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Vote Splitting, Reelection and Electoral Control: Political Gridlocks, Ideology and the War on Terror

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Vote Splitting, Reelection and Electoral Control: Political Gridlocks, Ideology and the War on Terror[1]

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Abstract

This article presents a game-theoretic model of voting and political bargaining where voters have two instruments for controlling politicians: vote splitting and reelection. It shows that vote splitting may totally offset the traditional reelection control mechanism, which suggests an application to the American 2004 Presidential elections. When reelection is useful, voters tend to have more flexible reelection criteria when they believe the true state of the world is likely to be unfavorable. Furthermore, there will be government shutdown with positive probability. Political gridlocks constitute an information revelation mechanism that improves subsequent control. The model is robust to voters' ideological heterogeneity.

JEL classification: D72, C72.

Key words: Electoral control; reelection; vote splitting; government shutdown, ideology.

1. Introduction

The literature on voting highlights two instruments of electoral control: reelection and vote splitting. The reelection approach to electoral control establishes that, in order to be reelected, an incumbent is required to produce a minimum level of social output, according to a rule that is optimally set by voters, in an electoral game. Barro (1973) uses that approach to conclude that voters can restrict an incumbent's level of overspending in a general equilibrium model where the government taxes citizens in order to finance its expenditure. Ferejohn (1986) shows that the reelection connection

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may induce the incumbent into putting a higher personal effort level, which is costly, into his administration.

Therefore, reelection models usually focus on the period just before a new term. In that aspect, they belong to the so-called *pre-electoral politics* literature.

On the other hand, the vote-splitting literature focuses on what happens after a politician is elected, and incorporates particular features of the decision making process once election has occurred, like bargaining structures. Fiorina's articles (1986, 1988, 1992) show that the rigidity of political parties' ideological positions makes it best for voters at the center of the political spectrum to split their ticket, inducing a more moderate political outcome. This argument is made more precise in Alesina and Rosenthal's studies (1989, 1995, 1996), where a very elegant game theoretic model of probabilistic voting concludes on the optimality of vote splitting. Furthermore, Bugarin (1999) focuses on the role of uncertainty and shows that, although voters may prefer a party over another in a deterministic world, when a stochastic process affects voters' utilities, vote splitting may be optimal in order to insure society against very extreme policies in adverse states of the world.

Although the above instruments are both available to voters in real world elections, the traditional literature fails to analyze them in an integrated framework. A recent exception is Bugarin (2003), which studies a model where voters recognize that an Executive incumbent has to bargain with the Legislature in order to pass a budget. The incumbent receives “political income” from overspending, but passing an expensive budget is costly, the more so the stronger is the opposition in the Legislature. The true competitive cost of the budget is a random variable, which is observed only by the Executive incumbent. The main result of that article is that voters tend to be more demanding (on the level of social output generated by government) in order to reelect an incumbent when they expect the true state of the world to be “favorable”, whereas they become more flexible if they believe the true state of the world is “unfavorable”. Moreover, vote splitting will be optimal in the good state of the world whereas unified government will be the choice of the electorate in the bad state.

The referred article highlights some basic trade-offs between the two instruments of electoral control: reelection and vote splitting. Nevertheless, many features of real world political negotiation are abstracted from the model. In particular it assumes that the executive incumbent can always pass the budget, if he bears its political costs. However, political gridlocks do occur when a government cannot have its budget proposal supported by the Legislature, as it happened during the

first Clinton administration in the United States.[3] What are the effects of political gridlocks on voters' behavior? How do gridlocks affect the trade-off between reelection and vote splitting? Is the basic model in Bugarin (2003) robust to the presence of this type of political immobility?

In addition to analyzing political gridlocks, one would like to know if the original model is robust to the inclusion of voters' ideological heterogeneity that is not related to the concern of controlling the elected officials.

The objective of the present article is to explore those issues. The next section extends the basic Bugarin (2003) model to allow for a more general bargaining cost function and political gridlocks. Section 3 solves the electoral control game in the particular case where voters have complete information about the relevant parameters of the economy. This benchmark analysis shows that there is never a government shutdown in equilibrium. Moreover, voters use both vote splitting and reelection as reinforcing tools for the control of politicians.

Section 4 analyses the more complex case of incomplete information, where the two control mechanism, vote splitting and reelection, are shown not to be complementary any more. Two important features of the equilibria must be pointed out.

First, there are pooling equilibria where an incumbent delivers a level of social welfare below the complete information one and is reelected. In that equilibrium, the reelection mechanism works against voters' control of the incumbent so that vote splitting becomes the only electoral control mechanism. This appears to be a new result in the literature that arises from a certain conflict between the two control mechanisms available to voters.

Second, there are separating equilibria where political gridlocks do occur with positive probability. Gridlocks arise in equilibrium as an information revelation device that allows voters to determine the true state of the world, before they take their reelection decisions. Moreover, the possibility of gridlocks reduces the scope of vote splitting as an electoral control mechanism. In that case reelection reappears as an important tool for electoral control.

Section 5 considers the case where the Legislature may impose very high negotiation costs to the executive incumbent and concludes that reelection vanishes again as a control device, leaving voters with divided government as the only tool to discipline the incumbent.

Section 6 extends the basic model in order to allow voters to have idiosyncratic components to their utilities that are not related to incumbent performance (their ideological component), and derives a new rationale for the existence of primary elections.

[3] In fact, government shutdowns are frequent in America's political history. According to Keith (1999), there were 17 funding gaps during the 23 fiscal years covering 1977 to 1999, leading to partial government shutdowns ranging in duration from 1 to 21 full days.

Section 7 considers the role of political "efficiency" of the incumbent, showing that, in the present context, having more "capable" politicians may not be beneficial to society.

Section 8 initiates the analysis of a more general framework, the multidimensional case, where politicians can choose among a number of different projects for the budget proposal.

As an application, section 9 reinterprets the American 2004 presidential election and its relationship with the war on terror in the light of the pooling equilibrium results.

Finally, section 10 presents some concluding remarks.

2. The electoral-control game

There are two periods. Voters elect the Executive and the Legislature at each period. Once elected, the Executive incumbent proposes a budget of the form (n, p) where p is the unit cost and n is the number of copies of a project to be implemented. Then the Executive officeholder and the legislators bargain over the proposed project.[4]

The project has a real cost r, corresponding to competitive factors of production, which is the private information of the proposer. If $p>r$, then there is an overpayment $e=p-r$ from which the Executive extracts political income. A factor $\beta\in(0,1)$ describes this political income in that $n\cdot\beta\cdot e$ is the utility gain to the Executive from project (n, p). The coefficient β can be interpreted as the Executive corruption factor associated to project (n, p). The choice of proposal (n, p) is restricted by a budget constraint that requires total spending not to be higher than a certain amount B, i.e., $n\cdot p\leq B$.

Voters elect the Executive incumbent and the Legislators from two identical parties, I and II. The bargaining process among elected officials is summarized by a cost function c to the proposer, which depends both on the proposed cost p and the representation $1-\pi$ of the Executive incumbent's party in the Legislature, *i.e.*, $c = c(p, \pi)$ where π is the proportion of the Legislative opposition to the Executive incumbent's party.

Therefore, if the incumbent passes a budget (n, p), her resulting utility is:

$$v(r, n, p, \pi) = n\beta(p - r) - c(p, \pi) \qquad (1)$$

[4] A more general model would assume a multidimensional budget including many different projects: $(N,P)=((n_1,\ldots, n_k),(p_1,\ldots, p_k))$ where p_i is the unit cost and n_i is the number of copies of project i, $i=1,\ldots, k$. Most of the present article abstracts from multidimensionality for tractability reasons; that simpler approach can be supported by two different arguments: first, the electoral campaign may be polarized around one main issue; second, the political decision making in the Legislature may be constrained by a committee structure where each committee decides on a particular project, as in the structure induced equilibria literature (see Shepsle, 1979 and Shepsle and Weingast, 1981). Section 5 presents a preliminary exploration of the multidimensional case.

The cost function c is assumed to be multiplicatively separable on its arguments: $c(p, \pi) = f(p).\ g(\pi)$. The function f represents the general opposition of the Legislature to costly projects, whereas the function g captures the cost of the ideological opposition of competing parties in the Legislature. The functions f and g are assumed to be nonnegative, strictly increasing, strictly convex and continuously differentiable functions with $f(0)=0$.

