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Inefficient Policies and Incumbency Advantage

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Abstract

We study incumbency advantage in a dynamic game with incomplete information between an incumbent and a voter. The incumbent knows the true state of the world, e.g., the severity of an economic recession or the level of criminal activities, and can choose the quality of his policy. This quality and the state of the world determine the policy outcome, i.e., the economic growth rate or the number of crimes committed. The voter only observes the policy outcome and then decides whether to reelect the incumbent or not. Her preferences are such that she would reelect the incumbent under full information if and only if the state of the world is above a given threshold level. In equilibrium, the incumbent is reelected in more states of the world than he would be under full information. In particular, he chooses inefficient policies and generates mediocre policy outcomes whenever the voter's induced belief distribution will be such that her expected utility of reelecting the incumbent exceeds her expected utility of electing the opposition candidate. Hence, there is an incumbency advantage through inefficient policies. We provide empirical evidence consistent with the prediction that reelection concerns may induce incumbents to generate mediocre outcomes.

JEL code: D72, C73
Keywords: Elections, Incumbency Advantage, Political Economics

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1 Introduction

Would an incumbent political leader who is known to be tough on crime want to be tough on crime before elections if he is more likely to be reelected when crime is perceived as a serious problem? Similarly, would an incumbent who is known to be good in fostering growth really want to efficiently fight a recession before elections if he is more likely to be reelected if the economy does not do too well? These are the questions addressed in the present paper.

We study a two period game with incomplete information and two strategic players, an incumbent and a voter. The policy outcome, i.e., the crime rate or the severity of a recession, is a function of the quality of the policy chosen by the incumbent and of the state of the world. Assume that the decisive policy dimension is crime. For a given state of the world, the policy outcome, i.e. the crime rate, is high (low) if the quality of the policy is low (high). Information is asymmetric in that the incumbent knows both the state of the world and the quality of the policy he chose while the voter observes neither. She only observes the outcome, then updates her beliefs about the state of the world and decides whether to reelect the incumbent or not. Both players dislike high policy outcomes, and the incumbent cares strongly about his reelection. We assume that there are two possible types of incumbents, L and R. The type who is not the incumbent is the opposition candidate in the election. Hence, there are two versions of this game that differ in the incumbent's (and the opposition candidate's) type. Type L is more reluctant than the voter to spend public funds to reduce the policy outcome and type R is less reluctant than the voter. Under full information, the voter would therefore elect candidate L if the state of the world were below a certain threshold level, and candidate R otherwise.

The following results are obtained. In every Perfect Bayesian Equilibrium (PBE), an incumbent of type L has no incentive to conduct low quality policies, as this would increase his disutility from high policy outcomes and could, on top of that, make his reelection less likely. An incumbent of type R faces conflicting incentives when it comes to his quality choice. Low quality policies decrease his utility due to higher policy outcomes, but potentially also improve his reelection chances. In every PBE, such an incumbent chooses low quality policies in some states of the world.[1] This makes the voter uncertain about the true state of the world because now an observed policy outcome is consistent with either a low quality policy in a low state or a high quality policy in a high state. In equilibrium, she must therefore assign positive probability on each of the two states. The incumbent chooses low quality policies only in those low states where the voter's induced belief distribution is such that her expected utility of reelecting him exceeds her expected utility of voting for the opposition candidate. Therefore, it is optimal for the voter to reelect the incumbent whenever she is uncertain about the state of the world.

Moreover, all PBE have the same structure and all but one are characterized by an incumbency advantage, though the voter is fully rational and therefore aware of the fact that the incumbent has incentives to choose inefficient policies in order to induce her to reelect him. To the best of our knowledge, this is the first model in which an incumbent

[1] To simplify the exposition of the paper, we will introduce the additional restriction that off equilibrium beliefs are formed under the "Laplacian" assumption that the error that gives rise to some off equilibrium observation occurs with the same probability from any source it can come from. The PBE satisfying this restriction is unique.

can use inefficient policies to successfully induce rational, Bayesian updating voters to reelect him in states of the world in which they would be better off electing the opposition candidate.

A fairly vast political economics literature analyzes strategic interactions between incumbents and voters. In Rogoff and Siebert (1988), Alesina and Cukierman (1990), Hess and Orphanides (1995, 2001) and Cukierman and Tommasi (1998), incumbents take (socially) costly actions in equilibrium aimed at increasing their reelection probability.[2] None of them, however, has the feature that an incumbent deliberately makes the voters uncertain in such a way that they reelect him in states of the world in which they would be better off electing the opposition candidate.[3]

Berrebi and Klor (2006) analyze a model of election and terroristic attacks in the context of the Israeli-Palestinian conflict. In their model the Palestinian player determines the level of terror attacks to target the beliefs of the Israeli voters. This is similar to our model, where the voter's beliefs are successfully targeted by the incumbent. Berrebi and Klor also provide empirical evidence that the electorate's preferences depend on the state of the world, which supports one of our main assumptions.

Alternative explanations of incumbency advantage are based on personal votes and face recognition (e.g., Ansolabehere, Snyder and Stewart, 2000; Prior, 2006) or on the idea that incumbents are of a higher average quality than the challengers (e.g., Cox and

[2] In Rogoff and Siebert (1988), which is closest to our model, the incumbent sets a low tax rate before elections (which later leads to a sub-optimally high seignorage tax) in an attempt to convince the voter that he is competent and able to provide public goods efficiently. However, the equilibrium in their model is fully separating. Hence, the voter always correctly infers the incumbent's type, and thus the incumbent cannot improve his reelection prospects in equilibrium.

[3] In Persson and Svensson (1989) and Alesina and Tabellini (1990), the incumbent's policy choice is distorted by another strategic consideration, namely that of constraining the choice set of a successive government whose policy objectives differ.

Katz, 1996; Levitt and Wolfram, 1997; Beviá and Llavador, 2006). Our model provides a complementary explanation for why incumbency can matter for electoral prospects.

Our paper is also consistent with the finding in the empirical political business cycle literature that "economic activity [is] significantly higher under Democrats than Republicans in the first half of their terms" in the U.S. (Drazen 2000). In particular, it provides an explanation why economic activity tends to slow down at the end of the first term under Democrats but not under Republicans: Democrats may deliberately slow down the economy prior to elections because their reelection prospects improve when voters have the impression that the economy is in bad shape.

