"PRUDENCE AND SUCCESS IN POLITICS"

by

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ABSTRACT

The paper proposes a theory of political inertia. The setup is a repeated game between an infinitely-lived electorate and finitely-lived politicians. The latter are endowed with a given reputation for competence. In one equilibrium, politicians seeking reelection exhibit an extreme form of caution, avoiding any risky involvement. Other equilibria exist, however, in which moderately cautious politicians take up those challenges that are not too informative about their competence.

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1. Introduction

"A prince, however, should be slow to believe and to act; [...] and should proceed moderately and with prudence ..."


Traditional wisdom considers prudence a necessary virtue in politics. Indeed, in a recent article on the electoral cycle and US foreign policy, Quandt (1986) observes that "if the prospects for an agreement do not look good during the third year, the tendency is to cut one's losses and to disengage the president from the diplomatic effort. Above all, the president does not want to be seen as responsible for a foreign policy failure. [...] The guidelines for the fourth year [...] are fairly simple. Try to avoid taking a position. Steer clear of new initiatives1."

The question of whether career concerns lead to under- or overinvolvement in risky endeavours has been, for the case of managers, a subject of interest to economists for some time. Holmstrom and Ricart I Costa (1986), for instance, use a model where managerial competence is initially unknown and where the principal (stockholders) and the agent (manager) have symmetric beliefs. The manager's actions allow all players to update their common beliefs about his competence, thus affecting his earnings

1 Quandt (1986) pp. 832-3; italics are ours.
profile. The private return from a risky venture to the agent is then, in general, not identical with its return to the firm. Whether the agent ends up under- or overinvesting in risky projects depends on his risk aversion, and the principal's problem is to design incentive contracts inducing optimal risk-taking. In politics, such contracts are not available, although a Constitution may be thought of as a form of contracting between voters and politicians. The appropriate framework for the type of problems we are investigating is rather a repeated agency game.

The players, in our model, are a set of politicians and a representative voter. All players are infinitely lived, but politicians cannot cumulate more than two terms in office, so that, as incumbents, they face a finite horizon. Repeated games with asymmetric horizons have been used in relation with the chain-store paradox (see among others Kreps and Wilson, 1982, Milgrom and Roberts, 1982, Fudenberg and Kreps, 1987) and with reputation for quality (Shapiro, 1982). However, only recently have their properties been studied systematically (see Fudenberg, Kreps and Maskin, 1990). General results in the tradition of the Folk theorem have been shown to hold, provided that players with short horizons

2 The effect of learning about a manager's ability on his earnings profile has also been analysed, both theoretically and empirically, in a different model, by Murphy (1986). Lambert (1986) considers a related agency problem where the principal must motivate the executive to spend effort to generate information about the profitability of risky projects.

3 The representative-voter assumption, also used by Rogoff (1990), is justified when one considers valence issues, i.e. issues over which all voters have identical preferences. For instance, one may think of foreign policy where bipartisan issues are plenty.
("short" players) have complete memory -- so that they can condition their strategies on the game history -- and can be punished within their ephemerous lifetime. Our game satisfies both properties. Politicians are players with long horizons but short periods of incumbency; complete memory is then, here, a natural assumption. Also, the two-term rule ensures that they can always be punished (by not being reelected) for deviating during a first term (there is no incentive problem for second-term actions since they are irrelevant for career concerns). Multiple equilibria are therefore the rule, and the usual problem of equilibrium selection arises.

Fudenberg and Levine (1989) have argued that, in an infinitely repeated simultaneous-move game, reputation effects may enable the long player to reach his preferred outcome. In a sequential-move game with incomplete information about the politicians' type, however, the outcomes we identify as plausible are perfect Bayesian equilibria that are best for politicians. These equilibria rely on self-enforcing punishments à la Friedman (1971, 1986), i.e. punishments forming an equilibrium for the repeated game. Friedman's version of the Folk theorem, although arguably less powerful than the more modern one due to Fudenberg and Maskin (1986), does not require mutually enforcing punishments. Such punishments would impose a high degree of rationality on each player. This seems implausible in a game where a long player faces an infinite sequence of short players, each of whom must participate in the scheme.
Our model features the existence of an *incumbency advantage*\(^4\). The voter is always willing to reelect an incumbent when she has not been able to update her beliefs about his competence. If the incumbent has the option not to take action, he is then willing to act only if doing so does not reduce his chances of being reelected. The incumbency advantage thus creates a bias towards caution in the incentive structure. More precisely, suppose that politicians are of two types, competent (c) or incompetent (u), this type being unknown to all players. Assume that the outcome \((y \in \mathbb{R})\) of a politician's actions is stochastic. Nature draws, in each period, a pair of distributions over outcomes \((F_c(y), F_u(y))\), where \(F_c(y)\) dominates \(F_u(y)\) in the sense of first-order stochastic dominance. Such a pair of distributions constitutes what we call an "opportunity for action", which the politician may take or reject. What matters for the politician is the ex-ante probability that the voter's posterior belief about his competence will not drop below a cutoff value where he is replaced. A politician enjoying an incumbency advantage will then reject all those opportunities for action for which the voter's posterior beliefs may, with positive probability, fall below the cutoff. We call such behaviour *strategic caution*. What is important here is not the riskiness of the action *per se*, but its *information content*. Let us stress that this result flows from the structure of incentives, not from any assumption about the politician's degree of risk-aversion.

