CAREER CONCERNS AND POLITICAL ALTERNATION WITH IGNORANT VOTERS*

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Abstract: Voters are often believed to give a disproportionate weight to superficial elements, such as differences in the personalities of political candidates and neglect other more fundamental dimensions, such as their administrative competencies. We show that this kind of behavior may promote the welfare of society. We obtain this result in a dynamic model in which politicians' career concerns have countervailing consequences on welfare. They are beneficial because they make it more likely that a competent incumbent is reelected, but they are harmful because the incumbent can distort policies to increase his probability of reelection. When electoral outcomes depend on personality differences, a commitment to political alternation arises that trades off the beneficial and harmful effects of incumbents' career concerns. When the private rents from holding office are larger, the optimal trade off between beneficial and harmful effects of incumbents' career concerns is obtained when the electoral outcomes depend more on personality differences.

1 Introduction

According to a common view of politics, the outcomes of elections are often influenced by events that have no apparent connection with candidates' competencies or political agendas. This is possible because voters often ignore important policy dimensions and react to apparently superficial differences among candidates.

In this paper we want to formalize this view and analyze its implications. Our starting hypothesis is that electoral outcomes can be swayed by elements that have no connection with the competency, honesty, or political orientation of political candidates. We call these elements the "personalities" of political candidates. We find that the fact that electoral outcomes depend more on candidates' personalities creates a commitment to political alternation that trades off the beneficial and harmful effects of incumbents' career concerns. This in turn implies that voters' welfare may increase.

To understand our results it is useful to note that incumbents' career concerns may have countervailing consequences on voters' welfare. They are beneficial when they help discipline the

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behavior of incumbents or make it more likely that a competent incumbent is reelected. But they are harmful if an incumbent can increase the probability of reelection by distorting policies. Our results depend on the fact that politicians' career concerns have both positive and negative effects. In other words we assume that career concerns make it the interest of competent politicians to stay in power and therefore increases the probability of this happening. But we also assume that career concerns have perverse consequences because competent incumbents need to distort policies to signal their ability.

When the harmful effect on policies outweighs the long-run gains from a better selection of candidates, voters' interests are better served when electoral outcomes are influenced by politicians' personalities because this creates a commitment to ex-ante desirable political alternation.

We make use of a simple model based on the work of Rogoff and Sibert (1988) and Rogoff (1990) in which politicians value voters' welfare but also obtain a rent from holding office. An incumbent politician is up for reelection but is challenged by an opponent. The incumbent has to finance an exogenously given government expenditure, but his administrative competence determines the required tax revenue. If the incumbent is competent, he needs to raise less revenue than if he is not. Tax revenue can be raised through two means, a non distortionary lump sum tax which is set prior to the election and a distortionary tax that is levied after the election to make up for any budget deficit. Because the incumbent observes his competence before the election and voters only after that and because administrative competence is serially correlated, the incumbent may want to signal his competence when this is high. In other words, the incumbent has an incentive to appear competent that is tempered only by the fact that he values the cost of signaling for voters' welfare.

In the paper we assimilate the personality of a politician with features, such as his physical aspect or moral leadership, which are not correlated with his administrative competence. Our contribution is to show that conceding relevance to the personalities of politicians increases the probability of not reelecting a competent incumbent, but reduces the distortion caused by the electoral process, because competent politicians can credibly signal their type at a lower social cost. When the latter effect dominates the former, attaching great relevance to the personalities of politicians may be desirable for voters. This happens, for instance, when politicians are "office seekers", i.e., attach a high weight to being in power relative to voters' welfare. For this reason, erratic electoral outcomes cease to be the product of capricious and irrational behavior of backward voters and emerge as a desirable reaction to temper the behavior of politicians who would otherwise be too obsessed with reelection.

In our work we consider a representative voter and we assume that he cares sufficiently about the personalities of political candidates. This means that we assume that politicians' personalities are likely to have a significant impact on electoral outcomes. The fundamental reason why we make this assumption is that there exists ample documentation of the fact that voters are often very poorly informed about fundamental policy issues.[1] Gul and Pesendorfer (2006) demonstrate that if an individual voter is poorly informed about policy dimensions, he chooses to vote for the candidate whose personality he prefers, even if personalities have a very minor importance and if the candidate with the better personality is likely to implement an inferior policy. In other words, Gul and Pesendorfer (2006) show that the behavior of rational individual voters fails to aggregate information properly and causes personalities to have a large impact on electoral outcomes. In our work we analyze if and under what condition, this kind of behavior may have beneficial dynamic repercussions.

Our work is obviously related to the literature on politicians' career concerns (for a review see

[1] See, for instance, Delli Carpini and Keeter (1993).

Persson and Tabellini (2000)). Because we want to show that the effects we discuss are generally applicable, we choose to follow closely a standard framework and our modeling is therefore very similar to Rogoff and Sibert (1988) and Rogoff (1990). Our paper is also related to several recent attempts to identify the selection and the discipline properties in career concerns models. Ichino and Muehlheusser (2004), for instance, study a dynamic adverse selection setting and argue that reducing monitoring increases the probability of misbehavior, but may also increase the probability of early termination of undesirable types of agents. Besley and Smart (2003) study the consequences of measures of fiscal restraint on the discipline and the selection of politicians and indicate that some measures can lead to effects with opposite signs. But apart from its general connection with career concerns models, our paper is the first, to the best of our knowledge, to make the point that volatility can promote voters' welfare because it increases political alternation.

The paper is organized as follows. Section 2 presents the model. Section 3 characterizes the equilibrium. Section 4 analyzes the consequences of personality volatility on equilibrium outcomes. Section 5 provides a discussion.

2 The Model

We consider an environment in which an incumbent politician has private information about his administrative competence and is challenged by an opponent. The incumbent politician can use fiscal policy to signal his type, but the election outcome depends not only on the perceived competence of the incumbent vis-à-vis the opponent, but also on their personalities, i.e., on factors that are uncorrelated with the administrative competencies of the incumbent and the opponent.

