# Inefficient Policies and Incumbency Advantage*

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**Abstract**

Political incumbents who are up for reelection have the paradoxical incentives to perform inefficiently in exactly those realms of politics in which they are perceived to do better than their opponents because they want the public to believe that their continued presence in office is needed. We provide a model that exhibits this behavior in equilibrium. The voter is uncertain about the state of the world and the incumbent's choice of policy, so that bad policy outcomes may be due to either a bad state or the incumbent's choice of inefficient policy. The equilibrium of the game is such that the incumbent is reelected in all states in which he chooses inefficient policies, whereas he would not be reelected in some of these states if he chose efficient policies. Thus, the incumbent not only enjoys an incumbency advantage due to asymmetric information but he also performs in some instances inefficiently in those realms of politics where he is believed to be strong. This is consistent with the findings of the empirical political business cycle literature that growth towards the end of the term slows down under a Democrat in office and with the empirical evidence on homicide and economic growth rates in OECD countries that we provide.

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## 1 Introduction

Whether political leaders can be trusted to act in the best of public interest is a question of traditional concern and obvious relevance for economists and political philosophers alike. The question is particularly salient in those realms of politics where office motivated political incumbents are stronger than their challengers exactly because they may want to make the electorate believe that the evils they are meant to cure are still prevalent and thus require their continued presence in office. Accordingly, a right-wing incumbent who enjoys a reputation of being tough on crime might not necessarily chase down all the villains because he will be reelected if and only if the public sees enough villains in the streets. Analogously, a left-wing politician who is known for his dislike of low economic growth and high unemployment rates may on purpose hamper short-run growth so the public believes that they cannot do without him in these harsh economic times while, in fact, the times are not as harsh as the incumbent makes them appear.

There is ample evidence that political leaders in different political parties have reputations for being good at different things.[1] When crime, or terrorism, or foreign threats are perceived as high, right-wing parties tend to do better in elections. When voters are more concerned about the economy, in most countries this tends to boost the vote for left-wing parties. There is also ample evidence that voters are generally rather ill-informed about facts relevant to politics (see e.g. Bartels, 1996, or Blendon et al., 1997). Therefore, there is some ground for the idea that rationally acting self-interested political incumbents may be able to successfully "fool" the public. Yet, to the best of our knowledge, this idea has received no attention in the economics literature so far. To fill this void, we provide a simple model that we consider plausible and that has exactly the features that the political incumbent may sometimes choose inefficient policies in a realm of politics in which he is strong, which allows him to "fool" the voters and, thereby, to improve his reelection prospects. We also provide empirical evidence consistent with these features.

This model basically works as follows. In contrast to the voter an incumbent politician who holds an executive office knows the current state of the world, say, the prevalence of criminals. It is common knowledge that the future state of the world is strongly correlated with the current state. The preferences of the voter and the candidates are such that under complete information she would reelect the incumbent if and only if the prevalence of criminals is above

[1] For evidence and references see Section 5 below.

a certain threshold level. The incumbent can choose to fight crime efficiently or not. The voter observes neither this choice nor, as mentioned, the prevalence of criminals, but she observes the resulting policy outcome, say, the crime rate. The incumbent's preferences are such that he dislikes crime much like the voter does. But he also has a preference for being in office. Therefore, he is willing to make some trade-offs between higher crime rates and increases in the probability that he is reelected.

In equilibrium the incumbent uses the available policy instruments efficiently both in high states where crime is a very serious issue and in low states where crime is only a minor problem. Observing the resulting crime rate, the voter correctly infers the underlying state of the world and reelects the incumbent with probability one in the high states and with probability zero in the low states. However, in intermediate states the incumbent chooses inefficient policies, which results in a higher crime rate than when policies are efficient. Observing intermediate levels of the crime rate, the voter can therefore not tell whether they are the product of the use of inefficient policies when the prevalence of criminals is moderately low or of the use of efficient policies when the prevalence of criminals is moderately high. The twist of the model is that in these instances the voter's updated beliefs are garbled in exactly such a way that her expected utility of reelecting the incumbent exceeds her expected utility of electing the challenger. Therefore, the incumbent is reelected whenever he uses inefficient policies, and he is reelected in more states of the world than he would be if the voter were fully informed.

The model therefore predicts that an incumbent behaves in a socially harmful way in those realms of politics where he enjoys a reputation of being stronger than his challenger. Moreover, there is an incumbency advantage due to asymmetric information between the incumbent and the electorate. To the best of our knowledge, these predictions are novel. As they might seem paradoxical, we review the existing empirical evidence and provide some new empirical evidence in their support. Consistent with the findings of the previous literature, we show first that left-wing politicians tend to be better at fostering short-run economic growth and that right-wing politicians tend to be better at fighting crime than their respective opponents. Second, we show that economic growth slows down in a statistically significant way in the two years prior to elections if the incumbent is left-wing and up for reelection. Similarly, crime rates go up in a statistically significant way in the two years preceding an election if the incumbent is right-wing and up for reelection. While we do not claim that this evidence is conclusive, we view it as strong support for our model.

Our model is closest to the contributions of Rogoff and Siebert (1988) and Rogoff (1990). In their models the incumbent has private information about his ability whereas the voter is privately informed about his bliss point policy. The incentives to signal high ability induce the incumbent to distort the policy away from the social optimum. The incumbent's equilibrium strategy, however, is strictly monotone in his type, so that all sequential equilibria, though inefficient, are fully separating.[2] In Alesina and Cukierman (1990), where the incumbent also distorts the policy with the aim of improving his reelection prospects, the equilibrium where the voter's updating rule is linear rather than Bayesian is also separating.[3]

Coate and Morris (1995) study incumbents' incentives to use inefficient ways of redistribution to special interest groups. An incumbent in their model can be of two types, "good" or "bad", which is his private information. In equilibrium a bad incumbent may choose inefficient transfers to conceal his type. Since under full information the voter would reelect the good type and vote out of office the bad type with probability one, the asymmetry of information improves the reelection prospects of the bad type and decreases those of the good type. This contrasts with our model, where the asymmetry of information never hurts an incumbent and sometimes benefits him.

Our paper also relates to the literature on political business cycles. In this literature, there are two competing strands: one assuming opportunistic policy-makers (e.g., Nordhaus, 1975; Rogoff and Siebert, 1988; and Rogoff, 1990), and one assuming partisan policy-makers with differences in their macroeconomic objectives (e.g., Hibbs, 1977; and Alesina, 1987). In his comprehensive survey of the political business cycle literature, Drazen (2000) argues that partisan models suffer from conceptual weaknesses.[4] Drazen (2000, p.93-94) also mentions the empirical regularity, first pointed out by Alesina (1988), of "a clear partisan effect on economic activity in the United States, with economic activity being significantly higher under Democrats than Republicans in the first half of their terms" while "in the fourth year of the administration, the growth performance under the two parties is identical". While models with opportunistic policy-makers typically fail to explain this asymmetry, our model with its opportunistic incum-

[2]There also exist pooling equilibria, but Rogoff and Siebert discard them since they do not satisfy the Cho-Kreps intuitive criterion. Of note, the partially pooling equilibrium of our model does satisfy the Cho-Kreps intuitive criterion.

[3]For models with inefficient policies and incumbency advantage absent asymmetric information, see, e.g., Hess and Orphanides (1995, 2001). A model with incumbency advantage under asymmetric information but without inefficient policies is presented by Hodler, Loertscher and Rohner (2007).

[4]For example, he reiterates Rogoff's (1988) argument that partisan models can only predict political business cycles if agents are not allowed to sign new contracts just after elections even though this would be in their best interest. (See also the reply by Alesina, 2000).

bent can account for it, exactly because it also builds on partisan differences. It suggests that left-wing political leaders care in principle more about short-run economic growth than right-wing leaders, so that they foster growth more in the first half of their terms in which electoral concerns are still negligible. But because they are known to be generally more enthusiastic about fostering short-run growth, they sometimes choose to foster growth inefficiently before elections to make the voters think that they are still needed in office.

The remainder of the paper is organized as follows. Section 2 lays out the model. Section 3 solves the simple model discussed above. Section 4 shows that the results are robust when the incumbent does not only choose the (unobservable) efficiency with which he fights crime or fosters growth, but also the (observable) budget that he spends on this fight. Section 5 reviews existing empirical evidence and provides some new empirical evidence in support of our model. Section 6 concludes. The appendices contain lengthy proofs, technical robustness results, and a description of the data.

## 2 The Model

In this section, we first present our model and then briefly discuss the main assumptions. There are two periods $t = 1, 2$ and two parties, $L$ and $R$. In period one, one of these parties is in office for exogenous reasons. The party in office is called the incumbent and labelled $I$. At the end of period one, the median voter either reelects the incumbent or replaces him by the other party. Throughout we refer to an incumbent as "he" and to the voter as "she". Since there are two types of incumbents $I \in \{L, R\}$, there are two versions of this game differing in the incumbent's type. In each version, there are three players, the incumbent, the opposition party, and the voter.

**Information:** Information is asymmetric in that in each period $t$ the state of the world $z_t$ is only known to the party in office, but not to the voter.[5] While all we need is that $z_1$ contains some information about $z_2$, we assume for simplicity that the state of the world is the same in both periods, i.e., $z_1 = z_2 = z$. Specifically, we assume that $z$ is a random draw from the commonly known distribution $F(z)$ with continuous density $f(z)$ and full support on $[\underline{a}, \overline{a}]$, i.e., $f(z) > 0$ for all $z \in [\underline{a}, \overline{a}]$.[6] The voter's prior belief that state $z \in [\underline{a}, \overline{a}]$ is realized is thus $\mu(z) = f(z)$. While the voter does not observe $z$, she observes the policy outcome $y_t$ in period $t$,

[5]It is irrelevant whether or not the party in opposition knows $z_t$, as this party takes no action in $t$.
[6]Some restrictions on $\underline{a}$ and $\overline{a}$ will be introduced below.

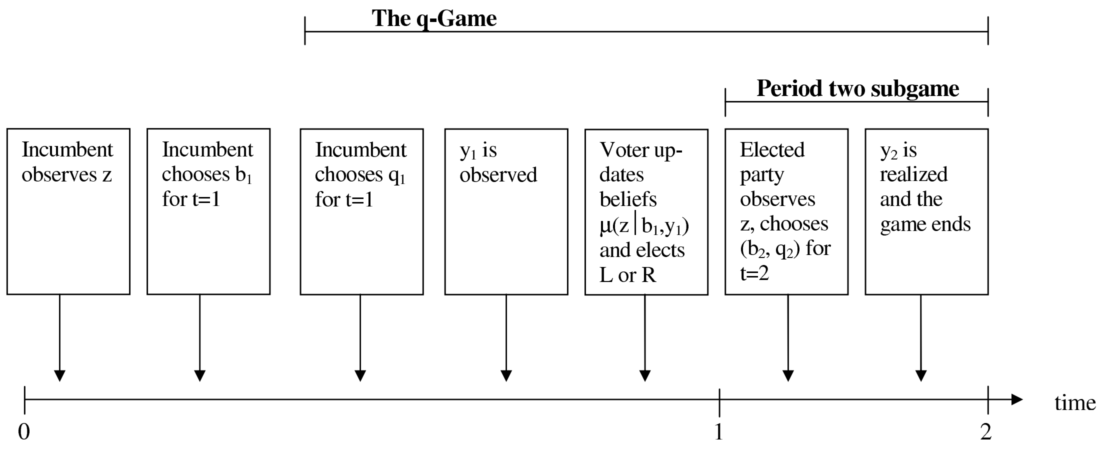


Figure 1: Timing.

which depends both on $z$ and the actions undertaken by the incumbent. One can think of $z$ as the underlying state of the economy and $y_t$ as the severity of a recession. Alternatively, one can think of $z$ as the number of potential delinquents and $y_t$ as the number of crimes committed.

**Timing and Actions:** After having learned $z$ at the beginning of period one, the incumbent can choose between low and high public expenditures, i.e., he chooses a budget $b_1(z) \in \{\underline{b}, \overline{b}\}$, with $\underline{b} < \overline{b}$. The choice of $b_1$ is observed by the voter. In addition, the incumbent also has the choice between low and high quality policies $q_1(z) \in \{\underline{q}, \overline{q}\}$, with $\underline{q} < \overline{q}$. The quality $q_t$ can be thought of as measuring the efficiency with which money is spent on stimulating short-run economic growth or the efficiency with which police are employed to fight crime. This choice does not involve a direct cost in terms of expenditures. The key assumption is that $q_1(z)$ is *not* observed by the voter. That is, the voter does not observe whether all the money spent to boost the economy is allocated in the most efficient manner, or whether the police perform their tasks, which are partly undercover anyway, efficiently.

At the end of period one, the voter observes the budget $b_1$ and the policy outcome $y_1$, and updates her beliefs about the true state of the world, $\mu(z \mid b_1, y_1)$. She then plays $v(b_1, y_1) \in \{l, r\}$, with $v(b_1, y_1) = k$ meaning that after observing $b_1$ and $y_1$ she (re)elects party $k = L, R$. Note that the policy outcome $y_t$ serves as a signal for the voter about the true state of the world $z$. Since the incumbent can affect $y_t$ with his actions while the party in opposition cannot, there is an asymmetry between the two parties. In period two, the party in office chooses the budget $b_2(z) \in \{\underline{b}, \overline{b}\}$ and the quality $q_2(z) \in \{\underline{q}, \overline{q}\}$. The policy outcome $y_2$ is then realized and the game ends.

The timing is summarized in Figure 1, which also contains the description of two separate games or subgames which we will study in turn. The $q$-Game is identical to the full game except that in the $q$-Game the budget $b_1$ is exogenously given in period one. The $q$-Game, which is not a proper subgame of the full game, is analyzed in Section 3. The full game is analyzed in Section 4.