The remainder of the paper is organized as follows. Section 2 lays out the model. Section 3 solves the model under the assumption that in period one the incumbent can only choose the quality of his policy, which the voter cannot observe. Section 4 solves the model under the assumption that the incumbent can choose in period one both quality and the budget size, the latter being observed by the voter. Section 5 provides empirical evidence supporting both the assumptions and the predictions of our model. Section 6 concludes. The appendix contains lengthy proofs and a technical robustness result.

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 two strategic players, the incumbent and the voter.

Information: Information is asymmetric in that the voter does not know the state of the world z whereas I does. 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 $z \in [\underline{a}, \overline{a}]$.[4] The state z is the same in both periods and known by the incumbent in period one and in case the incumbent is replaced, by the party that replaces him in period two. The voter, however, does not observe z. Her prior belief that state $z \in [\underline{a}, \overline{a}]$ is realized is thus $\mu(z) = f(z)$. But the voter observes the policy outcome y_t in period t, which depends both on z and the actions undertaken by the incumbent. We can think of z as the 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, I 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

[4] Some restrictions on $\underline{a}$ and $\overline{a}$ will be introduced and discussed below.

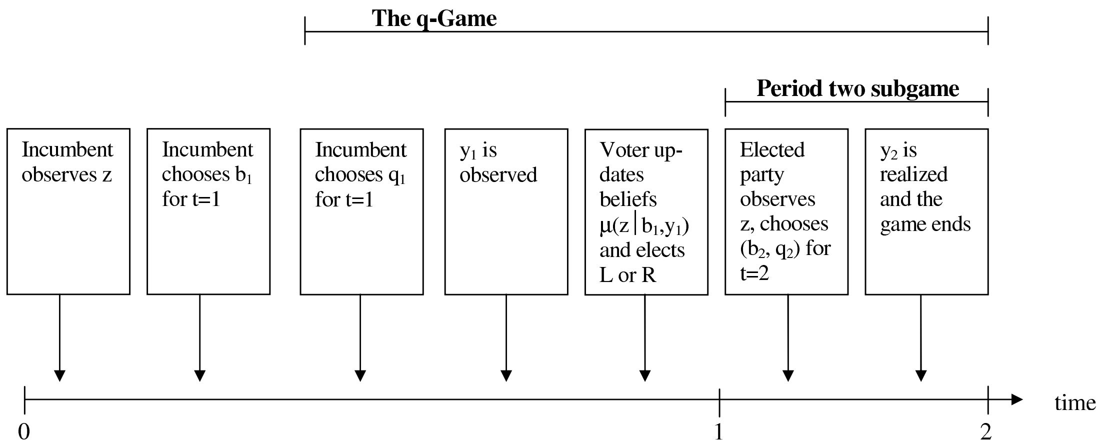

Figure 1: Timing.

key assumption is that $q_1(z)$ is *not* observed by the voter.

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.[5] 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. It is analyzed in Section 3. Because the voter is not at a singleton information set when casting her vote, the q-Game is not a proper subgame of the full game.

[5]The assumption that the party in opposition does not know z in $t = 1$ is without loss of generality as this party can take no action in $t = 1$.

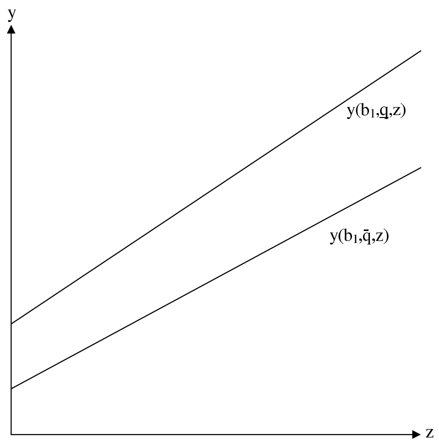

Figure 2: Technology.

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. This implies that an increase in z has a stronger effect on outcome y_t if the budget devoted to reducing y_t is small than when it is large.[6] 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. Under our assumptions on timing and information, this choice occurs first and the voter thereafter only observes y_1. Thus, the vertical axis depicting y is the basis for the voter's decision.

[6]A simple technology satisfying this requirement is $y = A(b_t, q_t)z$ with $A(\overline{b}, q_t) < A(\underline{b}, q_t)$.

Payoffs: The players L and R and the voter M 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 when the policy b_t is implemented and the outcome is 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 $c''(y_t) \geq 0$.[7] 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 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.[8] 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 $c'(y_t) > 0$.

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

[8] 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, left-wing parties are 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.

In addition, we assume throughout that parties L and R have lexicographic preferences for being in office and, of course, prefer being in office for two periods to being in office for just one period. To ease the exposition, we assume that the voter elects R in case she is indifferent between L and R. Without loss of generality, we assume that there is no discounting.[9]

Solution Concept: The solution concept we employ is Perfect Bayesian Equilibrium (PBE). We add the following restriction on the voter's off equilibrium beliefs: When observing an outcome y_1 that cannot result from the 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

[9] To see why this is without loss of generality, observe first that nothing changes for politicians as long as they have sufficiently strong preferences for being in office. Second, on election day the voter's decision depends only on her expectation about the differences in outcomes when L or when R is in office. This expectation will not be affected by discounting.

not willing to bear. These assumptions are substantiated by robust empirical evidence that shows that voters are, in general, quite poorly informed.[10]

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 (see Drazen, 2000).[11] In Section 5, we also provide empirical evidence that homicide rates differ depending on the incumbent's political orientation (see Table 1 below).

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 is better off in period two with R's budget choice if the state z is high, and with L's budget choice otherwise.

The two period structure is, obviously, the simplest game form that allows for re-election and hence incumbency advantage. The discussion of the implications of our restriction on off equilibrium beliefs is best postponed and is done after Proposition 3.

[10]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.

[11]This is also borne out in our data (see Table 2).

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 a dominant 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 of z 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 z at which the voter changes his 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, 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.

Lemmas 1 and 2 and Assumption 1 imply:

Proposition 1 *When in office in period two, R plays $(\overline{b}, \overline{q})$ 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, the voter elects L if $z < \tilde{z}$ and R 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

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

Observe that because $\partial y(b, q, z)/\partial z > 0$ and $y(b, \underline{q}, z) > y(b, \overline{q}, z)$, it follows 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 policy 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*

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

Figure 3 shows that at most two z's are consistent with an observed y_1.

[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.