The extensive form of the game we analyze is summarized in the following. There are two politicians, the incumbent, I, and the opponent, O. In period 1 I is in power. At the beginning of period 1, time 1.1, I's administrative competence in period 1, ε_1^I, is determined as follows:

$$\varepsilon_1^I = \alpha_1^I$$

where α_1^I is a random variable with $\Pr(\alpha_1^I = \overline{\alpha}) = \rho$ and $\Pr(\alpha_1^I = \underline{\alpha}) = 1 - \rho$, $\overline{\alpha} > \underline{\alpha}$. We assume that $\rho \in (1/2, 1)$, but qualitatively identical results can be obtained when $\rho \leq (0, 1/2]$. I privately observes ε_1^I at time 1.2. At time 1.3 I sets the level of a nondistortionary lump sum tax $t_1 \geq 0$ needed to finance $g > 0$, an exogenously given expenditure in government services. Because I sets t_1 after having observed whether the realization of his first period competence was $\underline{\alpha}$ or $\overline{\alpha}$ we denote his first period strategy by $\tau_1 : \{\underline{\alpha}, \overline{\alpha}\} \to [0, g]$, $\tau_1\left(\varepsilon_1^I\right) \in [0, g]$. At time 1.4 nature determines the personalities of I and O

$$\begin{aligned} \eta_1^I &= q_1^I \\ \eta_1^O &= q_1^O \end{aligned}$$

where q_1^i, $i = I, O$, is a random variable with $\Pr\left(q_1^i = \overline{q}\right) = \phi$ and $\Pr\left(q_1^i = \underline{q}\right) = 1 - \phi$, $\overline{q} > \underline{q} > 0$. At time 1.5 a representative voter observes t_1, observes the personalities of I and O and elects either I or his opponent O for period 2. We denote the strategy of the representative voter by $\nu : \mathbb{R}_+ \times \left\{\underline{q}, \overline{q}\right\}^2 \to \{I, O\}$, $\nu\left(t_1, q_1^O, q_1^I\right) \in \{I, O\}$. After a politician is elected for office in period 2, additional tax revenue for period 1 is raised through a distortionary tax s_1

$$s_1 = g - \varepsilon_1^I - t_1. \tag{1}$$

The sequence of events in period 2 is identical. If I is reappointed for period 2, his competence and his personality in period 2, ε_2^I and η_2^I, are determined as

$$\begin{aligned} \varepsilon_2^I &= \frac{1}{2}\alpha_1^I + \frac{1}{2}\alpha_2^I \\ \eta_2^I &= \frac{1}{2}q_1^I + \frac{1}{2}q_2^I, \end{aligned} \tag{2}$$

where α_2^I is a random variable with $\Pr(\alpha_2^I = \overline{\alpha}) = \rho$ and $\Pr(\alpha_2^I = \underline{\alpha}) = 1 - \rho$ and q_2^I is a random variable with $\Pr\left(q_2^I = \overline{q}\right) = \phi$ and $\Pr\left(q_2^I = \underline{q}\right) = 1 - \phi$. We denote by $\mathcal{E}_2^I = \left\{\underline{\alpha}, \frac{\underline{\alpha}+\overline{\alpha}}{2}, \overline{\alpha}\right\}$ the space of possible values of ε_2^I. If O replaces I in period 2, O's competence and personality in period 2, ε_2^O and η_2^O, are determined as

$$\begin{aligned} \varepsilon_2^O &= \alpha_2^O \\ \eta_2^O &= \frac{1}{2}q_1^O + \frac{1}{2}q_2^O, \end{aligned} \tag{3}$$

where α_2^O is a random variable with $\Pr\left(\alpha_2^O = \overline{\alpha}\right) = \rho$ and $\Pr\left(\alpha_2^O = \underline{\alpha}\right) = 1 - \rho$ and where q_2^O is a random variable with $\Pr\left(q_2^O = \overline{q}\right) = \phi$ and $\Pr\left(q_2^O = \underline{q}\right) = 1 - \phi$. We denote by $\mathcal{E}_2^O = \{\underline{\alpha}, \overline{\alpha}\}$ the space of possible values of ε_2^O. The second period strategy for player $i = I, O$, is the tax rate he sets in the second period if elected. We denote it by $\widehat{\tau}_2^i : \mathcal{E}_2^i \to [0, g]$.

All random variables α_1^I, q_1^I, q_1^O, α_2^I, α_2^O, q_2^I, q_2^O are independently distributed. We also assume that

$$(1 - \rho)\left(\overline{\alpha} - \underline{\alpha}\right) < \overline{q} - \underline{q} < \rho\left(\overline{\alpha} - \underline{\alpha}\right). \tag{4}$$

In broad terms the previous assumption requires that the differences between attractive and unattractive personalities is neither too large nor too small in comparison with the differences in the administrative competencies.

The sequence of events and the budget constraint in (1) describe a situation in which

- Government spending can be financed through different means;
- The less distortionary means (t) is more readily visible to voters (it is observed before the representative voter casts his vote) and the more distortionary means (s) is less readily visible to voters (it is observed only after the representative voter has cast his vote);
- A more competent politician needs less resources to achieve a given goal (total tax revenue needed to finance g is lower when the incumbent is competent).

The preferences of the representative voter at time 1.5 are represented by the following utility function

$$\Gamma = E_{1.5}\left[W_1 + \eta_1 + W_2 + \eta_2\right]. \tag{5}$$

The expectation is taken with respect to the information available to the representative voter at time 1.5; η_1 represents the personality of the incumbent (who is in power in period 1) and η_2 represents the personality of either I or O depending on who is elected for period 2. $W_1 = g + y - t_1 - s_1 - \Delta(s_1)$ represents the material welfare of the representative voter for period 1: y is an exogenously given and nonstorable endowment and $\Delta(s)$ represents the cost of distortions arising from the use of the distortionary tax, $\Delta(0) = 0$, $\Delta'(.) > 0$ for $s > 0$ and $\Delta''(.) > 0$. To ensure interior solutions, we also assume that $\lim_{s \to g - \overline{\alpha}} \Delta(s) = +\infty$ or in other words that the cost of setting a lump sum tax rate equal to 0 is prohibitively high even if the politician has high competence (in this case $s = g - \overline{\alpha}$ would then be necessary to balance the budget). A similar expression describes the second period material welfare of the representative voter.

From the point of view of the representative voter's material welfare, given (1) and (5) and given that distortions are minimized when $\Delta = 0$, it is preferable to finance government spending with only lump sum taxes (which implies that no distortionary taxation takes place, $s = 0$); given (2) and (3) it is preferable to elect I for office in period 2 if and only if his administrative competence in period 1 is high, $\varepsilon_1^I = \overline{\alpha}$.

The incumbent and the opponent care about the welfare of the representative voter, but also derive utility from being in office. We model this by assuming that the preferences of politician $i = I, O$ are represented by the following utility function[2]

$$\Psi^i = E\left[W_1 + \eta_1 + W_2 + \eta_2 + \pi_2^i X\right] \tag{6}$$

The expectation is taken with respect to the information available to politician i; π_2^i represents the estimate that player i makes of the probability that he will be in power in period 2 and X represents the rent that player i receives if he is in power in period 2.[3]

Because of the information structure and of the timing of events, the game we have described is a signaling game. The incumbent is the sender (has private information about his administrative competence when he sets t_1, the level of nondistortionary taxes in period 1) and the representative voter is the receiver (before voting makes inferences about the incumbent's administrative competence in period 1 conditional on t_1). The equilibrium concept we use is perfect Bayesian equilibrium.