Note that, depending on the final cost of passing budget (n, p), the incumbent may prefer not to submit that project. This will happen if $v(r, n, p, \pi)<0$. If the cost $c(p, \pi)$ is so high that the incumbent has negative utility $v(r, n, p, \pi)$ for every project (n, p), then she will prefer not to submit any project at all. This corresponds to a political gridlock where the executive incumbent and the Legislators are unable to agree on the budget. In that case, a basic reversionary budget is implemented. For simplicity, the model assumes, without loss of generality, that neither the executive incumbent, nor the voters derive any utility from this reversionary budget.

Voters are uncertain about the true unit cost of the projects, r, but know that it must be one of two possible values: $r=l$ or $r=h$ with $l<h$. The cost $r=l$ corresponds to a "good" state of the world, in that it is cheap to implement the projects, whereas $r=h$ corresponds to a "bad" state in that the projects are costly. Voters assign probability $\rho\in(0,1)$ to the good state $r=l$ and $1-\rho$ to the bad state $r=h$.

At each period, voters derive utility from the social return of the implemented budget (n, p), which is measured in terms of the number of projects implemented. This social return is given by the real-valued function $\varphi(n)$, which is assumed to be strictly increasing and strictly concave with $\varphi(0)=0$. Therefore, voters want to induce the Executive incumbent to pass a budget with a high value for n.

Figure 1 presents an extensive form of the electoral-control game played by the voters and the politicians. At the beginning of period 1 the state of the world r is realized, which corresponds to the two possible initial white nodes. The left hand side of the figure corresponds to the favorable state $r=l$, whereas the right hand side corresponds to the unfavorable state $r=h$. Voters (V) do not observe the realized state and elect the Executive incumbent (from party I or II) and the proportion of the opposing party in the Legislature, π_1. The lower half of the figure corresponds to the case where voters elect an incumbent from party I whereas the upper half of the figure corresponds to voters choosing an incumbent from party II in period 1. The elected Executive observes r and decides whether or not to pass a budget. If a budget is not passed, i.e., a political gridlock occurs, a reversionary policy rule applies and all agents receive (normalized) zero utilities. This corresponds to the choice $n_1=p_1=0$. If the budget (n_1, p_1) is passed, the corresponding incumbent's first period

utility is derived according to expression (1). The index 1 (respectively 2) in the figure corresponds to the first (respectively second) period.

FIGURE 1 HERE

Period 2 starts with voters deciding whether to reelect the Executive incumbent or not, as well as the proportion of the opposition party in the Legislature, π_2. Then, the elected Executive decides whether to pass a budget or not. If a budget is not passed –in which case $n_2=p_2=0$– a reversionary policy rule applies and all agents receive (normalized) zero utilities. If the budget (n_2, p_2) is passed, the corresponding incumbent's second period utility is derived according to (1). Finally, the game concludes.

The utility of a representative voter is $\varphi(n_1)+\delta\varphi(n_2)$ where $\delta\in(0,1)$ is the intertemporal discount factor, common to all agents. The utility of a reelected Executive incumbent is $v(r,n_1,p_1,\pi_1)+\delta v(r,n_2,p_2,\pi_2)$. The utility of an incumbent that is elected only at period 1 is $v(r,n_1,p_1,\pi_1)$ and the present value of the utility of an Executive that is elected only at period 2 is $\delta v(r,n_2,p_2,\pi_2)$.

For simplicity, the game tree presents one generic choice among infinitely many at each node; for example, when voters (*V*) elect an incumbent of party I in period 1, they can choose any proportion of party II representatives in the Legislature: $\pi_1\in$ [0,1]. The dotted curves in the figure represent this infinite choice. The dotted straight lines represent voters' information sets.

In order to better understand the effects of the incomplete information on the mechanisms of vote splitting and reelection, the present study first analyzes the complete information framework.

3. The complete information benchmark

Suppose voters can observe the true state of nature at the beginning of period 1. This corresponds to erasing the dotted lines in Figure 1. The corresponding game is solved by backwards induction in order to derive the subgame perfect equilibrium.

3.1. Second period

The incumbent's choice

In period 2 an elected incumbent solves the following maximization problem.

$$\begin{cases} \max\limits_{n,p} v(r,n,p,\pi_2) = n\beta(p-r) - c(p,\pi_2) \\ \text{s.t.} \quad np \le B \end{cases}$$

In that problem, a proposal (n,p) with $0<np<B$ is strictly dominated by the feasible proposal (n', p) where $n' = \frac{B}{p}$, i.e., if a nonzero solution exists, then, the budget constraint holds with equality. Therefore, writing $e=p-r$, the Executive incumbent's maximization problem can simply be written as:

$$\max_{e\ge 0} v(r,e,\pi_2) = \beta B \frac{e}{r+e} - c(r+e,\pi_2) \tag{2}$$

The notation in problem (2) stresses the dependence of the utility of the incumbent on the overspending level e, rather than on n and p. Note that the objective function above is strictly concave and $h(e) = \beta B \frac{e}{r+e}$ converges asymptotically to a horizontal straight line ($y=\beta B$). Since c is a strictly convex function on its first variable, there exists a unique solution to the above problem. Let $\hat{e}(r,\pi_2)$ be that unique solution. The present problem assumes that a positive level of overspending $\hat{e}(r,\pi_2)$ is always optimal, for all $r=h, l$, and all $\pi_2 \in [0,1]$.

The theorem below characterizes the effects of changes of the parameters r and π_2 on the solution $\hat{e}(r,\pi_2)$ and the indirect utility function $v(r,\hat{e}(r,\pi_2),\pi_2)$. The proofs of all theorems are presented in the appendix.

Theorem 1. *Let $\hat{e}(r,\pi_2)$ and $v(r,\hat{e}(r,\pi_2),\pi_2)$ be respectively the* (*interior*) *solution and the indirect utility function associated to the maximization problem below.*

$$\max_{e\ge 0} v(r,e,\pi_2) = \beta B \frac{e}{r+e} - c(r+e,\pi_2)$$

Then,

(*i*) *The optimal overspending level $\hat{e}(r,\pi_2)$ of an incumbent at period* 2 *is a strictly decreasing function of π_2. Moreover, the total cost of a project $r+\hat{e}(r,\pi_2)$ is a strictly increasing function of the state of nature r.*

(*ii*) *The indirect utility function $v(r,\hat{e}(r,\pi_2),\pi_2)$ is a strictly decreasing function of the state of nature r and of the opposition level π_2.*

Voters' choice

Theorem 1 highlights two opposing incentives faced by voters in period 2. On one hand, they want to choose the highest possible level of opposition, since increasing opposition reduces the overspending $\hat{e}$, which in turn, increases $\hat{n} = \frac{B}{r+\hat{e}}$ and consequently increases voters' utility $\varphi(\hat{n})$. On the other hand, as π_2 increases, the corresponding indirect utility decreases. If it becomes negative, then the incumbent will choose $(n,p)=(0,0)$ and gridlock will result, yielding zero utility to voters. Therefore, voters will choose $\pi_2=\pi_r$ to be the highest opposition in the Legislature that gives nonnegative utility to the incumbent. Thus, one of the two situations below must arise, for each realization of $r=h, l$.

$$\begin{cases} \pi_r = 1 & \text{if} \quad v(r,\hat{e}(r,1),1) \geq 0 \\ \pi_r < 1 & \text{if} \quad v(r,\hat{e}(r,1),1) < 0 \end{cases}$$

Furthermore, when $\pi_r<1$, then $v(r,\hat{e}(r,\pi_r),\pi_r)=0$ and,

$$\begin{cases} v(r,\hat{e}(r,\pi_2),\pi_2) \geq 0 & \text{for} \quad \pi_2 \leq \pi_r \\ v(r,\hat{e}(r,\pi_2),\pi_2) < 0 & \text{for} \quad \pi_2 > \pi_r \end{cases}$$

Theorem 1 also shows that the incumbent has always a utility advantage in the good state if compared to the bad state of nature. In particular, if $\pi_h<1$ then,

$$v(l,\hat{e}(l,\pi_h),\pi_h) > v(h,\hat{e}(h,\pi_h),\pi_h)=0.$$

Therefore, $\pi_l \geq \pi_h$. Clearly, if $\pi_h=1$ then also $\pi_l=1$.

The case $\pi_h=\pi_l=1$ is an extreme solution where total vote splitting is optimal, regardless of the state of the world. This will happen, for example, if there is a significant unbalance of political power toward the Executive incumbent, in such a way that it can always pass a utility-enhancing budget even if the entire Legislature is opposing him. That case reflects a certain level of institutional weakness in society in the sense that the Legislature is unable to impose strong opposition costs to the Executive incumbent, even when totally dominated by opposing parties. This is typically the case in authoritarian regimes, and may explain why in the seventies in Brazil, the military regime witnessed an incredible increase in the seats occupied by the opposing party, the *MDB* (Movimento Democrático Brasileiro) in Congress. That situation has been explored in a previous article (Bugarin (2003)) and will not be considered here. Instead, this study assumes that

total vote splitting is not always a dominant strategy, i.e., $\pi_h<1$ and $\pi_l=1$.[5] This more intuitive assumption leads to the conclusion that voters will impose more opposition to the Executive incumbent when the state of the world is favorable. Equivalently, voters tend to be more sympathetic towards the incumbent when a bad state of the world is realized. The corollary below summarizes the results.