\(^4\) See Calvert (1986) for a survey of other arguments supporting the existence of an incumbency advantage.
The paper is organized as follows. Section 2 lays out the model. Section 3 presents a perfect Bayesian equilibrium where caution is extreme, i.e. where politicians refuse any risky involvement during a first term. Section 4 then produces alternative equilibria where politicians act less cautiously, accepting those first-term actions that reveal little about their competence. Section 5 presents a simple parameterized example clarifying our notion of information content. Section 6 concludes.

2. The model

We consider an infinitely repeated game \( \Gamma \) of incomplete, but symmetric, information. At each stage of the game the players are a politician drawn from a large population and a representative voter. The representative-voter assumption is justified in our framework because the electoral issue on which we focus is the politician's competence, rather than the redistributive consequences of his choices. In the terminology of the political science literature, we consider a valence issue, i.e. an issue over which everyone agrees.

Let the population of politicians be indexed by \( N \), the set of natural numbers. At the beginning of each time period \( t \), a finite random sample \( K_t, 1 < |K_t| \), of candidates to the upcoming election is drawn from \( N \). \( K_t \) does not include the incumbent, if any. We shall suppose in fact that, by constitutional rule, no politician
can cumulate more than two mandates. Hence, each newly elected politician practically faces a finite horizon, while the voter considers an infinite one\textsuperscript{5}.

Now, let $\mathcal{H}$ denote the set of histories of $\Gamma$, $\mathcal{H}_t$ the set of histories up to the start of the election at time $t$, and $\mathcal{H}'_t$ the set of histories up to the outcome of the election at period $t$. The elements $H \in \mathcal{H}$, $H_t \in \mathcal{H}_t$, and $H'_t \in \mathcal{H}'_t$ are then random variables. We shall write $h_t$ ($h'_t$) an instance of $H_t$ ($H'_t$). This notation allows us to define two useful classes of functions:

First, the ascension times $r: \mathcal{H}'_t \times \mathbb{N} \to \{1,2,\ldots,t,t+1\}$, where $r(H'_t,j)$ is the time at which politician $j$ is first elected, if any. By convention, if $j$ is not elected at or before time $t$, $r(h'_t,j) = t+1$. If $j$ is never elected, $r(h,j) = \infty$.

Second, the election results $\iota: \mathcal{H}'_t \to \mathbb{N}$, where $\iota(h'_t)$ is the elected (incumbent) politician for period $t$.

The following relations are easily verified:

$$r(h'_t,j) = t \quad \Rightarrow \quad j = \iota(h'_t) \quad \forall t$$

$$j = \iota(h'_t) \quad \Rightarrow \quad r(h'_t,j) = t \quad \text{or} \quad t-1.$$

Early in period $t$ there is an election over the set of candidates $K'_t$, where $K'_t = K_t \cup \iota(H'_{t-1})$ if $r(H'_{t-1}, \iota(H'_{t-1})) = t-1$, and $K'_t = K_t$ otherwise (see figure 1). Let $\alpha_t = (\ldots, \alpha_{tj}, \ldots)$ be a probability distribution over $K'_t$: $\Sigma_j \alpha_{tj} = 1$ and $\forall t$, $\forall j \in K'_t$, $\alpha_{tj} \geq 0$. The number $\alpha_{tj}$ is the probability that the voter supports candidate $j$ at time $t$ (hence the probability that $j$ gets elected at

\textsuperscript{5} Mello e Souza (1989) uses a similar framework in a different context.
t), when j is either an opposition candidate or the incumbent up for reelection. The vector function \( \alpha_t(H_j) \) is thus a policy for the voter at time \( t \); \( \alpha = (\alpha_1, \alpha_2(H_2), \ldots) \) constitutes a supergame strategy of the voter.

