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Incumbent performance and electoral control

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1. INTRODUCTION

In the pure theory of electoral competition, citizens compare the platforms of the candidates and vote for the one whose platform is preferred. Candidate strategies are identified with promises about future performance in office. Models of this sort have been developed in both static [McKelvey (1975)] and dynamic [Kramer (1977)] settings, and all appear to have the property that if the set of alternatives is "large enough" in some sense, equilibrium platforms rarely exist. But these models have another feature that is quite as disturbing as their instability.

In the static setting discussed by McKelvey, little attention is paid to the possibility that, once in office, the politician's preferences may diverge from those of his constituents and that he may therefore choose policies at variance from his platform. Instead it is simply assumed that promises will be kept whether or not such behavior is congruent with the interest of the officeholder. It is sometimes argued that an "enforcement" mechanism may exist to discipline politicians for failing to keep promises, but without a specification of the mechanism it is not obvious that it would be in the interests of the

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electorate to carry out threatened punishments.

In Kramer's dynamic model, the incumbent's platform is identified with his current record in office so that, assuming that voters would believe any proposed platform, a challenger will virtually always be able to propose a platform that will defeat the incumbent. But if the incumbent knows that he will lose his reelection bid, he might as well simply pursue his own private interest while in office rather than doing what he promised during the campaign (or doing whatever he did during his previous term); he will be turned out at the next election anyway. Clearly, in this case, the voters have no reason to take challenger platforms as anything other than pure rhetoric; voters would soon learn that rational officeholders would ignore their preferences once in office.

In both of these cases, there is no reason for voters to pay attention to the candidates' choice of platforms. For this reason, there is no cause to believe that there will be any predictable connection between the profile of voter preferences and public policy. If there actually is such a connection, neither of these theories can account for it.

The pure theory of elections pays little attention to the sorts of strategies or decision rules that might be followed by members of the electorate. Instead, it is usually hypothesized that citizens vote for the candidate whose platform they like best, ignoring further strategic considerations. Indeed, in two-candidate contest, if candidates are assumed to implement their platforms, voting for someone other than the preferred candidate is a dominated strategy. The only interesting question in this case is whether or not to vote.

The purpose of this paper is to try to construct a coherent model in which voters have an incentive to base their choices on behavior of officeholders and in which officeholders choose their strategies in anticipation of this behavior. Such a model is necessarily dynamic. Voters are assumed to base their evaluations of officeholders on their actual performance in office rather than on hypothetical promises they might make during a campaign. In this model, the key to the voting decision is found not in the earnest pledges of the contenders but, rather, in the infamous remark of a Kansas farmer: "But what have you done for me lately?"

If voters vote on the basis of platforms or "issues," politicians have little incentive to do what they promise. Thus, voters might be well-advised to pay attention to the incumbent's performance in office rather than to the hypothetical promises of competing candidates. By basing their votes on evaluations of performance, voters may be able to motivate officeholders to pay attention to the interests of the electors. That such a strategy may be attractive has been most forcefully argued by V.O. Key (1966). Key argued that if voters reward or punish officeholders on the basis of their performance in office, officeholders will not only be diligent but will also be motivated to use their initiative in the face of new or unexpected events that arise between elections.

There is abundant empirical evidence that the pure theory of elections is, at best, only a partial description of electoral phenomena. Much of recent data suggest that voters do respond to the performance of incumbent candidates in office as well as to the platform promises of competing candidates [Kramer (1971), Fiorina (1981)]. At both the aggregate and individual level and in virtually all nations that have been studied, the performance of the economy has a major effect on the electoral fate of the incumbent executive. Moreover, there is evidence that officeholders try to anticipate performance-oriented voting in their choice of policies while in office.[1]

Thus, it appears that voters employ decision rules that are based, in part, on the past performance of the government in office. Moreover, the actual evidence for extensive issue voting is fairly weak. If the incumbent administration has been successful in promoting economic growth and avoiding major wars, it will tend to be rewarded at the polls, no matter how attractive the policy positions of the opposition.[2]

This paper begins an investigation of the structure of electoral

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[1]See the political business-cycle literature, especially Tufte (1978). Recent work on Congress [Mayhew (1974)] suggests that similar incentives structure the behavior of Congressmen.