Corollary 1. *When voters can observe the true state of the world, they will choose the level of vote splitting in period* 2 *according to the following rule:*

(*i*) $\pi_2 = \pi_l = 1$ *if* $r=l$.

(*ii*) $\pi_2 = \pi_h < 1$ *if* $r=h$.

An important consequence of Corollary 1 is that it is optimal for voters to reinforce the opposing party in the Legislature in the last period, i.e., some degree of vote splitting at $t=2$ is optimal regardless of the state of nature. That result is intuitive: in the last period reelection cannot be used in order to induce a more favorable outcome; therefore vote splitting becomes the only control mechanism voters are left with. However, the possibility of gridlock caused by a too strong opposition in the Legislature reduces the optimal level of vote splitting in the last period, in the bad state $r=h$. Therefore, voters tend to give more support to the incumbent's party when they know the state of the world is truly bad.

3.2. First period

The optimal choice of voters in period 1 will depend strongly on the realized state of the world.

The unfavorable state r=h.

When the realized state of nature is unfavorable, the first period incumbent knows that, by subgame perfection, voters will choose $\pi_2=\pi_h$ and the utility of any incumbent in period 2 will be zero. Therefore, that first period incumbent is indifferent between being reelected or not being reelected. Hence, voters cannot use reelection as an instrument for disciplining the politician: the electoral connection is lost. But then, the best voters can do is to use vote splitting optimally as a control device and choose $\pi_1=\pi_h$. Moreover, any rule for deciding on reelecting the incumbent is optimal.

In conclusion, in equilibrium voters will choose $\pi_1=\pi_2=\pi_h$ and any reelection criterion, and the incumbent in each period will equally choose $e=\hat{e}(h,\pi_h)$.

[5] The case $\pi_h<\pi_l<1$ is discussed in section 5.

This specific case highlights the importance of vote splitting as a device for controlling politicians. In fact, in a bad state of nature, this mechanism arises as the only one available to voters, since the electoral connection vanishes.

The favorable state r=l.

When the realized state of nature is favorable, the incumbent in period 1 knows by subgame perfection that, if he is reelected, voters will choose $\pi_2=\pi_l=1$ and his utility in period 2 will be positive. Therefore, that first period incumbent is willing to give up some utility in period 1 (in the form of reduced overspending) if he is compensated by being reelected and deriving a positive utility in period 2. Hence, reelection may be used as a mechanism to discipline the incumbent. Although there are several possible subgame perfect equilibria, they can all be ranked in terms of voters' welfare. Therefore, this study focuses on the best equilibrium for voters.

By sequential rationality, suppose the opposition level π_1 has been set and let $\tilde{e}(l,\pi_1)$ is the minimal value of *e* such that:

$$v(l,e,\pi_1)+\delta v(l,\hat{e}(l,1),1) = v(l,\hat{e}(l,\pi_1),\pi_1) \tag{3}$$

Then *e* is selected in such a way that an incumbent is indifferent between choosing her optimal $\hat{e}(l,\pi_1)$ at period *t*=1 and not being reelected or choosing the lower[6] $\tilde{e}(l,\pi_1)$ at *t*=1, being reelected, and choosing $\hat{e}(l,1)$ in the second period. This is the lowest level of overspending voters can impose on the incumbent. The corresponding reelection rule is as follows. Voters will reelect the incumbent if the observed output is at least $n^* = \frac{B}{l+\tilde{e}(l,\pi_1)}$, and will not reelect him otherwise.

Condition (3) ensures that the incumbent is (weakly) motivated to comply to the reelection condition and that any condition requiring a lower level of overspending will induce the incumbent to choose the higher overspending level $\hat{e}(l,\pi_2)$, while giving up on being reelected.

Next, Theorem 2 allows us to infer the optimal level of vote splitting in period 1.

Theorem 2. *When the economy is in a good state, r=l, the induced overspending* $\tilde{e}(l,\pi_1)$ *is a strictly decreasing function of* π_1.

[6] By construction $v(l,e,\pi)$ is a strictly concave, non monotonic function of *e* (due to the internal solution hypothesis), hence it is single peaked. The model additionally postulates that $\tilde{e}(l,\pi_2)>0$.

Therefore, voters will choose $\pi_1=\pi_l=1$ in period 1. In conclusion, in equilibrium voters will choose $\pi_1=\pi_2=\pi_l=1$ and will reelect an incumbent if the observed output level is at least $n^* = \frac{B}{l+\tilde{e}(l,\pi_l)}$. The incumbent will choose $e=\tilde{e}(l,\pi_l)$ in period 1, will be reelected, and will choose $e=\hat{e}(l,\pi_l)$ in period 2.

Notice that there is no political gridlock in the complete information benchmark. Indeed, that inefficient outcome will only manifest itself in the incomplete information case, as an information revelation mechanism.

4. The incomplete information case

Suppose now voters cannot observe the true state of the nature. The game is solved by sequential rationality in order to derive its perfect Bayesian equilibria.

4.1. Second period

The incumbent's choice

The elected incumbent solves the same maximization problem as in the complete information case. Therefore, the incumbent will choose $\hat{e}(r,\pi_2)$, which corresponds to $\hat{n}(\pi_2)=\frac{B}{r+\hat{e}(r,\pi_2)}$, $\hat{p}_r(\pi_2)=r+\hat{e}(r,\pi_2)$, as long as $v(r,\hat{e}(r,\pi_2),\pi_2)\geq 0$. This will always de the case if $r=l$, for all $\pi_2\in[0,1]$. However, if $r=h$ and $\pi_2>\pi_h$, then the incumbent will choose $(n, p)=(0,0)$.

Voters' choice

Voters' choice regarding the opposition in the Legislature at period 2 will depend on the updated information they will have at that period. Theorem 3 states that, regardless of the information available, in equilibrium π_2 will take one of the two possible values found in the complete information benchmark.

***Theorem* 3.** *In any perfect Bayesian equilibrium of the incomplete information game, in period* 2 *either* $\pi_2=\pi_h$ *or* $\pi_2=\pi_l$.

The exact choice for π_2 will be determined after the analysis of the first period strategies.

4.2. First period

Consider two possible types of equilibria, according to the level of information revelation at the end of the period.

Pooling equilibrium

A pooling equilibrium will arise when an incumbent in a state of the world will mimic the behavior he would have in another state of the world. Such a strategy will be optimal only if it allows the incumbent to be reelected and derive a positive utility in period 2. By Theorem 3, this will only happen if $\pi_2=\pi_h$. Suppose that is the case. Then, in a bad state of the world, an incumbent will have zero utility in period 2, if reelected. Therefore, only an incumbent in a good state of the world may be interested in mimicking an incumbent in a bad state, and not otherwise.

In a pooling equilibrium, at the end of period 1 there is no information updating. Therefore, in order to have $\pi_2=\pi_h$, it must also be the case that $\pi_1=\pi_h$. But then, the incumbent will choose $\hat{e}(h,\pi_h)$ in a bad state of the world in period 1, which corresponds to the outcome $\hat{n}_h(\pi_h)=\dfrac{B}{h+\hat{e}(h,\pi_h)}$. Theorem 4 states the conditions for the pooling equilibrium to exist.

***Theorem* 4.** *For r=h, l and* $\pi\in[0,1]$, *define* $\hat{n}_r(\pi)=\dfrac{B}{r+\hat{e}(r,\pi)}$ *and suppose that voters' ex-ante beliefs* ρ *and the incumbent's utility* v *satisfy conditions* (*i*) *and* (*ii*) *below.*

(*i*) $\rho\le\dfrac{\varphi(\hat{n}_h(\pi_h))}{\varphi(\hat{n}_l(\pi_l))-\varphi(\hat{n}_l(\pi_h))+\varphi(\hat{n}_h(\pi_h))}$.