**Technology:** The policy outcome $y_t$ depends on the state $z$ and the policies $b_t$ and $q_t$ as follows:

$$y_t = y(b_t, q_t, z), \tag{1}$$

where $y(.)$ satisfies $0 < y(\overline{b}, q_t, z) < y(\underline{b}, q_t, z)$ for any $q_t$ and $z$ and $y(b_t, \overline{q}, z) < y(b_t, \underline{q}, z)$ for any $b_t$ and $z$. Moreover, we assume that $y(b_t, q_t, z)$ is continuous and increasing in $z$ and that $\partial y(\underline{b}, q_t, z)/\partial z > \partial y(\overline{b}, q_t, z)/\partial z$ for any $q_t$ and $z$. The latter assumption implies that a deterioration in the state of the world, i.e., an increase in $z$, has a stronger effect on the outcome $y_t$ if the budget devoted to reducing $y_t$ is small than if it is large.[7] The technological relationship between states $z$, policies $q \in \{\underline{q}, \overline{q}\}$ and outcomes $y_1$ is illustrated in Figure 2. Observe that the horizontal axis depicts the states $z$ observed by the incumbent. Hence, the horizontal axis is the basis for the incumbent's policy choices. These choices occur first and the voter thereafter only observes $y_1$. Thus, the vertical axis depicting $y$ is the basis for the voter's decision.

**Payoffs:** The players $L$, $M$ and $R$ differ with respect to their preferences, in particular in how they value the trade-off between the disutility of $y_t$ and the expenditures $b_t$ incurred to reduce $y_t$. Each agent $i$'s instantaneous von Neuman-Morgenstern utility with policy $b_t$ and outcome $y_t$ is

$$u_i = -\alpha_i b_t - c(y_t), \tag{2}$$

where $c(y_t)$ is continuous and satisfies $c'(y_t) > 0$ and $c''(y_t) \geq 0$.[8] Hence, high crime rates or severe recessions lead to an increasing disutility.

The players' preference parameters are ordered as follows: $\alpha_L > \alpha_M > \alpha_R$. In the crime example, this preference ordering implies that $L$ is more reluctant to spend money to fight

[7] A simple technology satisfying this requirement is $y = A(b_t, q_t)z$ with $A(\overline{b}, q_t) < A(\underline{b}, q_t)$. Together with the assumption of an increasing disutility of high outcomes (introduced below), this requirement will ensure that players tend to prefer $\overline{b}$ when $z$ is high and $\underline{b}$ otherwise (see Lemma 2).

[8] Instead of having just one voter, we could assume that there is a continuum of voters all with utility function (2), but with different $\alpha_i$'s. The voter with the median $\alpha_i$ would then be decisive, and we could focus on the game between this voter and the incumbent.

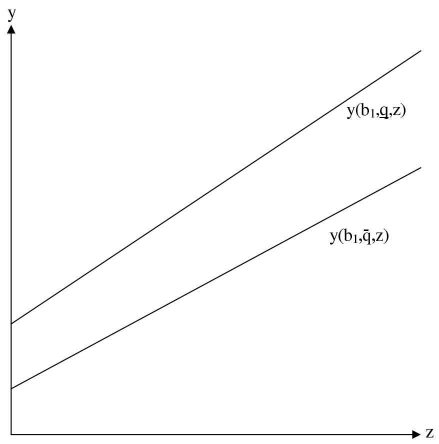


Figure 2: Technology.

crime than the voter, who in turn is more reluctant to do so than $R$. In the economic growth example, it would imply that $L$ has the weakest and $R$ the strongest willingness to foster short-run growth.[9] Replacing $y_t$ by $y(b_t, q_t, z)$ in (2) we can write $i$'s utility in state $z$ with budget $b_t$ and quality $q_t$ as

$$u_i(b_t, q_t, z) = -\alpha_i b_t - c(y(b_t, q_t, z)). \tag{3}$$

Observe that $u_i(b_t, \overline{q}, z) > u_i(b_t, \underline{q}, z)$ for all $b_t$ and $z$ because $y(b_t, \overline{q}, z) < y(b_t, \underline{q}, z)$ and $c'(y_t) > 0$. Hence, no party in office would ever choose $\underline{q}$ unless this leads to some future benefits.

We assume throughout that parties $L$ and $R$ are not only policy-motivated, but also office-motivated. In particular, the party in office gets a rent $\Psi \geq 0$ per term. Hence, the instantaneous utility of party $j = L, R$ is $\Psi + u_j(b_t, q_t, z)$ when in office and $u_j(b_t, q_t, z)$ otherwise. The voter's instantaneous utility is simply $u_M(b_t, q_t, z)$ no matter what party is in office. To ease the exposition, we however assume that she votes for $R$ in case she is indifferent between $L$ and $R$. The discount factor is $\beta > 0$ for all players, and utility is additively separable over time.[10]

**Solution Concept:** The solution concept we employ is Perfect Bayesian Equilibrium (PBE). We restrict our attention to PBE in pure strategies, and we add the following restriction on the voter's off equilibrium beliefs: When observing an outcome $y_1$ that cannot result from the

[9] In general, a left party may be more reluctant than a right party to spend money on crime deterrence if this requires cuts in, say, public education or public health expenditures. For the growth example, the notation may be slightly misleading. According to empirical evidence (see Section 5), left-wing parties tend to be more willing to foster short-run economic growth. Consequently, $R$ stands for a left-wing incumbent and $L$ for a right-wing incumbent in the growth application. This should be kept in mind in the empirical analysis below.

[10] The discount factor does neither affect the behavior of the voter, whose decision on election day depends only on her expectations about future outcomes, nor the behavior of the opposition party, which can take no action in period one.

incumbent having played his equilibrium strategy, the voter has "Laplacian" beliefs, i.e., she assumes that the incumbent may have played the "wrong" $q_1(z)$ with the same error probability $\varepsilon > 0$ at each state $z$ consistent with $y_1$. This implies that the voter's off equilibrium beliefs over the states $z$ that can technically lead to the observed outcome $y_1$ must equal her prior beliefs over these states.

**Motivation:** We now briefly discuss the main assumptions made above. The assumptions that the government is better informed about the state of nature $z$ than the public and that its quality choice $q_t$ is not observed by the voter may appear controversial at first. Note, however, that all that is required is that the voter does not observe $z$ and $q_t$, not that $z$ and $q_t$ are unobservable at all costs. One may thus interpret our model as one in which there are two policy instruments, a first one, $b_t$, which the voter observes at low or zero costs, and a second one, $q_t$, which the voter could only observe at costs he is not willing to bear. These assumptions are substantiated by robust empirical evidence that shows that voters are, in general, quite poorly informed.[11]

The assumption that parties differ with respect to their preferences (i.e. $\alpha_L > \alpha_R$) is not directly testable. However, if a party in office has some systematic effect on policy outcomes and if it chooses policies to obtain outcomes that it prefers, differences in preferences should be reflected by differences in outcomes. It is a well established fact of the empirical literature on political business cycles that economic policy outcomes differ depending on which party is in office (e.g. Drazen, 2000). In Section 5, we also provide empirical evidence that homicide rates differ depending on the incumbent's political orientation.

The dichotomous policy choice sets of a party in office deserves some commenting as well. Though we do not do so in this paper, it can easily be shown that qualitatively all our results go through if the quality choice is continuous, i.e. if $q_t(z) \in [\underline{q}, \overline{q}]$, provided the difference between $\underline{q}$ and $\overline{q}$ is not too large. The main results should also go through with a continuous budget choice $b_t(z)$ as long as the voter remains better off in period two with the budget choice of $R$ if the state $z$ is high and with the budget choice of $L$ if $z$ is low.

The two period structure is, obviously, the simplest game form that allows for reelection and hence incumbency advantage. The discussion of the implications of our restriction on off equilibrium beliefs is best postponed and is done after Proposition 4.

[11] See Bartels (1996) or Blendon et al. (1997). Of course, given the small probability that they can affect election outcomes, individual voters' ignorance may be perfectly rational.

# 3 The $q$-Game

In this section, we focus on the case where the budget in period one is exogenous such that the incumbent can only choose quality $q_1(z) \in \{\underline{q}, \overline{q}\}$ in period one. In period two, the party in office can still choose both the budget $b_2(z) \in \{\underline{b}, \overline{b}\}$ and the quality $q_2(z) \in \{\underline{q}, \overline{q}\}$. This corresponds to a game that is slightly simpler than the full game of Section 4. Analyzing this game will not only be helpful in solving the full game, but is interesting in itself because it contains the main mechanism that allows an incumbent of type $R$ to gain an advantage over the opposition candidate.

## 3.1 The Period Two Subgame

We first derive the policies that the parties $L$ and $R$ play in period two when in office. We begin with their choice of quality $q_2(z) \in \{\underline{q}, \overline{q}\}$. Since $u_i(b_2, \overline{q}, z) > u_i(b_2, \underline{q}, z)$ for any $i, z$ and any budget $b_2$, it follows:

**Lemma 1** *In period two, $\overline{q}$ is the optimal strategy for any party in office.*

We next show for which states of the world each player $i$ prefers policies $(\overline{b}, \overline{q})$ to $(\underline{b}, \overline{q})$ in period two. Define $\tilde{z}_i$ as the threshold value that makes $i$ indifferent and let

$$\Delta u_i(z) \equiv u_i(\overline{b}, \overline{q}, z) - u_i(\underline{b}, \overline{q}, z). \tag{4}$$

Observe that $\Delta u_i(z)$ is the difference between the utility derived under $\overline{b}$ and $\underline{b}$ when the state is $z$ and the quality is $\overline{q}$. Then, $\tilde{z}_i$ satisfies $\Delta u_i(\tilde{z}_i) = 0$.

**Lemma 2** *For each player $i$, a unique threshold $\tilde{z}_i$ exists, such that $i$ is strictly better off with $(\overline{b}, \overline{q})$ than with $(\underline{b}, \overline{q})$ if $z > \tilde{z}_i$, and strictly worse off if $z < \tilde{z}_i$. These thresholds are ordered as*

$$\tilde{z}_R < \tilde{z}_M < \tilde{z}_L. \tag{5}$$

The proof is in Appendix A. This lemma implies that $L$ prefers $(\underline{b}, \overline{q})$ for all but those $z$'s that exceed $\tilde{z}_L$, while $R$ prefers $(\overline{b}, \overline{q})$ for all but those $z$'s below $\tilde{z}_R$. The state of the world at which the voter changes her preferred policy is in-between at $\tilde{z}_M$. For notational ease, we let $\tilde{z} \equiv \tilde{z}_M$. Recall that the support of the states $z$ is $[\underline{a}, \overline{a}]$. We now introduce a simplifying assumption on the parameters $\tilde{z}_i$ and their relation to the support of $z$.

**Assumption 1**

$$\tilde{z}_R < \underline{a} < \tilde{z} < \overline{a} < \tilde{z}_L.$$

This assumption serves two purposes. First, it makes sure that there are no regions (namely, $z < \tilde{z}_R$ or $z > \tilde{z}_L$) where both parties agree on the optimal policy in period two, which would make the voter indifferent and would therefore not be a particularly insightful setup to analyze. Second, it guarantees that the budget under which the voter is better off depends on $z$, which, in turn, implies that the voter does not always prefer the same party.

From Lemmas 1 and 2 and Assumption 1 follows:

**Proposition 1** *When in office in period two, R plays* $(\bar{b}, \overline{q})$ *and L plays* $(\underline{b}, \overline{q})$ *for all z.*

Proposition 1 and Lemma 2 imply that the voter is better off with $L$'s policy if $z < \tilde{z}$, and with $R$'s policy if $z > \tilde{z}$. This leads to the following corollary:

**Corollary 1** *Under full information about z, L would be elected if* $z < \tilde{z}$ *and R would be elected otherwise.*

### 3.2 The Equilibrium of the $q$-Game

We now focus on period one and derive the equilibria of the two versions of the $q$-Game, one with incumbent $R$ and one with incumbent $L$.

We first analyze how the voter updates her beliefs about $z$ after observing a policy outcome $y_1$. For a given budget $b_1$, any observed $y_1$ is in principle consistent with, at most, two different $z$'s. Denote by $\underline{z}(y_1)$ the state of the world consistent with quality choice $\underline{q}$ and observation $y_1$ and by $\overline{z}(y_1)$ the state consistent with $\overline{q}$ and $y_1$. That is, $\underline{z}(y_1)$ and $\overline{z}(y_1)$ are implicitly defined by

$$y_1 = y(b_1, \underline{q}, \underline{z}(y_1)) \quad \text{and} \quad y_1 = y(b_1, \overline{q}, \overline{z}(y_1)). \tag{6}$$

It follows from $\partial y(b, q, z)/\partial z > 0$ and $y(b, \underline{q}, z) > y(b, \overline{q}, z)$ that $\overline{z}(y_1) > \underline{z}(y_1)$. The property that no $z$ other than $\underline{z}(y_1)$ and $\overline{z}(y_1)$ can a priori be consistent with an observed $y_1$ restricts the voter's beliefs $\mu(z|b_1, y_1)$ substantially and implies in particular:[12]

**Lemma 3** *For a given budget* $b_1$ *and an observed outcome* $y_1$*, at most the states* $\underline{z}(y_1)$ *and* $\overline{z}(y_1)$ *are feasible. For all feasible* $y_1$*, the voter's beliefs thus satisfy*

$$0 \leq \mu(\underline{z}(y_1)|b_1, y_1) = 1 - \mu(\overline{z}(y_1)|b_1, y_1) \leq 1.$$

Figure 3 shows that at most two $z$'s are consistent with an observed $y_1$. Due to Lemma 3 we can and will use the more concise notation $\mu(y_1) \equiv \mu(\underline{z}(y_1)|b_1, y_1)$ from here onwards.

[12] Clearly, $\underline{z}(y_1)$ and $\overline{z}(y_1)$ are both consistent with $y_1$ only if they are both in the support of $z$. We come back to that point shortly when making an assumption that guarantees that this is the case in the "relevant range" (where we will also make clear what the relevant range is). Any other feasible $y_1$ is consistent with one $z$.