Before proceeding it is useful to notice that given that period 2 is the last and given the preferences of politicians, fiscal policy in period 2 maximizes the welfare of the representative voter and makes no use of distortionary taxation, s_2. In other words, in equilibrium

$$\widehat{\tau}_2^i\left(\varepsilon_2^i\right) = g - \varepsilon_2^i$$

for $i \in \{I, O\}$. The rest of the paper will be centered on the analysis of period 1 when reputational concerns shape the play of the incumbent and the representative voter.

3 Equilibrium

In subsection 3.1 we start by analyzing the equilibrium in a symmetric information environment in which α_1^I is observed by the representative voter prior to voting. In subsection 3.2 we then turn to the analysis of the asymmetric information environment described above, where the representative voter does not observe α_1^I prior to voting.

3.1 Equilibrium with symmetric information

If α_1^I is observed by the representative voter prior to voting, the incumbent's fiscal policy cannot affect the representative voter's expectations about his post-electoral competence and thus has no effect on his chances of remaining in office. Because $E_{1.5}\left[\pi_2^I\right]$ is independent of his play, in equilibrium I maximizes the welfare of the representative voter also in period 1:

$$\widetilde{\tau}_1^I\left(\varepsilon_1^I\right) = g - \varepsilon_1^I.$$

[2] Similar results would obtain if politicians ignored voters' preferences over personalities and cared only for their material welfare.

[3] Because the incumbent is in power in period 1 by assumption, we ignore the rent from holding office in period 1.

The fact that α_1^I is observed before voting has no impact on equilibrium play in the second period and we therefore have

$$\widetilde{\tau}_2^i\left(\varepsilon_2^i\right) = g - \varepsilon_2^i \tag{7}$$

for $i \in \{I, O\}$.

Define now $\widetilde{W}_2^i$, $i = I, O$, as period 2's material welfare of the representative voter when politician i is in power in period 2 and plays according to (7). Simple algebra shows that

$$\widetilde{W}_2^i = y + \varepsilon_2^i.$$

We denote by $\underline{\Omega}^i$, $i = I, O$ period 2 expected material welfare for the representative voter when politician i is in power in period 2 and when the incumbent's administrative competence for period 1 is $\varepsilon_1^I = \underline{\alpha}$; similarly we denote by $\overline{\Omega}^i$, $i = I, O$, period 2 expected material welfare for the representative voter when politician i is in power for period 2 and when the incumbent's administrative competence for period 1 being $\varepsilon_1^I = \overline{\alpha}$. Simple algebra shows that

$$\begin{aligned}
\underline{\Omega}^I &= E\left[\widetilde{W}_2^I | \alpha_1^I = \underline{\alpha}\right] = y + \rho\frac{1}{2}\overline{\alpha} + (2-\rho)\frac{1}{2}\underline{\alpha} \\
\overline{\Omega}^I &= E\left[\widetilde{W}_2^I | \alpha_1^I = \overline{\alpha}\right] = y + (1+\rho)\frac{1}{2}\overline{\alpha} + (1-\rho)\frac{1}{2}\underline{\alpha} \\
\underline{\Omega}^O &= \overline{\Omega}^O = E\left[\widetilde{W}_2^O | \alpha_1^I = \alpha\right] = y + \rho\overline{\alpha} + (1-\rho)\underline{\alpha}
\end{aligned}$$

Notice that given that the administrative competence of the opponent in period 2 is independent of the administrative competence in period 1 of the incumbent, the expected material welfare of having the opponent in power in period 2 is independent of the administrative competence of the incumbent in period 1, $\underline{\Omega}^O = \overline{\Omega}^O$. For this reason in the following we will simply write Ω^O.

We can now determine the election outcome in the equilibrium with full information. Recall that the representative voter casts his vote after observing period 1 administrative competence of the incumbent and period 1's personalities of both politicians. Simple algebra also shows that under (4)

$$\left(\underline{\Omega}^I - \Omega^O\right) + \left(\frac{1}{2}q_1^I - \frac{1}{2}q_1^O\right) < 0 \text{ for all } \left(q_1^O, q_1^I\right) \in \left\{\underline{q}, \overline{q}\right\}^2 \tag{8}$$

$$\left(\overline{\Omega}^I - \Omega^O\right) + \left(\frac{1}{2}\underline{q} - \frac{1}{2}\overline{q}\right) < 0 \tag{9}$$

$$\overline{\Omega}^I - \Omega^O > 0 \tag{10}$$

$$\left(\overline{\Omega}^I - \Omega^O\right) + \left(\frac{1}{2}\overline{q} - \frac{1}{2}\underline{q}\right) > 0 \tag{11}$$

Consider condition (8). The left hand side of (8) represents the expected utility the representative voter obtains in period 2 if he elects the incumbent when his period 1 administrative competence is low and when his period 1 personality is q_1^I minus his expected utility if he elects the opponent when his period 1 personality is q_1^O(recall that $\eta_2^i = \frac{1}{2}q_1^i + \frac{1}{2}q_2^i$, $i = I, O$, and that the expected value of $q_2^I - q_2^O$ is 0). By (8), therefore, if the incumbent has low competence in period 1, $\alpha_1^I = \underline{\alpha}$, the opponent is elected for period 2 regardless of the personalities in period 1. In a similar way (9) implies that if the incumbent has high competence in period 1, $\alpha_1^I = \overline{\alpha}$, but has an unattractive personality while the opponent has an attractive personality, the latter is elected for period 2. Finally (10) and (11) imply that if the incumbent has high competence in period 1, $\alpha_1^I = \overline{\alpha}$, and has a personality no worse than the opponent's, the incumbent is reelected for period 2.

Because the second period is the last, second period play is easily determined in equilibrium. In what follows we therefore center attention on first period equilibrium play of the incumbent and the representative voter. A perfect Bayesian equilibrium consists of a pair of strategies, $(\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha}))$ for the incumbent and $\widehat{\nu}\left(t_1, q_1^O, q_1^I\right)$ for the representative voter together with beliefs $\widehat{\mu}(t_1)$, such that strategies are best responses to each other given the beliefs and the beliefs are computed from equilibrium strategies whenever possible.

We proceed backward and we start analyzing the play of the representative voter. Let

$$\mu(t_1) = \Pr\left(\alpha_1^I = \overline{\alpha} \mid t_1\right)$$

denote the posterior beliefs of the representative voter on the first period administrative competence of the incumbent. More precisely $\mu(t_1)$ is the probability that the representative voter attaches to the incumbent having a high competence in period 1 conditional on the level of the lump sum tax.