(*ii*) $v(l,h-l+\hat{e}(h,\pi_h),\pi_h)+\delta v(l,\hat{e}(l,\pi_h),\pi_h)\ge v(l,\hat{e}(l,\pi_h),\pi_h)+\delta v(l,\hat{e}(l,\pi_l),\pi_l)$

Then there exists a unique pooling equilibrium where voters choose $\pi_1=\pi_2=\pi_h$ *and reelect an incumbent if the observed output in period* 1 *is at least* $\hat{n}_h(\pi_h)$. *In period* 1 *the incumbent delivers the required output* $\hat{n}_h(\pi_h)$ *regardless of the state of nature, and is reelected. In period* 2, *an incumbent chooses* $\hat{e}(h,\pi_h)$ *in a bad state and* $\hat{e}(l,\pi_h)$ *in a good state of nature.*

Condition (*i*) in Theorem 4 states that the probability of a good state of nature is very low, so that voters prefer to choose $\pi_1=\pi_h$ in order not to risk the costly political gridlock that might occur if they were to choose a higher level of opposition in the Legislature.

On the other hand, condition (*ii*) states that an incumbent in a good state prefers to mimic the bad-state behavior by choosing a suboptimal level of overspending and being reelected with low

opposition (π_h) in the Legislature in period 2, rather than choose his optimal level of overspending in period 1 and face the higher level of opposition (π_l) in the Legislature in period 2.

The main insight from the pooling equilibrium refers to the fact that, when vote splitting is available in an incomplete information environment, it may totally offset reelection as a mechanism of electoral control. Indeed, in the pooling equilibrium, the incumbent does not care about being reelected in a bad state of nature. Furthermore, in a good state, the incumbent is induced to deliver a reduced output in order to be reelected. In fact, the incumbent would deliver a higher level of output if reelection were forbidden. This result is very different from those of traditional models where only the reelection mechanism is available, in which reelection tends to improve electoral control.[7] Here, there is a conflict between the two mechanisms and sequential rationality implies a dominance of vote splitting over reelection. An application of the ideas of this pooling equilibrium to the American 2004 presidential election is presented in section 9.

Separating equilibria

An important characteristic of the pooling equilibrium is that voters are indifferent between reelecting or not reelecting an incumbent at the end of period 1, as long as they set the appropriate level of vote splitting in period 2. But then, voters can use this indifference, in order to be more demanding for reelection, focusing the reelection requirement on the good state of the world. Take, for example, the situation in which voters believe a bad state is likely and choose $\pi_1=\pi_h$. If the bad state is realized, then the incumbent doesn't care about being reelected, so that any reelection requirement is equally optimal. However, if the good state is actually realized, then the incumbent cares about reelection whatever the opposition in period 2. Therefore, she is willing to comply with a more demanding reelection criterion.

Theorem 5 presents separating equilibria of the electoral control game.

Theorem 5. *For r=h, l and* $\pi\in[0,1]$, *define* $\hat{n}_r(\pi)=\dfrac{B}{r+\hat{e}(r,\pi)}$ *and* $\tilde{n}_l(\pi)=\dfrac{B}{l+\tilde{e}(l,\pi)}$ *where* $\tilde{e}(l,\pi)$ is the minimal value of *e* such that:

$$v(l,e,\pi)+\delta v(l,\hat{e}(l,1),1) = v(l,\hat{e}(l,\pi),\pi).$$

Then, for each value of the ex-ante probability ρ*, there exists a separating perfect Bayesian equilibrium to the electoral control game, which is described below.*

[7] For seminal references, see Barro (1973) and Ferejohn (1986).

(*i*) *If* $\rho > \dfrac{\varphi(\hat{n}_h(\pi_h))}{\varphi(\tilde{n}_l(\pi_l)) - \varphi(\tilde{n}_l(\pi_h)) + \varphi(\hat{n}_h(\pi_h))}$, *then there is a perfect Bayesian equilibrium of the game where voters choose divided government in period* 1: $\pi_1=\pi_l=1$, *and will require a minimum output level of* $n^* = \tilde{n}_l(\pi_l)$ *for reelecting the incumbent.*

If the realized state of the world is r=l, the incumbent will deliver $\tilde{n}_l(\pi_l)$, *will be reelected, and will face total opposition in the Legislature in period* 2: $\pi_2=\pi_l=1$.

If the realized state is r=h, there will be a political gridlock in the first period, the incumbent will not be reelected and the new incumbent will face partial opposition in the Legislature in period 2: $\pi_2=\pi_h$.

Furthermore, this is the equilibrium that gives the highest utility to voters among all the separating equilibria when expectations of a good state of the world are high.

(*ii*) *If* $\rho < \dfrac{\varphi(\hat{n}_h(\pi_h))}{\varphi(\tilde{n}_l(\pi_l)) - \varphi(\tilde{n}_l(\pi_h)) + \varphi(\hat{n}_h(\pi_h))}$, *then there is a perfect Bayesian equilibrium of the game in which voters choose partially divided government in period* 1: $\pi_1=\pi_h$, *and will require a minimum output level of* $n^* = \tilde{n}_l(\pi_h)$ *for reelecting the incumbent.*

If the realized state of the world is r=l, the incumbent will deliver $\tilde{n}_l(\pi_h)$, *will be reelected, and will face total opposition in the Legislature in period* 2: $\pi_2=\pi_l=1$.

If the realized state is r=h, the incumbent will deliver $\hat{n}_h(\pi_h)$ *and will not be reelected. The new incumbent will face partial opposition in the Legislature in period* 2: $\pi_2=\pi_h$.

Furthermore, this is the equilibrium that gives the highest utility to voters among all the separating equilibria when expectations of a good state of the world are low.

Notice that in both cases there is full revelation of the true state of nature at the end of period 1. This explains why voters can always chose the optimal level of vote splitting in period 2. Moreover, because of the full information revelation, it becomes a trivial exercise to check for Bayesian consistency of beliefs in the second period.

The main difference between the two cases is related to the way voters view the state of nature *ex-ante*. If voters believe that the good state is very likely, they will totally divide their political ticket and will be very demanding for reelection, even though they understand this may induce a government shutdown. On the other hand, if they believe the bad state is very likely, then they will avoid gridlocks by selecting less opposition in the Legislature and they will adopt a less

demanding reelection criterion $\left(\tilde{n}_l(\pi_h) < \tilde{n}_l(\pi_l)\right)$, even though they understand that the incumbent will not produce the optimal level of social output if the realized state of nature is indeed good.

An important consequence of Theorem 5 is that, when voters believe the underlying state of nature is likely to be good, gridlocks occur with positive probability. Therefore, the inefficient outcome of government shutdown arises here as an equilibrium behavior of the electoral-control game, due to the incomplete information of voters. As a matter of fact, gridlocks occur in equilibrium as an information revelation device, that increases voters' utilities in the second period.

5. The strong institutional framework case

Consider now the case $\pi_h<\pi_l<1$. This corresponds to the situation where the Legislature is very strong and can impose very high costs for an incumbent to pass a budget. In that case, by adjusting the level opposition in the Legislature, voters can further reduce overspending, but the consequence is that the incumbent will have zero utility at each period, in the complete information case. Subgame perfection ensures that reelection vanishes as a controlling device and, one once again, vote splitting remains the only tool for reducing a politician's overspending.

This is also true when it comes to the incomplete information case, were, in a separating equilibrium voters obtain at most (in the good state) the complete information output level $\hat{n}_l(\pi_l)$. Again, there is a pooling equilibrium when voters believe that the bad state of nature is very likely to occur. In that pooling equilibrium, an incumbent will deliver a low outcome level $\hat{n}_h(\pi_h)$ even in the good state of nature.

The main insight of this extension is that, when institutions are strong to the point that the Legislature can impose such a high cost to the incumbent that he derives zero utility when passing a budget, then either the reelection motives vanish, or worse, they induce the incumbent to deliver an outcome that is below the complete information level (the pooling equilibrium case).[8]

Comparing these results to the previous sections ones, the present study highlights an important trade-off for democratic regimes, when the Legislature is considered. On one hand, the stronger the Legislature, the less abusive the incumbent will be in terms of overspending. On the other hand, if the Legislature is too strong, it may induce an incumbent, in a good state of nature, to perform poorly in order to convince voters that the state is a bad one, so that he could be reelected and face less opposition in the Legislature in period 2. The search for the optimal strength of a Legislature is left here as a suggestion for future research, both at the theoretical and the empirical levels.

[8] An alternative interpretation of this situation is that the Executive is too weak via-à-vis the Legislature.