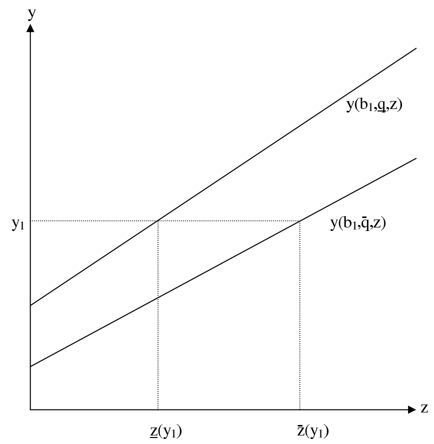


Figure 3: Any $y_1$ is consistent with at most two states.

Note that when the true state is $\tilde{z}$ and the incumbent plays high quality $\overline{q}$, then the policy outcome is

$$y^S \equiv y(b_1, \overline{q}, \tilde{z}).$$

By Lemma 3 the only two states consistent with this observation are $\underline{z}(y^S) \equiv z^S$ and $\overline{z}(y^S) = \tilde{z}$. Similarly, when the incumbent plays low quality $\underline{q}$ in state $\tilde{z}$, then the voter knows after observing

$$y^H \equiv y(b_1, \underline{q}, \tilde{z})$$

that the true state of the world must be $\underline{z}(y^H) = \tilde{z}$ or $\overline{z}(y^H) \equiv z^H$. We can now introduce the assumption on the support $[\underline{a}, \overline{a}]$ referred to above:

**Assumption 2**

$$\underline{a} < z^S \quad \text{and} \quad z^H < \overline{a}.$$

The pairs $(y^S, z^S)$ and $(y^H, z^H)$ allow for a simple characterization of equilibrium play in states $z < z^S$ and $z > z^H$. To see this, consider for example the voter's inference and voting behavior after observing $y_1 < y^S$. Either the incumbent has played $\overline{q}$, in which case the state is $\overline{z}(y_1) < \tilde{z}$, or he has played $\underline{q}$, in which case the state is $\underline{z}(y_1) < \overline{z}(y_1) < \tilde{z}$. Whether $\underline{z}(y_1)$ or $\overline{z}(y_1)$ is the true state, the voter knows that the true state is smaller than $\tilde{z}$. Consequently, it follows (see Lemma 2 and Proposition 1) that the voter elects $L$ for any beliefs $\mu(y_1)$ consistent with Lemma 3 when observing $y_1 < y^S$. Now, given that $L$ is (re)elected for any state $z < z^S$, both types of incumbent optimally play $\overline{q}$ in these states to decrease disutility $c(y_1)$. Similarly, when the voter observes $y_1 \geq y^H$, the only states consistent with this observation satisfy $\overline{z}(y_1) > \underline{z}(y_1) \geq \tilde{z}$. Therefore, the voter correctly infers that the state is larger than $\tilde{z}$ and thus

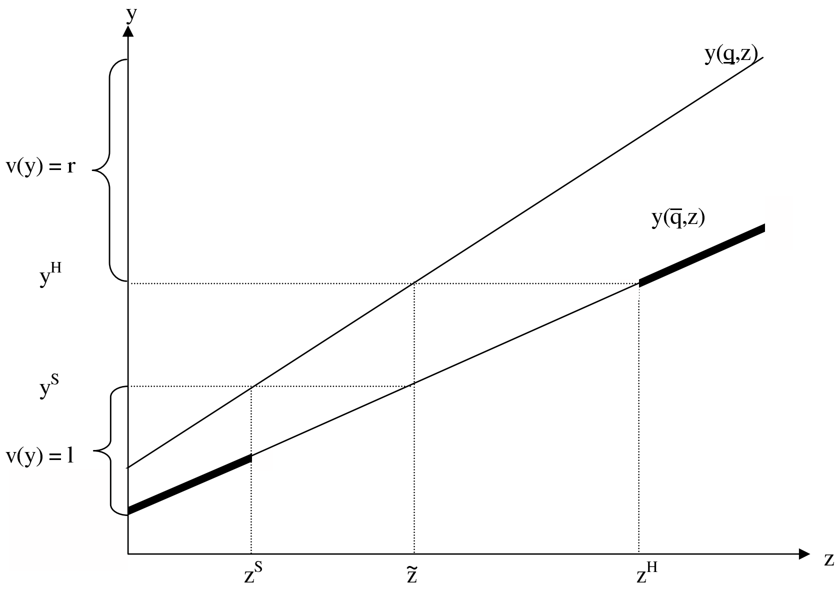


Figure 4: Illustration of Lemma 4.

votes for $R$ for any beliefs $\mu(y_1)$ consistent with Lemma 3. But given that $R$ is (re)elected for any $z \geq z^H$, both types of incumbent optimally choose $\overline{q}$ in these states. These results are summarized as follows:

**Lemma 4** *The voter elects $L$ if $y_1 < y^S$ and $R$ if $y_1 \geq y^H$. Both types of incumbent play $\overline{q}$ for $z < z^S$ and $z \geq z^H$.*

Figure 4 illustrates Lemma 4. It depicts the policy outcome $y_1$ as a function of state $z$ and quality $q_1(z) \in \{\underline{q}, \overline{q}\}$. The figure also shows that whenever $y_1 < y^S$, the voter knows that $z < \tilde{z}$. She therefore votes for $L$ with certainty. The incumbent chooses $\overline{q}$ as he cannot affect her voting behavior. Similarly, the voter knows that $z \geq \tilde{z}$ whenever $y_1 \geq y^H$. Hence, the incumbent has again no possibility to affect her voting behavior when $z \geq z^H$ and therefore chooses again $\overline{q}$. Note that the incumbent's choice of $q_1$ is highlighted in the figure with a solid line on the corresponding $y_1$-function.

When the voter observes a policy outcome $y_1 \in [y^S, y^H)$, her voting behavior is less clear-cut and depends on her beliefs about the quality chosen by the incumbent. However, when $L$ is the incumbent, it turns out that the equilibrium play is straightforward. To see this, suppose $L$ always chooses $\overline{q}$ in period one and observe that if $L$ plays this strategy, it will be fully revealing. Hence, the only beliefs consistent with this strategy will be that $L$ has played $\overline{q}$, i.e. $\mu(y_1) = 0$ for all observations $y_1$ made on the equilibrium path. Given that the voter correctly infers what the true state is, she optimally votes for $L$ if and only if she observes $y_1 < y^S$. But given that she plays this strategy and holds these beliefs, $L$ has clearly no incentive to deviate and to play $\underline{q}$: If $z \geq \tilde{z}$ this would lead to a policy outcome $y_1$ that $L$ likes less than if he plays $\overline{q}$ without changing the fact that he is voted out of office. For $z \in [z^S, \tilde{z})$ he is, in addition to the worse policy outcome, voted out of office in states where he would be reelected if he played $\overline{q}$. Last, for $z < z^S$ he gets reelected with any $q_1(z)$, but playing $\overline{q}$ leads to a better policy outcome. Therefore, the strategies and beliefs we have just described constitute a PBE. In Appendix A, we show that it is the unique PBE.

**Proposition 2** *The q-Game with incumbent L has a unique PBE in which L plays* $\overline{q}$ *for any* $z$ *in period one, and the voter reelects L for* $y_1 < y^S$ *and elects R otherwise. As under full information, L is reelected if and only if* $z < \tilde{z}$.

The proposition tells us that an incumbent of type $L$ always chooses high quality $\overline{q}$. He will not deviate because he dislikes high policy outcomes $y_1$ and cannot improve his reelection prospects by playing low quality $\underline{q}$. On the contrary, playing $\underline{q}$ could make the voter think that the state of the world $z$ is higher than it actually is, making him more inclined to vote for $R$. Hence, incumbent $L$'s strategic incentives are well aligned with the common interest in low $y_1$. Observe that our restrictions on off equilibrium beliefs do not matter here.[13]

The case with incumbent $R$ is quite different from the one with incumbent $L$ because $R$'s strategic incentives are not well aligned with the common interest in low $y_1$. To see this, suppose that $R$ also plays $\overline{q}$ for all $z$. The voter then again forms the beliefs $\mu(y_1) = 0$ for all observations $y_1$ on the equilibrium path, and therefore reelects $R$ if and only if $z \geq \tilde{z}$. But given this strategy of the voter, $R$ could ensure his reelection also for $z \in [z^S, \tilde{z})$ by deviating and playing $\underline{q}$. Hence, a fully separating PBE in which $R$ plays $\overline{q}$ for all $z$ exists only if his short-term benefit of playing $\overline{q}$, $u_R(b_1, \overline{q}, z) - u_R(b_1, \underline{q}, z) > 0$, exceeds his discounted future benefits of playing $\underline{q}$, $\beta[\Psi + u_R(\overline{b}, \overline{q}, z) - u_R(\underline{b}, \overline{q}, z)] > 0$, for all $z \in [z^S, \tilde{z})$. That is, only if for all $z \in [z^S, \tilde{z})$

$$\Psi \leq \hat{\Psi}(z) \equiv u_R(\underline{b}, \overline{q}, z) - u_R(\overline{b}, \overline{q}, z) + \frac{1}{\beta}[u_R(b_1, \overline{q}, z) - u_R(b_1, \underline{q}, z)]$$

holds, do we have a fully separating PBE where incumbent $R$ plays $\overline{q}$ for all $z$. In Appendix A, we show that this PBE is also unique if $\Psi \leq \underline{\Psi} \equiv \min_{z \in [z^S, \overline{z}')} \hat{\Psi}(z)$, where $\overline{z}' \in (z^S, \tilde{z})$ is

[13] The only possible off equilibrium observations are $y_1 > y(b_1, \overline{q}, \overline{a})$, which can only result from the play of $\underline{q}$ in high states $z > \tilde{z}$. Hence, the off-equilibrium beliefs are $\mu(y_1) = 1$ for $y_1 > y(b_1, \overline{q}, \overline{a})$. They are pinned down without our additional restriction.

defined below.[14]

**Proposition 3** *Given $\Psi \leq \underline{\Psi}$, the q-Game with incumbent R has a unique PBE in which R plays $\overline{q}$ for any z in period one, and the voter reelects R for $y_1 \geq y^S$ and elects L otherwise. As under full information, R is reelected if and only if $z \geq \tilde{z}$.*

Proposition 3 says that incumbent $R$ always chooses high quality $\overline{q}$ if his office rent $\Psi$ is relatively small. But if $\Psi$ is sufficiently large, there cannot exist an equilibrium in which $R$ always chooses $\overline{q}$, as he would want to deviate for $z \in [z^S, \tilde{z})$ to ensure that he receives $\Psi$ in period two again. Hence, the equilibrium will look differently when the office rent $\Psi$ of incumbent $R$ is high. To understand this equilibrium, it is useful to begin with the hypothetical situation where $R$ plays $\underline{q}$ in state $\underline{z}(y)$ with the same probability as he plays $\overline{q}$ in state $\overline{z}(y)$. This will be helpful in determining the off equilibrium beliefs of the voter, her behavior on and off the equilibrium path and the equilibrium behavior of the incumbent.

**Lemma 5** *Suppose that in period one R plays $\underline{q}$ with probability $\lambda > 0$ for any $z \in (z^S, \tilde{z})$ and $\overline{q}$ with probability $\lambda$ for any $z \in (\tilde{z}, z^H)$. Then there exists a $y' \in (y^S, y^H)$ such that the voter is indifferent between L and R when observing $y'$. If $y'$ is unique, the voter reelects R if and only if $y_1 \geq y'$.*

A simple but by no means tight sufficient condition for $y'$ to be unique is that the distribution $f(z)$ is uniform. For simplicity, we subsequently assume that $y'$ is unique. However, none of our main results is qualitatively affected if $y'$ is not unique.[15] Figure 5 illustrates Lemma 5 when $y'$ is unique.

Lemma 5 states that whenever the voter observes a policy outcome $y_1 \in (y^S, y^H)$, which can occur because $R$ plays with a certain probability $\underline{q}$ in states $z < \tilde{z}$ or because $R$ plays with the same probability $\overline{q}$ in states $z > \tilde{z}$, then the voter elects $R$ if $y_1 \geq y'$, and $L$ otherwise. Intuitively, whenever $y_1$ is slightly below $y^H$, the voter knows that the true state of the world is either slightly below $\tilde{z}$, in which case she would be somewhat better off with $L$, or slightly below $z^H$, in which case she would be much better off with $R$. Hence, she votes for $R$, as this maximizes her expected utility. Conversely, when $y_1$ is slightly above $y^S$, the voter knows that she would either strongly prefer $L$ or have a weak preference for $R$ if she knew the true state of the world $z$. She therefore votes for $L$.

[14] Alternative PBE that could exist when $\Psi \leq \hat{\Psi}(z)$ for all $z \in [z^S, \tilde{z})$, but $\Psi > \hat{\Psi}(z)$ for some $z \in (\tilde{z}, \overline{z}')$ would not be intuitive in the sense of Cho and Kreps (1987).

[15] We show this in Appendix C.1.

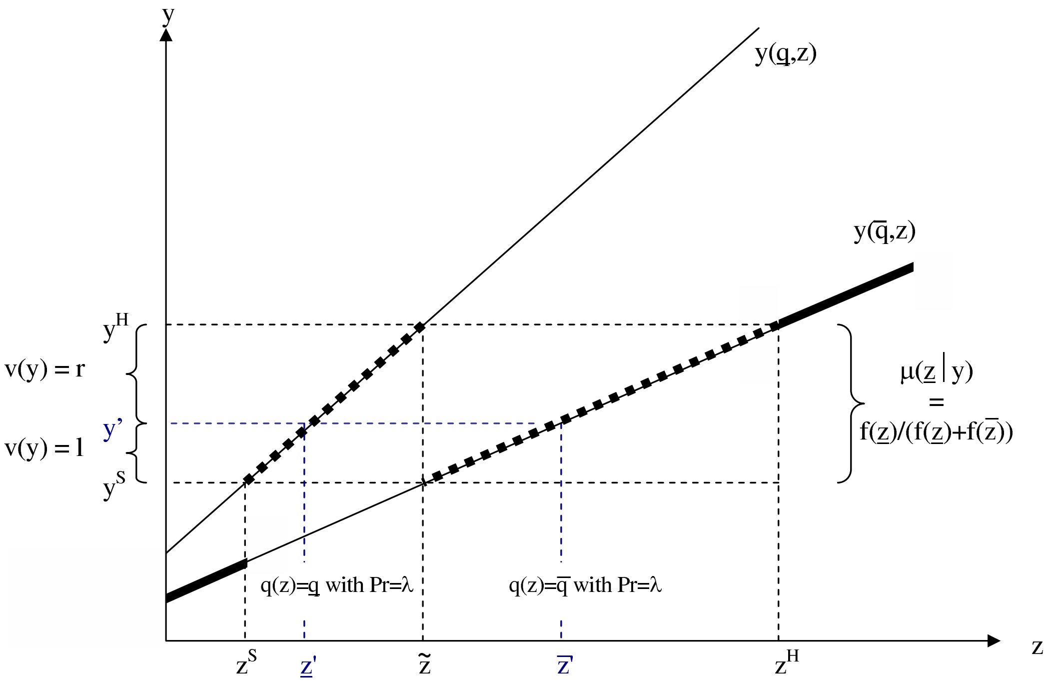


Figure 5: Illustration of Lemma 5.