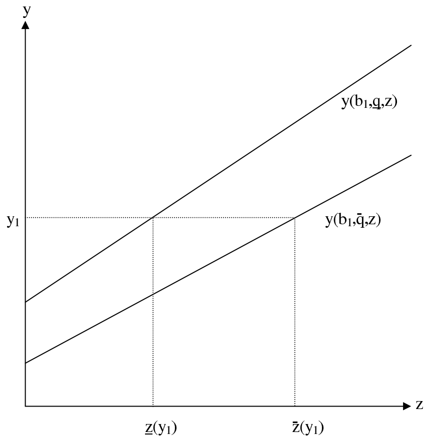

Figure 3: Any y_1 is consistent with at most two states.

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

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

By Lemma 3 the only two states consistent with this observation are $\underline{z}(y^L) \equiv z^L$ and $\overline{z}(y^L) = \tilde{z}$. Similarly, when the incumbent plays $\underline{q}$ 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 $\overline{z}(y^H) \equiv z^H$.

The pairs (y^L, z^L) and (y^H, z^H) allow for a simple characterization of equilibrium play in states $z < z^L$ and $z > z^H$. To see this, consider for example the voter's inference and voting behavior after observing $y_1 < y^L$. 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 $\mu(\underline{z}(y_1)|b_1, y_1) \in [0, 1]$ consistent with Lemma 3 when observing $y_1 < y^L$.

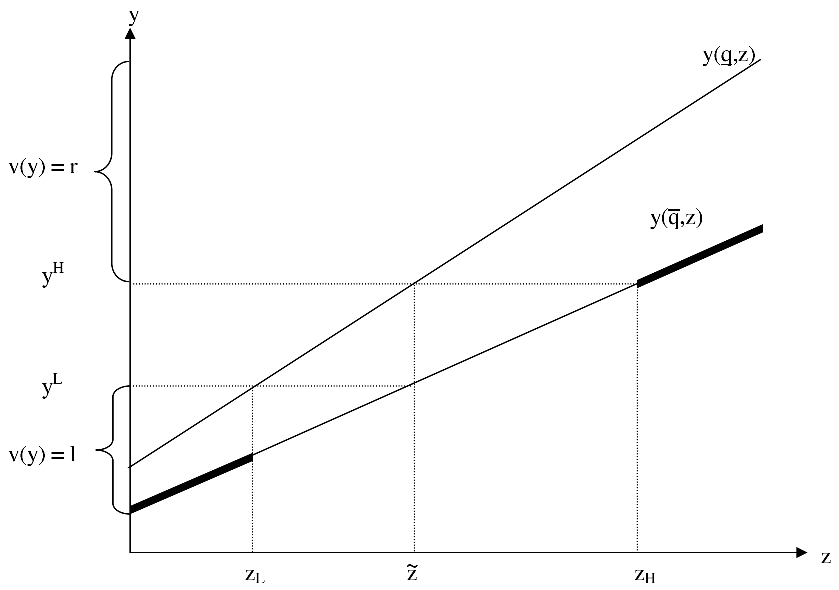

Figure 4: Illustration of Lemma 4.

Now, given that L is (re)elected for any state $z < z^L$, both types of incumbent optimally play $\overline{q}$ in these states to decrease disutility $c(y_1)$. Similarly, when the voter observes $y_1 > y^H$, the only states consistent with this observation satisfy $\overline{z}(y_1) > \underline{z}(y_1) > \tilde{z}$. Therefore, the voter correctly infers that the state is larger than $\tilde{z}$ and thus votes for R for any beliefs $\mu(\underline{z}(y_1)|b_1, y_1) \in [0, 1]$ consistent with Lemma 3. But given that R is (re)elected for any $z > z^H$, both types of incumbent optimally choose $\overline{q}$ in these states. These results are summarized as follows:

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

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 $y_1 < y^L$, 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 $z > \tilde{z}$ whenever

$y_1 > y^H$. Hence, the incumbent has again no possibility to affect her voting behavior when $z > z^H$ 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 $y_1 \in [y^L, y^H]$, her voting behavior is less clear-cut and depends on her beliefs about the quality chosen by the incumbent.[13] 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. $\mu(\underline{z}(y_1)|b_1, y_1) = 0$ for all observations y_1 made on the equilibrium path. Given that she correctly infers what the true state is, she optimally votes for L if and only if she observes $y_1 < y_L$. But given that she plays this strategy and holds these beliefs, L has clearly no incentive to deviate and 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 $z \in [z^L, \tilde{z})$ 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 $z < z^L$ 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 this equilibrium,*

- *L plays $\overline{q}$ for any z in period one,*
- *the voter reelects L for $y_1 < y(b_1, \overline{q}, \tilde{z})$ and elects R otherwise,*

[13] This contrasts with the cases $y_1 < y^L$ and $y_1 > y^H$ analyzed in Lemma 4, where the voting behavior is the same for any $\mu(\underline{z}(y_1)|b_1, y_1) \in [0, 1]$.

- *the voter's beliefs are* $\mu(\underline{z}(y_1)|b_1, y_1) = 0$ *for* $y_1 < y(b_1, \overline{q}, \overline{a})$ *and* $\mu(\underline{z}(y_1)|b_1, y_1) = 1$ *otherwise.*

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 because the only off equilibrium observations are y_1's that are so large that they can only result from the play of $\underline{q}$ in states $z > \tilde{z}$. Hence, off equilibrium beliefs are pinned down even without our additional restriction.

The case with incumbent R is quite different from the one where L is the incumbent because there is no fully separating PBE with incumbent R. To see this, observe first that due to Lemma 4 the only candidate for a fully separating equilibrium is the one where R plays $\overline{q}$ for all z. In such an equilibrium, R is reelected if and only if $z \geq \tilde{z}$. But then R has an incentive to deviate and play $\underline{q}$ for z close to but below $\tilde{z}$ because this would induce the voter to reelect him.