6. Ideology & primaries

This article has assumed so far that all voters are identical in their concern to control the elected executive incumbent. However, in the real world one observes that voters do derive utility in voting for candidates they believe best represent their own beliefs on how to handle policies; this is the ideological part of voters utilities.[9] If that ideological component is excluded from consideration, then all electoral issues could be reduced to a contract between voters and the "hired" incumbent, and that does not seem to be the case in real world situations.[10]

There are at least two answers to the above criticism. First, although it is true that voters care about ideology, if they are heterogeneous enough, then, there is no way voters can coordinate in the ideological dimension.[11] To quote Ferejohn (1986), "In the face of heterogeneous preferences, then, the incumbent has both the opportunity and motivation to play off the voters against one another. The result is that the incumbent is entirely uncontrolled by the electorate." Therefore all voters are left with to coordinate their electoral behavior is their concern about the abuses (corruption, inefficiency, low effort dedicated to the job) of the incumbent.

This discussion is somehow related to the two distinct interpretation of voting presented in Riker (1982): the populist and the liberal interpretations. The populist interpretation of voting emphasizes the fact that the "opinions of the majority *must* be right and *must* be respected". Under that point of view all voters have to do is express sincerely their own opinions –ideologies– and hope that they represent the majority's view. On the other hand, according to the liberal interpretation of voting, "there is no such magical identification" between the will of the people and the elected incumbent's decisions: "the outcome of voting is just a decision and has no special moral character". It is under the liberal view that voters can understand that "the function of voting is to control officials, *and no more*".[12] Therefore, one could say that the present article falls in the Madisonian tradition of the liberal point of view and that it recognizes that no electoral control issues can be discussed under the populist tradition based on each voters acting according to her ideology bias.[13] One must add that this view does not restrains voting to contracts in the explicit sense, but it surely approaches it to implicit contract theory where voters try to set the right incentives to the incumbent by using their available instruments: vote splitting and reelection[14].

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[9] See on the subject, the discussions in Ferejohn (1986) or Bugarin (1999).
[10] I am indebted to Donald Campbell for this comment.
[11] See Proposition 6 in Ferejohn (1986).
[12] All quotations are taken from chapter 1 of Riker (1982); the italics are as in the original text.
[13] The author is deeply indebted to Roger Myerson for extremely insightful discussions on this issue, including pointing out professor Riker's book. Of course, the interpretations expressed here are the author's sole responsibility.
[14] For a recent explicit contract theoretic approach to reelection in a no-Legislature model see Gersbach and Liessem (2005).

The second answer to the above criticism refers to the case where voters' heterogeneity in limited enough so that they can be added to the basic model while still maintaining their electoral control concern. That approach is briefly explored henceforth.

Let i be a generic voter. Her utility is extended in such a way that at each period it depends not only on the public goods production, $\varphi(n)$, but also on an ideological parameter δ_i: $u_i(n)=\varphi(n)+\delta_i$. The parameter δ_i is a random variable with known distribution and reflects voter i's bias toward party I: if $\delta_i>0$ than i prefers party I to party II and the magnitude of δ_i shows how important this bias is to voter i. On the other hand, if $\delta_i<0$ then i prefers party II to party I.

When the game starts in period 1 each voter observes her ideological bias and society is divided into two groups: voters with positive biases support party I while voters with negative biases support party II. Each party holds its primary elections when its members (those with biases favoring it) choose its candidate to run for the executive office among several identical party members. Then general elections are held as in the original model. At the beginning of period 2 new party primaries take place and party members decide whether to keep the same candidate to run for reelection or to replace him.

Then general elections are held again in the same manner as in the original model. For simplicity (but without loss of generality) it is assumed here that the ideology biases are realized only once at the beginning of period 1, so that the voter with median bias is know at the beginning of period 2.

The appropriate solution of the game is again perfect Bayesian equilibrium, and it is calculated by sequential rationality. The arguments are similar but now, because of the ideological component of voters' utilities, there shall be no change in the party that holds the executive, since there is no change in the median bias voter. Therefore, electoral control is done not by changing parties but by changing incumbents from the same party. That is, voters that are members of the ruling party will apply the former reelection criteria within the party in such a way that, if the incumbent complies to the reelection requirement, then he will be reappointed as the party's candidate during that party's primaries; otherwise a challenger will be elected as the party's candidate to the second period election.

The above argument allows for complete compatibility between ideology and electoral control, due to the fact that now voters have one more instrument: they control both the party and the incumbent candidate. By controlling which party rules they satisfy their ideological concerns, whereas by controlling which candidate from that party will remain in power they control incumbent's abuses.

Under that modeling, voters will not be indifferent among parties in period 1 –as happened before– but will still choose the right amount of vote splitting. The party that will be elected in both periods is the one that is preferred by the voter with median bias, and the reelection criterion will apply to the incumbent, rather than to the party.

Note that this result can be easily extended to allow for changes in elected parties. It is only necessary that the ideological biases δ_i be realized at the beginning of every period. In that case, if the median bias in period 2 favors the same party as in period 1, the above argument replicates. However, if there is a change in the median bias, then there will be a resulting change in the party that is elected in period 2. It is important to stress that in this case electoral control is reduced, since an incumbent in period 1 knows there is a chance he will not be reelected even though he complies with his party's reelection criterion, because the popular (median) support may turn against his party. In that case voters will have to be less demanding in terms of their reelection criterion and also impose less opposition in Congress in period 1, since reelection becomes less likely to the incumbent.

In conclusion, if ideological heterogeneity among voters is one-dimensional and can be resolved within each party, then it does not affect the main results of the basic model. On the other hand, if ideology becomes the only issue in voters decision, then each voter votes according to that criterion, there is no electoral control by way of reelection (the electoral connection is lost) and vote splitting is a trivial and uninteresting consequence of voters' heterogeneity.

7. Political efficiency and incumbency

The parameter β reflects how effective the incumbent is in transforming overspending into an argument of his own utility. This could be seen as a measure of the political efficiency of a system, since the part $(1-\beta)e$ of the overspending does not go to any of the agents in the game. In particular, one may view β as the *type* of the incumbent, so that more efficient incumbents (higher β's) will be able to acquire a higher part of the overspending e.

A natural question that arises then is: what is the effect to society of having incumbents with different β's? Should society prefer more efficient incumbents? The next proposition shows that, in fact, less incumbent efficiency may be desirable in the context of the present electoral-control game.

Theorem 6. *Let* $\hat{e}(r,\pi,\beta)$ *be the solution to the one-period incumbent maximization problem, where the dependency on the parameter* β *is made explicit. Then* $\hat{e}(r,\pi,\beta)$ *is a strictly increasing function of* β*.*

Therefore, the higher the parameter β, the higher the level of overspending chosen by an incumbent than is not concerned with reelection.

The main insight from the above proposition is that, the higher the parameter β, the higher the potential gains from overspending, *ceteris paribus*. Therefore, the higher the incentives an incumbent has for deviating from the optimal budget. This result may be vaguely related to the recent debate on term limits. Indeed, if one believes that the parameter β is not only a characteristic of the incumbent, but rather a learning variable that may increase as the incumbent acquires administrative experience and contacts, then incumbency may be seen as undesirable from the point of view of voters' welfare. In that case a limit on the possibility of reelection may be another instrument of control of the politicians, by restraining them from becoming *experts* in the precise sense of deviating a higher percentage of the overspending to their personal benefit. Viewing β as corruption, the previous proposition confirms that expertise in that area tends to have undesirable effects to society's welfare.

Nota bene, the present model is not intended to model corruption opportunities, which are much more sophisticated and diversified than what appears here. Moreover, even in the context of the model, a higher β does not necessarily imply a higher level of overspending in equilibrium, since in the particular case of a bad state of the world, the extra attractiveness of the budget may be compensated with a higher opposition in the Legislature. The model, however, highlights the role of the legislative opposition in reducing corruption in a world of incomplete information.

8. The multidimensional case: a first exploration

Suppose now that an executive incumbent presents a budget proposal $(N,P)=((n_1,n_2,\ldots,n_k),(p_1,p_2,\ldots,p_k))$ where n_i is the number of copies and p_i is the unit cost of project i, i=1,…,k. Then the incumbent's second period maximization problem becomes:

$$\begin{cases} \max\limits_{N,P} v(N,P,\pi)=\sum\limits_{i=1}^{k} n_i\beta_i(p_i-r_i)-c(p_1,p_2,\ldots,p_k,\pi) \\ \text{s.t.} \quad N\cdot P\le B \end{cases}$$

The main difficulty that arises in this context is that we do not have a concave problem anymore, which invalidates the use of first order conditions. It may be shown, however, that if the cost function is strictly increasing in all its variables, then, the optimal solution for the incumbent involves the choice of exactly one type of project, reverting to the one-dimensional case.[15] That result might explain why some politicians tend to focus on a few very expensive projects, as seems to have been the case of America's president George W. Bush's war against terror.