To simplify the subsequent discussion of the equilibrium with incumbent $R$ and a relatively high office rent $\Psi$, we denote the two states that are in principle consistent with $y'$ by

$$\underline{z}' \equiv \underline{z}(y') \quad \text{and} \quad \overline{z}' \equiv \overline{z}(y').$$

Note that $\underline{z}' \in (z^S, \tilde{z})$ and $\overline{z}' \in (\tilde{z}, z^H)$ since $y' \in (y^S, y^H)$. From Lemma 5 follows that the voter reelects $R$ after observing a policy outcome $y_1 \in [y', y^H)$ when $R$ plays $\underline{q}$ for all $z \in [\underline{z}', \tilde{z})$ and $\overline{q}$ for all $z \in [\overline{z}', z^H)$. The voter does so even though she is aware that the observed $y_1$ can result from $R$ having played $\underline{q}$ in state $\underline{z}(y_1) < \tilde{z}$ or from $R$ having played $\overline{q}$ in state $\overline{z}(y_1) > \tilde{z}$.

The intuition is the following. Given an observation $y_1 \geq y'$, voting for $R$ maximizes her expected utility, where the expectation is taken with respect to her beliefs. These beliefs, in turn, are updated using Bayes' rule for observations that are consistent with $R$'s equilibrium strategy. For the observations smaller than $y'$ that are off equilibrium her beliefs must be such that her expected utility of voting for $L$ exceeds her expected utility of voting for $R$. Our restriction on off equilibrium beliefs implies that this is the case. Therefore, $R$ indeed wants to play $\overline{q}$ for all $z \in [\overline{z}', z^H)$ as this leads to his reelection and minimizes $y_1$. Playing $\underline{q}$ whenever $z \in [\underline{z}', \tilde{z})$ also leads to his reelection and is therefore indeed optimal for $R$ if the discounted future benefit of being reelected exceeds the short-term benefit of a lower $y_1$, i.e., if $\Psi > \hat{\Psi}(z)$ for all $z \in [\underline{z}', \tilde{z})$.

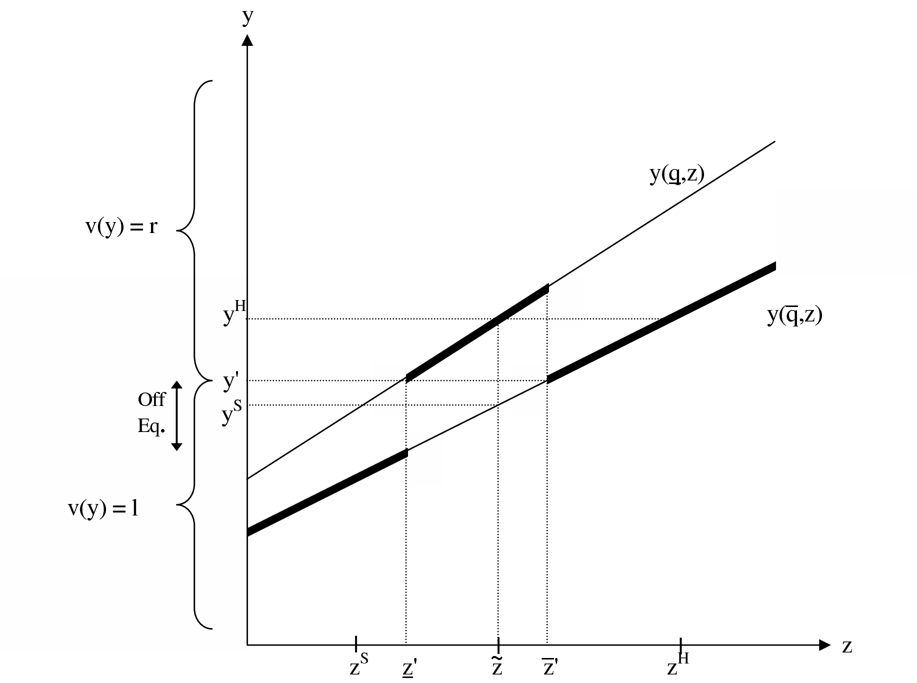


Figure 6: Equilibrium in the $q$-Game with incumbent $R$.

Lemma 5 further implies that if $R$ played $\underline{q}$ for all $z \in [z^S, \underline{z}')$ and $\overline{q}$ for all $z \in [\tilde{z}, \overline{z}')$, then the voter would elect $L$ when observing the corresponding policy outcome $y_1 < y'$. If $\Psi > \hat{\Psi}(z)$ for all $z \in [\tilde{z}, \overline{z}')$, $R$ would therefore deviate and play $\underline{q}$ for $z \in [\tilde{z}, \overline{z}')$ to make clear that $z \geq \tilde{z}$, which would ensure his reelection. Consequently, he plays $\overline{q}$ for $z \in [z^S, \underline{z}')$ to reduce $y_1$, as he is not reelected anyway. When $\Psi > \hat{\Psi}(z)$ for all $z \in [\underline{z}', \overline{z}')$, there thus exists an equilibrium in which $R$ plays $\underline{q}$ for $z \in [\underline{z}', \overline{z}')$ and $\overline{q}$ otherwise. Given $\Psi > \overline{\Psi} \equiv \max_{z \in [z^S, \overline{z}')} \hat{\Psi}(z)$, this equilibrium is also unique. Appendix A proves existence and uniqueness.

**Proposition 4** *Given $\Psi > \overline{\Psi}$, the $q$-Game with incumbent $R$ has a unique PBE with Laplacian off equilibrium beliefs, in which $R$ plays $\underline{q}$ for $z \in [\underline{z}', \overline{z}')$ and $\overline{q}$ for any other $z$ in period one, and the voter reelects $R$ for $y_1 \geq y'$ and elects $L$ otherwise. $R$ is reelected for all $z \geq \underline{z}'$, i.e., in strictly more states $z$ than under full information.*

Proposition 4 is illustrated in Figure 6. The incumbent $R$ plays $\overline{q}$ for $z < \underline{z}'$ and $z \geq \overline{z}'$, and $\underline{q}$ for intermediate $z$'s, while the voter reelects $R$ if $y \geq y'$ and elects $L$ otherwise. Under full information, incumbent $R$ would be reelected if $z \geq \tilde{z}$, and voted out of office otherwise. With asymmetric information about the true state of the world $z$, $R$ is reelected in equilibrium for any $z \geq \underline{z}'$. Hence, asymmetric information increases $R$'s ex ante reelection probability, i.e., his reelection probability before observing $z$, by $F(\tilde{z}) - F(\underline{z}')$, which is strictly positive since $\underline{z}' < \tilde{z}$. The difference $F(\tilde{z}) - F(\underline{z}')$ is thus naturally interpreted as the size of $R$'s incumbency advantage due to asymmetric information.[16] Note that when observing $y_1 \in [y', \min\{y(b_1, \underline{q}, \overline{z}'), y(b_1, \overline{q}, \overline{a})\})$ and voting for $R$ the voter is aware that under full information she would rather vote for $L$ in the low state $\underline{z}(y_1))$, i.e. with probability $\frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$. Incumbent $R$ can use his information advantage to increase his reelection prospects because he only manipulates the voter's beliefs about $z$ (i.e. induces the voter's belief distribution to be non-degenerate) when the manipulated beliefs are such that her expected utility is higher when voting for $R$ than when voting for $L$.

The role of our restriction on the off equilibrium beliefs is to pick a unique equilibrium (see claim 4.3 in the proof of Proposition 4) even if $\Psi > \hat{\Psi}(z)$ for some $z \in [\overline{z}' z^H]$. In absence of this restriction, there would be multiple PBE that differ with respect to the equilibrium outcome. All of these PBE are characterized by some $y^* \in [y', y^H]$, such that $R$ plays $q(z) = \underline{q}$ for all $z \in [\underline{z}(y^*), \overline{z}(y^*))$ and is reelected whenever he plays $\underline{q}$. The voter's off equilibrium beliefs that $z = \underline{z}(y_1)$ have to be sufficiently high such that she would optimally elect $L$ when observing an off equilibrium $y_1 < y^*$. Clearly, such off equilibrium beliefs are consistent with PBE in absence of any additional restrictions, and they deter any deviation by incumbent $R$. Observe, however, that these off equilibrium beliefs must exceed the prior probability $\frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ whenever $y^* > y'$. Our restriction does not allow for such punishing beliefs as it requires off equilibrium beliefs to be formed not only under the insight that an off equilibrium observation $y_1$ can normally stem from two sources of errors, but also under the hypothesis that both errors are equally likely. The assumption underlying all PBE but the one characterized in Proposition 4 is that errors in low states are more likely than errors in high states. It is not clear why this should be particularly plausible. That said, our restriction does not only pick a unique PBE when $\Psi > \overline{\Psi}$, but also the one with the largest incumbency advantage. However, all except at most one of the other PBE also exhibit a strictly positive incumbency advantage (and none an incumbency disadvantage because $y^* \leq y^H$).[17]

Proposition 4 states that $R$ improves his reelection prospects by playing low quality $\underline{q}$ in

[16]Assuming that the policy dimension is fixed, this is also the difference in ex ante probabilities that the incumbent of type $R$ is elected when he is an incumbent and when he is the challenger of a type $L$ incumbent. Hence, this definition of incumbency advantage is the same as the one advocated by Beviá and Llavador (2006).

[17]Moreover, all PBE are intuitive in the sense of Cho and Kreps (1987). To see this, note that both the $\underline{z}(y_1)$-type and the $\overline{z}(y_1)$-type of incumbent $R$ could possibly gain by deviating from equilibrium behavior provided the voter deviates from her strategy in the off equilibrium range. The $\underline{z}(y_1)$-type's potential gain is reelection instead of losing office, while the $\overline{z}(y_1)$-type's potential gain is reelection with a better policy outcome instead of reelection with a worse outcome. Thus, all PBE are consistent with the Cho-Kreps intuitive criterion.

some intermediate states of the world $z$ if $\Psi > \overline{\Psi}$. This condition does however not necessarily require a high office rent $\Psi$ as the threshold $\overline{\Psi}$ can be small or even negative if $R$'s short-term benefit of high quality $\overline{q}$ (rather than $\underline{q}$) is small relative to his discounted benefit of having a large budget $\overline{b}$ (rather than $\underline{b}$) in period two. That is, if $u_R(b_1, \overline{q}, z) - u_R(b_1, \underline{q}, z) > 0$ is small relative to $\beta[u_R(\overline{b}, \overline{q}, z) - u_R(\underline{b}, \overline{q}, z)] > 0$. This can be the case, e.g., if the difference between $\underline{q}$ and $\overline{q}$ is small relative to the difference between $\underline{b}$ and $\overline{b}$, or if $\beta$ is high. In other words, an incumbent of type $R$ does not only choose low quality $\underline{q}$ in some states $z$ when he gets a high rent from being in office, but also when he is much better off with his policy in the next term than with the opposition candidate's policy.[18]

# 4 Equilibrium of the Full Game

In this section, we analyze the full game in which the party in office can choose the observable budget $b_t(z) \in \{\underline{b}, \overline{b}\}$ and the unobservable quality $q_t(z) \in \{\underline{q}, \overline{q}\}$ in both periods $t = 1, 2$.

Note first that the period two subgame is the same in the full game as it was in the $q$-Game. Proposition 1 therefore applies, and $R$ plays $(\overline{b}, \overline{q})$ for all $z$ when in office in period two, while $L$ plays $(\underline{b}, \overline{q})$ for all $z$. Hence, $R$ would under full information again be elected for all $z \geq \tilde{z}$, and $L$ for all $z < \tilde{z}$.

Consider the equilibrium outcome in period one when the incumbent is of type $L$. In Proposition 2, we have seen that in period one $L$ plays $\overline{q}$ for all $b_1$ and $z$, because playing $\underline{q}$ would increase $y_1$ and might, on top of that, even decrease his reelection prospects. Given that $L$ plays $\overline{q}$ for all $z$ independently of his budget choice, the voter never faces any uncertainty about $z$ and reelects $L$ if and only if $z < \tilde{z}$. But given that $L$ cannot increase his reelection prospects anyway, he is best off choosing his preferred budget $\underline{b}$ in period one. It follows:

**Proposition 5** *The full game with incumbent L has a unique PBE with the equilibrium outcome described in Proposition 2 and with* $b_1(z) = \underline{b}$.

Consider next the case with an incumbent of type $R$. As shown in Proposition 3, there exists a unique PBE in which $R$ plays $\overline{q}$ for all $z$ in period one if his office rent $\Psi$ is sufficiently small such that he prefers playing $\overline{q}$ and not getting reelected to playing $\underline{q}$ and getting reelected for all $z \in [z^S, \overline{z}')$. The budget choice leads to a slight complication since the thresholds $z^S, \underline{z}'$,

[18] Note that when $\Psi \in (\underline{\Psi}, \overline{\Psi}]$, $R$ would play $\underline{q}$ to get reelected for some, but not all $z \in [z^S, \overline{z}')$. In equilibrium, $R$ might thus still play $\underline{q}$ for some, but not all $z \in [\underline{z}', \overline{z}')$ (see Appendix C.3). He would therefore still have a weakly positive incumbency advantage in any pure strategy PBE.