A necessary and sufficient condition for the strategy of the representative voter to be a best response to $\mu(t_1)$ is that

$$\widehat{\nu}\left(t_1, q_1^O, q_1^I\right) = I \text{ if and only if } \mu(t_1)\overline{\Omega}^I + (1-\mu(t_1))\underline{\Omega}^I + \frac{1}{2}q_1^I \geq \Omega^O + \frac{1}{2}q_1^O, \tag{12}$$

or, in words, the incumbent is reelected for period 2 if and only if the expected utility of the representative voter for the second period is no lower with the incumbent than with the opponent.

We now move backward and characterize the incumbent's best response to an arbitrary strategy of the representative voter, $\nu\left(t_1, q_1^O, q_1^I\right)$. Notice first that when the incumbent sets the level of the lump sum tax, he has not observed yet the personalities q_1^O and q_1^I, but he can compute the probability that he will be reelected if he chooses a given t_1. Denote by $\pi(t_1, \nu)$ the probability that the representative voter will reelect the incumbent when he follows strategy ν, $\pi(t_1) = \Pr\left(\nu\left(t_1, q_1^O, q_1^I\right) = I\right)$.

We can now characterize the best response of the incumbent $(\tau_1(\underline{\alpha}), \tau_1(\overline{\alpha}))$ to a given strategy of the representative voter, ν. Consider first $\tau_1(\underline{\alpha})$, i.e., what the incumbent does when he observes that his first period competence is low. The incumbent knows that if he sets a lump sum tax equal to t_1, the material welfare of the representative voter will be $y + \underline{\alpha} - \Delta(g - \underline{\alpha} - t_1)$. This corresponds to the material welfare that the representative voter obtains if no distortion occurs (the representative voter's initial endowment plus the incumbent's administrative competence) minus the cost of relying on a distortionary tax (to make up for the budget deficit $g - \underline{\alpha} - t_1$). The incumbent also knows that if he sets t_1, he will be reelected for period 2 with probability $\pi(t_1, \nu)$. In this case the representative voter obtains an expected material welfare of $\underline{\Omega}^I$ and the incumbent obtains a rent of X. If the opponent is instead elected for period 2, an event that happens with probability $1 - \pi(t_1, \nu)$, period 2 expected material welfare for the representative voter is Ω^O and the incumbent obtains no rent. Therefore for $(\tau_1(\underline{\alpha}), \tau_1(\overline{\alpha}))$ to be a best response to ν, $\tau_1(\underline{\alpha})$ has to be a solution to the following problem

$$\tau_1(\underline{\alpha}) = \arg\max_{t_1 \geq 0} y + \underline{\alpha} - \Delta(g - \underline{\alpha} - t_1) + \pi(t_1, \nu)\underline{\Omega}^I + (1 - \pi(t_1, \nu))\Omega^O + X\pi(t_1, \nu).$$

In a similar way for $(\tau_1(\underline{\alpha}), \tau_1(\overline{\alpha}))$ to be a best response to ν the lump sum tax set by the incumbent after he observes that his first period competence is high $\tau_1(\overline{\alpha})$ has to be such that.

$$\tau_1(\overline{\alpha}) = \arg\max_{t_1 \geq 0} y + \overline{\alpha} - \Delta(g - \overline{\alpha} - t_1) + \pi(t_1, \nu)\overline{\Omega}^I + (1 - \pi(t_1, \nu))\Omega^O + X\pi(t_1, \nu).$$

An equilibrium is given by a profile of strategies and a beliefs, $((\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha})), \widehat{\nu}(t_1, q_1^O, q_1^I), \widehat{\mu}(t_1))$, such that

$$\widehat{\tau}_1(\underline{\alpha}) = \arg\max_{t_1 \in [0,g]} y + \underline{\alpha} - \Delta(g - \underline{\alpha} - t_1) + \pi(t_1, \widehat{\nu})\underline{\Omega}^I + (1 - \pi(t_1, \widehat{\nu}))\Omega^O + X\pi(t_1, \widehat{\nu})$$

$$\widehat{\tau}_1(\overline{\alpha}) = \arg\max_{t_1 \in [0,g]} y + \overline{\alpha} - \Delta(g - \overline{\alpha} - t_1) + \pi(t_1, \widehat{\nu})\overline{\Omega}^I + (1 - \pi(t_1, \widehat{\nu}))\Omega^O + X\pi(t_1, \widehat{\nu})$$

$$\widehat{\nu}(t_1, q_1^O, q_1^I) = \begin{cases} I & \text{if } \hat{\mu}(t_1)\overline{\Omega}^I + (1 - \hat{\mu}(t_1))\underline{\Omega}^I + q_1^I \geq \Omega^O + q_1^O \\ O & \text{if } \hat{\mu}(t_1)\overline{\Omega}^I + (1 - \hat{\mu}(t_1))\underline{\Omega}^I + q_1^I < \Omega^O + q_1^O \end{cases}$$

and beliefs that are computed from $(\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha}))$ whenever possible.

As is typically the case in signaling environments, multiple equilibria exist, both separating and pooling. In a separating equilibrium, the incumbent's choice of fiscal policy perfectly reveals his type. In a pooling equilibrium, the incompetent type mimics the competent type. As in Rogoff (1990), it is easy to see that no pooling equilibrium survives the intuitive criterion of Cho and Kreps (1987). We therefore center our attention on pure strategy separating perfect Bayesian equilibria.

PROPOSITION 1 *In any separating equilibrium* $\widehat{\tau}_1(\underline{\alpha}) = g - \underline{\alpha}$. *The set of separating equilibria is nonempty.*

PROOF. See Appendix A.1.

It is convenient to notice that in all separating equilibria the low competence incumbent receives the same payoff, because it sets $\widehat{\tau}_1(\underline{\alpha}) = g - \underline{\alpha}$ and is reelected with probability 0. But two other observations are also useful. First, the expected utility of the high competence incumbent is different in different separating equilibria. Second, because in all separating equilibria the high competence incumbent is reelected for period 2 with probability $1 - \phi(1 - \phi)$ (the probability that the incumbent's personality is not worse than the opponent's), the differences in equilibria arise only because different first period lump sum taxes give rise to different levels of first period material welfare. This means that in the set of separating equilibria the ones that lead to highest first period material welfare Pareto dominate the rest. These ideas are used in the next proposition that characterizes the separating equilibria that survive the intuitive criterion of Cho and Kreps (1987).