To understand the equilibrium with incumbent R, it is useful to begin with the hypothetical situation where R plays $\underline{q}$ in state $\underline{z}(y)$ and $\overline{q}$ in state $\overline{z}(y)$ with probability $\lambda > 0$. This will later 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* $z \in (z^L, \tilde{z})$

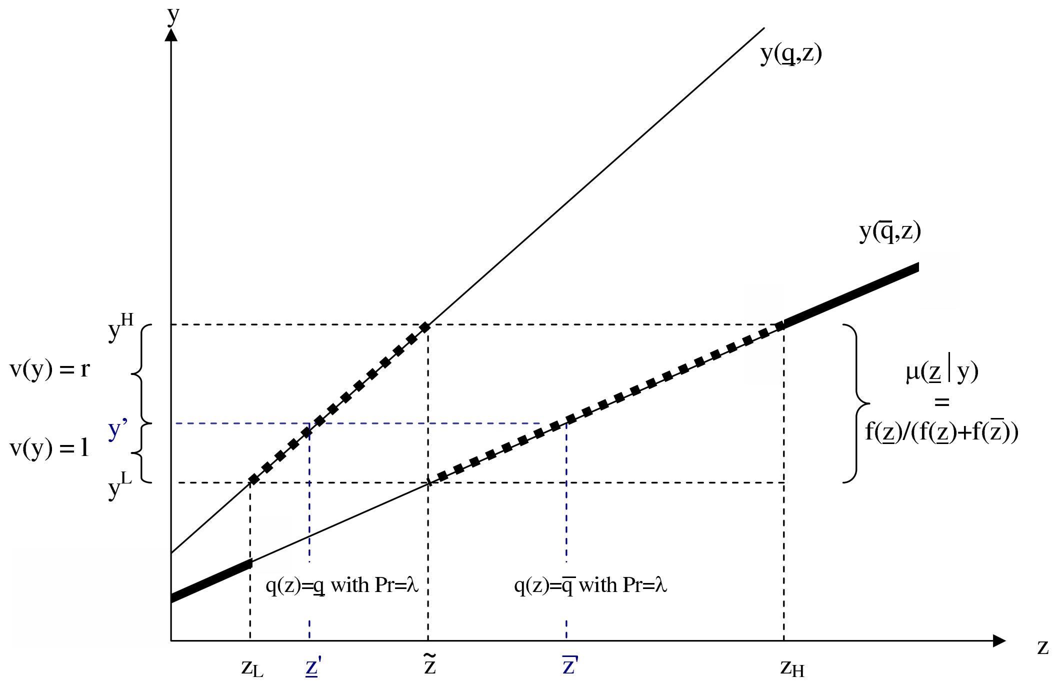

Figure 5: Illustration of Lemma 5.

and $\overline{q}$ with probability λ for any $z \in (\tilde{z}, z^H)$. Then there exists a $y' \in (y^L, y^H)$ such that the voter is indifferent between L and R when observing y'. If y' is unique, the voters elects 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, as we show in Appendix B, none of our main results is qualitatively affected if y' is not unique. Figure 5 illustrates Lemma 5 for the case that y' is unique.

Lemma 5 states that whenever the voter observes a policy outcome $y_1 \in (y^L, y^H)$, 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^L, 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.

We are now able to derive the equilibrium of the q-Game when the incumbent is of type R. To simplify the subsequent discussion, 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 $\underline{z}' \in (z^L, \tilde{z})$ and $\overline{z}' \in (\tilde{z}, z^H)$ since $y' \in (y^L, y^H)$. 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 observations smaller than y', which 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. For $z \in [\underline{z}', \tilde{z})$, playing $\underline{q}$ leads to R's reelection and is therefore indeed optimal for R since playing $\overline{q}$ would lead to $y_1 < y^L$ and, consequently, to the election of L.

Before proceeding further, we now introduce the assumption on the support $[\underline{a}, \overline{a}]$ referred to above. Though all we really need for $\underline{a}$ is $\underline{a} < \underline{z}'$, we assume for expositional ease $\underline{a} < z^L$. Similarly, though the following assumption on $\overline{a}$ is by no means necessary for our main results, it simplifies the characterization of equilibrium play substantially. Consequently, we assume $\overline{z}(y(b_1, \underline{q}, \overline{z}')) < \overline{a}$. In words, $\overline{z}(y(b_1, \underline{q}, \overline{z}'))$ is a state such that y_1 is the same if high quality is chosen in this state as when low quality is chosen in state $\overline{z}'$. That is, we assume:[14]

Assumption 2

$$\underline{a} < z^L \quad \text{and} \quad \overline{z}(y(b_1, \underline{q}, \overline{z}')) < \overline{a}.$$

Lemma 5 further implies that when R would play $\underline{q}$ for all $z \in [z^L, \underline{z}')$ and $\overline{q}$ for all $z \in [\tilde{z}, \overline{z}')$, then the voter would vote for L when observing the corresponding policy outcome $y_1 < y'$. Therefore, R plays $\underline{q}$ for $z \in [\tilde{z}, \overline{z}')$ to make clear that $z \geq \tilde{z}$, which ensures his reelection, and $\overline{q}$ for $z \in [z^L, \underline{z}')$ to reduce y_1 (as he is not reelected anyway). In equilibrium, R thus plays $\underline{q}$ for $z \in [\underline{z}', \overline{z}')$ and $\overline{q}$ otherwise and is reelected whenever $z \geq \underline{z}'$. The following proposition provides a complete characterization of the equilibrium:

Proposition 3 *The q-Game with incumbent R has a unique PBE that satisfies our restriction on off equilibrium beliefs. In this equilibrium,*

- *R plays $\underline{q}$ for $z \in [\underline{z}', \overline{z}')$ and $\overline{q}$ for any other z in period one,*

[14] Assumption 2 is a simultaneous constraint on the support of z, the preferences of the voter and the technology. In terms of technology, it essentially requires that the difference $y(b, \underline{q}, z) - y(b, \overline{q}, z)$ is not too large, i.e., that the inefficiency of low quality policies is moderate.

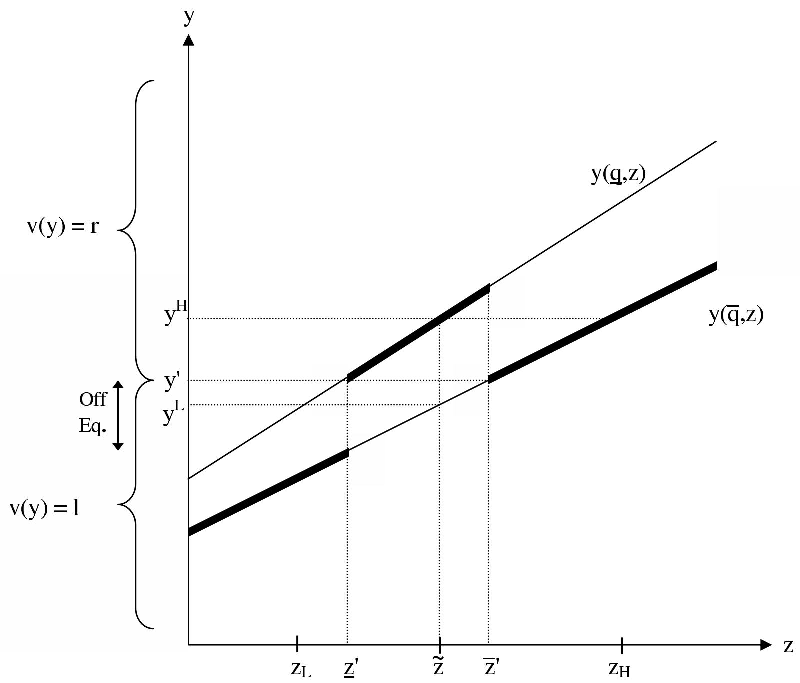

Figure 6: Equilibrium in the q-Game with incumbent R.