$\overline{z}', z^H$ and $\hat{\Psi}(z)$ all depend on $b_1$. However, $\Psi < \underline{\Psi}^{FG} \equiv \min_{b_1 \in \{\underline{b}, \overline{b}\}}[\min_{z \in [z^S, \overline{z}'(b_1))} \hat{\Psi}(b_1, z)]$ is a simple sufficient condition that $R$ still plays $\overline{q}$ for all $b_1$ and $z$ since it makes sure that he still cares more about a low outcome $y_1$ in period one than about his future office rent and about the budget in period two. He is therefore best off choosing his preferred budget $\overline{b}$ in period one.

**Proposition 6** *Given $\Psi < \underline{\Psi}^{FG}$, the full game with incumbent $R$ has a unique PBE with the equilibrium outcome described in Proposition 3 and with $b_1(z) = \overline{b}$.*

Propositions 5 and 6 imply that asymmetric information does still neither improve the reelection prospects of an incumbent of type $L$, nor those of an incumbent of type $R$ with a sufficiently low office rent $\Psi$.

We now discuss the most interesting case in which incumbent $R$ cares in the relevant states of the world $z$ more about his office rent and the budget $b_2$ in period two than about the outcome $y_1$ in period one. The assumption $\Psi > \overline{\Psi}^{FG} \equiv \max_{b_1 \in \{\underline{b}, \overline{b}\}}[\max_{z \in [z^S, \overline{z}'(b_1))} \hat{\Psi}(b_1, z)]$ is a sufficient condition for that. For simplicity, we further introduce:

**Assumption 3**

$$u_R(\overline{b}, \underline{q}, z) > u_R(\underline{b}, \overline{q}, z) \quad \text{for all} \quad z \in [z^S, \overline{z}'(\overline{b})).$$

This assumption implies that $R$ prefers being reelected with $(\overline{b}, \underline{q})$ to being reelected with $(\underline{b}, \overline{q})$. This is likely if the difference between high and low quality is small relative to the difference between a large and a small budget. It follows from Assumption 3 and $u_R(\underline{b}, \overline{q}, z) > u_R(\underline{b}, \underline{q}, z)$ that $u_R(\overline{b}, \underline{q}, z) > u_R(\underline{b}, \underline{q}, z)$ for all $z \in [z^S, \overline{z}'(\overline{b}))$.

To derive the unique PBE when incumbent $R$'s office rent is $\Psi > \overline{\Psi}^{FG}$ and his preferences satisfy Assumption 3, we focus on his equilibrium strategies for all states $z$ starting with high states: Note first that whenever $z \geq \overline{z}'(\overline{b})$, $R$ can play his most favored policy bundle $(\overline{b}, \overline{q})$ and is reelected nevertheless. The reason is that this bundle leads to an outcome $y_1 \geq y'(\overline{b})$ that induces the voter to reelect $R$ even if $y_1$ could also result from $R$ having played $(\overline{b}, \underline{q})$ in the corresponding low state. Given that in equilibrium $R$ plays $(\overline{b}, \overline{q})$ for $z \geq \overline{z}'(\overline{b})$, $R$ plays $(\overline{b}, \underline{q})$ in states $z \in [\underline{z}'(\overline{b}), \overline{z}'(\overline{b}))$ as this is his most preferred policy bundle that can ensure his reelection. Whenever $z < \underline{z}'(\overline{b})$, $R$ is not reelected when playing $\overline{b}$ (independently of $q_1(z)$) because this would lead to $y_1 < y'(\overline{b})$. Moreover, he would also not be reelected when playing $\underline{b}$ because his equilibrium play does not include $\underline{b}$ for any $z \geq \tilde{z}$, such that the voter would know with certainty that $z < \tilde{z}$ when observing $\underline{b}$. As there is no way of being reelected, $R$ plays his most favored policy bundle $(\bar{b}, \bar{q})$ for $z < \underline{z}'(\bar{b})$. Hence, the unique PBE has the same equilibrium outcome as the one described in Proposition 4 with $b_1(z) = \bar{b}$. $R$ therefore has an incumbency advantage equal to $F(\tilde{z}) - F(\underline{z}'(\bar{b}))$. The following Proposition summarizes the results of this discussion.

**Proposition 7** *Given $\Psi > \overline{\Psi}^{FG}$, the full game with incumbent $R$ has a unique PBE with Laplacian off equilibrium beliefs if Assumption 3 holds. The equilibrium outcome is identical to the one described in Proposition 4 with $b_1(z) = \bar{b}$ for all $z$. $R$ is thus reelected for all $z \geq \underline{z}'(\bar{b})$, i.e., in strictly more states $z$ than under full information.*

Interestingly, $R$'s incumbency advantage would be no smaller than $F(\tilde{z}) - F(\underline{z}'(\bar{b}))$ in equilibrium if Assumption 3 did not hold. To see this, note first that $R$ would also play $(\bar{b}, \bar{q})$ for all $z \geq \bar{z}'(\bar{b})$ in this case. He could therefore always ensure his reelection for all $z \in [\underline{z}'(\bar{b}), \bar{z}'(\bar{b}))$ by playing $(\bar{b}, \underline{q})$, such that his incumbency advantage would be at least $F(\tilde{z}) - F(\underline{z}'(\bar{b}))$. Moreover, if $u_R(\bar{b}, \underline{q}, z) \leq u_R(\underline{b}, \bar{q}, z)$, $\underline{z}'(\underline{b}) < \underline{z}'(\bar{b})$ and $\bar{z}'(\underline{b}) < \bar{z}'(\bar{b})$,[19] his incumbency advantage could even be greater as he would then play $(\underline{b}, \bar{q})$ in some states $z \in [\bar{z}'(\underline{b}), \bar{z}'(\bar{b}))$, such that he could ensure his reelection in some states $z \in [\underline{z}'(\underline{b}), \underline{z}'(\bar{b}))$ by playing $(\underline{b}, \underline{q})$. Therefore, we have shown the following:

**Proposition 8** *Given $\Psi > \overline{\Psi}^{FG}$, in equilibrium $R$ also plays $\underline{q}$ for some intermediate states $z$ and is reelected for at least all $z \geq \underline{z}'(\bar{b})$ even if Assumption 3 does not hold.*

Propositions 7 and 8 show that the most interesting results of the $q$-Game carry over to the full game: A sufficiently office-motivated incumbent $R$ improves his reelection prospects by choosing low quality policies in some states of the world. Hence, we still get the perhaps paradoxical prediction that prior to elections office-motivated incumbents sometimes choose inefficient policies in the realms of politics in which they are perceived as strong.

# 5 Empirical Evidence

One implication for observables of our model is that prior to elections office-motivated incumbents should, for some states of the world, generate mediocre policy outcomes in the policy dimension in which they are commonly perceived as strong. Another prediction of the model is that incumbents should, on average, have an electoral advantage. In this section, we discuss

[19]The orderings of $\underline{z}'(\underline{b})$ and $\underline{z}'(\bar{b})$, and $\bar{z}'(\underline{b})$ and $\bar{z}'(\bar{b})$, respectively, depend on the functional forms of $u_M(b, q, z)$ and $f(z)$.

existing empirical evidence that is consistent with both the main assumptions and these predictions of the model. In addition, we provide our own evidence on the use of inefficient policies in the presence of electoral concerns. While we do not claim that this evidence is conclusive, we view it as strong support for our model.

### 5.1 Existing Results of the Empirical Literature

**Assumptions of the Model:** A key assumption of our model is that parties differ with respect to their preferred policies and that voters prefer one party to the other depending on the state of the world. There is ample empirical evidence that left-wing parties favor public spending for combatting poverty, unemployment and low economic growth, while right-wing parties take a tougher stand on fighting crime and terrorism (see e.g. Hicks and Swank, 1992; Allan and Scruggs, 2004; Medina-Ariza, 2006). Opinion poll data suggest that voters understand these policy differences and choose their electoral support according to what they perceive as the most important issues on the political agenda. For the United States, Newport and Carroll (2004) document large differences in what Republicans and Democrats considered to be the "most important problem facing the nation" in the years 2003 and 2004. While 16% of Democrats considered unemployment to be the most important problem, only 8% of Republicans did so; and while 13% of Republicans considered terrorism to be the most important problem, only 6% of Democrats did so. In addition, 69% of the voters who saw terrorism as the most important issue in 2006 thought that Republicans were better suited to fight terrorism, while only 17% thought that Democrats were better suited (Newport and Carroll, 2006).

One of the key findings in the empirical literature on political business cycles is that economic growth in the U.S. is on average higher under Democrats than under Republicans (Alesina, Roubini, and Cohen, 1997; Drazen, 2000). Further evidence that parties differ with respect to the policy outcomes they generate when in office is provided in the Tables 1, 2 and 3 below, which will be discussed in detail in subsection 5.2. These tables show that the homicide rate is on average significantly lower if the incumbent is politically right, and that the growth rate tends on average to be larger if the incumbent belongs to the political left.

Evidence that the voters' support for one party relative to another depends on their beliefs about the state of the world is provided by e.g. Berrebi and Klor (2006). They document that Israeli voters tend to elect the left-wing party (Labor) when few people died in terror attacks in the months before the elections, and the right-wing party (Likud) when many people died in terror attacks. They find a statistically significant increase in the support for the right-wing party when the number of terror fatalities rises. Moreover, Wolfers and Zitzewitz (2004, p.1) find that political betting markets "suggest that issues outside the campaign - like the state of the economy, and the progress on the war on terror - are the key factors in the forthcoming [2004 U.S. presidential] election." We conclude that there is fairly broad support for our main assumptions.

**Predictions of the Model:** Our model predicts that prior to elections office-motivated incumbents should for some states of the world implement policies they are perceived as tough at inefficiently. In their study on terrorism and electoral outcomes, Berrebi and Klor (2006) provide evidence that is consistent with this perhaps paradoxical prediction. They show that right-wing incumbents impose total or partial closures on Westbank or Gaza much less frequently before elections than left-wing incumbents. This finding is consistent with the notion that prior to elections right-wing incumbents take less precautions against terror attacks than left-wing incumbents even though they have the reputation of being tougher. When presenting our own results below, we also discuss the findings of the empirical political business cycles literature, which are in line with our predictions on the use of inefficient policies.

A second important prediction of the model is that incumbents have on average an electoral advantage. This topic has received considerable attention in the literature. Most contributions focus on parliamentary elections. However, there is also substantial evidence for an incumbency advantage in U.S. gubernatorial elections (e.g., Petterson, 1982; Tompkins, 1984; Ansolabehere and Snyder, 2002; Ansolabehere, Snowberg and Snyder, 2006). There has been a debate in the literature about whether the incumbency advantage is due to selection effects, i.e. incumbents being of a "higher average quality" than the challengers (e.g., Cox and Katz, 1996; Levitt and Wolfram, 1997), or whether the advantage somehow arises from the period in office. A recent paper by Lee (2008) shows that even in the absence of selection effects a strong incumbency advantage persists, which is related to having been in office. Using a regression-discontinuity analysis he finds that a candidate who has marginally won an election has a significant and substantial edge in future competitions as compared to candidates who have marginally lost elections. This incumbency advantage related to holding office could be related to "personal votes" and face recognition (e.g., Ansolabehere, Snyder and Stewart, 2000; Prior, 2006). In our model we provide a new, complementary channel through which holding office can improve electoral prospects: By implementing inefficient policies the incumbent can induce uncertainty about the underlying state of the world when this assures his reelection.

### 5.2 Evidence for the Inefficient Policies Channel

We now present further empirical evidence that is in line with the prediction of our model. Though by definition the inefficient policies in our model are not observed, the model has the observable implication that incumbents with electoral concerns should sometimes generate mediocre policy outcomes in the policy dimension in which they are commonly perceived as strong. To the best of our knowledge there are no contributions in the literature that provide direct evidence in line with this phenomenon of mediocre policy outcomes. We have therefore collected annual data for all OECD countries between 1975 and 2004 with the aim of explaining differences in the levels of homicides and (short-run) economic growth rates with the political factors identified in our model. All dependent and independent variables are explained in some detail in the Data Appendix.

The dependent variable in Table 2 is the number of homicides per hundred thousand people. This data is provided by the World Health Organization (2006) and is collected from local doctors reporting the cause of death of patients. It is widely used in the literature and is recognized as a very reliable data source (see e.g. Gartner, 1990). The dependent variable in Table 3 is the annual growth rate of GDP per capita, taken from the World Bank (2006b).

Various independent variables are included. First, there are dummy variables for the political orientation of the government. The dummy variable "Right" takes a value of 1 if the party in power is to the political right, and 0 otherwise. The variables "Center" and "Left" are analogously defined. The coding is based on data from the Database of Political Institutions (DPI), which is described in Beck et al. (2001).

Another key variable is "Electoral concerns (2y.)". It is a dummy variable that takes the value of 1 when the incumbent can run for reelection and elections take place within two years or less. This variable has been coded using data on election dates from Brender and Drazen (2005) and the International Institute for Democracy and Electoral Assistance (2006), as well as data on term limits and on the number of terms served by a particular incumbent, taken from Johnson and Crain (2004), Zárate (2007) and various national sources. The variable "Electoral concerns (1y.)" is defined and constructed analogously to "Electoral concerns (2y.)", except

Table 1: Descriptive Statistics: Homicide and Growth

| | | Full sample | Left | Right |
|---|---|---|---|---|
| Homicide: | Mean | 2.33 | 3.08 | 1.79 |
| | Std.Dev. | 3.35 | 4.50 | 2.07 |
| | Minimum | 0.00 | 0.40 | 0.00 |
| | Maximum | 20.52 | 20.52 | 10.38 |
| | Observations | 729 | 324 | 292 |
| Growth: | Mean | 2.24 | 2.29 | 2.10 |
| | Std.Dev. | 2.92 | 2.33 | 3.19 |
| | Minimum | -12.66 | -8.99 | -12.66 |
| | Maximum | 23.26 | 7.35 | 23.26 |
| | Observations | 783 | 320 | 337 |

that it covers only one year preceding the election.