Each election is followed by an opportunity for action, that the elected politician can either take or refuse. In the first case the outcome is \( Y_t \), a function of two independent random variables: \( S_t \), a "dossier", or set of judgmental elements about the prospects of the action, drawn from a stationary distribution, and \( \epsilon_t \), a factor depending on the politician's competence. Formally,

\[
Y_t = Y(S_t, \epsilon_t)
\]

\[
\frac{\partial Y}{\partial S_t} > 0 \quad \frac{\partial Y}{\partial \epsilon_t} > 0
\]  

A politician being either competent (c) or incompetent (u), \( \epsilon \) can be drawn either from distribution \( F_c \) (of density \( f_c \) with support \( \Omega_c \)) or from distribution \( F_u \) (of density \( f_u \) with support \( \Omega_u \)), where \( F_c \) dominates \( F_u \) in the first order. Each pair \([F_c,F_u]\) is indexed by a random vector \( A \) drawn in each period from a stationary distribution.  

The realizations \( s_t \) of \( S \) at \( t \), and \( a_t \) of \( A \) at \( t \) are observed by the politician before he chooses to take action or not. He does not know \( \epsilon_t \) at this stage, however, but only at the end of the period if he decides to take action. If no action is taken by the

---

6 For example, \( A \) can be equal to \((a_1, a_2)\), so \( F_c(\epsilon_t) = F(\epsilon_t | a_1) \) and \( F_u(\epsilon_t) = F(\epsilon_t | a_2) \). See the proof of lemma 2 in the appendix.
politician in period $t$, no instance of $\epsilon_t$ can be observed. At the end of the period, that is before the next election, all the realizations that can possibly have occurred become common knowledge.

Now, according to himself and to the voter, a politician is competent with prior probability $p$. This parameter $p$ is common knowledge and constant across all politicians. When $\epsilon_t$ is observed, however, beliefs about an incumbent $j$'s competence are revised for next period according to Bayes's rule. Hence, at the end of period $t$ the belief on the incumbent's competence becomes

$$p_{t+1,j}(H_{t+1}) = \begin{cases} \frac{pf_t^c}{pf_t^c + (1-p)f_t^u} & \text{if } \epsilon_t \text{ is observed} \\ p & \text{otherwise} \end{cases} \quad (2)$$

A newly elected politician thus faces a dilemma: should $\epsilon_t$ be observed or not?

Let $D$ be the stationary support of $S$, and denote by $D_{tj} \subseteq D$ the set of "acceptable dossiers" for politician $j$ at time $t$. Similarly, let $T$ be the stationary support of $A$, and denote by $T_{tj} \subseteq T$ the set of "acceptable tests" for $j$ at $t$. A policy for politician $j$ at $t$ is then
Equation (3) says that when politician $j$ is the incumbent, $\beta_{tj}$ is the product of the indicator functions of the sets $D_{tj}$ and $T_{tj}$. One can write $\beta_{tj} = \beta_j(H',S_t,A_t)$, and a supergame strategy for politician $j$ is then

$$\beta_j = (0, \ldots, \beta_{x(H,j),j}, \beta_{x(H,j),j+1}, 0, \ldots)$$

Let $\beta$ be the vector of strategies of all politicians. Throughout the paper, we will consider symmetric equilibria in the sense that

$$\beta_{x(H,j),j} = \beta_{x(H,i),i}$$
$$\beta_{x(H,j),j+1} = \beta_{x(H,i),j+1}$$

$\forall i, j \in N$

Given (4) and (5), we can speak, by abuse of language, of "the politician's first (or second) term", meaning any incumbent's first or second term.

The voter's expected payoff given the politicians' strategy is finally given by

$$V(\alpha, \beta) = E \left[ \sum_{t=1}^{\infty} \beta^t \beta_{x(H',S_t,A_t)} Y(S_t, \epsilon_t) \right]$$

(6)
where δ is the voter's discount factor. To maximize V, the voter can use reelection as an incentive for incumbents.

Politicians maximize their probability of being elected. After they win, they get what Rogoff (1990) pleasantly calls an "ego rent", i.e. a fixed utility bonus that we normalize to unity. Given the voter's strategy, a politician's expected payoff can then be written as

\[ W_j(\alpha, \beta) = E \left[ \rho^{r(H,j)-1} \left( 1 + \rho a_{r(H,j)+1,j} \right) \right] \]  

(7)

where ρ is a discount factor. In this model, politicians have no preferences over actions per se, hence no ideology. They would instead break indifference by picking the voter's preferred move, then exhibiting episodic sparks of statesmanship.

The description of the game is now complete. In the following section we will describe a "benchmark" perfect Bayesian equilibrium characterized by an extreme form of caution.