Given that solution, voters can decide on the optimal level of vote splitting. Results similar to those of the one-dimensional case can be proved, showing in particular that voters will impose more opposition in the Legislature when the good state of the world is revealed.

The analysis gets more demanding, however, when it comes to the first period solution. In order to solve the problem, this author needed to assume that the social utility function $\varphi(N) = \varphi(n_1, n_2, \ldots, n_k)$ is additively separable in the inputs n_i, i=1,…,k, and symmetric. In that particular case, it remains optimal to the incumbent to select essentially one type of project and a result similar to the one-dimensional case obtains. However, the assumption on φ is strong and hardly intuitive, which suggests that much work remains to be done in the multidimensional case.

9. An Application to the American 2004 presidential election and the war on terror

"The coordinated attacks on the World Trade Center (WTC), the Pentagon, and commercial civilian aircraft on the morning of September 11, 2001, were the most deadly terrorist acts ever to occur in the United States."[16] According to the New York Times,[17] 2,819 people were killed, including 343 firefighters or paramedics. The corresponding trauma impinged on citizens residing in Manhattan[18] as well as on Americans all over the country has been extensively documented[19]. According to Schuster at al. (2001), "The events on September 11 were widely described as attacks on America, and most or all Americans may have identified with the victims or perceived the attacks as directed at themselves as well." The subsequent war against terror became a national priority, swallowing up an estimated US$864 billion of taxpayers' dollars.[20]

In the language of the present study, one can characterize those events as a clear shift in the American electorate towards more negative expectations about the state of the world. According to the pooling equilibrium analysis, as long as this expectation of a high probability for the bad state of

[15] The proofs can be obtained from the author upon request.
[16] Schlenger at al. (2002).
[17] "Death, destruction, charity, salvation, war, money, real estate, spouses, babies, and other September 11 statistics", http://nymag.com/news/articles/wtc/1year/numbers.htm, accessed on February 13, 2009.
[18] Galea et al. (2002).
[19] Schuster at al. (2001).
[20] Belasco (2008).

the world persisted, one should expect the reelection of the incumbent president with lower opposition in Congress. Therefore, any incumbent running for reelection would have a clear incentive to sustain these negative expectations.

Nacos et al. (2007) find evidence that "both Bush's overall approval ratings and the public's rating of his handling of terrorism were affected by news reports of his statements about the terrorist threat and increases in the alert level and administration officials' public statements." According to that study:

> *Bush himself told a White House reporter that he believed "his 2004 re-election victory over Sen. John Kerry was inadvertently aided by Osama bin Laden, who issued a taped diatribe against him the Friday before Americans went to the polls." As the president put it, "I thought it was going to help. I thought it would help remind people that if bin Laden does not want Bush to be president, something must be right with Bush." Not surprisingly, Senator Kerry, too, told an interviewer soon after the election that he lost to Bush because of the bin Laden video.*

Note that in addition to being reelected, President Bush increased its support in Congress, as the number of republican representatives increased from 229 to 232 in the 108th Congress vis-à-vis the 107th Congress[21]. The present model's pooling equilibrium analysis suggests that very pattern. As society became strongly convinced that the state of nature was unfavorable, it became less demanding in terms of the opposition in Congress and the incumbent was reelected.

10. Concluding remarks

The present study is part of a research program that tries to build formal models of political processes in which all agents are rational, act strategically, and in which institutions observed in the real world arise as consequences of agents' equilibrium behavior. A previous work (Bugarin, 2003) has shown how voters add vote splitting to their reelection strategies in order to increase their control of politicians. The main result in that article stresses the flexibility of voters, which tend to be less demanding for reelection when they believe the incumbent may not be the sole responsible for a weak social outcome, i.e., when they believe the world is in a "bad state". That article, however, limits the analysis by assuming out the possibility of gridlocks, i.e., situations in which the Executive and the Legislators do not reach an agreement on the budget proposal. Moreover, the bargaining process between the Executive and the Legislature assumes the existence of a cost function with some very specific properties. Finally, that article did not consider the possibility that

[21] "Party Divisions of the House of Representatives", Office of the Clerk, U.S. House of Representatives, http://clerk.house.gov/art_history/house_history/partyDiv.html, accessed on February 13, 2009.

voters' utilities might be affected by an ideological component that is not related to the control of politicians.

The present article extends that previous study, by adding the possibility of gridlocks, by relaxing one strong hypothesis on the bargaining process and by explicitly adding an ideological component to voters' utilities. The main result, however, remains robust: voters do take their decisions based on their beliefs about the underlying state of nature, and are more flexible when they believe that the state is unfavorable. Moreover, some important new results are obtained. First, it shows that the fear of a government shutdown may lead to a pooling equilibrium where an incumbent delivers a lower level of social welfare in order to be reelected, than he would deliver if no reelection were allowed. This new result suggests that, under specific situations, reelection may play against its traditional role of controlling an incumbent. An application of the pooling equilibrium analysis to American 2004 presidential elections is discussed in the text.

Second, it shows that the inefficient phenomenon of gridlock may occur in equilibrium with positive probability. Gridlock works here as an information revelation device that allows voters to take better decisions at the second period.

Several extensions, including a stronger Legislature, the role of ideology and a more general budget were also explored. However, this study may still be extended in different directions.

First, the full multidimensional analysis needs to be deepened: what is the result of the electoral game when the budget takes the form $(N,P)=((n_1,n_2,\ldots,n_k),(p_1,p_2,\ldots,p_k))$, where $k>1$ is the number of different projects available? Is there a natural solution which does not depend upon strong hypothesis on the shape of the social welfare function φ?

Second, the number of periods may be altered: what if there are infinitely many reelection periods? In that case, how should the role of uncertainty be extended? One possible extension, following Bugarin (1999), is to think of the uncertainty as a stationary Markov process and study how voters update their beliefs; an alternative approach that is followed in Persson & Tabellini (2000, chapter 4) is to postulate a moving average process for the uncertainty, resulting in a model of electoral cycles.

Third, the previous section suggests that there may be a positive relationship between term limits and electoral control, a result that diverges from the usual literature on voting and therefore deserves a more careful analysis.

Forth, one would like to understand how the equilibria would change if there were a continuous range for the set of possible states of nature, rather than only two possible states.

Finally, and most importantly, a nontrivial effort has to be made in order to make endogenous the bargaining process between the executive and the Legislature. Such an attempt has

been made when parties' utilities are defined exclusively in ideological terms in Bugarin (1999); on the other hand, when legislators care only about their own "share of the pie", Baron and Ferejohn (1989) have studied a precise bargaining game. It remains to extend those works in the more general context studied here.

References

Alesina, A. and Rosenthal, H., 1989, Partisan cycles in congressional elections and the macroeconomy. *American Political Science Review* 83, 373–398.

Alesina, A. and Rosenthal, H., 1995, *Partisan politics, divided government and the economy*. Cambridge: Cambridge University Press.

Alesina, A. and Rosenthal, H., 1996, A theory of divided government. *Econometrica* 64, 1311–1341.

Baron, D. P. and Ferejohn, J. A., 1989, Bargaining in legislatures. *American Political Science Review* 83, 1181–1206.

Barro, R., 1973, The control of politicians: an economic model. *Public Choice* 14, 19–42.

Belasco, A., 2008, The cost of Iraq, Afghanistan, and other global war on terror operations since 9/11. CRS Report for Congress, Order Code RL33110, www.fas.org/sgp/crs/natsec/RL33110.pdf, accessed on February 13, 2009.

Bugarin, M., 1999, Vote splitting as insurance against uncertainty. *Public Choice* 98, 153–169.

Bugarin, M., 2003, Vote splitting, reelection and electoral control: towards a unified model. *Social Choice and Welfare* 20, 137–154.

Ferejohn, J., 1986, Incumbent performance and electoral control. *Public Choice* 50, 5–26.

Fiorina, M. P., 1988, The reagan years: Turning toward the right or groping toward the middle? In A. Kornberg & W. Mishler, eds., *The Resurgence of Conservatism in Anglo-American Democracies*. Durham, NC: Duke University Press.

Fiorina, M. P., 1992, An era of divided government. *Political Science Quarterly* 107, 387–410.

Fiorina, M. P., 1996, *Divided Government*, 2nd. ed. Boston: Allyn and Bacon.

Galea, S., Ahern, J., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., and Vlahov, D., 2002, Psychological sequelae of the September 11 terrorist attacks in New York City. *The New England Journal of Medicine* 346, 982-987.

Gersbach, H., Liessem, V., 2005. *Reelection Threshold Contracts in Politics*. CEPR Discussion Paper No. 5175.