The descriptive statistics of the two dependent variables are displayed in Table 1. As expected, right-wing parties do on average better with respect to fighting homicides (statistically significant at the 1% level), while left-wing parties tend to foster higher growth, although this is not statistically significant.

In Table 2 we analyze with the help of OLS-regressions our model's prediction that right-wing incumbents sometimes choose to put less effort into fighting homicides when facing reelection. This effect is likely to be strongest in the one or two years preceding elections. In column 1 it is shown that right-wing incumbents are on average associated with a significantly lower homicide rate. Also, on average incumbents with electoral concerns are associated with a significantly lower homicide rate. However, our model predicts that this should not necessarily be the case for office-motivated right-wing incumbents who prior to elections may have incentives to fight crime inefficiently. To account for this we include in column 2 the interaction term of "Electoral concerns (2y.)" (EC (2y.)) and "Right", which is positive and significant at the 1% level. This suggests that office-motivated right-wing incumbents might indeed sometimes implement inefficient policies before elections.

In line with our model we expect that the incentives for right-wing governments to fight crime inefficiently towards the end of the electoral term are especially important when the incumbent can personally run for re-election. Thus, we expect a general variable of the last two years in office (including observations where the government can run for reelection and observations where it cannot run for reelection) to have a weaker effect on policies than our "Electoral concerns (2y.)" variable. As shown in column 3, this is the case: The interaction term between "Last 2 years" and "Right" is not significant.[20]

[20]We cannot include the "Last 2 years" variable and the "Electoral concerns (2y.)" variable in the same specification due to multicollinearity (the correlation between these two variables is 0.85).

Table 2: Partisanship, Electoral Concerns and Homicide

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Right | -0.793 | -3.079 | -1.552 | -0.833 | -0.812 | | | -0.413 |
| | (3.05)*** | (5.91)*** | (2.88)*** | (6.03)*** | (5.93)*** | | | (4.15)*** |
| Left | | | | | | 0.716 | | |
| | | | | | | (5.17)*** | | |
| Center | | | | | | | 0.277 | |
| | | | | | | | (1.29) | |
| Electoral concerns (2y.) | -2.997 | -4.113 | | -0.234 | -0.223 | 0.278 | 0.118 | |
| | (10.19)*** | (11.30)*** | | (2.29)** | (2.21)** | (2.79)*** | (1.31) | |
| Electoral concerns (1y.) | | | | | | | | -0.115 |
| | | | | | | | | (1.38) |
| EC (2y.) * Right | | 3.008 | | 0.711 | 0.699 | | | |
| | | (5.03)*** | | (4.65)*** | (4.61)*** | | | |
| EC (2y.) * Left | | | | | | -0.550 | | |
| | | | | | | (3.62)*** | | |
| EC (2y.) * Center | | | | | | | -0.309 | |
| | | | | | | | (1.44) | |
| EC (1y.) * Right | | | | | | | | 0.269 |
| | | | | | | | | (2.13)** |
| Last 2 years | | | -1.146 | | | | | |
| | | | (3.10)*** | | | | | |
| Last 2 years * Right | | | 0.802 | | | | | |
| | | | (1.30) | | | | | |
| Gov. spending (-1) | | | | | 0.302 | 0.027 | 0.021 | 0.032 |
| | | | | | (1.42) | (1.20) | (0.92) | (1.42) |
| GDP (-1) | | | | | 0.000 | 0.000 | 0.000 | 0.000 |
| | | | | | (4.33)*** | (4.68)*** | (4.46)*** | (4.51)*** |
| Intercept | 4.988 | 5.792 | 3.599 | 0.916 | -1.228 | -1.965 | -1.615 | -1.425 |
| | (18.52)*** | (18.75)*** | (11.40)*** | (2.52)** | (1.72)* | (2.73)*** | (2.20)** | (2.00)** |
| Country and Time FE | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Observations | 650 | 650 | 693 | 650 | 649 | 649 | 649 | 659 |
| R-squared | 0.15 | 0.19 | 0.03 | 0.22 | 0.24 | 0.23 | 0.20 | 0.21 |

Dependent variable is number of homicides per 100'000 people. Absolute values of t-statistics are in parentheses. */**/*** indicates significance at the 10%/5%/1% level. (-1) indicates that first lags are taken.

Columns 4 and 5 show that the results are robust to the inclusion of time effects, country fixed effects and the control variables of government spending and GDP.[21]

Another useful robustness check is to see whether this effect is also present for center or left-wing incumbents. If it were the case, this would contradict the model's predictions. As shown in columns 6 and 7, this effect does not hold for left-wing and center incumbents. As additional robustness check in column 8 the variable of electoral concerns focussing on a shorter time span (1 year) before the elections is included. The interaction term of "Electoral concerns (1y.)" and "Right" is also positive and significant.

These empirical findings are consistent with the prediction of our model that incumbents who run for reelection sometimes deliberately choose inefficient policies that lead to mediocre policy outcomes in the areas in which they are considered to be strong. We cannot, however, rule out that these findings are partly affected by the endogeneity of the party in power.

[21] We believe that government spending and GDP capture important characteristics of a society. However, we would have liked to control for other factors, such as police spending. Unfortunately, we could not include this variable due to the large number of missing observations.

Table 3: Partisanship, Electoral Concerns and Economic Growth

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Left | 0.265 | 0.722 | 0.166 | 1.234 | 1.155 | | | 0.692 |
| | (1.23) | (1.70)* | (0.37) | (2.77)*** | (2.46)** | | | (2.11)** |
| Center | | | | | | -0.575 | | |
| | | | | | | (0.75) | | |
| Right | | | | | | | -0.868 | |
| | | | | | | | (1.86)* | |
| Electoral concerns (2y.) | 0.117 | 0.392 | | 0.633 | 0.575 | 0.003 | -0.254 | |
| | (0.48) | (1.19) | | (2.02)** | (1.71)* | (0.01) | (0.72) | |
| Electoral concerns (1y.) | | | | | | | | 0.552 |
| | | | | | | | | (2.04)** |
| EC (2y.) * Left | | -0.614 | | -1.017 | -1.225 | | | |
| | | (1.25) | | (2.08)** | (2.36)** | | | |
| EC (2y.) * Center | | | | | | 0.692 | | |
| | | | | | | (0.92) | | |
| EC (2y.) * Right | | | | | | | 0.804 | |
| | | | | | | | (1.57) | |
| EC (1y.) * Left | | | | | | | | -0.816 |
| | | | | | | | | (1.94)* |
| Last 2 years | | | -0.208 | | | | | |
| | | | (0.63) | | | | | |
| Last 2 years * Left | | | -0.193 | | | | | |
| | | | (0.37) | | | | | |
| Education spend.(-1) | | | | | 0.092 | 0.112 | 0.114 | 0.071 |
| | | | | | (0.50) | (0.60) | (0.61) | (0.39) |
| Capital formation | | | | | 0.139 | 0.132 | 0.140 | 0.130 |
| | | | | | (2.92)*** | (2.74)*** | (2.91)*** | (2.80)*** |
| Gov. spending (-1) | | | | | -0.212 | -0.232 | -0.217 | -0.221 |
| | | | | | (2.37)** | (2.58)** | (2.41)** | (2.54)** |
| GDP (-1) | | | | | -0.000 | -0.000 | -0.000 | -0.000 |
| | | | | | (3.01)*** | (2.86)*** | (3.05)*** | (3.41)*** |
| Intercept | 1.925 | 1.715 | 2.388 | 2.512 | 7.247 | 7.920 | 8.085 | 8.084 |
| | (8.25)*** | (5.96)*** | (8.26)*** | (2.34)** | (2.51)** | (2.74)*** | (2.79)*** | (2.88)*** |
| Country and Time FE | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Observations | 693 | 693 | 736 | 639 | 499 | 499 | 499 | 514 |
| R-squared | 0.00 | 0.00 | 0.00 | 0.20 | 0.25 | 0.24 | 0.24 | 0.25 |

Dependent variable is growth of GDP per capita. Absolute values of t-statistics are in parentheses. */**/*** indicates significance at the 10%/5%/1% level. (-1) indicates that first lags are taken.

Ruling this out would require strong and valid instruments for both the party in power and the interaction term. Finding such instruments is difficult if not impossible. Further, note that even if the level of homicides affects the party in office, it is unclear how e.g. reversed causality could account for the finding that this level is higher when the right-wing incumbent can stand for reelection than otherwise.

Table 3 reports results from OLS-regressions of the annual growth rate of GDP per capita, on a number of explanatory variables.[22] The interaction term of "Electoral concerns (2y.)" and "Left" is negative and significant once country fixed effects and time dummies are included, i.e., from column 4 onwards. This result is robust to the inclusion of control variables and the use of the "Electoral concerns (1y.)" variable. As expected, the significant negative interaction

[22]Appendix C.2 presents a sketch of the model when the policy outcome $y$ is a good rather than a bad. It shows that the incumbent who is strong in fostering $y$ has incentives to use inefficient policies to downward distort the outcome for intermediate states of the world.

term is only present for left-wing incumbents, but not for incumbents from center or right-wing parties. The results of Table 3 are in line with the model's prediction that office-motivated left-wing incumbents do on average a poorer job at promoting growth when they have electoral concerns than otherwise. These findings lend further support to our model, but we again view them as suggestive rather than conclusive.

Observe also that these results are in line with the empirical findings of the political business cycle literature noted earlier. According to this literature economic growth is higher under Democrats than Republicans in the first half of their terms and growth significantly decreases for Democrats in the second half of their terms (Alesina, Roubini, and Cohen, 1997; Drazen, 2000). Our model provides a theoretical explanation for the observed economic slowdowns at the end of the first term under Democratic U.S. presidents *and* for the absence of such slowdowns under Republican presidents.

## 6 Conclusions

Wittman (1989, p. 1396-97) argued forcefully that "democratic political markets are organized to promote wealth-maximizing outcomes, [...] and that political entrepreneurs are rewarded for efficient behavior." The model presented in this paper suggests that this is indeed often the case. It shows that political incumbents find it in their best interest to implement efficient policies in those realms of politics in which they are considered to be weaker than the opposition candidate, as well as in low and high states of the world in which there is either no way or no need to influence the election outcomes to their advantage.

The model, however, also suggests that office-motivated incumbents sometimes choose inefficient policies and that they can thereby improve their reelection prospects. In particular, we show that incumbents may choose inefficient policies in intermediate states of the world in realms of politics in which they are considered to be stronger than the opposition candidate. The choice of inefficient policies for some states makes the voter uncertain about the true state of the world when observing the corresponding policy outcomes. By choosing inefficient policies only if the voter's expected utility of reelecting the incumbent exceeds her expected utility of electing the challenger, the incumbent is reelected in more states than he would be if he always chose efficient policies. Thus, in our model an incumbent sometimes chooses inefficient policies in realms of politics in which he is considered to be strong, and in these instances he enjoys an incumbency advantage due to asymmetric information. To the best of our knowledge, both of these features of our model are new to the literature.

The idea that incumbents sometimes choose inefficient policies in realms of politics in which they are strong may seem paradoxical. However, the evidence we provide from OECD countries is consistent with this idea: Homicide rates are on average lower under right-wing governments than under left-wing governments, but increase under right-wing governments in the last two years before elections if the government can be reelected. This suggests that right-wing incumbents, who are often tougher on fighting crime than their challengers, may indeed choose inefficient policies in the fight against crime to improve their reelection prospects by making the threat from crime look worse than it actually is.

Similarly, the data suggests that left-wing governments tend to do better at in promoting short-run economic growth than right-wing governments. Further, economic growth slows down under left-wing governments prior to elections if the government can be reelected. This is consistent with the well-documented finding from the political business cycle literature that economic growth decreases under left-wing governments towards the end of the electoral term. Our model suggests that these slowdowns could be driven by left-wing governments that can stand for reelection and that want to make the economic times appear harsher than they really are.

# Appendix

## A Proofs

**Proof of Lemma 2:** Because $c''(y) \geq 0$, $y(\overline{b}, q, z) < y(\underline{b}, q, z)$ and $\partial y(\underline{b}, q, z)/\partial z > \partial y(\overline{b}, q, z)/\partial z$, $\Delta u_i(z)$ strictly increases in $z$. Continuity of $c(y)$ in $y$ and of $y(b, q, z)$ in $z$ imply that $\Delta u_i(z)$ is continuous in $z$. Hence, for every $i$ a unique $\tilde{z}_i$ exists. The ordering (5) holds because $\Delta u_i(z)$ decreases in $\alpha_i$, which implies that $\tilde{z}_i$ increases in $\alpha_i$. ■

**Proof of the uniqueness part of Proposition 2:** We begin with an implication of Lemma 4. Observe first that the lemma implies that for all $z \geq \tilde{z}$, $R$ is (re)elected after the incumbent has played $\underline{q}$. Similarly, for $z < \tilde{z}$, $L$ is (re)elected after the incumbent has played $\overline{q}$. Consequently, there is no $z \in [\underline{a}, \overline{a}]$ such that $L$ is (re)elected when $\underline{q}$ has been played and $R$ is (re)elected when $\overline{q}$ has been played. Since playing $\overline{q}$ leads moreover to better policy outcomes (i.e. lower $c(y_1)$), there can be no equilibrium in which $L$ plays $\underline{q}$ for any $z$. ■

**Proof of the uniqueness part of Proposition 3:** Lemma 4 implies that $R$ plays $\overline{q}$ for

$z < z^S$ and $z \geq z^H$. Further, given $\Psi \leq \underline{\Psi}$, $R$ also plays $\overline{q}$ for any $z \in [z^S, \overline{z}')$. Given this, there can be no equilibrium in which $R$ plays $\underline{q}$ for $z \in [\overline{z}', z^H)$ since it would then pay for $R$ to deviate and to play $\overline{q}$, as this would still lead to his reelection by definition of $\overline{z}'$ (defined further below in the tex)t. Hence, there can be no equilibrium in which $R$ plays $\underline{q}$ for any $z$. ■

**Proof of Lemma 5:** The proof contains four steps.

First, given $R$'s strategy described in the lemma, Bayes' rule implies that the voter's beliefs are

$$\mu(y_1) = \frac{\lambda f(\underline{z}(y_1))}{\lambda f(\overline{z}(y_1)) + \lambda f(\underline{z}(y_1))} = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1)) + f(\underline{z}(y_1))} \tag{7}$$

when observing $y_1 \in (y^S, y^H)$. Since $f(z) > 0$ for any $z$, $\mu(y_1) \in (0, 1)$ for any $y_1 \in (y^S, y^H)$.