Let T_1 denote the tax rate that maximizes first period utility for the competent type of incumbent subject to the constraint that the incompetent type of incumbent prefers to set $t_1 = g - \underline{\alpha}$ and being found out to be incompetent to setting T_1 and being believed to be the competent type with probability 1.[4]

PROPOSITION 2 $T_1 \in (0, g - \overline{\alpha}]$. *In all separating equilibria that survive the Intuitive Criterion,* $\widehat{\tau}_1(\overline{\alpha}) = T_1$.

PROOF. See Appendix A.2.

Under certain conditions an equilibrium exists in which $\widehat{\tau}_1(\overline{\alpha}) = g - \overline{\alpha}$, i.e., also the first period lump sum tax set by the competent incumbent is efficient. This occurs when the continuation payoff that the low competence incumbent obtains from setting a first period lump sum tax equal

[4] A formal definition of T_1 is given in the proof of Proposition 2 in Appendix A.2

to $g - \overline{\alpha}$ and being believed to have high competence with probability 1 is sufficiently small and whenever the cost of setting the first period lump sum tax equal to $g - \overline{\alpha}$ rather than to $g - \underline{\alpha}$ is sufficiently high. But if these conditions are not met, in equilibrium $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$.

In the rest of the paper we will center our attention on (separating) equilibria that survive the intuitive criterion and we will simply refer to them as equilibria.

The next proposition circumscribes to equilibria in which $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$ and analyzes the impact of the size of the rent from holding office on the equilibrium outcome.

Proposition 3 *Consider equilibria in which $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$. An increase in X, the rent from holding office, decreases $\widehat{\tau}_1(\overline{\alpha})$ and leads to lower equilibrium material welfare for the high competence incumbent and lower equilibrium utility for the representative voter.*

Proof. See Appendix A.3.

4 Career Concerns and Personality

The very simple stochastic structure that we have chosen for the personality of a politician is meant to point out that its impact is larger when it is more volatile. To see this recall that we have assumed that the personalities of politicians have a substantial impact on electoral outcomes. In particular (4) guarantees that $\overline{q} - \underline{q}$ is big enough that in a symmetric information setting the incumbent loses the election with certainty if his personality is unattractive ($\underline{q}$) while his opponent's is attractive ($\overline{q}$)–even when the incumbent is known to have high administrative competence. But the impact of this assumption on equilibrium outcomes depends on the probability of such an event occurring. If ϕ is near 1, then the personalities of the incumbent and the politician are likely to be both attractive and they are unlikely to be determinant. Similarly, if ϕ is near 0, the personalities of the two candidates are likely to be both unattractive. Because not reelecting a competent incumbent has probability $\phi(1-\phi)$, this event is very rare whenever ϕ is near 0 or 1 but is maximal when $\phi = \frac{1}{2}$, i.e., when the variance of the personality is maximal.

A different way of expressing these ideas is to view the personalities of candidates as random variables that take the high value for all realizations that are rated as appropriate and the low value for the complementary set, i.e., for realizations that are rated as inappropriate. A very severe electorate may associate most realizations to inappropriate behavior (ϕ near 1) and a very indulgent electorate may do the opposite (ϕ near 0). But in either case the probability of the personalities determining the electoral outcomes would be very low. By contrast, an electorate that assigns sufficiently likely sets of realizations to either rating (ϕ near 1/2) has a larger opinion volatility and is more likely to expose electoral outcomes to this volatility.

In the rest of this section we want to analyze the impact of the volatility of personalities on equilibrium outcomes. For this reason we use $\gamma = \phi(1-\phi)$ as a measure of volatility that ranges from 0 (minimum volatility when $\phi \in \{0, 1\}$) to 1/4 (maximum volatility when $\phi = 1/2$) .

Proposition 4 *Consider equilibria in which $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$. An increase in γ increases $\widehat{\tau}_1(\overline{\alpha})$ and therefore decreases equilibrium distortions.*

Proof. See Appendix A.4.

Proposition 4 states that a larger personality volatility reduces the incentives for an incompetent incumbent to distort policies, because it decreases the expected reward obtained from making the representative voter believe that he is competent. This implies that in equilibrium the distortion that the competent incumbent has to introduce to credibly signal his type is lower.

In different words Proposition 4 shows that an increase in personality volatility may be beneficial because it reduces the perverse effects of politicians' career concerns. But because an increase in personality volatility also has a direct effect on electoral outcomes, it is also important to weigh its beneficial effects against its potential costs deriving from an increase in the probability that a competent incumbent is not reelected. We do this in the following Proposition in which we analyze the consequences of personality volatility on the representative voter's lifetime utility

$$W_1 + \eta_1 + W_2 + \eta_2$$

as well as on his material welfare,

$$W_1 + W_2.$$

PROPOSITION 5 *Consider equilibria with* $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$.

1. *The representative voter's lifetime utility is maximized when* $\gamma = \frac{1}{4}$ *if* $\overline{\Omega}^I - \underline{\Omega}^I < \frac{1}{2}(\overline{q} - \underline{q}) + X$ *and when* $\gamma = 0$ *if* $\overline{\Omega}^I - \underline{\Omega}^I > \frac{1}{2}(\overline{q} - \underline{q}) + X$.

2. *The representative voter's material welfare is maximized when* $\gamma = \frac{1}{4}$ *if* $\overline{\Omega}^I - \underline{\Omega}^I < X$ *and when* $\gamma = 0$ *if* $\overline{\Omega}^I - \underline{\Omega}^I > X$.

PROOF. See Appendix A.5.

Recall that $\gamma = \phi(1-\phi)$ and that the variance of the distribution of personalities is $\phi(1-\phi)(\overline{q} - \underline{q})$. Because it studies the consequences of an increase in the variance for a given value of $\overline{q} - \underline{q}$, Proposition 5 analyzes the repercussions of an increase in personality volatility.

To understand Proposition 5 it is convenient to recall that a larger personality volatility has two implications: i) It reduces the incentives of the incompetent incumbent to imitate the strategy of the competent incumbent and therefore it reduces the policy distortions that credibly signal the latter type; ii) It makes it more probable that the electoral outcome is determined by the personalities of the candidates and not by the administrative competence of the incumbent.

Part 1 of Proposition 5 analyzes the representative voter's lifetime utility and finds that the beneficial effect of decreasing policy distortions is measured by X, the beneficial effect of selecting the politician with a strictly better personality is $\frac{1}{2}(\overline{q} - \underline{q})$, and that the cost of not reelecting a competent incumbent is measured by $\overline{\Omega}^I - \underline{\Omega}^I$. When the cost outweigh the beneficial effects, the representative voter's utility is maximized when personality volatility is maximal, i.e., when $\gamma = \frac{1}{4}$, or equivalently when $\phi = \frac{1}{2}$. When the beneficial effects are outweighed by the cost the representative voter's utility is maximized when personality volatility is minimal, i.e., when $\gamma = 0$, or equivalently when $\phi \in \{0, 1\}$.