[2]In spite of the great quantity of statistical investigations of issue voting, the evidence for effects of candidate platforms on the vote is mixed. See Page and Jones (1979).

behavior that takes account of the motivations of officeholders. We wish to know how voters ought to behave if they wish to get their representatives to pursue the interests of the electors. In order to address this question, we need to develop a formal model within which politicians can be induced to act in the interests of the electors. The natural mechanism to transmit such incentives is the fact that elections take place repeatedly and that officeholders desire to retain office. Under these circumstances, voters can adopt strategies that can affect the incentives of officeholders in various ways. We also insist on separating the actions of the candidates in office from the notion of the performance of a government which is led by an incumbent candidate. With this separation, the situation becomes a variant of the "principal-agent" problem in which the officeholder is an agent of the electors, and voters have the opportunity to structure the incentives facing the officeholder agent to induce him to act to enhance their well-being.

The paper introduces an alternative theory of elections, as pure in its own way as the classical one exposited by McKelvey and Kramer. In this model voters respond only to the performance of the candidate in office and do not pay any attention whatsoever to the promises of the challenger or, for that matter, to the promises of the incumbent. All that counts for a voter here is how well he fares under a given administration.

In the model, voters assume that a newly elected officeholder will pursue his own interests once in office, no matter what he claimed in the context of the campaign. On this view, promises play no role at all because there is no way for candidates to commit themselves to keep them. As long as politicians are all of the same "type," in the sense that they have the same preferences and abilities, the voter can correctly anticipate how the officeholder will behave in every circumstance that may confront him. No promise to do otherwise would be credible and so none would be heeded.

Given this hypothesis about the behavior of politicians in office, the voters will choose a decision rule that maximizes their well-being subject to the constraint that politicians are pursuing their self-interest. Nevertheless, voters are constrained in their choice of decision rules to recognize that at any future time, prescribed voting

behavior must be in the interest of the electors at that time. They are unable to bind or precommit themselves or their offspring to choices in the future that will seem unattractive at that time. Thus, those voting rules based on "incredible" threats are not available because officeholders would recognize that such threats would not be carried out.

2. PREVIOUS RESEARCH

There has been some investigation of the incentives that certain types of performance-oriented voting rules confer on incumbents [Nordhaus (1975)]. However, most of this work focuses on a relatively specialized implication of performance-oriented voting: if voters are sufficiently myopic, incumbents have an incentive to behave differently in election years than at other times and therefore to try to create political business cycles. Whether or not incumbents are able to create political business cycles, however, depends on a variety of other factors irrelevant to our present concern with the control of incumbents through the choice of voter-decision rules. Indeed, recent work suggests that if voters are able to take account of economic constraints, politically-induced business cycles may not occur [Chappell and Keech (1985)]. Moreover, the formulation of political business-cycle models does not pay much attention to the choice of *optimal* voter-decision rules, given the opportunities of incumbents.

More relevant to the present paper is Robert Barro's (1973) seminal investigation of the control of politicians. Barro investigates the question of how much the fact of repeated elections may induce officeholders to act on the preferences of the electorate rather than their own objectives. Barro's approach differs from ours in several respects. First, he assumes that officeholders have a finite and commonly known horizon. Thus, in their last term of office their behavior is

uncontrollable.[3] In light of this uncontrollability, the electorate would not return an officeholder seeking his last term; the politician would then see this and be uncontrollable in the penultimate term, and the process would unravel. The present model is formulated with an infinite horizon, so that such last-period effects are avoided. The reader may think of the competitors for office as political parties that last indefinitely and must solve the "last-period" problem for their officeholders through the use of internal incentives.[4]

Second, Barro's model is formulated in a world of perfect information, whereas the present model contains an informational asymmetry: the electorate is not able to observe the actions of politicians directly. With perfect information the voter is able to extract most of the rents in the transaction. In equilibrium, at each period, the electorate demands that the officeholder provide a quantity of effort that leaves him indifferent between leaving and staying in office. Here we allow a natural informational asymmetry in favor of officials, which allows them opportunities to take advantage of their privileged positions. Intuitively, the greater the informational advantage that officials hold, the greater their ability to earn rents from officeholding.