3. An equilibrium with extreme caution

Let us denote by \( D^* \) the set of actions having a non-negative expected value. Formally,

\[ D^*(a_t) = \{ s_t \in D : E^{p_{ij}}(Y_t | s_t, a_t) \geq 0 \} \]  

(8)

\footnote{This assumption is standard in the agency literature; see e.g. Holmstrom and Ricart I Costa (1986).}
Using the stationarity of the distributions of $S_t$ and $A_t$, we can write

$$v(p_{tj}) = E^{P_{tj}}(I_{p_t}, Y_t)$$

where $I_{p_t}$ is the indicator function of the set $D^*$ defined in (8). Using this notation, let $q$ be the probability threshold that satisfies:

$$v(q) = \frac{\delta}{1+\delta} v(p)$$

It is shown in the appendix that $v(.)$ is an increasing function; therefore, $q < p$.

We are now able to define a strategy for the voter in terms of the parameter $q^8$:

$$\alpha_{tj}(q) = \begin{cases} 
0 & \text{if } (i) \ r(h_{t-1}', j) - t-1 \wedge p_{tj} < q \\
\frac{1}{|K_t|+1} & \text{if } (ii) \ j \in K_t \wedge p_{tj} > q \wedge r(h_{t-1}', i) = t-1 \\
1 & \text{if } (iii) \ r(h_{t-1}', j) - t-1 \wedge p_{tj} - q \\
\frac{1}{|K_t|} & \text{if } (iv) \ j \in K_t \wedge p_{tj} = q \wedge r(h_{t-1}', i) = t-1 \\
1 & \text{if } (v) \ r(h_{t-1}', j) - t-1 \wedge p_{tj} > q \\
\frac{1}{|K_t|} & \text{if } (vi) \ j \in K_t \wedge t-1 \\
0 & \text{if } (vii) \ j \in K_t \wedge r(h_{t-1}', i) - t-1 \wedge p_{tj} < q \\
\frac{1}{|K_t|} & \text{if } (viii) \ j \in K_t \wedge r(h_{t-2}', i) - t-2 \wedge i - 1(h_{t-1}'). 
\end{cases}$$

In words, if the voter's revised belief about the incumbent politician's competence has dropped below the cutoff value $q$ (case (i)), the incumbent is replaced with probability one. The voter

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8 Note that $q$ is a well-defined mathematical entity and is not defined with reference to any equilibrium point of the game. This formulation of strategies owes a lot to the comments of Avinash Dixit.
then randomizes uniformly among $|K_t|$ opposition candidates (case (vii)). The same randomizing rule applies at time one (case (vi)) and after the end of an incumbent's second term (case (viii)). If the voter's belief about the incumbent's competence is, after one term, greater than $q$, the voter retains him with probability one (case (v)), assigning a probability of election equal to zero to all opposition candidates (case (ii)). If the voter's belief is exactly $q$, she uniformly randomizes between the incumbent and the opposition candidates (in number $11(d)$, assigning everyone a probability of reelection equal to $1/(|K_t|+1)$ (cases (iii) and (iv)).

Consider now the following strategy for politicians:

$$\beta_{tj} = \begin{cases} 1 & \text{if } r(h_{t-1}^t, j) = t-1 \land s_t \in D^* \\ 0 & \text{otherwise} \end{cases}$$  \hspace{1cm} (12)

Proposition 1

The strategy combination $(\alpha(q), \beta)$, where $q$ is defined in (10), $\alpha(q)$ in (11), and $\beta$ in (12), is a perfect Bayesian equilibrium of $\Gamma$.

Proof

The proposition is proved by backward induction. After politician $j$ has been reelected, i.e. at $h_t^t$, with $r(h_t^t, j) = t-1$ and $i(h_t^t) = j$, $\beta_{tj}$ is optimal for him by assumption. For the voter at $h_t$ with $r(h_{t-1}^t, j) = t-1$, two cases must be distinguished. If the incumbent has played according to (12), i.e. if $\beta_{t-1, j} = 0$, then $p_{tj}$
= p > q and the voter's best response is to reelect him; this, given B, yields expected payoff \((1/1-\delta^2)v(p)\), and it is easily checked that, given B, any deviation \(a' \neq a\) yields a lower payoff to the voter. If, on the other hand, the incumbent has deviated and \(p_{t+1} \neq p\), assuming again that future politicians will follow strategy B, reelecting the incumbent yields a payoff equal to \(v(p_{t+1}) + (\delta^2/1-\delta^2)v(p)\), while not reelecting him yields a payoff equal to \((\delta/1-\delta^2)v(p)\). One sees immediately that it is optimal to set

\[
\alpha_{t+1} = \begin{cases} 
1 & \text{if } p_{t+1} > q \\
\frac{1}{|K_t|+1} & \text{if } p_{t+1} = q \\
0 & \text{if } p_{t+1} < q 
\end{cases} \tag{13}
\]

Now, at \(t_{t+1}'\), with \(r(h_{t+1}',j) = t-1\), and given \(a, B_{t-1,j} = 0\) implies \(\alpha_{t+1} = 1\). Hence B is optimal. QED