Part 2 of Proposition 5 analyzes the representative voter's material welfare. The only change with respect to the analysis of the representative voter's lifetime utility is that selecting the politician with a strictly better personality is ignored and this explains why $\frac{1}{2}(\overline{q} - \underline{q})$ disappears from the condition that determines whether maximal or minimal volatility is desirable.

A few remarks about Proposition 5 are useful.

1. Proposition 5 finds that the equilibrium utility and material welfare of the representative voter are linear in γ. This is obviously a consequence of using a simple model, but the result is convenient because it emphasizes the factors that determine whether personality volatility is desirable or not for voters.

2. The model we use in this paper is also simple because we consider a 2-period model. But our results generalize to an infinite horizon model. When the horizon is infinite, an increase in personality volatility decreases the reward that an incompetent incumbent receives when he distorts policies and makes the electorate believe that he is competent for the following two reasons:

   (a) There is a higher probability of not being reelected even if believed to be competent;

   (b) The probability of returning to power after losing increases because the opponent is also subject to personality volatility and there is a higher chance that he will not be reelected when he is competent.

   In other words, an infinite horizon model is useful to recognize another reason why personality volatility may be desirable, but the qualitative results are unchanged.

3. A sufficiently large increase in the rents that a politician obtains while in power may increase the optimal level of personality volatility. The reason is that when rents from holding office are higher, the policy distortions needed to credibly signal a high first period competence are also higher. But an increase in volatility may reduce these distortions.

4. For ease of exposition Proposition 5 considers only the cases in which for all values of ϕ all equilibria imply some efficiency loss because $\widehat{\tau}_1(\overline{\alpha}) < g - \overline{\alpha}$. Straightforward algebra shows that this is the case whenever

$$\frac{3}{4}\Delta(\overline{\alpha} - \underline{\alpha}) < X + \underline{\Omega}^I - \Omega^O. \tag{13}$$

   When (13) does not hold the analysis is a bit more involved because it requires to keep into account that the incentive compatibility constraint for the low competence incumbent may cease to be binding, but the same qualitative results hold.

5 Discussion

A conventional view of politics revolves around the idea that voters are often ignorant about fundamental characteristics, such as the administrative competence of candidates, and that electoral outcomes are influenced by factors that have no apparent connection with them, such as the candidates' aspects, clothing, acquaintances, hobbies, or sexual lives. A few empirical studies have demonstrated the validity of this view.[5]

The objective of this paper is to study the repercussions of this kind of apparently capricious behavior of voters. In particular we center our attention on the fact that an immediate consequence is an increase in the randomness of election outcomes. This is harmful because it increases the probability that an incumbent who demonstrates his competence while in office may not be reelected. But because this reduces the value of signalling a high administrative competence, a beneficial effect is generated by the reduced willingness of incumbents to distort policies to signal their ability.

In more general terms our result can be summarized as follows. We note that politicians' career concerns can have beneficial and harmful consequences and we show that when the beneficial consequences are outweighed by the harmful ones, an increase in the randomness of electoral

[5] See, for example, the experiments run by Druckman (2003), Redlawsk and Lau (2003) and Todorov, Mandisodza, Goren, and Hall (2005).

outcomes increases political alternation and therefore lowers career concerns and increases welfare. Our results can also be understood in the following terms. Making electoral outcomes dependent on the realizations of irrelevant factors is equivalent to credibly committing to not always reelect a candidate believed to be competent. This behavior is always ex post suboptimal, but it is ex-ante optimal if the harmful effects of career concerns outweigh their beneficial effects.

We identify the factors that determine the magnitude of the beneficial and the harmful effects and we are therefore able to envision situations in which the higher political alternation introduced by the volatility in voters' perception of the personalities of politicians leads to welfare gains. For instance, we show that when politicians enjoy larger rents from being in office, more volatility is welfare improving and when administrative competence is very important less volatility is desirable.

A Proofs of Lemmas and Propositions

A.1 Proof of Proposition 1

Suppose that a separating equilibrium $\left(\left(\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha})\right), \widehat{\nu}\left(t_1, q_1^O, q_1^I\right), \widehat{\mu}(t_1)\right)$ exists. This implies that

$$\begin{aligned} \widehat{\tau}_1(\underline{\alpha}) &\neq \widehat{\tau}_1(\overline{\alpha}) && (14)\\ \widehat{\mu}\left(\widehat{\tau}_1(\overline{\alpha})\right) &= 1 && (15)\\ \widehat{\mu}\left(\widehat{\tau}_1(\underline{\alpha})\right) &= 0. && (16) \end{aligned}$$

To show that the set of separating equilibria is nonempty, we show that we can always construct separating equilibria in which

$$\widehat{\mu}(t) = 0 \text{ if } t \neq \widehat{\tau}_1(\overline{\alpha}). \quad (17)$$

Given the beliefs in (15)-(17), for a separating equilibrium it is necessary and sufficient that neither type of incumbent wishes to imitate the strategy of the other type:

$$\begin{aligned} & y + \underline{\alpha} - \Delta\left(g - \underline{\alpha} - \tau_1(\underline{\alpha})\right) + \pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right)\underline{\Omega}^I + \left(1 - \pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right)\right)\Omega^O + X\pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right) \\ \geq\ & y + \underline{\alpha} - \Delta\left(g - \underline{\alpha} - \tau_1(\overline{\alpha})\right) + \pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right)\underline{\Omega}^I + \left(1 - \pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right)\right)\Omega^O + X\pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right) \quad (18)\\ & y + \overline{\alpha} - \Delta\left(g - \overline{\alpha} - \tau_1(\overline{\alpha})\right) + \pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right)\overline{\Omega}^I + \left(1 - \pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right)\right)\Omega^O + X\pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right) \\ \geq\ & y + \overline{\alpha} - \Delta\left(g - \overline{\alpha} - \tau_1(\underline{\alpha})\right) + \pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right)\overline{\Omega}^I + \left(1 - \pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right)\right)\Omega^O + X\pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right) \quad (19) \end{aligned}$$

From (12) we obtain

$$\pi\left(t_1, \widehat{\nu}\right) = \Pr\left(\mu(t_1)\overline{\Omega}^I + (1 - \mu(t_1))\underline{\Omega}^I + q_1^I \geq \Omega^O + q_1^O\right) \quad (20)$$

and substituting (15) and (16) in (20) we obtain

$$\begin{aligned} \pi\left(\tau_1(\underline{\alpha}), \widehat{\nu}\right) &= 0 && (21)\\ \pi\left(\tau_1(\overline{\alpha}), \widehat{\nu}\right) &= 1 - \phi(1 - \phi). && (22) \end{aligned}$$

