and voters under the hypothesis of full rationality.

The implications of the model of the political budget cycle we presented in this paper are clear: incumbent politicians reduce taxes and increase public expenditure in the period prior to the elections in order to appear competent and be re-elected. Rational voters recognize policy-makers' incentive and evaluate only unexpected policy results to determine a government's competence: the higher the pre-electoral deficit, the higher the gain in term of votes for the incumbent.

In accordance with the latest studies, we found evidence of a budget cycle in the electoral year: higher deficits are driven mainly by tax cuts, but there are also increases in public expenditure on goods and services (this result is less robust, however).

Given the evidence in favor of the pre-electoral manipulation of the economy, what is missing is a clear link between these results and voters' behavior. Confining our attention to the effect of fiscal variables on vote, the empirical analysis strongly contradicts our model: governments are punished for the budget imbalances, driven either by tax cuts or by increased spending.

Also other economic variables are significant in explaining the electoral outcome: the incumbent is punished for low GDP growth and high unemployment, and for unexpected increase in the inflation rate.

According to traditional models of political business cycles, voters reward high GDP growth, low unemployment and inflation rates. GDP growth and unemployment rates should be lower than average in the period preceding the elections, while the inflationary effects of expansionary policies should be postponed after the elections.

Rational models of the political business cycle differ from the previous ones for they do not predict an increased economic activity in the electoral period. Moreover voters should gauge the government's competence by separating unexpected and expected results, only the former being relevant.

Our results tend to support the hypothesis of voters who are not fully rational. In fact there is evidence of a cycle in the GDP growth (although

not in the unemployment rate), followed by increasing prices. Voters do not distinguish between unexpected and expected components of GDP growth and unemployment, whereas they punish only unexpected inflation. This suggests that, at least partially, voters elaborate the economic information available for a variable, such as the inflation rate, which is often influenced by elements beyond the control of the government (e.g. due to oil shocks).

It seems a reasonable explanation that the manipulation of fiscal variables is pursued to influence economic variables such as the GDP growth and the unemployment rate that might be more easily used by the electorate to infer the competence of the government.

In an integrated framework, which still needs to be formalized, we can think about voters who like economic growth and low unemployment and inflation and who anticipate the incentive for the government to manipulate the economy. They evaluate the government's competence in a complex way, by taking into account not only the final results of interest (GDP growth, unemployment, inflation) but also the manipulation of the fiscal variables. Given a certain rate of economic growth achieved by an incumbent, they punish more the government that experiences a higher deficit than the one that achieves growth by policies whose effects are neutral for the budget.

The trade-off faced by the incumbent can be modeled as follows: his attempt to stimulate the economy is limited by the inflationary consequences, as predicted by the usual models, and, moreover, by the surge of budget imbalances. The size of the manipulation of the economy is determined by the preferences of the individuals.

This is only an attempt to provide an interpretation for our unexpected findings. What we want to stress here is that the models of political budget and business cycle, either in their traditional or rational variants, are not consistent with empirical data, and more refinements are needed, by allowing for partial rationality of individuals on the one hand, and by achieving a better understanding of the relationships between the economic variables on the other hand.

Appendix A: Data

Countries:

The countries considered in the empirical analysis are:

Austria, Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Sweden, Switzerland, UK, USA.

Fiscal Variables

EX = central government expenditure on subsidies and services (% of GDP). Source IMF/GFS.

EXP = central government total expenditure (% of GDP). Source World Bank.

TR = central government tax revenues (% of GDP). Source World Bank.

SUR = central government overall (-) deficit or surplus (+) (% of GDP). Source World Bank.

SUR^{unex} = unexpected variation in central government overall (-) deficit or surplus (+) (% of GDP). Univariate autoregressive specification.

EXP^{unex} = unexpected variation in central government total expenditure (% of GDP). Univariate autoregressive specification.

TR^{unex} = unexpected variation in central government tax revenues (% of GDP). Univariate autoregressive specification.

Economic Variables

GDP = real GDP growth rate. Source OECD.

INF = consumer price index growth rate. Source OECD.

UN = unemployment rate. Source OECD.

GDP^{unex} = unexpected GDP growth rate. Univariate autoregressive specification.

GDP^{ex} = expected GDP growth rate. Univariate autoregressive specification.

INF^{unex} = unexpected inflation rate. Univariate autoregressive specification.

INF^{ex} = expected inflation rate. Univariate autoregressive specification.

UN^{unex} = unexpected UN rate. Univariate autoregressive specification.

UN^{ex} = expected UN rate. Univariate autoregressive specification.

Political Variables

ELE = dummy variable which assumes value 1 on an electoral year and 0 otherwise. Source Mackie and Rose (1991, 1997).

PREele = Dummy variable which assumes value 4 in the quarter when election are held, values 3,2,1, respectively in the previous quarter and zero otherwise.

POSTele = Dummy variable that assumes value 4 in the first quarter after the election, value 3,2,1, respectively in the following 3 quarters and zero otherwise.

NOP = number of ruling parties. Source Woldendorp et al. 1998.

PVOTE = share of votes obtained by the incumbent government in the previous election. Source Mackie and Rose (1991, 1997).