Second, given her beliefs, the voter plays $v(y_1) = r$ if and only if

$$E_\mu(\Delta u_M \mid y_1) = \mu(y_1)\Delta u_M(\underline{z}(y_1)) + [1 - \mu(y_1)]\Delta u_M(\overline{z}(y_1)) \geq 0, \tag{8}$$

where $E_\mu$ denotes the expectation taken with respect to beliefs $\mu(y_1)$. Since $u_M(z)$ strictly and continuously increases in $z$ and since $\overline{z}(y_1) > \tilde{z} > \underline{z}(y_1)$, it follows for any given $y_1 \in (y^S, y^H)$ that $E_\mu(\Delta u_M \mid y_1)$ strictly and continuously decreases in $\mu(y_1)$, that $E_\mu(\Delta u_M \mid y_1) < 0$ if $\mu(y_1) = 1$, and that $E_\mu(\Delta u_M \mid y_1) > 0$ if $\mu(y_1) = 0$. Hence, for any $y_1 \in (y^S, y^H)$ there is a unique belief $\tilde{\mu}(y_1) \in (0, 1)$ such that $E_\mu(\Delta u_M \mid y_1) = 0$. Moreover, $\tilde{\mu}(y_1) = 0$ if $y_1 = y^S$ and $\tilde{\mu}(y_1) = 1$ if $y_1 = y^H$. Further, $\tilde{\mu}(y_1)$ increases in $y_1$, because $E_\mu(\Delta u_M \mid y_1)$ would increase in $y_1$ if beliefs were kept constant.

Third, since $\tilde{\mu}(y_1)$ continuously increases from zero to one as $y_1$ increases from $y^S$ to $y^H$ and since $\mu(y_1)$ is continuous and $\mu(y_1) \in (0, 1)$ for any $y_1 \in (y^S, y^H)$, there is a $y' \in (y^S, y^H)$ such that $\mu(y') = \tilde{\mu}(y')$. When observing this $y'$ and when $R$ plays the strategy described in the lemma, then $E_\mu(\Delta u_M \mid y') = 0$ such that the voter is indifferent between $L$ and $R$.

Fourth, if $y'$ is unique, then $E_\mu(\Delta u_M \mid y_1) \geq 0$ if and only if $y_1 \geq y'$, which implies that the voter plays $v(b_1, y_1) = r$ if and only if $y_1 \geq y'$. ■

**Proof of Proposition 4:** The proof has two parts. We first prove that the strategy profile and the beliefs that are consistent with it constitute a PBE that satisfies our restriction on off equilibrium beliefs. (The result that $R$ is reelected if and only if $z \geq \underline{z}'$ directly follows from this strategy profile.) Second, we show that there exists no other PBE in pure strategies that satisfies this restriction. For notational ease, we again set $\mu(y_1) \equiv \mu(\underline{z}(y_1) \mid b_1, y_1)$.

*Part I (Existence)*: We distinguish two cases: $\overline{a} > \overline{z}(y(b_1, \underline{q}, \overline{z}'))$ and $\overline{a} \in (z^H, \overline{z}(y(b_1, \underline{q}, \overline{z}'))]$, where $\overline{z}(y(b_1, \underline{q}, \overline{z}')) > z^H$. In the first case, the voter's on equilibrium beliefs are $\mu(y_1) = 0$ for $y_1 < y(b_1, \overline{q}, \underline{z}')$ and for $y_1 \geq y(b_1, \underline{q}, \overline{z}')$, and $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ for $y_1 \in [y', y(b_1, \underline{q}, \overline{z}'))$, and her off equilibrium beliefs are $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ for $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y')$ and $\mu(y_1) = 1$ for $y_1 > y(b_1, \overline{q}, \overline{a})$. In the second case, the voter's (on and off equilibrium) beliefs $\mu(y_1)$ are identical for all $y_1 < y'$, but $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ for $y_1 \in [y', y(b_1, \overline{q}, \overline{a})]$, and $\mu(y_1) = 1$ for $y_1 > y(b_1, \overline{q}, \overline{a})$. In what follows we only provide the existence proof for the first of these cases as the existence proof for the second case is very similar.

First, we show that $R$ does not want to deviate given the voter's strategy. Given $z < \underline{z}'$, the voter plays $v(b_1, y_1) = l$ for any $q_1(z)$. Hence, $\overline{q}$ is $R$'s best response. Given $z \in [\underline{z}', \overline{z}')$, the voter plays $v(b_1, y_1) = r$ if and only if $R$ plays $\underline{q}$. Hence, $\underline{q}$ is $R$'s best response. Given $z \geq \overline{z}'$, the voter plays $v(b_1, y_1) = r$ for any $q_1(z)$. Hence, $\overline{q}$ is $R$'s best response. Thus, given the voter's strategy, $R$'s strategy is optimal.

Second, we show that the voter's strategy is optimal given her beliefs. Given $y_1 < y(b_1, \overline{q}, \underline{z}')$ and beliefs $\mu(y_1) = 0$, $v(b_1, y_1) = l$ is obviously the voter's best response. Given $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y')$ and beliefs $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$, $v(b_1, y_1) = l$ is the voter's best response by construction of $y'$. Given $y_1 \in [y', y(b_1, \underline{q}, \overline{z}'))$ and beliefs $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$, $v(b_1, y_1) = r$ is the voter's best response by construction of $y'$. Given $y_1 \geq y(b_1, \underline{q}, \overline{z}')$ and beliefs $\mu(y_1) = 0$, $v(b_1, y_1) = r$ is the voter's best response. Thus, given the voter's beliefs, her strategy is optimal.

Third, we show that on equilibrium the voter's beliefs are updated according to Bayes' rule and consistent with $R$'s strategy. Given $R$'s strategy, observations $y_1 < y(b_1, \overline{q}, \underline{z}')$ are only consistent with $R$ having played $\overline{q}$. Hence, $\mu(y_1) = 0$ for such observations. Given $R$'s strategy and observations $y_1 \in [y', y(b_1, \underline{q}, \overline{z}'))$, $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ by Bayes' rule. Given $R$'s strategy, observations $y_1 \in [y(b_1, \underline{q}, \overline{z}'), y(b_1, \overline{q}, \overline{a})]$ are only consistent with $R$ having played $\overline{q}$. Hence, $\mu(y_1) = 0$ for such observations. Thus, given $R$'s strategy, the voter's beliefs are consistent and updated using Bayes' rule.

Fourth, we derive the voter's beliefs off equilibrium. The observations $y_1 > y(b_1, \overline{q}, \overline{a})$ are off equilibrium, but only consistent with $R$ having played $\underline{q}$. Hence $\mu(y_1) = 1$ for such observations. An observation $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y')$ is consistent with $\underline{q}$ being played in state $\underline{z}(y_1)$ and $\overline{q}$ being played in state $\overline{z}(y_1)$, both of which are not played on equilibrium. Let $\varepsilon > 0$ be the probability that such an "error" occurs in either state and denote by $\mu_\varepsilon(y_1)$ the updated belief that $z = \underline{z}(y_1)$. Then, $\mu_\varepsilon(y_1) = \frac{\varepsilon f(\underline{z}(y_1))}{\varepsilon f(\underline{z}(y_1))+\varepsilon f(\overline{z}(y_1))} = \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1))+f(\overline{z}(y_1))}$, which is the same as stated in the proposition. This completes the proof of the existence part.

*Part II (Uniqueness):* Claims 4.1 to 4.3 rule out all alternative candidate pure strategy equilibria in the interval $[z^S, z^H)$. Further, Lemma 4 rules out any alternative equilibria for $z < z^S$ and $z \geq z^H$.

*Claim 4.1:* For any pair $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^S, \tilde{z}) \times [\tilde{z}, z^H)$, there is no equilibrium with $q_1(\underline{z}(y_1)) = q_1(\overline{z}(y_1))$.

Proof: Suppose $q_1(\underline{z}(y_1)) = q_1(\overline{z}(y_1)) = \overline{q}$. Then, the voter's beliefs are $\mu(y_1) = 0$ when observing $y_1 = y(b_1, \overline{q}, \underline{z}(y))$ or $y_1 = y(b_1, \overline{q}, \overline{z}(y))$. She thus plays $v(b_1, y_1) = l$ if $y_1 = y(b_1, \overline{q}, \underline{z}(y_1))$, and $v(b_1, y_1) = r$ if $y_1 = y(b_1, \overline{q}, \overline{z}(y_1))$. But given this strategy of the voter and since $y(b_1, \overline{q}, \overline{z}(y_1)) = y(b_1, \underline{q}, \underline{z}(y_1))$ and $\Psi > \overline{\Psi}$, $R$ in state $\underline{z}(y_1)$ has an incentive to deviate, i.e. to play $q_1(\underline{z}(y_1)) = \underline{q}$.

Suppose therefore $q_1(\underline{z}(y_1)) = q_1(\overline{z}(y_1)) = \underline{q}$. Then, the voter's beliefs are $\mu(y_1) = 1$ when observing $y_1 = y(b_1, \underline{q}, \underline{z}(y_1))$ or $y_1 = y(b_1, \underline{q}, \overline{z}(y_1))$. She thus plays $v(b_1, y_1) = l$ if $y_1 = y(b_1, \underline{q}, \underline{z}(y_1))$, and $v(b_1, y_1) = r$ if $y_1 = y(b_1, \underline{q}, \overline{z}(y_1))$. But given this strategy of the voter, $R$'s best response is to deviate in state $\underline{z}(y_1)$ and to play $q_1(\underline{z}(y_1)) = \overline{q}$, because he will not be reelected anyway and $c'(y_1) > 0$.

*Claim 4.2:* For any pair $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^S, \underline{z}') \times [\tilde{z}, \overline{z}')$, there is no equilibrium with $q_1(\underline{z}(y_1)) = \underline{q}$ and $q_1(\overline{z}(y_1)) = \overline{q}$.

Proof: By definition of $y'$, when observing $y_1 = y(b_1, \underline{q}, \underline{z}(y_1)) = y(b_1, \overline{q}, \overline{z}(y_1)) < y'$, the voter would play $v(b_1, y_1) = l$. Hence, $R$ in state $\overline{z}(y_1)$ would have an incentive to deviate and to play $q_1(\overline{z}(y_1)) = \underline{q}$, which would lead to $y_1 > y'$ and therefore ensure his reelection (see Lemma 4). Similarly, $R$ in state $\underline{z}(y_1)$ would have an incentive to play $q_1(\overline{z}(y_1)) = \overline{q}$, as this would improve the policy outcome without affecting the probability of reelection.

*Claim 4.3:* For any pair $(\underline{z}(y_1), \overline{z}(y_1)) \in [\underline{z}', \tilde{z}) \times [\overline{z}', z^H)$, there is no equilibrium with $q_1(\underline{z}(y_1)) = \overline{q}$ and $q_1(\overline{z}(y_1)) = \underline{q}$ that satisfies our restriction on the off equilibrium beliefs.

Proof: If $q_1(\underline{z}(y_1)) = \overline{q}$ and $q_1(\overline{z}(y_1)) = \underline{q}$ is part of an equilibrium strategy profile, the voter elects $L$ after $R$ has played $q_1(\underline{z}(y_1)) = \overline{q}$. So for $R$ to have no incentive to deviate and play $q_1(\underline{z}(y_1)) = \underline{q}$ in state $\underline{z}(y_1)$ even though $\Psi > \overline{\Psi}$, the voter must play $v(b_1, y_1) = l$ following the observation $y_1 = y(b_1, \underline{q}, \underline{z}(y_1)) \geq y'$. For $v(b_1, y_1) = l$ to be optimal given her beliefs, it must hold that $\mu(y_1) > \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1))+f(\overline{z}(y_1))}$ by construction of $y'$ (and since $y_1 \geq y'$). However, as shown at the end of part I, the only off equilibrium beliefs consistent with our restriction are

$\frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1))+f(\overline{z}(y_1))}$. ■

# B Data Appendix

*Capital formation:* Capital formation in percentage of GDP, from World Bank (2006b).

*Center:* Dummy being 1 for parties in the political center, with respect to the party platforms and agendas. The variable is from the Database of Political Institutions (DPI), described in Beck et al. (2001). Their coding is based on the party name and handbook description as well as on expert opinions.

*Education spending:* Public education spending in percent of GDP, from World Bank (2006a).

*Electoral concerns (2y.) or (1y.):* Dummy variable being 1 when both a) the incumbent is legally entitled to run for reelection, and b) elections take place within two years or less for (y2), resp. one year or less for (y1). The data on election dates is from Brender and Drazen (2005) and the International Institute for Democracy and Electoral Assistance (2006), the data on term limits and on the number of terms served by a particular incumbent has been taken from Johnson and Crain (2004), Zárate (2007) and various national sources.

*GDP:* Gross domestic product per capita at constant prices, from World Bank (2006b).

*Government spending:* General government final consumption expenditure in percent of GDP, from World Bank (2006b).

*Growth:* Annual growth rate of GDP per capita, from World Bank (2006b).

*Homicide:* Number of homicides per hundred thousand people, from World Health Organization (2006).

*Last 2 years:* Dummy being 1 for the last two years before elections.

*Left:* Dummy being 1 for left parties. Coding and source the same as for “Center”.

*Right:* Dummy being 1 for right parties. Coding and source the same as for “Center”.

# C Supplementary Material

The following contains supplementary material and is not intended for publication.