This implies that in a separating equilibrium

$$\tau_1(\underline{\alpha}) = g - \underline{\alpha}. \quad (23)$$

Substituting (21)-(23) into (18) and (19), recalling $\Delta(s) = 0$ for $s \leq 0$ and simplifying we obtain

$$\begin{aligned} \Delta\left(g - \underline{\alpha} - \tau_1(\overline{\alpha})\right) &\geq (1 - \phi(1 - \phi))\left(\underline{\Omega}^I - \Omega^O\right) + X(1 - \phi(1 - \phi)) && (24)\\ \Delta\left(g - \overline{\alpha} - \tau_1(\overline{\alpha})\right) &\leq (1 - \phi(1 - \phi))\left(\overline{\Omega}^I - \Omega^O\right) + X(1 - \phi(1 - \phi)) && (25) \end{aligned}$$

Notice that $\overline{\Omega}^I > \underline{\Omega}^I$ implies that the right hand side of (24) is larger than the right hand side of (25) and $\Delta'(.) > 0$ implies that the left hand side of (24) is smaller than the left hand side of (25). Recalling that $\lim_{s \to g - \overline{\alpha}} \Delta(s) = +\infty$, we obtain that there exists a $\tau_1(\overline{\alpha}) < g - \overline{\alpha}$ such that (24) and (25) both hold. ■

A.2 Proof of Proposition 2

Let T_1 denote the tax rate that maximizes first period utility for the competent type of incumbent subject to the constraint that the incompetent type of incumbent prefers setting $t_1 = g - \underline{\alpha}$ and being found out to be incompetent to setting T_1 and being believed to be the competent type with probability 1. Using (18), (21) and (22) we obtain

$$\begin{aligned} T_1 &= \arg\max_{T_1} g + y - T_1 - \overline{s} - \Delta(\overline{s}) && (26) \\ y + \underline{\alpha} &\geq g + y - T_1 - \underline{s} - \Delta(\underline{s}) + (1 - \phi(1-\phi))\left(X + \underline{\Omega}^I - \Omega^O\right) && (27) \\ \overline{s} &= \min\{0, g - \overline{\alpha} - T_1\} && (28) \\ \underline{s} &= \min\{0, g - \underline{\alpha} - T_1\}. && (29) \end{aligned}$$

Constraints (28) and (29) mean that if T_1 is insufficient to fund g, the difference will have to be raised by distortionary taxation. Notice that T_1 exists given that $\Delta(.)$ is convex and that the constraints define a convex and closed set.

If at a solution of (26) (27) is not binding, $T_1 = g - \overline{\alpha}$. If at a solution of (26) (27) is binding, on the other hand $T_1 < g - \overline{\alpha}$. To see this suppose that $T_1 = g - \overline{\alpha} + k$, $k > 0$. In this case the value of the objective function is $y + \overline{\alpha} - k$. Suppose first that $k > \overline{\alpha} - \underline{\alpha}$. Then from (27) with equality and (29) we obtain

$$k - (\overline{\alpha} - \underline{\alpha}) = (1 - \phi(1-\phi))\left(\underline{\Omega}^I - \Omega^O\right) + X(1 - \phi(1-\phi)) \quad (30)$$

Consider now the constraint for the low type when $t_1 \leq g - \underline{\alpha}$:

$$\Delta(g - \underline{\alpha} - t_1) \geq (1 - \phi(1-\phi))\left(\underline{\Omega}^I - \Omega^O\right) + X(1 - \phi(1-\phi)) \quad (31)$$

Substituting (30) into (31)

$$\Delta(g - \underline{\alpha} - t_1) \geq k - (\overline{\alpha} - \underline{\alpha}) \quad (32)$$

Notice that there exists a $T_1' < g - \underline{\alpha}$ such that

$$\Delta\left(g - \underline{\alpha} - T_1'\right) = k - (\overline{\alpha} - \underline{\alpha})$$

But this implies that there is a $k' < \overline{\alpha} - \underline{\alpha}$ such that for $T_1'' = g - \overline{\alpha} + k'$ (32) holds and the value of the objective function $y + \overline{\alpha} - k' > y + \overline{\alpha} - k$ and a contradiction is obtained.

Suppose now $0 < k \leq \overline{\alpha} - \underline{\alpha}$. Then from (27) with equality and (29) we obtain

$$\Delta(g - \underline{\alpha} - T_1) = (1 - \phi(1-\phi))\left(\underline{\Omega}^I - \Omega^O\right) + X(1 - \phi(1-\phi)).$$

Because $\Delta(.)$ is increasing, however, any $t_1 < T_1$ will satisfy (27) and (29). Recall that the value of the objective function when $T_1 = g - \overline{\alpha} + k$ is $y + \overline{\alpha} - k$. But because $\Delta(.)$ is increasing and continuous, there is a $T_1'' < g - \overline{\alpha} < T_1$ such that (27) and (29) hold and such that the value of the objective function is

$$y + \overline{\alpha} - \Delta\left(g - \overline{\alpha} - T_1''\right) > y + \overline{\alpha} - k$$

and a contradiction is obtained. This proves that $T_1 \leq g - \overline{\alpha}$.

The proof that a separating equilibrium exists with $(\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha})) = (g - \underline{\alpha}, T_1)$ with beliefs

$$\begin{aligned} \widehat{\mu}(T_1) &= 1 \\ \widehat{\mu}(t_1) &= 0 \text{ if } t_1 \neq T_1. \end{aligned}$$

follows from simple computations. Similarly, the proof that only $(\widehat{\tau}_1(\underline{\alpha}), \widehat{\tau}_1(\overline{\alpha}))$ survives the intuitive criterion of Cho and Kreps (1987) follows from standard arguments and is therefore omitted. ■

A.3 Proof of Proposition 3

Consider an equilibrium in which $\widehat{\tau}_1(\overline{\alpha}) < g - \underline{\alpha}$. Because $\widehat{\tau}_1(\overline{\alpha}) = T_1$, (27) is binding at a solution of (26). This means that the multiplier associated to it is strictly positive and an increase in X leads to a decrease in the maximum of (26). Because a decrease in the maximum can only be obtained by a lower value of T_1, from Proposition 2 we obtain that the only difference derives from a lower value of $\widehat{\tau}_1(\overline{\alpha})$. Because this causes a loss of utility only if the incumbent has high competence in the first period, only the high competence incumbent and the representative voter are negatively affected and the result follows. ■

A.4 Proof of Proposition 4

The proof follows along the same lines of the proof of Proposition 3 after having substituted $\gamma = \phi(1-\phi)$ in (27). ■

A.5 Proof of Proposition 5

We only provide the proof of Part 1. The proof of Part 2 follows along similar lines.