Keith, R., 1999, *Preventing Federal Government Shutdowns: Proposals for an automatic continuing resolution*. Congressional Research Service Report for Congress RL30339.

Nacos, B., Bloch-Elkon, Y., and Shapiro, R., 2006, The threat of international terrorism after 9/11: News coverage and public perceptions, *Paper presented at the annual meeting of the American Political Science Association, Marriott, Loews Philadelphia, and the Pennsylvania Convention Center, Philadelphia, PA*, Aug 31, 2006. http://www.allacademic.com//meta/p_mla_apa_research_citation/1/5/2/4/7/pages152470/p152470-1.php, accessed on February 13, 2009.

Nacos, B., Bloch-Elkon, Y., and Shapiro, R., 2007, The threat of international terrorism after 9/11: News coverage and public perceptions. *Public Opinion Pros*. http://www.publicopinionpros.com/features/2007/feb/nacos.asp, accessed on February 13, 2009.

Persson, T. and Tabellini, G., 2000, *Political Economics: Explaining Economic Policy*. Cambridge: MIT Press.

Riker, W. H., 1983, *Liberalism Against Populism. A confrontation between the theory of democracy and the theory of social choice*. Prospect Hights: Waveland Press.

Shepsle, K. A., 1979, Institutional arrangements and equilibrium in multidimensional voting models. *American Journal of Political Science* 23, 27–59.

Shepsle, K. A. and Weingast, B. R., 1981, Structure-induced equilibrium and legislative choice. *Public Choice* 37, 503–17.

Schlenger, W. E., Caddell, J., Ebert, L., Jordan, B., Rourke, K., Wilson, D., Thalji, L., Dennis, J., Fairbank, J. and Kulka, R., 2002, Psychological reactions to terrorist attacks. Findings from the National Study of Americans' Reactions to September 11. *The Journal of the American Medical Association* 288, 581–588.

Schuster, M., Stein, B., Jaycox, L., Collins, R., Marshall, G., Elliott, M., Zhou, A., Kanouse, D., Morrison, j., and Berry, S., 2001, A National Survey of Stress Reactions after the September 11, 2001, Terrorist Attacks. *The New England Journal of Medicine* 345, 1507-1512.

Appendix

Proof of Theorem 1

(i) The optimal overspending level $\hat{e}(r,\pi_2)$ is the solution *e* to the following first order condition:

$$\beta Br = (r+e)^2 \frac{\partial}{\partial p} c(r+e,\pi_2) = (r+e)^2 f'(r+e) g(\pi_2)$$

Note that the left hand side of the above expression does not depend on π_2. Since the function f' is strictly increasing in p and the function g is strictly increasing in π_2, if π_2 increases, the corresponding solution e must decrease.

Note that the first order condition can also be written as follows.

$$\beta B = \frac{(r+e)^2 f'(r+e)}{r} g(\pi_2)$$

Thus, for all r, $s=h$, l, it must be the case that $\frac{(r+e(r,\pi_2))^2 f'(r+e(r,\pi_2))}{r} = \frac{(s+e(s,\pi_2))^2 f'(s+e(s,\pi_2))}{s}$. Hence, if $r>s$, then it must be the case that $(r+e(r,\pi_2))^2 f'(r+e(r,\pi_2)) > (s+e(s,\pi_2))^2 f'(s+e(s,\pi_2))$. Since f' is strictly increasing, it follows that $r+e(r,\pi_2) > s+e(s,\pi_2)$.

(ii) Using the Envelope Theorem one can derive the inequalities below.

$$\frac{\partial}{\partial r} v(r,\hat{e}(r,\pi_2),\pi_2) = \frac{\partial}{\partial r} v(r,e,\pi_2)\Big|_{e=\hat{e}(r,\pi_2)} = -\beta B \frac{\hat{e}(r,\pi_2)}{(r+\hat{e}(r,\pi_2))^2} - f(r+\hat{e}(r,\pi_2)) \cdot g(\pi_2) < 0.$$

$$\frac{\partial}{\partial \pi_2} v(r,\hat{e}(r,\pi_2),\pi_2) = \frac{\partial}{\partial \pi_2} v(r,e,\pi_2)\Big|_{e=\hat{e}(r,\pi_2)} = -f(r+\hat{e}(r,\pi_2)) \cdot g(\pi_2) < 0.$$

Proof of Theorem 2

For all values of the opposition parameter π_1, the function $\tilde{e}(l,\pi_1)$ satisfies:

$$v(l,\tilde{e}(l,\pi_1),\pi_1) + \delta v(l,\hat{e}(l,1),1) = v(l,\hat{e}(l,\pi_1),\pi_1)$$

Taking first order derivatives with respect to π_1 yields:

$$\frac{\partial}{\partial e} v(l,\tilde{e}(l,\pi_1),\pi_1) \cdot \frac{\partial}{\partial \pi_1} \tilde{e}(l,\pi_1) + \frac{\partial}{\partial \pi} v(l,\tilde{e}(l,\pi_1),\pi_1) =$$

$$\frac{\partial}{\partial e} v(l,\hat{e}(l,\pi_1),\pi_1) \cdot \frac{\partial}{\partial \pi_1} \hat{e}(l,\pi_1) + \frac{\partial}{\partial \pi} v(l,\hat{e}(l,\pi_1),\pi_1)$$

By definition, $\frac{\partial}{\partial e} v(l,\hat{e}(l,\pi_1),\pi_1) = 0$.

Since $\tilde{e}(l,\pi_1) < \hat{e}(l,\pi_1)$, it follows that $\frac{\partial}{\partial e} v(l,\tilde{e}(l,\pi_1),\pi_1) > 0$.

Finally, since $\frac{\partial}{\partial \pi} v(l, e, \pi_1) = -f(l+e)g'(\pi_1)$, one can write:

$$\frac{\partial}{\partial \pi_1}\tilde{e}(l,\pi_1) = \left[f\left(l+\tilde{e}(l,\pi_1)\right) - f\left(l+\hat{e}(l,\pi_1)\right)\right]g'(\pi_1)\left[\frac{\partial}{\partial e}v\left(l,\tilde{e}(l,\pi_1),\pi_1\right)\right] > 0.$$

Proof of Theorem 3

Suppose that $\pi_2 \in [0, \pi_h)$ Then there will never be political gridlock in period 2 and the incumbent choose $\hat{e}(r,\pi_2)$ in state $r=h, l$. Consider now the alternative choice for voters $\pi_2' = \pi_h$. Then, if voters choose π_2' there will still be no gridlock and the incumbent will choose $\hat{e}(r,\pi_2') < \hat{e}(r,\pi_2)$ in state $r=h, l$, which gives higher utility to voters. Therefore π_2' strictly dominates π_2.

Similarly, any choice $\pi_2 \in (\pi_h, \pi_l) = (\pi_h, 1)$ is strictly dominated by $\pi_2' = \pi_l$.

Proof of Theorem 4

The discussion that preceded the theorem showed that in the only candidate for pooling equilibrium the incumbent produces output at level $\hat{n}_h(\pi_h)$ regardless of the state of the world, and is reelected with the low level of opposition in the Legislature π_h in period 2. When the realized state is good, the incumbent will loose utility in period 1 by mimicking the bad-state strategy. Note that, from Theorem 1, $l + \hat{e}(l,\pi_2) > h + \hat{e}(h,\pi_2)$; therefore, $\hat{n}_l(\pi_h) > \hat{n}_h(\pi_h)$. Hence, for the mimicking strategy to be optimal, it must be the case that, when an output higher than $\hat{n}_h(\pi_h)$ is realized, voters believe the state is favorable with certainty and will, therefore, choose $\pi_2 = \pi_l$. Hence, the equilibrium beliefs of voters are:

$$\begin{cases} \rho_2 = \rho \text{ if } n \le \hat{n}(\pi_h) \\ \rho_2 = 1 \text{ if } n > \hat{n}(\pi_k) \end{cases}$$

Given the equilibrium strategies of the incumbents, voters learn no new information at the end of period 2. Therefore, voters' second period beliefs about the state of nature are given by $\rho_2 = \rho$.

Given these beliefs, if voters choose $\pi_2 = \pi_h$, their expected utility at $t=2$ is:

$$(\lambda) = \rho\varphi\left(\hat{n}_l(\pi_h)\right) + (1-\rho)\varphi\left(\hat{n}_h(\pi_h)\right)$$

On the other hand, if voters choose $\pi_2 = \pi_l$, their expected utility at $t=2$ is:

$$(\mu) = \rho\varphi\left(\hat{n}_l(\pi_l)\right) + (1-\rho)\varphi(0) = \rho\varphi\left(\hat{n}_l(\pi_l)\right)$$

Therefore, voters will choose $\pi_2=\pi_h$ if $(\lambda)\geq(\mu)$, which yields condition (*i*). Since there is no relevant new information between periods 1 and 2, the same condition ensures that voters will choose $\pi_1=\pi_h$ as well.