APPENDIX B: Electoral Results

The electoral results for each party are taken from Mackie and Rose (1991, 1997). Our source to determine the ruling coalition is Woldendorp et al. (1997). The ruling government is defined as the one incumbent in the twelve months before elections take place. We found no problem in defining the ruling parties for most of the data. In some cases, however, we could not compare the results of current and previous elections because of aggregation and disaggregation among parties. Therefore some elections are not included (Netherlands 1977, France 1978 and Italy 1994).

In a few cases, due to high political instability, elections were held only a few months after the previous ones. This is the case of the United Kingdom (two elections in 1974) and Ireland (three elections between 1980 and 1981). It seems quite unlikely that the incumbent is able to manipulate the economy successfully in the few months between the elections. For this reason, elections held less than twelve months after the previous one are not considered.

Previous studies did not take into account the elections characterized by a dramatic loss of votes for the incumbent since economic motivations alone cannot explain the voters' behavior. However, the results are invariant to either the inclusion or the exclusion of elections in which the support for the government varies more than twenty percentage points.

APPENDIX C: Separating Unexpected and Expected Components

This section provides details of the methodology employed in the statistical analysis presented in Table 4 and 5 to estimate unexpected and expected components of the economic variables. We follow the procedure used by Whitten and Palmer (1999). The following autoregressive specification is adopted for quarterly data on GDP growth, unemployment, and inflation:

$$Y_{i,t} = \beta_{1i} + \beta_{2i}Y_{i,t-1} + \beta_{3i}(Y_{i,t-1} - Y_{i,t-5}) + \beta_{4i}Q_{i,t}^2 + \beta_{4i}Q_{i,t}^3 + \beta_{4i}Q_{i,t}^4 + \varepsilon_{i,t}$$

where $Y_{i,t}$ is the economic measure for country i at time t , $Q_{i,t}^2$, $Q_{i,t}^3$ and $Q_{i,t}^4$ represent dummy variables respectively for the second, third and fourth quarters and control for seasonal trends. The term $Y_{i,t-1} - Y_{i,t-5}$ control for business cycle trends. Finally $\varepsilon_{i,t}$ is a white noise error process.

Unfortunately the fiscal variables are available only at annual frequency, making it more difficult to formulate precisely the unexpected components. The following autoregressive specification is adopted for public expenditures (EX), tax revenues (TR) and central government overall deficit or surplus (SUR),

$$Y_{i,t} = \beta_{1i} + \beta_{2i}Y_{i,t-1} + \dots + \beta_{3i}Y_{i,t-n} + \varepsilon_{i,t}$$

where $Y_{i,t}$ is the economic measure for country i at time t and $\varepsilon_{i,t}$ is a white noise error process. The order of this autoregressive specification is chosen ad hoc for each country considering the Akaike and Schwarz information criteria.

We computed these regressions separately for each country over the period 1960-95. The residuals from the autoregressions provide the unexpected part. The expected part of the economic variables is obtained by difference. Generally the autoregression residuals are white noise for all countries. Indeed the fitted values from these regressions represent a weighted average of all values from the sample, then the residuals for a specific country represent changes for expectations derived on the basis of time series of past values in that country. Another alternative could be to perform these regressions starting from the smallest sample and make a forecast of one quarter ahead and iterate this procedure increasing the sample. In this case the forecasted value should be interpreted as the actual expectation of people in the specific country at a specific time. Contrarily the procedure used in this paper, considering all the sample, estimates the expected component of the economic variables and not the "actual" expected component. Finally, using this technique to obtain measures of the unexpected component allows us to standardize a performance according to the economic context in which it occurred; thereby it makes this measures comparable in a panel data specification (across country and over time).

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Tables

Table 1
Data Description

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
EX	7.72	7.76	2.48	2.28	16.55
EXP	32.90	34.60	10.53	8.25	56.43
TR	22.36	31.16	8.72	9.54	46.70
SUR	-2.86	-2.02	3.45	4.47	-16,25
GDP	3.29	3.19	2.61	-6.73	11.95
INF	5.78	4.58	4.12	-0.74	24.24
UN	4.77	3.94	3.72	0.002	18.37

Notes: SUR and TR run from 1961 to 1995 for all countries. EXP runs from 1961 to 1995 except for UK. EX runs from 1971 to 1995 for all countries. GDP, UN and INF are quarterly data and run from 1961 to 1995.

Table 2
Political Budget Cycle

Dependent Variable	SUR	TR	EX	EXP
CONSTANT	-0.17 (-1.44)	0.22 (1.11)	0.16*** (3.66)	0.64*** (2.96)
SUR(-1)	0.88*** (55.15)			
TR(-1)		0.99*** (154.76)		
EX(-1)			0.98*** (201.76)	
EXP(-1)				0.98*** 186.57
GDP	0.02 (1.05)	-0.03 (-1.32)	-0.05*** (-8.14)	-0.09*** (-3.46)
UN	-0.69*** (-9.98)	-0.15** (-2.02)	0.05*** (3.34)	0.47*** (5.68)
INF	-0.01 (-1.31)	0.07*** (5.09)	0.007*** (2.67)	0.07*** (4.92)
ELE	-0.22** (2.22)	-0.28** (-2.19)	0.09*** (3.38)	-0.02 (-0.18)
Adj. R-squared	0.83	0.95	0.94	0.97
Period	1961-95	1961-95	1972-95	1961-95
No. Countries	18	18	18	17
No. Observation	628	596	391	579
F-test	1.31 (1.77)	0.13 (1.77)	1.22 (1.77)	1.00 (1.77)

Notes: (heteroskedastic-consistent t-statistic in parentheses); *p<0.10, **p<0.05, ***p<0.001; constant intercept and FGLS method adopted.