- *the voter elects L for $y_1 < y'$, and reelects R otherwise,*

- *the voter's on equilibrium beliefs are $\mu(\underline{z}(y_1)|b_1, y_1) = 0$ for $y_1 < y(b_1, \overline{q}, \underline{z}')$ and for $y_1 \geq y(b_1, \underline{q}, \overline{z}')$, and $\mu(\underline{z}(y_1)|b_1, y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ for $y_1 \in [y', y(b_1, \underline{q}, \overline{z}'))$,*

- *the voter's off equilibrium beliefs are $\mu(\underline{z}(y_1)|b_1, y_1) = \frac{f(\underline{z}(y_1))}{f(\overline{z}(y_1))+f(\underline{z}(y_1))}$ for $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y')$ and $\mu(\underline{z}(y_1)|b_1, y_1) = 1$ for $y_1 > y(b_1, \overline{q}, \overline{a})$.*

Proposition 3 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.[15] Note that when observing $y_1 \in [y', y(b_1, \underline{q}, \overline{z}'))$ and voting for R the voter is aware that under full information she would rather vote for L 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 3.4 in the proof). 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 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 3 is that errors in low states are more likely than errors in high states.

[15] 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).

It is not clear why this should be particularly plausible. That said, our restriction does not only pick a unique PBE, but also the one with the largest incumbency advantage. However, all except one of the other PBE also exhibit a strictly positive incumbency advantage (and none a negative incumbency advantage because $y^* \leq y^H$).[16]

4 Equilibrium of the Full Game

In this section, we analyze the full game in which the incumbent 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 $t = 1, 2$. Again we distinguish the game with incumbent L and the game with incumbent R.

First, note 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. Second, we look at 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 has no reason not to choose his preferred budget $\underline{b}$ in period one.

Proposition 4 *The full game with incumbent L has a unique PBE. The equilibrium outcome is identical to the one described in Proposition 2 with the addition that* $b_1(z) = \underline{b}$.

[16]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.

We now turn to the full game when the incumbent is of type R. We have seen in Proposition 3 that R plays $\overline{q}$ if he cannot affect his reelection prospects, but acts strategically and plays $\underline{q}$ in states $z \in [\underline{z}', \overline{z}')$ to ensure his reelection. The thresholds $\underline{z}'$ and $\overline{z}'$, however, depend on b_1, as seen in equation (6). Therefore, R's choice of (b_1, q_1) may depend on whether he prefers being reelected with $(\overline{b}, \underline{q})$ or $(\underline{b}, \overline{q})$. This preference may in general vary with the state, which complicates the analysis without affecting the conclusions in any substantial way. However, if the difference between high and low quality is small relative to the difference between a large and a small budget, then R will always prefer being reelected with $(\overline{b}, \underline{q})$ to being reelected with $(\underline{b}, \overline{q})$. For simplicity, we therefore introduce:

Assumption 3

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

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 $z \leq \overline{z}'(\overline{b})$.

To derive the equilibrium, we focus on R's equilibrium strategy in all states z. We begin with high z's: Whenever $z \geq \overline{z}'(\overline{b})$, R can play his most favored policies $(\overline{b}, \overline{q})$ and is reelected nevertheless. The reason is that these policies lead to a policy 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 state $\underline{z}(b_1, y_1)$.

Given that in equilibrium R plays $(\overline{b}, \overline{q})$ for $z \geq \overline{z}'(\overline{b})$, R is reelected in states $z \in [\underline{z}'(\overline{b}), \overline{z}'(\overline{b}))$ when playing $(\overline{b}, \underline{q})$, but not when playing $(\overline{b}, \overline{q})$. Hence, in these states R plays $(\overline{b}, \underline{q})$ because this is his most preferred policy bundle that ensures his reelection.

Whenever $z < \underline{z}'(\overline{b})$, R is not reelected when playing $\overline{b}$ because this would lead to an outcome $y_1 < y'(\bar{b})$. Moreover, he would also not be reelected when playing $\underline{b}$ because he never plays $\underline{b}$ for any $z \geq \underline{z}'(\bar{b})$ in equilibrium. Thus, the voter would know with certainty that $z < \underline{z}'(\bar{b})$ when observing $\underline{b}$. As there is no way of being reelected, R plays his most favored policies $(\bar{b}, \bar{q})$ for $z < \underline{z}'(\bar{b})$.

Proposition 5 *The full game with incumbent R has a unique PBE satisfying our restriction on off equilibrium beliefs. The equilibrium outcome is identical to the one described in Proposition 3 with the addition that $b_1(z) = \bar{b}$ for all z.*

This proposition implies that R has an incumbency advantage equal to $F(\tilde{z}) - F(\underline{z}'(\bar{b}))$ in the full game. The incumbency advantage would be no lower without Assumption 3. To see this, note first that in equilibrium R plays $(\bar{b}, \bar{q})$ for all $z \geq \bar{z}'(\bar{b})$ independently of whether Assumption 3 holds or not. He can therefore always ensure his reelection for all $z \geq \underline{z}'(\bar{b})$ by playing $(\bar{b}, \underline{q})$ for $z \in [\underline{z}'(\bar{b}), \bar{z}'(\bar{b}))$. Hence, his incumbency advantage is at least $F(\tilde{z}) - F(\underline{z}'(\bar{b}))$. Moreover, if Assumption 3 did not hold and if $\underline{z}'(\underline{b}) < \underline{z}'(\bar{b})$ and $\bar{z}'(\underline{b}) < \bar{z}'(\bar{b})$, the incumbency advantage could even be greater because in equilibrium R might 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 $(\underline{b}, \underline{q})$. In summary, none of our main results would be affected if we did not make Assumption 3.