This "benchmark equilibrium" exhibits an extreme form of caution: first-term politicians do nothing, thus preventing any reputation slippage. Because they are expected to behave optimally in their last term, they enjoy and "incumbency advantage" ensuring their reelection. Along the equilibrium path, incumbents are thus always reelected. Note that there exists in fact a continuum of Nash equilibria (corresponding to different q's in \([0,p)\)) that

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9 We are using here the standard postulate that, whatever the history of the game (i.e., even if some players have deviated in the past), all players are expected to follow their equilibrium strategies in the future, and that each player is using this postulate to calculate expected payoffs down the game tree. For a discussion of this postulate, see Kreps and Wilson, 1982, p. 875.
yield the same outcome. However, only one of these, where \( q \) satisfies (10), is perfect.

Total inaction in the first mandate is an extreme result. In the next section we present other PBE's where politicians behave in a more plausible fashion. The intuition is the following: perfection implies that \( q < p \), so that some reputation slippage is tolerated by the voter in equilibrium; politicians can then act sometimes, without compromising their reelection.

4. Equilibria with moderate caution

In this section, we seek alternative PBE's of the game. Part 4.1 is in the spirit of the Folk theorem. Politicians use the inaction equilibrium of section 3 as a threat to force more tolerance from the voter for bad first-term outcomes. This allows them to take some weakly informative actions while maintaining a probability of reelection equal to unity. The interesting feature of this equilibrium is that it exists for any value of the voter's discount parameter in \((0,1)\).

In 4.2, we show that the single fact that politicians always break indifference by picking the voter's preferred move also forces a margin of tolerance for bad first-term outcomes. One can therefore construct equilibria where strategic caution is moderate without appealing to punishment strategies.
4.1 An equilibrium with punishments

In a version of the Folk theorem due to Friedman (1971), punishments are open-loop equilibria of the repeated game\(^{10}\). Similarly here, punishments consist in reversion to the equilibrium of proposition 1. Although these punishments do not constitute, properly speaking, an open-loop equilibrium (since strategies (11) and (12) are conditional on the game history), they do not condition on past deviations (they are like "defect always" in a repeated prisoner's dilemma). Hence, they are simple to construct and have a strong intuitive appeal since they are self-enforcing\(^{11}\).

Suppose that there exists a function \(q'\) such that

\[
v(q') + \delta E \sum_{t=1, t \text{ odd}} [\delta^{t-1} E (I_{D_t=\Lambda q_t} Y_t) + \delta^t v(p_{t+1}(H_{t+1})) - \frac{\delta}{1-\delta^2} v(p)] (14)
\]

where

---

\(^{10}\) Open-loop strategies allow no feedback from the game history.

\(^{11}\) One could also construct a "hybrid" equilibrium where the voter punishes any politician who deviates from a specified rule (designed to maximize the voter's gain), while being punished by all politicians if he failed to punish. The politicians' punishment consists in reverting to the equilibrium of proposition 1. An equilibrium constructed in this manner has the odd property that politicians are better-off on the punishment path (where they get a reelection probability equal to unity) than on the equilibrium path. The slightest amount of group rationality would then induce them to implement the punishment right away, thus reverting to the equilibrium of prop. 1.

We are grateful to Jeff Banks for pointing out to us the existence of this equilibrium.
\[ T_t(q') = \{ a_t \in T : p_tj(a_t) > q' \text{ with prob. } 1 \} \]  

(15)

It is shown in proposition 4 that \( q' < p \). \( T_t(q') \) is the set of opportunities for action such that the worst realization of \( \epsilon_t \) would not imply a drop of reputation at or below \( q \). It will turn out to indicate those actions whose information content is compatible with certain reelection. For instance, an action whose associated distributions have distinct supports cannot belong to \( T_t(q') \), for distinct supports imply that the worst updated belief would be \( p_{t+1,j} = 0 \) (if \( \epsilon_t \) fell in \( \Omega^n - \Omega^c \)).

Consider now the following strategies. For the voter,

\[
\alpha'_{tj} = \begin{cases} 
\alpha_{tj}(q) & \text{if } \exists j, z < t : r(h'_{z-1}, j) = z-1 \land j \neq 1(h'_t) \\
\alpha_{tj}(q') & \text{otherwise}
\end{cases}
\]

(16)

where \( \alpha_{tj}(q) \) is defined by (11) and \( \alpha_{tj}(q') \) is defined in similar fashion. For politicians,

If \( \exists j, z < t : r(h'_{z-1}, j) = z-1 \land j \neq 1(h'_t) \) then

\[ \beta'_{tj} = \beta_{tj} \]

Otherwise, then

\[
\beta'_{tj} = \begin{cases} 
1 & \text{if } (i) \ s_t \in D^* \land a_t \in T_t(q') \land j \neq 1(h'_t) \\
0 & \text{otherwise}
\end{cases}
\]

(17)

In words, the politicians' trigger strategy consists of using all the margin for reputation-slippage to take valuable actions as long as all past incumbents have been reelected, while forever
reverting to the strategy of the "benchmark" equilibrium if one previous incumbent has been dismissed.