Consider now the decision of an incumbent in a favorable state, in period 1. Given voters beliefs, if the incumbent chooses his one-period optimal overspending level $e=\hat{e}(h,\pi_h)$, then he will be reelected, but will face high opposition in period 2 ($\pi_2=\pi_l$). Therefore, his total utility will be:

$$(\lambda')= v(l,\hat{e}(l,\pi_h),\pi_h)+\delta v(l,\hat{e}(l,\pi_l),\pi_l)$$

On the other hand, they may choose $e=e_{lh}$ where e_{lh} is a level of overspending such that $\frac{B}{l+e_{lh}}=\hat{n}_h(\pi_h)$, i.e., the strategy that corresponds to mimicking the output produced in a bad state. In that case, the incumbent will be reelected and face lower opposition in period 2 ($\pi_2=\pi_h$). Hence, his expected utility will be:

$$(\mu')= v(l,e_{lh},\pi_h)+\delta v(l,\hat{e}(l,\pi_h),\pi_h)$$

Therefore, the incumbent will choose the suboptimal overspending level e_{lh} if $(\lambda')\leq(\mu')$.

Since $\frac{B}{l+e_{lh}}=\hat{n}_h(\pi_h)=\frac{B}{h+\hat{e}(h,\pi_h)}$, it follows that $e_{lh}=(h-l)+\hat{e}(h,\pi_h)$.

Plugging in e_{lh} into (μ'), the relation $(\lambda')\leq(\mu')$ yields condition (*ii*).

Proof of Theorem 5

In a separating equilibrium, the incumbent in a bad state will choose, in period 1,

$\hat{n}_h(\pi_1)=\frac{B}{h+\hat{e}(h,\pi_1)}$, $\hat{p}_h(\pi_1)=h+\hat{e}(h,\pi_1)$, if $\pi_1\leq\pi_h$, and $n=0=p$, if $\pi_1\leq\pi_h$.

Moreover, in a separating equilibrium voters learn about the realized state of nature at the end of period 1. Therefore, by sequential rationality, in period 2 voters will choose $\pi_2=\pi_h$ if $r=h$ and $\pi_2=\pi_l$ if $r=l$.

Since a reelected incumbent derives positive utility in the good state of nature, he is willing to give up some utility in period 1 in order to be reelected, if that loss is compensated by future gains. If the opposition in period 1 is π_1, then the maximum level of output that the incumbent will comply with in, order to be reelected, is $\tilde{n}_l(\pi_1)=\frac{B}{l+\tilde{e}(l,\pi_1)}$. It remains for voters to decide on the opposition level π_1.

Using an argument similar to the one in Theorem 3, one can easily show that either $\pi_1=\pi_h$ or $\pi_1=\pi_l$. In both cases, an incumbent will not be reelect in a bad state.

If voters choose $\pi_1=\pi_h$, then there will be no political gridlock in a bad state, and the expected utility of voters in period 1 is:

$$(\lambda)= \rho\varphi\left(\tilde{n}_l\left(\pi_h\right)\right)+\left(1-\rho\right)\varphi\left(\hat{n}_h\left(\pi_h\right)\right)$$

On the other hand, is voters choose $\pi_1=\pi_l$, then there will be political gridlock ($n=p=0$) in a bad state, and the expected utility of voters in period 1 is:

$$(\mu)= \rho\varphi\left(\tilde{n}_l\left(\pi_l\right)\right)+\left(1-\rho\right)\varphi\left(0\right)= \rho\varphi\left(\tilde{n}_l\left(\pi_l\right)\right)$$

Suppose that $(\lambda)\leq(\mu)$, which corresponds to the situation (*i*) in the theorem. Then voters will choose $\pi_1=\pi_l$ end the reelection criterion will be:

Reelect the incumbent if the observed output level is at least $\tilde{n}_l\left(\pi_l\right)$.

Do not reelect the incumbent if the observed output level is below $\tilde{n}_l\left(\pi_l\right)$.

In a bad state, the incumbent will not pass any budget, because he will be facing too much opposition in the Legislature. In a good state, the incumbent will deliver a high level of output $\left(\tilde{n}_l\left(\pi_l\right)\right)$ and will be reelected.

The corresponding consistent beliefs for voters, $\rho(n)$, are given by:

$$\begin{cases}\rho\left(n\right)=0 \quad \text{if} \quad n<\tilde{n}_l\left(\pi_l\right)\\ \rho\left(n\right)=1 \quad \text{if} \quad n\geq\tilde{n}_l\left(\pi_l\right)\end{cases}$$

Note that a more flexible reelection criteria of the type "reelect the incumbent if and only if the observed output level is at least n^*", where $\hat{n}_l\left(\pi_l\right)\leq n^*\leq\tilde{n}_l\left(\pi_l\right)$, also yields a similar separating equilibrium, if associated to a system of beliefs of the type:

$$\begin{cases}\rho\left(n\right)=0 \quad \text{if} \quad n<n^*\\ \rho\left(n\right)=1 \quad \text{if} \quad n\geq n^*\end{cases}$$

However, in that equilibrium, voters do not explore the entire potential of the reelection mechanism to control the incumbent in period 1. In particular, such equilibrium yields a lower utility to voters.

Suppose now that $(\lambda)\geq(\mu)$, which corresponds to the situation (*ii*) in the theorem. Then voters will choose $\pi_1=\pi_h$ and the reelection criterion will be:

Reelect the incumbent if the observed output level is at least $\tilde{n}_l\left(\pi_h\right)$.

Do not reelect the incumbent if the observed output level is below $\tilde{n}_l(\pi_h)$.

In a bad state, the incumbent will deliver a low level of output $\left(\hat{n}_h(\pi_h) < \tilde{n}_l(\pi_k)\right)$ and will not be reelected. In a good state, the incumbent will deliver a higher level of output $\left(\tilde{n}_l(\pi_h) > \hat{n}_l(\pi_h)\right)$ and will be reelected.

The corresponding consistent beliefs for voters, $\rho(n)$, are given by:

$$\begin{cases} \rho(n) = 0 \quad \text{if} \quad n < \tilde{n}_l(\pi_h) \\ \rho(n) = 1 \quad \text{if} \quad n \geq \tilde{n}_l(\pi_h) \end{cases}$$

In period 2 the incumbents will always face the complete information optimal opposition level, and will react accordingly.

Similarly to the previous case, a more flexible reelection criteria of the type "reelect the incumbent if and only if the observed output level is at least n^*", where $\hat{n}_l(\pi_h) \leq n^* \leq \tilde{n}_l(\pi_h)$, also yields a similar separating equilibrium, if associated to a system of beliefs of the type:

$$\begin{cases} \rho(n) = 0 \quad \text{if} \quad n < n^* \\ \rho(n) = 1 \quad \text{if} \quad n \geq n^* \end{cases}$$

However, in that equilibrium, once again voters do not explore the entire potential of the reelection mechanism to control the incumbent in period 1. In particular, voters receive a lower level of utility.

Proof of Theorem 6

Recall that $\hat{e}(r, \pi, \beta)$ is the solution e to the following first order condition:

$$\beta Br = (r+e)^2 \frac{\partial}{\partial p} c(r+e, \pi_2) = (r+e)^2 f'(r+e) g(\pi_2)$$

If β increases, so does the right hand side of the above equation. Now, since the functions $(r+e)^2$ and $f'(r+e)$ are strictly increasing functions of e, when β increases the corresponding e has to increase as well.

$$\begin{pmatrix} \varphi(n_1)+\delta\varphi(n_2) \\ \delta\nu(l,n_2,p_2,\pi_2) \\ \nu(l,n_1,p_1,\pi_1) \end{pmatrix} \quad \begin{pmatrix} \varphi(n_1)+\delta\varphi(n_2) \\ 0 \\ \nu(l,n_1,p_1,\pi_1)+\delta\nu(l,n_2,p_2,\pi_2) \end{pmatrix} \quad \begin{pmatrix} \varphi(n_1)+\delta\varphi(n_2) \\ \delta\nu(h,n_2,p_2,\pi_2) \\ \nu(h,n_1,p_1,\pi_1) \end{pmatrix} \quad \begin{pmatrix} \varphi(n_1)+\delta\varphi(n_2) \\ 0 \\ \nu(h,n_1,p_1,\pi_1)+\delta\nu(h,n_2,p_2,\pi_2) \end{pmatrix}$$