5 Empirical Evidence

One implication for observables of our model is that prior to elections incumbents should, for some states of the world, generate mediocre policy outcomes in the policy dimension in which they are commonly perceived as strong. In this section, we discuss and provide empirical evidence that is consistent both with this prediction and with our main assumptions. We also present evidence that for the five largest developed democracies the chances of an incumbent president, chancellor or prime minister being reelected are greater than fifty percent.

5.1 Assumptions

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 see terrorism as the most important issue in 2006 think that Republicans are better suited to fight terrorism, while only 17% think that Democrats are better suited (Newport and Carroll, 2006).

One of the key findings in the empirical literature on political business cycles (PBC) is that economic growth in the U.S. is higher under Democrats than Republicans in the first half of their terms and that growth significantly decreases for Democrats in the second half of their terms (Alesina, Roubini, and Cohen, 1997; Drazen, 2000). Further evidence that parties differ significantly with respect to the policy outcomes they generate when in office is provided in Tables 1 and 2 below. Table 1 shows that the homicide rate is significantly lower if the incumbent is politically right and Table 2 illustrates that the growth rate is larger if the incumbent belongs to the political left.

It is also worth mentioning that the strategically chosen inefficiencies prior to elections do not annihilate the long-term differences between parties. Whatever the incentives to distort, right-wing incumbents have empirically a better overall record on fighting homicides and left-wing incumbents have a better growth record.

Evidence that the voters' support for one party relative to another depends on their beliefs about the state of the world is provided by 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.[17] 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 assumptions.

[17]Specifically, an increase in the number of terror fatalities in Israel from its monthly average of seven to eight causes a significant increase of 0.4 percent in the support for Likud, Israel's right-wing party.

5.2 Predictions

Our model predicts that prior to elections parties should for some states of the world implement policies they are perceived as tough at inefficiently. In a 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.

Though by definition the inefficient policies in our model are not observed, the model has the observable implication that in these situations incumbents should generate below average policy outcomes in the policy dimension in which they are commonly and correctly (at least as suggested by Tables 1 and 2) perceived as strong. To the best of our knowledge there are no papers in the literature that provide a direct test of 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 help of political factors identified in our model.

In Table 1 we test the prediction of the model that a right-wing incumbent has incentives to put less effort into fighting crime when he runs for reelection using OLS-regressions. This effect is likely to be strongest in the one or two years preceding elections. The dependent variable in Table 1 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). Table 2 reports results from OLS-regressions of the annual growth rate of GDP per capita, taken from the World Bank (2006b), on a number of explanatory variables.

Various independent variables are included in the regressions presented in Tables 1 and 2. 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 the one labelled "Electoral concerns (y1)". It is a dummy variable that takes the value of 1 when the incumbent can run for reelection and elections take place within one year 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 (y2)" is defined and constructed analogously to "Electoral concerns (y1)", except that it covers the two years preceding the election.

Several control variables are included. "Education spending" refers to the public education spending in percent of GDP and is taken from the World Bank (2006a). The variable "Capital formation" captures the capital formation in percentage of GDP, "Government spending" corresponds to the general government final consumption expendi-

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Simple	Interaction	Fixed Eff.	Control	Left	Centre	Elec. (2y)
Right	***-0.793***	***-3.079***	***-0.833***	***-0.812***			***-0.413***
	(3.05)***	***(5.91)******	***(6.03)******	***(5.93)******			***(4.15)******
Left					0.716		
					(5.17)***		
Centre						0.277	
						(1.29)	
Electoral concer. (y2)	-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 concer. (y1)							-0.115
							(1.38)
Elec. con. (y2) * Right		***3.008***	***0.711***	***0.699***			
		(5.03)***	***(4.65)******	***(4.61)******			
Elec. con. (y2) * Left					-0.550		
					(3.62)***		
Elec. con. (y2) * Centre						-0.309	
						(1.44)	
Elec. con. (y1) * Right							***0.269***
							(2.13)**
Gov. spending (-1)				0.032	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)***
Time dummies			Yes	Yes	Yes	Yes	Yes
Country fixed effects			Yes	Yes	Yes	Yes	Yes
Constant	4.988	5.792	0.916	-1.228	-1.965	-1.615	-1.425
	(18.52)***	(18.75)***	(2.52)**	(1.72)*	(2.73)***	(2.20)**	(2.00)**
Observations	650	650	650	649	649	649	659
R-squared	0.15	0.19	0.22	0.24	0.23	0.20	0.21
Number of id05	27	27	27	27	27	27	27

Note: Dependent variable: Number of homicides per 100'000 people. Absolute value of t statistics in parentheses. * = significant at 10%; ** = significant at 5%; *** = significant at 1%. (-1) = first lag.

Table 1: Partisanship, Electoral Concerns and Homicide

ture in percent of GDP, and "GDP" refers to the gross domestic product per capita at constant prices. The latter three variables are provided by the World Bank (2006b).

Table 1 presents the results for the homicide rate. In column 1 we see that right-wing incumbents are on average associated with a significantly lower homicide rate. Also, on average incumbents with electoral concerns do a significantly better job in fighting crime. However, our model predicts that this should not necessarily be the case for right-wing incumbents who prior to elections may have incentives to fight crime inefficiently. This is tested in column 2 with the help of the interaction term of "Electoral concerns (y1)" and "Right". As the model predicts, this interaction term is positive and significantly so. Columns 3 and 4 show that these results are robust to the inclusion of time effects, country fixed effects and the control variables of government spending and GDP.[18]

[18]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

Another important robustness check is to see whether this effect is also present for center or left incumbents. If this were the case, this would contradict the model's predictions. As shown in columns 5 and 6, the effect does not hold for left and center incumbents. As additional robustness check in column 7 the variable of electoral concerns focussing on a longer time span (2 years) before the elections is included. As above, the interaction term of "Electoral concerns (y2)" and "Right" is positive and significant, which is in line with our model.

Table 2 reports results for incumbents and short-run economic growth rates.[19] The interaction term of "Electoral concerns (y1)" and "Left" is negative and significant once fixed effects are included. We therefore conclude that left-wing incumbents do a poorer job in promoting growth when they have electoral concerns than otherwise, which is consistent with the predictions of our model.

Observe also that these results are perfectly in line with the empirical findings of the PBC literature noted above. Moreover, 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.

In column 4 several control variables are included. Capital formation is shown to enhance the economic performance, while government spending and the GDP level reduce the growth rate. Columns 5 and 6 show that the effect is, as predicted, not present for right and center incumbents. Column 7 shows that the findings are robust to the use of the two-year "Electoral concerns (y2)" variable.

could not include this variable due to the large number of missing observations.