Proposition 2

\((\alpha', \beta')\) is a perfect Bayesian equilibrium of the game \(\Gamma\) for any \(\delta\) in \([0,1)\).

Proof

The proof is again by backward induction. At \(h_t',\) if \(r(h_t',j) = t-1\) and \(i(h_t') = j\), then \(\beta_{tj}'\) is optimal by assumption. At \(h_t\), with \(r(h_{t-1}',j) = t-1\), if \(\beta_{t-1,j} = 0\), then \(\alpha_{tj}(q')\) is optimal as in proposition 1. If \(\beta_{t-1,j} = 1\), then, given \(\beta'\), it can be easily checked that \(\alpha_{tj}(q')\) is a best response by definition of \(q'\). At \(h_{t-1}'\), with \(r(h_{t-1}',j) = t-1\), and given \(\alpha', \beta_{tj}'\) is optimal because it ensures reelection.

\(QED\)

Proposition 2 says that the incumbent politician is always reelected along the equilibrium path. Even though politicians do take some actions, they take actions that reveal just so little information that the voter's posterior beliefs can never drop below the reelection threshold. The existence of the threat (to revert to the equilibrium with extreme caution of section 3) increases the cost to the voter of firing an incumbent. Politicians are then allowed to be bolder in their first mandates. The presence of the threat, however, raises the voter's welfare in equilibrium.
Note that the equilibrium \((a', \beta')\) does not break down for low values of \(\delta\) because here a discounting period is not identical with a game period. A discounting period covers both the voter's move and the politician's move. A voter can be punished for a deviation within the same period, so that a lower value of the discount parameter does not necessarily reduce the effectiveness of punishments. It can be easily seen by inspection of (14) that, by construction of the function \(q'(\delta)\), \(a'\) remains a best response to \(\beta'\) even for \(\delta = 0\).

4.2 Equilibria without threats

Define \(q''\) by

\[
n(q'') = (1-\delta) E \sum_{t-1, t \text{ odd}} [\delta^{t-1}P(I_{D*} \cap T_t(q'') Y_t) + \delta^t V(P_{t+1}(H_{t+1}))]
\]

(18)

where

\[
T_t(q'') = \{a_t \in T : p_t(a_t) > q'' \text{ with prob. } 1\}
\]

(19)

Now consider the following strategies:

\[
a''_{t,j} = a_{t,j}(q'')
\]

(20)

where \(a_{t,j}(q'')\) is defined in a manner similar to (11), and

\[
\beta''_{t,j} = \begin{cases} 1 & \text{if } (i) \ s_t \in D* \land j = 1(h_t') \land r(h_{t-1}', j) = t-1 \\
0 & \text{otherwise} \\
\end{cases}
\]

(ii) \(s_t \in D* \land a_t \in T_t(q'') \land r(h_t', j) = t
\]

(21)
The only difference with the strategies of section 3 is that, here, politicians take all opportunities for action that ensure reelection. Strategy $B''$ illustrates therefore the assertion that, when indifferent, politicians choose the voter's preferred move.

Proposition 3

$(a'', B'')$ is a PBE of $\Gamma$.

Proof

The proof is similar to that of propositions 1 and 2.

We shall now establish a ranking of the above tolerance levels. The interest of this is to determine which equilibrium has the lowest level of strategic caution, so that a welfare ranking can be obtained.

Proposition 4

For any $\delta \in (0, 1)$, $q'(\delta) < q(\delta) < q''(\delta) < p$.

Proof

We first show that $q'' < p$. By definition

$$
\nu(q'') = (1-\delta)E \sum_{t-1, t \text{ odd}} [\delta^{t-1}E^{P}P(I_{D_{t}+L_{t-1}(q'')}Y_{t}) + \delta^{t}\nu(p_{t+1}(H_{t+1}))]
$$  \hspace{2cm} (22)

If \( p \leq q'' \), \( T_t(q'') = \emptyset \), so \( p_{t+1}(H_{t+1}) = p \) and equation (22) reduces to \( v(q'') = \frac{\delta}{1+\delta} v(p) \), which is absurd for any \( \delta > 0 \).