F-test is an F test of the null hypothesis that all country-specific effects are equal. That is under the null hypothesis the efficient estimators is pooled least squared (5% critical value reported in parentheses).

Table 3
Political Business Cycle

Dependent Variable	GDP	INF
CONSTANT	0.42*** (7.64)	0.18*** (5.81)
GDP(-1)	0.95*** (46.99)	
GDP(-2)	0.01 (0.42)	
GDP(-3)	0.03 (1.26)	
GDP(-4)	-0.52*** (-20.92)	
GDP(-5)	0.35*** (13.15)	
GDP(-6)	0.009 (0.48)	
INF(-1)		1.40*** (70.27)
INF(-2)		-0.39*** (-11.36)
INF(-3)		0.10*** (3.29)
INF(-4)		-0.60*** (-19.30)
INF(-5)		0.59*** (18.00)
INF(-6)		-0.06* (-1.84)
INF(-7)		-0.09*** (-4.47)
PRE-ELE	0.046** (2.12)	-0.01 (-1.23)
POST-ELE	0.048** (2.22)	0.03*** (3.13)
Adj. R-squared	0.78	0.96
Period	1962:3-1995:4	1961:4-1995:4
No. Countries	18	18
No. Observation	2412	2458
F-test	1.27 (1.67)	0.81 (1.67)

Notes: (heteroskedastic-consistent t-statistic in parentheses); *p<0.10, **p<0.05, ***p<0.001; constant intercept and FGLS method adopted.

F-test is an F test of the null hypothesis that all country-specific effects are equal. That is under the null hypothesis the efficient estimators is pooled least squared (5% critical value reported in parentheses).

Table 4

Vote function: Macroeconomic Variables

Dependent Variable	VOTE Eq.1	VOTE Eq.2	VOTE Eq.3
PVOTE	0.75*** (17.56)	0.73*** (15.82)	0.72*** (15.58)
NOP	1.06** (2.35)	0.82* (1.66)	0.75 (1.55)
GDP	0.27** (2.27)		0.27** (2.16)
UN	-0.28** (-2.44)		-0.39*** (-3.31)
INF	0.06** (0.70)		
GDP-exp		0.29* (1.66)	
GDP-unexp		0.26 (1.15)	
UN-exp		-0.46*** (-3.53)	
UN-unexp		-1.68 (-0.93)	
INF-exp		0.08 (0.09)	
INF-unexp		-0.73* (-1.76)	-0.90** (-2.22)
Adj. R-squared	0.94	0.92	0.92
Period	1961:3-1995:4	1964:3-1995:4	1964:3-1995:4
No. Countries	18	18	18
No. Observation	178	159	164
F-test	1.86 (1.67)	1.89 (1.67)	1.84 (1.67)

Notes: (heteroskedastic-consistent t-statistic in parentheses); *p<0.10, **p<0.05, ***p<0.001; Fixed Effect method adopted.

F-test is an F test of the null hypothesis that all country-specific effects are equal. That is under the null hypothesis the efficient estimators is pooled least squared (5% critical value reported in parentheses).

Table 5
Vote Function: Fiscal Variables

Dependent Variable	VOTE Eq.4	VOTE Eq.5	VOTE Eq.6
PVOTE	0.72*** (15.89)	0.76*** (15.73)	0.76*** (15.58)
NOP	0.80* (1.66)	0.70 (1.35)	0.72 (1.39)
GDP	0.18 (1.38)	0.16 (1.12)	
UN	-0.43*** (-3.63)	-0.40*** (-2.86)	-0.44*** (-3.21)
INF-unexp	-0.92** (-2.30)	-0.71** (-1.66)	-0.66 (-1.58)
SUR-unexp	0.43* (1.86)		
EXP-unexp		-0.48* (-1.77)	-0.60** (-2.39)
TR-unexp		0.68** (2.14)	0.74** (2.37)
Adj. R-squared	0.93	0.92	0.95
Period	1964:3-1995:4	1964:3-1995:4	1964:3-1995:4
No. Countries	18	17	17
No. Observation	164	159	159
F-test	1.86 (1.67)	1.69 (1.67)	1.72 (1.67)

Notes: (heteroskedastic-consistent t-statistic in parentheses); *p<0.10, **p<0.05, ***p<0.001; Fixed Effect method adopted.

F-test is an F test of the null hypothesis that all country-specific effects are equal. That is under the null hypothesis the efficient estimators is pooled least squared (5% critical value reported in parentheses).