[19] Appendix C 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.

	(1) Simple	(2) Interaction	(3) Fixed Eff.	(4) Control	(5) Centre	(6) Right	(7) Elec. (2y)
Left	***0.265***	***0.722***	***1.234***	***1.155***			***0.692***
	(1.23)	***(1.70)****	***(2.77)******	***(2.46)*****			***(2.11)*****
Centre					-0.575		
					(0.75)		
Right						-0.868	
						(1.86)*	
Electoral concer. (y2)	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 concer. (y1)							0.552
							(2.04)**
Elec. con. (y2) * Left		***-0.614***	***-1.017***	***-1.225***			
		(1.25)	***(2.08)*****	***(2.36)*****			
Elec. con. (y2) * Centre					0.692		
					(0.92)		
Elec. con. (y2) * Right						0.804	
						(1.57)	
Elec. con. (y1) * Left							***-0.816***
							(1.94)*
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)***
Time dummies			Yes	Yes	Yes	Yes	Yes
Country fixed effects			Yes	Yes	Yes	Yes	Yes
Constant	1.925	1.715	2.512	7.247	7.920	8.085	8.084
	(8.25)***	(5.96)***	(2.34)**	(2.51)**	(2.74)***	(2.79)***	(2.88)***
Observations	693	693	693	499	499	499	514
R-squared	0.00	0.00	0.20	0.25	0.24	0.24	0.25
Number of id05	28	28	28	27	27	27	27

Note: Dependent variable: Growth of GDP per capita. Absolute value of t statistics in parentheses. * = significant at 10%; ** = significant at 5%; *** = significant at 1%. (-1) = first lag.

Table 2: Partisanship, Electoral Concerns and Economic Growth

5.3 Incumbency Advantage

We conclude this section by providing evidence about the existence of an incumbency advantage, a topic that 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). We have collected data on the reelection frequency of incumbent presidents, chancellors or prime ministers for the five largest developed democracies, i.e. USA, Japan, Germany, UK and France. In Figure 7 the reelection rates for incumbents are displayed.[20] In all of

[20]The following definitions apply: "Percentage reelected of those who run" are incumbents reelected divided by the number of incumbents running for office; "Percentage reelected of those who could run" are incumbents reelected divided by the sum of incumbents who run and incumbents who could run, but resign less than a year before the election for non-medical reasons. The following periods are covered: USA, 1789-2006; Japan, 1945-2006; Germany, 1945-2006; UK, 1900-2006; France, 1945-2006.

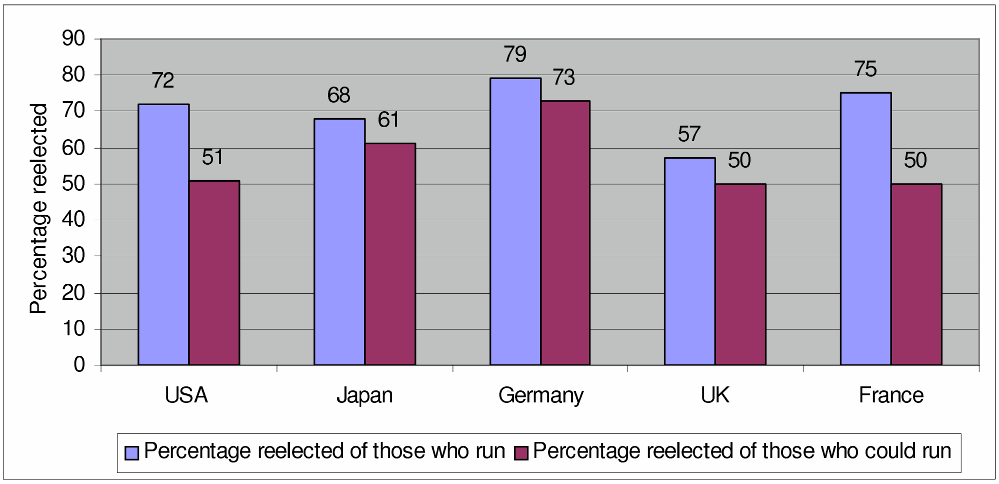

Figure 7: Incumbency Advantage.

those countries at least half of the incumbents who could seek reelection are successful and between 57 (UK) and 79 percent (Germany) of those who do seek reelection are reelected.

6 Conclusions

In this paper we have presented a dynamic game with incomplete information that shows that an incumbent may choose inefficient policies to increase his reelection chances. In particular, he chooses inefficient policies to induce uncertainty about the true state of the world whenever the states are such that the voter's expected utility of reelecting him exceeds her expected utility of voting for the challenger. It is worth emphasizing that the voter reelects the incumbent even though she is fully rational and thus perfectly aware of the fact that the incumbent may have chosen inefficient policies to ensure his reelection in states of the world in which she would be better off with the challenger.

The predictions of our model are supported by empirical evidence. Using panel

The data is from the following sources: International Institute for Democracy and Electoral Assistance (2006), Zárate (2007), Encyclopædia Britannica, CIA World Factbook, and various national information sources.

data for the OECD countries between 1975 and 2004, we show that homicide rates are higher under right-wing incumbents with electoral concerns and short-run economic growth is lower under left-wing incumbents with electoral concerns. Further research on informational asymmetries and elections seems fruitful.

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 α_i, which implies that $\tilde{z}_i$ increases in α_i. ■

Proof 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 Lemma 5: The proof contains four steps. For notational ease, we write $\mu(y_1) \equiv \mu(\underline{z}(y_1) \mid b_1, y_1)$.

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

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_μ 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 $y_1 \in (y^L, y^H)$ 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 $y_1 \in (y^L, y^H)$ 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 $y_1 = y^L$ 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 when beliefs were kept constant.

Third, since $\tilde{\mu}(y_1)$ continuously increases from zero to one as y_1 increases from y^L to y^H and since $\mu(y_1)$ is continuous and $\mu(y_1) \in (0, 1)$ for any $y_1 \in (y^L, y^H)$, there is a $y' \in (y^L, y^H)$ 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 3: The proof has two parts. We first prove that the strategy profile and beliefs constitute a PBE that satisfies our restriction on off equilibrium beliefs. Second, we show that there exists no other PBE that satisfies this restriction.