Next, we show that \( q < q'' \). In equation (22), let us take the expectation term by term, apply Jensen's inequality and use the martingale property of Bayesian posteriors (which implies that \( E[P_{t+1}(H_{t+1})|p] = p \)). We get

\[
v(q'') \geq \sum_{t-1, t \text{ odd}} (1-\delta) \delta^{t-1} E^p[I_{D \land T_{t}}(q'') Y_t] + (1-\delta) \frac{\delta}{1-\delta^2} v(p)
\]

That is,

\[
v(q'') \geq \sum_{t-1, t \text{ odd}} (1-\delta) \delta^{t-1} E^p[I_{D \land T_{t}}(q'') Y_t] + v(q)
\]

Hence, \( q < q'' \).

Finally, we show that \( q' < q \) for any \( \delta > 0 \). By definition,

\[
v(q) = \frac{\delta}{1+\delta} v(p)
\]

\[
v(q') + \delta E \sum_{t-1, t \text{ odd}} [\delta^{t-1} E^p(I_{D \land T_{t}}(q') Y_t) + \delta^t v(p_{t+1}(H_{t+1}))]
\]

\[
= \frac{\delta}{1-\delta^2} v(p)
\]

In the last equation, switching expectation and summation, using Jensen's inequality and the martingale property of posteriors, we get
\[ v(q') + \sum_{t=1, t \text{ odd}}^{\infty} \delta^{t-1} E(I_{D_t \land T_t}(q')Y_t) + \frac{\delta^2}{1-\delta^2} v(p) \leq \frac{\delta}{1-\delta^2} v(p) \]

i.e.

\[ v(q') + \sum_{t=1, t \text{ odd}}^{\infty} \delta^{t-1} E(I_{D_t \land T_t}(q')Y_t) \leq \frac{\delta}{1+\delta} v(p) - v(q) \]

Hence, \( q' < q \) whenever \( \delta > 0 \). \[ \text{QED} \]

5. **An example**

We introduce in this subsection a parameterized example in which our notion of "information content" can be summarized by one scalar parameter. The example also shows that the set of "acceptable actions" in any PBE of \( \Gamma \) is non-empty. Note that this does not preclude inaction to be an equilibrium outcome.

Consider an opportunity for action defined by the following two densities, defined on the given support \( \Omega = [-1, +1] \):

\[
\begin{align*}
f^c(\epsilon_t, A) &= \begin{cases} (1-A)/2 & \text{on } [-1,0] \\ 1/(2-A) & \text{on } [0, +1] \end{cases} \\
f^u(\epsilon_t, A) &= \begin{cases} 1/(2-A) & \text{on } [-1.0] \\ (1-A)/2 & \text{on } [0, +1] \end{cases}
\end{align*}
\]  

(28)

Note that the parameter \( A \) fully describes \( F^c \) and \( f^u \) given \( \Omega \). If \( A = 0 \), the two densities collapse to the uniform density on \([-1, +1]\), and \( \epsilon_t \) is drawn from a unique distribution whatever the level of competence. The action has thus no information content. If \( A = 1 \), \( f^u \) becomes the uniform density on \([-1,0]\), while \( f^c \) becomes the uniform density on \([0, +1]\). Posterior beliefs are either 0 or 1
"almost everywhere" (i.e., except at \( \epsilon_t = 0 \)), and the action is perfectly revealing. Note that for any \( A \in [0,1) \), \( f^c \) and \( f^u \) have a common support.

Suppose now that in each period, nature draws \( A \) from some distribution defined on \([0,1]\), and denote by \( a_t \) a realization of \( A \) at \( t \). For \( a_t \) to define an "acceptable action" in the sense of section 2, we must have

\[
a_t \in T_{t_j} \iff \frac{pf^c(e_t, a_t)}{pf^c(e_t, a_t) + (1-p)f^u(e_t, a_t)} > q
\]  

This can be reexpressed, after some rearrangement, as a condition on the likelihood ratio \( L(a_t) = \frac{f^c}{f^u} \):

\[
L(a_t) > \frac{q''(1-p)}{p(1-q'')} \tag{30}
\]

Denote by \( \lambda \) the right-hand-side of (30), and notice that proposition 4 implies that \( \lambda < 1 \). Equation (30) requires simultaneously

\[
\frac{(1-a_t)(2-a_t)}{2} > \lambda \quad \text{on} \quad [-1,0] \tag{31}
\]

\[
\frac{2}{(1-a_t)(2-a_t)} > \lambda \quad \text{on} \quad [0,1]
\]

Combining these two inequalities, we obtain
\[
\frac{2}{\lambda} > (1-a_\varepsilon)(2-a_\varepsilon) > 2\lambda
\]  \hfill (32)