## C.1 Multiple thresholds $y'$

In this appendix, we show how our main results from section 3 carry over to the case in which there exist multiple thresholds $y' \in (y^S, y^H)$ as defined in the proof of Lemma 5. In the proof of Lemma 5, the functions $\mu(y_1)$ and $\tilde{\mu}(y_1)$ were defined and shown to have the following properties: $\mu(y_1)$ is a continuous function of $y_1$ with range $(0,1)$ and $\tilde{\mu}(y_1)$ is a continuous and strictly increasing function of $y_1$ that takes the value zero at $y_1 = y^S$ and the value one at $y = y^H$. Therefore, a $y'$ such that $\tilde{\mu}(y') = \mu(y')$ exists. Moreover, because of these properties it is readily checked that generically there is an odd number of such $y'$'s.

Trivially, the unique PBE with incumbent $L$ carries over to any number of thresholds $y'$, as they play no role in this PBE. Similarly, the unique PBE in which incumbent $R$ always plays $\overline{q}$ carries also over when his office rent $\Psi$ is sufficiently small.[23]

To show how the PBE in which incumbent $R$ plays $\underline{q}$ for some intermediate states $z$ generalizes to any odd number of thresholds $y'$, we present the results for the case of three such thresholds: $y'$, $y''$ and $y'''$, satisfying $y^S < y' < y'' < y''' < y^H$. We assume that $\Psi$ is so large that $R$ would always play $\underline{q}$ if that guarantees his reelection whenever playing $\overline{q}$ does not.[24] Observe that the corresponding $z$-values are ordered as follows: $z^S < \underline{z}' < \underline{z}'' < \underline{z}''' < \tilde{z} < \overline{z}' < \overline{z}'' < \overline{z}''' < z^H$.

It follows from Lemma 5 (and its proof) that the voter elects $R$ if $y_1 \in [y', y'']$ or $y_1 \geq y'''$ and $L$ otherwise, given that $R$ plays $\underline{q}$ with probability $\lambda > 0$ for all $z \in (z^S, \tilde{z})$ and $\overline{q}$ with probability $\lambda$ for all $z \in (\tilde{z}, z^H)$. Therefore, the statement equivalent to Proposition 4 is:

**Proposition 9** *The q-Game with incumbent R has a unique PBE with Laplacian off equilibrium beliefs, in which R plays* $q_1(z) = \underline{q}$ *for* $z \in [\underline{z}', \underline{z}''] \cup [\underline{z}''', \overline{z}') \cup (\overline{z}'', \overline{z}''')$ *and* $q_1(z) = \overline{q}$ *otherwise, and the voter reelects R for* $y_1 \in [y', y'']$ *and* $y_1 \geq y'''$ *and elects L otherwise. R is thus reelected for all* $z \in [\underline{z}', \underline{z}'']$ *and all* $z \geq \underline{z}'''$*, i.e., in strictly more states than under full information.*

**Sketch of Proof:** The proof that the given strategies and beliefs constitute a PBE that satisfies our restriction on off equilibrium beliefs can be done in exactly the same manner as Part I (Existence) of the proof of Proposition 4. Note that there are again two cases to be considered: $\overline{a} > \overline{z}(y(b_1, \underline{q}, \overline{z}'''))$ and $\overline{a} \in (z^H, \overline{z}(y(b_1, \underline{q}, \overline{z}''')))]$. In the former case, the voter's on equilibrium beliefs are $\mu(y_1) = 0$ for $y_1 < y(b_1, \overline{q}, \underline{z}')$, for $y_1 \in (y(b_1, \overline{q}, \underline{z}''), y(b_1, \overline{q}, \underline{z}'''))$, for $y_1 \in [y(b_1, \underline{q}, \overline{z}'), y(b_1, \underline{q}, \overline{z}'')]$ and for $y_1 \geq y(b_1, \underline{q}, \overline{z}''')$, and $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1)) + f(\overline{z}(y_1))}$ for $y_1 \in [y', y'']$, for $y_1 \in [y''', y(b_1, \underline{q}, \overline{z}'))$ and for $y_1 \in (y(b_1, \underline{q}, \overline{z}''), y(b_1, \underline{q}, \overline{z}'''))$, and her off equilibrium beliefs are $\mu(y_1) = \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1)) + f(\overline{z}(y_1))}$ for $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y(b_1, \overline{q}, \underline{z}'')]$, for $y_1 \in [y(b_1, \overline{q}, \underline{z}'''), y')$

[23] A simple sufficient condition for this is that $\Psi < \hat{\Psi}(z)$ for all $z \in (z^S, z^H)$.

[24] A simple sufficient condition for this is that $\Psi > \hat{\Psi}(z)$ for all $z \in (z^S, z^H)$.

and for $y \in (y'', y''')$. The voter's beliefs are similar in the latter case except that $\mu(y_1) = 1$ for $y_1 > y(b_1, \overline{q}, \overline{a})$.

The proof that this PBE is the unique PBE that satisfies our restriction on off equilibrium beliefs corresponds to Part II (Uniqueness) of the proof of Proposition 4. Note that Claim 4.2 becomes relevant for any pairs $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^S, \underline{z}') \times [\tilde{z}, \overline{z}')$ or $(\underline{z}(y_1), \overline{z}(y_1)) \in [\underline{z}'', \underline{z}''') \times [\overline{z}'', \overline{z}''')$, and Claim 4.3 for any pairs $(\underline{z}(y_1), \overline{z}(y_1)) \in [\underline{z}', \underline{z}'') \times [\overline{z}', \overline{z}'')$ or $(\underline{z}(y_1), \overline{z}(y_1)) \in [\underline{z}''', \tilde{z}) \times [\overline{z}''', z^H)$. ■

As Proposition 9 shows, the main results remain qualitatively unchanged: $R$ plays $\underline{q}$ for some $z$, he is reelected whenever he plays $\underline{q}$, and he has an incumbency advantage due to asymmetric information, as he is reelected for more $z$'s than he would be under full information.

## C.2 The Model when the Policy Outcome is a Good

In this appendix, we provide a sketch of the model when the policy outcome $y$ is a good rather than a bad and when higher states $z$ are desirable, all else equal. One can think of $y$ as the economic growth rate. Let $u_i = -\alpha_i b + c(y)$ be $i$'s utility when the policy outcome is $y$ and the budget is $b$, disregarding any possible office rents. As before, assume that $c(.)$ increases and is convex in $y$. Let $y = y(b, q, z)$. Because $y$ is a good now, assume that $y(\overline{b}, q, z) > y(\underline{b}, q, z)$ for any $q$ and $z$, $y(b, \overline{q}, z) > y(b, \underline{q}, z)$ for any $b$ and $z$ and $\partial y(\overline{b}, q, z)/\partial z > y(\underline{b}, q, z)/\partial z$ for all $z$ and $q$. Keeping the ordering $\alpha_L > \alpha_M > \alpha_R$ the same as in the main text, $R$ has the greatest and $L$ the smallest willingness to foster short-run growth.[25] Therefore, the ordering of the threshold states $\tilde{z}_i$ is $\tilde{z}_R > \tilde{z}_M > \tilde{z}_L$, where player $i$ prefers budget $\overline{b}$ to $\underline{b}$ for any $z < \tilde{z}_i$ given $q = \overline{q}$. Let $\tilde{z} \equiv \tilde{z}_M$ be the state such that the voter is indifferent between $L$ and $R$. Imposing the analogous condition as before, $\tilde{z}_L < \underline{a} < \tilde{z} < \overline{a} < \tilde{z}_R$, makes sure that both parties choose different budgets in period two and that the voter's preferred parties depend on (her beliefs about) the state of the world. Under full information, the voter would thus elect $R$ whenever $z \leq \tilde{z}$.

To simplify the exposition and because it is the most interesting case, we focus on the case where $\Psi > \overline{\Psi}$. The model and the equilibrium behavior are analogous to the model with a bad. The sole difference is that now, for a fixed budget $b$, the outcome function $y(b, \overline{q}, z)$ is above the function $y(b, \underline{q}, z)$, as illustrated in Figure 7. In the $q$-Game with incumbent $L$, the incentives for the incumbent are well aligned with the public interest because he never wants

[25]In light of the empirical evidence that left-wing parties are more inclined to enhance short-run growth, this would mean that $L$ is a right-wing party and $R$ a left-wing party.

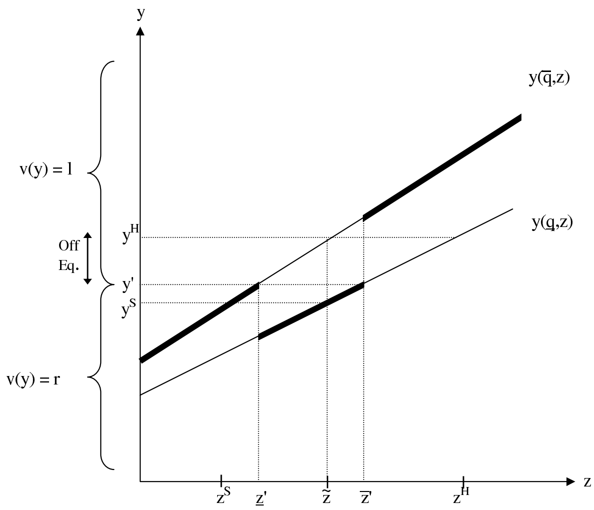


Figure 7: Equilibrium with incumbent $R$ when $y$ is a good.

to induce a lower outcome than the one resulting from high quality. In the equilibrium of the $q$-Game with incumbent $R$ satisfying our restriction on off equilibrium beliefs, $R$ plays $\underline{q}$ for all $z \in [\underline{z}', \overline{z}']$ and is reelected whenever he does so, where $\underline{z}'$ and $\overline{z}'$ are defined in the same way as when $y$ is a bad. In contrast to the model in the main text, the voter now elects $R$ for all $y \leq y'$ and elects $L$ otherwise. Incumbent $R$ is thus reelected for all $z \leq \overline{z}'$, i.e., in more states $z$ than under full information.

The results of the full game carry also over when $y$ is a good. Incumbent $L$ plays $(\underline{b}, \overline{q})$ for all $z$, and incumbent $R$ plays $\underline{q}$ for some intermediate states $z$ and is reelected for at least all $z \leq \overline{z}'(\overline{b})$ if $\Psi > \overline{\Psi}^{FG}$.

### C.3 Intermediate Values of $\Psi$

In this appendix, we sketch the PBE of the $q$-Game when the incumbent is of type $R$ and the office rent is $\Psi \in (\underline{\Psi}, \overline{\Psi})$. Let $\underline{z} \in [z^S, \tilde{z})$ be an arbitrary low state and $\overline{z} \in [\tilde{z}, z^H)$ be the corresponding high state. Let $y_0 \equiv y(b_1, \underline{q}, \underline{z}) = y(b_1, \overline{q}, \overline{z})$ be the corresponding outcome. Depending on the rankings of $\hat{\Psi}(\underline{z})$ and $\Psi$, and $\hat{\Psi}(\overline{z})$ and $\Psi$, there are four different cases:

*Case (i)*: $\hat{\Psi}(\underline{z}) < \Psi$ and $\hat{\Psi}(\overline{z}) < \Psi$.

For $\underline{z} \in [\underline{z}', \tilde{z})$, $R$'s equilibrium strategy is $q(\underline{z}) = \underline{q}$ and $q(\overline{z}) = \overline{q}$. Because $\underline{z} \geq \underline{z}'$, the voter's beliefs are by definition of $\underline{z}'$ such that she prefers reelecting $R$. For $\underline{z} \in [z^S, \underline{z}')$, $R$ plays $q(\underline{z}) = \overline{q}$ and $q(\overline{z}) = \underline{q}$ and is reelected in state $\overline{z}$ but not in state $\underline{z}$.

*Case (ii)*: $\hat{\Psi}(\underline{z}) > \Psi$ and $\hat{\Psi}(\overline{z}) < \Psi$.

$R$ plays $q(\underline{z}) = q(\overline{z}) = \overline{q}$ and is reelected in state $\overline{z}$ but not in state $\underline{z}$ because in either state the voter correctly infers the true state.

*Case (iii)*: $\hat{\Psi}(\underline{z}) > \Psi$ and $\hat{\Psi}(\overline{z}) > \Psi$.

Equilibrium play is the same as in Case (ii). That is, $R$ plays $q(\underline{z}) = q(\overline{z}) = \overline{q}$ and is reelected in state $\overline{z}$ but not in state $\underline{z}$ because in either state the voter correctly infers the true state.

*Case (iv)*: $\hat{\Psi}(\underline{z}) < \Psi$ and $\hat{\Psi}(\overline{z}) > \Psi$.

For $\underline{z} \in [\underline{z}', \tilde{z})$, $R$ plays $q(\underline{z}) = \underline{q}$ and $q(\overline{z}) = \overline{q}$ and is reelected in both states. For $\underline{z} \in [z^S, \underline{z}')$, things are bit more complicated. Clearly, $R$ plays $q(\overline{z}) = \overline{q}$ since he is not willing to play $\underline{q}$ in state $\overline{z}$ even if he were reelected for sure. However, given that he can "imitate" state $\overline{z}$ by playing $\underline{q}$ in state $\underline{z}$, there is no pure strategy equilibrium: If $q(\underline{z}) = q(\overline{z}) = \overline{q}$ were an equilibrium strategy, the voter would reelect $R$ in state $\overline{z}$ after observing $y_0$, so that $R$ would have an incentive to generate $y_0$ by playing $\underline{q}$ in state $\underline{z}$. On the other hand, $q(\underline{z}) = \underline{q}$ and $q(\overline{z}) = \overline{q}$ cannot be an equilibrium either because the voter would not reelect $R$ given the observation $y_0$ (because $y_0 < y'$). Thus, $R$ would be better off playing $\overline{q}$ in state $\underline{z}$. So there is no pure strategy equilibrium. In the mixed strategy equilibrium, $R$ mixes in state $\underline{z}$ in such a way that the voter is indifferent between electing $L$ and $R$ when observing $y_0$, and the voter mixes upon observing outcomes $y_0$ in such a way that $R$ is indifferent between playing $\overline{q}$ and $\underline{q}$ in state $\underline{z}$.

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