Part I (Existence): 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): We proceed as follows. Claim 3.1 rules out any mixed strategy equilibria. Claims 3.2 to 3.4 rule out all alternative candidate pure strategy equilibria in the interval $[z^L, z^H]$. Further, Lemma 4 rules out any alternative equilibria for $z < z^L$ and $z > z^H$.

Claim 3.1: There are no equilibria in mixed strategies.

Proof: Due to his lexicographical preferences, R never mixes if the voter is more likely to play $v(b_1, y_1) = r$ after one $q_1(z) \in \{\underline{q}, \overline{q}\}$ than after the other. But whenever the voter is equally likely to play $v(b_1, y_1) = r$, R plays $q_1(z) = \overline{q}$ because $c'(y_1) > 0$. Hence, R never mixes. As a consequence, the voter is (almost) never indifferent and does not mix neither.

Claim 3.2: For any pair $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^L, \tilde{z}) \times [\tilde{z}, z^H)$, 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 $y(b_1, \overline{q}, \overline{z}(y_1)) = y(b_1, \underline{q}, \underline{z}(y_1))$, R in state $\underline{z}(y_1)$ has an incentive to deviate and 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 3.3: For any pair $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^L, \underline{z}') \times [\tilde{z}, \overline{z}')$, 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 3.4: 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: For $q_1(\underline{z}(y_1)) = \overline{q}$ and $q_1(\overline{z}(y_1)) = \underline{q}$ to be part of an equilibrium strategy profile, R must have no incentive to play $q(\underline{z}(y_1)) = \underline{q}$. To deter such a deviation, 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 Multiple thresholds y'

In this appendix, we show how our main results carry over to the case in which there exist multiple thresholds $y' \in (y^L, y^H)$ as defined in 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 $y_1 = y^L$ 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 $I = L$ carries over to any number of thresholds y', as they play no role in this PBE. To show how our PBE in the q-Game with $I = R$ generalizes to any odd number of thresholds y', we present the results for the case of three such thresholds: y', y'' and y''', satisfying $y^L < y' < y'' < y''' < y^H$. Observe that the corresponding z-values must be ordered as follows: $z^L < \underline{z}' < \underline{z}'' < \underline{z}''' < \tilde{z} < \overline{z}' < \overline{z}'' < \overline{z}''' < z^H$.

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 $z \in (z^L, \tilde{z})$ and $\overline{q}$ with probability λ if $z \in (\tilde{z}, z^H)$. The statement equivalent to Proposition 3 is:

Proposition 6 *The q-Game with incumbent R has a unique PBE that satisfies our restriction on off equilibrium beliefs. In this equilibrium,*

- *R plays in period one $\underline{q}$ for $z \in [\underline{z}', \underline{z}'']$, for $z \in [\underline{z}''', \overline{z}')$ and for $z \in (\overline{z}'', \overline{z}''')$, and plays $\overline{q}$ otherwise,*
- *the voter reelects R if $y_1 \in [y', y'']$ or $y_1 \geq y'''$, and elects L otherwise.*
- *On equilibrium, the voter's beliefs are $\mu(\underline{z}(y_1)|b_1, y_1) = 0$ 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 they are $\mu(\underline{z}(y_1)|b_1, y_1) = \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1)) + f(\overline{z}(y_1))}$ for $y_1 \in [y', y'']$, for $y_1 \in [y''', y(b_1, \underline{q}, \overline{z}'))$ and for $y_1 \in (y(b_1, \underline{q}, \overline{z}''), y(b_1, \underline{q}, \overline{z}'''))$.*

- *Off equilibrium, i.e., for* $y_1 \in [y(b_1, \overline{q}, \underline{z}'), y(b_1, \overline{q}, \underline{z}'')]$*, for* $y_1 \in [y(b_1, \overline{q}, \underline{z}'''), y')$ *and for* $y \in (y'', y''')$*, the voter's beliefs are* $\mu(\underline{z}(y_1)|b_1, y_1) = \frac{f(\underline{z}(y_1))}{f(\underline{z}(y_1))+f(\overline{z}(y_1))}$.

Strategy 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 3.

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 3. Note that Claim 3.3 becomes relevant for any pairs $(\underline{z}(y_1), \overline{z}(y_1)) \in [z^L, \underline{z}') \times [\tilde{z}, \overline{z}')$ or $(\underline{z}(y_1), \overline{z}(y_1)) \in [\underline{z}'', \underline{z}''') \times [\overline{z}'', \overline{z}''')$, and Claim 3.4 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 6 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 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. 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. 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

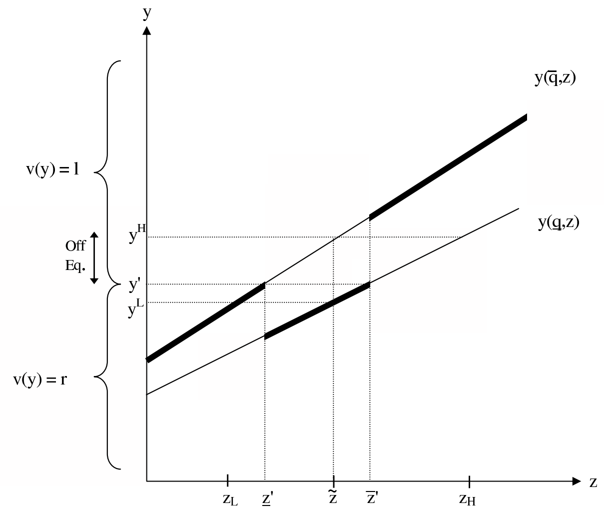

Figure 8: Equilibrium with $I = R$ when y is a good.

greatest and L the smallest willingness to foster growth.[21] 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 party depends on (her beliefs about) the state of the world.

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 8. In the q-Game with incumbent L, the incentives for the incumbent are well aligned with the public interest because he never wants 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

[21]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.

$\overline{z}'$ 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 L for all $y > y'$ and reelects R otherwise. Without our restriction on off equilibrium beliefs, there is a continuum of PBE that differ with respect to the cutoff point y^*, which is such that $v(y) = l$ for all $y > y^*$. Any $y^* \in [y^L, y']$ could be such a cutoff point.

In the equilibrium of the full game, incumbent L chooses $(\underline{b}, \overline{q})$ for all z and incumbent R chooses $(\bar{b}, \overline{q})$ for all $z \notin [\underline{z}', \overline{z}']$ and $(\bar{b}, \underline{q})$ otherwise under the assumption (which is the same as Assumption 3 in Section 4) that R's second most preferred policy bundle absent political considerations is $(\bar{b}, \underline{q})$.

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