We want to study equilibria for all values of $\phi \in [0,1]$ when all equilibria are such that $\widehat{\tau}_1(\overline{\alpha}) = T_1 < g - \overline{\alpha}$. This means that (27) is binding and that $\underline{s} = g - \underline{\alpha} - T_1$. This implies that

$$\Delta(g - \underline{\alpha} - T_1) = (1 - \phi(1-\phi))\left(X + \underline{\Omega}^I - \Omega^O\right) \tag{33}$$

Let δ denote the inverse of Δ and rewrite (33) as

$$g - \underline{\alpha} - T_1 = \delta\left((1 - \phi(1-\phi))\left(X + \underline{\Omega}^I - \Omega^O\right)\right)$$

or

$$T_1 = g - \underline{\alpha} - \delta\left((1 - \phi(1-\phi))\left(X + \underline{\Omega}^I - \Omega^O\right)\right). \tag{34}$$

Making use of (34) straightforward algebra shows that the lifetime expected utility of the representative voter is

$$\rho(y+\overline{\alpha}-\Delta\left(\underline{\alpha}-\overline{\alpha}+\delta\left((1-\phi(1-\phi))\left(X+\underline{\Omega}^I-\Omega^O\right)\right)\right) + (1-\phi(1-\phi))\overline{\Omega}^I$$
$$+\phi(1-\phi)\left(\Omega^O+\frac{1}{2}(\overline{q}-\underline{q})\right)) + (1-\rho)\left(y+\underline{\alpha}+\Omega^O\right) \tag{35}$$

Letting $\gamma = \phi(1-\phi)$ we can rewrite (35) to obtain $V(\gamma)$, the lifetime expected utility of the representative voter as a function of γ

$$\begin{aligned} V(\gamma) &= \rho(y + \overline{\alpha} - \Delta\left(\underline{\alpha} - \overline{\alpha} + \delta\left((1-\gamma)\left(X + \underline{\Omega}^I - \Omega^O\right)\right)\right) \\ &\quad + (1-\gamma)\overline{\Omega}^I + \gamma(\Omega^O + \frac{1}{2}(\overline{q} - \underline{q}))) + (1-\rho)\left(y + \underline{\alpha} + \Omega^O\right) \end{aligned} \tag{36}$$

From (36) we obtain

$$\begin{aligned} \frac{1}{\rho}V'(\gamma) &= \Delta'\left(\underline{\alpha} - \overline{\alpha} + \delta\left((1-\gamma)\left(X + \underline{\Omega}^I - \Omega^O\right)\right)\right)\delta'\left((1-\gamma)\left(X + \underline{\Omega}^I - \Omega^O\right)\right)\left(X + \underline{\Omega}^I - \Omega^O\right) \\ &\quad -\overline{\Omega}^I + \left(\Omega^O + \frac{1}{2}(\overline{q} - \underline{q})\right) \\ &= \Delta'\left(\underline{\alpha} - \overline{\alpha} + \delta\left((1-\gamma)\left(X + \underline{\Omega}^I - \Omega^O\right)\right)\right)\delta'\left((1-\gamma)\left(X + \underline{\Omega}^I - \Omega^O\right)\right)\left(X + \underline{\Omega}^I - \Omega^O\right) \\ &\quad - \left(\overline{\Omega}^I - \Omega^O - \frac{1}{2}(\overline{q} - \underline{q})\right) \end{aligned} \tag{37}$$

Because δ is the inverse of Δ, however,

$$\Delta'\left(\underline{\alpha}-\overline{\alpha}+\delta\left((1-\gamma)\left(X+\underline{\Omega}^{I}-\Omega^{O}\right)\right)\right)\delta'\left((1-\gamma)\left(X+\underline{\Omega}^{I}-\Omega^{O}\right)\right)=1$$

and we obtain

$$\begin{aligned}\frac{1}{\rho}V'(\gamma) &= X+\underline{\Omega}^{I}-\Omega^{O}-\left(\overline{\Omega}^{I}-\Omega^{O}-\frac{1}{2}\left(\overline{q}-\underline{q}\right)\right)\\ &= -\left(\overline{\Omega}^{I}-\underline{\Omega}^{I}\right)+X+\frac{1}{2}\left(\overline{q}-\underline{q}\right).\end{aligned}$$

When $\frac{1}{\rho}V'(\gamma)$ is positive,

$$\overline{\Omega}^{I}-\underline{\Omega}^{I}<X+\frac{1}{2}\left(\overline{q}-\underline{q}\right),$$

the maximum is given by the maximum value of γ. When $\frac{1}{\rho}V'(\gamma)$ is negative,

$$\overline{\Omega}^{I}-\underline{\Omega}^{I}<X+\frac{1}{2}\left(\overline{q}-\underline{q}\right),$$

the maximum is given by the minimum value of γ. Because the maximum of $\gamma=\phi(1-\phi)$ for $\phi\in[0,1]$ is at $\phi=\frac{1}{2}$ and the minimum is at $\phi\in\{0,1\}$, the result follows. ■

References

[1] Besley, T. and M. Smart (2003) "Fiscal Restraints and Voter Welfare", mimeo. London School of Economics, October.

[2] Cho, I. K. and D. M. Kreps (1987) "Signaling Games and Stable Equilibria", *Quarterly Journal of Economics*, 102, 179-221.

[3] Delli Carpini, M. X., and S. Keeter (1993) "Measuring Political Knowledge: Putting First Things First," *American Journal of Political Science*, 37, 1179-1206.

[4] Druckman, J. N. (2003) "The Power of Television Images: The First Kennedy-Nixon Debate Revisited," *Journal of Politics*, 65(2), 559–571.

[5] Gul, F. and W. Pesendorfer (2006) "Partisan Politics and Aggregation Failure with Ignorant Voters," mimeo. Princeton University.

[6] Ichino, A. and G. Muehlheusser (2004) "How Often Should You Open the Door? Optimal Monitoring to Screen Heterogeneous Agents", mimeo., European University Institute.

[7] Persson and Tabellini , (1990) Macroeconomic Policy, Credibility and Politics. Harwood Academic Publishers.

[8] Rogoff, K. and Sibert, A. (1988) "Elections and Macroeconomic Policy Cycles", *Review of Economic Studies*, January, 1-16

[9] Rogoff, K. (1990) "Equilibrium Political Budget Cycles", *American Economic Review*, March, 21-36.

[10] Todorov, A., A. N. Mandisodza, A. Goren, and C. C. Hall, (2005) "Inferences of Competence From Faces Predict Election Outcomes," *Science*, 308, 1623-1626.