It can be checked that for any \( \lambda \in (0,1) \), the set

\[
T_\varepsilon(q'') = \{ a_\varepsilon \in [0,1] : \frac{2}{\lambda} > (1-a_\varepsilon)(2-a_\varepsilon) > 2\lambda \}
\]  \hfill (33)

is nonempty.
5. **Concluding remarks**

Our election game encompasses a learning process about the competence characterizing each politician. All players hold symmetric beliefs. In equilibrium, an incumbent politician may see his reputation for competence drop below average without being automatically replaced. This stems from the existence of an incumbency advantage, a well-documented hypothesis in the political science literature, which is derived endogenously in our model. Furthermore, the equilibrium behaviour of elected politicians exhibits what we call *strategic caution*, consisting of avoiding those opportunities for action that might strongly reveal the incumbent's competence, *either way*. This result comes from an asymmetry in the incentive structure. The incumbency advantage is equivalent for the voter to a switching cost: whenever she cannot update her beliefs, she prefers to keep the incumbent. This creates a bias in favor of inaction for the politician, and results in strategic caution. Note that strategic caution results from the structure of incentives, not from the politicians' preferences.

Such behaviour entails a loss for the voter. By minimizing the amount of information available to the voter at reelection time, the politician prevents her from making an optimal retaining/firing decision. If contracts contingent on the information available to the politician when deciding upon acting were possible, the politician could be forced into action whenever appropriate. The
voter's problem would then be related, but not identical, to a class of statistical problems called bandit problems\textsuperscript{12}.

From the voter's point of view, the question is thus: provided an optimal solution to the bandit-type problem exists, can a Folk-theorem result be invoked to implement it? In section 4.1 we constructed a perfect equilibrium which reduces but does not eliminate the loss to the voter due to strategic caution. This equilibrium specifies relatively simple strategies. It escapes the usual problem of Folk-theorem equilibria which require an implausible degree of rationality from all players. This problem is especially worrisome in asymmetric-horizon models, where each one of an infinite sequence of short players must display the same degree of rationality, lest the whole equilibrium unravels.

Our results may be used to shed some light on the electoral cycle in U.S. foreign policy. Some of our assumptions must obviously be softened. For instance, the notion that a president is free to act as a statesman in his second term is somewhat inaccurate since he is bound to be perceived as a "lame duck" by foreign heads of states, so that actual opportunities for action may be few. By contrast, "no action" may not always be a feasible

\textsuperscript{12} A bandit problem (a bandit is a casino slot-machine) consists of choosing one among several stochastic processes in order to maximize expected gains. The essence of the solution to a bandit problem is a trade-off between the current gains or losses from trials and their informational value, the long-term goal of the experimenter being to learn the parameters of the processes. Here, the "bandit" has an infinite number of arms (the politicians) each having a finite life, so that learning is very limited. See, among others, Berry and Fristedt (1985). We are indebted to Jeff Banks for pointing this out to us.
alternative for a first-term president faced with a foreign-policy challenge. This being said, we predict that rational presidents tend to be cautious in foreign policy in their first terms, in the sense of avoiding initiatives where their personal competence is obviously at stake. This prediction may be used to shed some light on the contrasting electoral performance of the Carter and Reagan-I presidencies. By our definitions, President Carter ignored the cycle and engaged in activist, "hands-on" foreign policy (one may think of the multiple human-rights initiatives or of the disarmament negotiations), while President Reagan pretty much followed Quandt's precepts quoted in the introduction of this paper. The "competence factor" viewed in this strategic way may help explain why President Carter failed where President Reagan succeeded, even though their respective competence levels in foreign policy might not have been so different at the time of accession to the White House.
Lemma 1

Let $Y$ be an increasing function of $\epsilon$, and let the distribution $F(\epsilon|\theta_1)$ dominate $F(\epsilon|\theta_2)$ in the first order. Then $E(Y|\theta_1) > E(Y|\theta_2)$.

Proof


Lemma 2

$v(.)$ is an increasing function.

Proof

Expanding expression (11) in the text for $p_{tj} = z$, and using the stationarity of $S$ and $A$ to suppress time subscripts, we have

$$v(z) = \int \int \beta^* [S,E(\epsilon_t)] \left[ z E Y(S,\epsilon_t) + (1-z) E Y(S,\epsilon_t) \right] dF(S) dH(A)$$

(34)

where $F(S)$ is the distribution of $S$ and $H(A)$ is the distribution of $A$. Differentiating with respect to $z$, we have

$$\frac{dv(z)}{dz} = \int \int \beta^* (.) \left[ E Y(S,\epsilon_t) - E Y(S,\epsilon_t) \right] dF(S) dH(A)$$

(35)

The term in square brackets is positive by lemma 1, so the whole R.H.S. expression is positive. QED
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Figure 1

Period $t$

TIME

$A_t$

$S_t$

$E_t$

election $t$ (voter's action)

politician's action

election $t + 1$ (voter's action)

$h_t$

$h'_t$

$h_{t+1}$

$h'_{t+1}$
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<td>study&quot;, October 1989.</td>
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