Finally, Barro's model contains only one "representative" voter. In effect, this formulation assumes not only that voter preferences are identical, an assumption that may in some circumstances be justified, but also that there are no distributional issues at stake in political competition, surely a more controversial hypothesis. While we are unable to provide a complete analysis of the general case, we do show that the introduction of distributional issues profoundly changes the nature of the relationship between the electorate and its officials, vastly reducing the level of electoral control.

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[3]The mechanism suggested to overcome the last-period problem is the one introduced by Becker and Stigler (1974). Becker and Stigler argue that misbehavior can be controlled if officeholders face the loss of a pension (or, equivalently, a posted bond) in the event of malfeasance in their last term. Barro suggests that political parties might offer future appointment to office as an inducement for good last-period performance.

[4]See previous note.

In the next section we outline a simple dynamic model of electoral competition that allows us to analyze the incentives of officeholders and to see how they would respond to variations in electoral behavior. This model, like Barro's, contains only one voter (or a homogeneous electorate) and two or more candidates. The "space" over which the performance of the officeholder is defined is identified with an interval on the real line. In this context, the restriction to a one-dimensional outcome space is inconsequential, though in other settings it may not be.

When we turn our attention to a model in which there are several voters, the situation changes substantially. In Section 4 we show that the introduction of preference diversity permits the incumbent to escape electoral control unless the voters "agree" to utilize some sort of aggregate performance index as their criterion for retrospective voting. If voters utilize individualistic or group-based criteria, the incumbent will have the opportunity to exploit voter divisions to his advantage. The nature of such an agreement does not entail any precommitments by the voters, in the sense of requiring anyone to vote against his or her interests at some future point in time, and so such an agreement would be credible. We may interpret this result as saying that electoral control with a nonhomogeneous electorate requires "sociotropic" voting -- that is, voting based on an aggregate criterion -- rather than individualistic voting [Kiewiet (1983)].

3. A SIMPLE MODEL OF REPEATED ELECTIONS WITH A HOMOGENEOUS ELECTORATE

Many of the activities of officeholders are not directly observable by members of the electorate. Instead, electors are only able to assess the effects of governmental performance on their own well-being. Further, governmental performance is known to depend jointly on the activities of officeholders as well as on a variety of exogenous and essentially probabilistic factors. In other words, the officeholder is an agent of the electorate whose behavior is imperfectly monitored. Officeholders are assumed to desire reelection in order to take advantage of the perquisites of office as well as to pursue their own ideas about policy. It is the desire to retain office together with the

possibility of an indirect monitoring by the electorate which drive the incentive effects that we observe in the model.

Before setting out the model, we should emphasize that we have assumed that candidates for office are all essentially the same in the sense that they have the same preferences and abilities, and that this is common knowledge among all the actors. In other words, the voter's problem is to police moral hazard rather than to find and elect the more capable of benevolent officeholders. Rules of the sort we are addressing here may have the property of separating different types of officeholders in an appropriate setting, but we do not address those aspects here.

In this paper we take the liberty of working with explicit functional forms that are relatively easy to analyze. Some of the arguments developed here might be generalized in other settings, but for now we have chosen to try to obtain clear results in the context of a very simple model in order to aid our intuition about the ways in which the behavior of electors might induce officeholders to pay attention to their preferences.

The officeholder observes a random variable, $\theta \in \Omega = [0, m]$, a subset of the nonnegative real numbers, and then takes an action, $a \in [0,\infty)$, conditioned on that observation. We let F denote the distribution function of θ and assume that it is continuously differentiable. The single-period preferences of the officeholder are written as

$$v(a,\theta) = W - \phi(a),$$

where W is the value of holding office for a single term and ϕ is a positive monotone convex function and $\phi(0) = 0$. W may be thought of as the explicit compensation of the officeholder plus any rents he may earn as a result of his tenure and $\phi(a)$ is the cost of action a.

The voter is unable to distinguish the actions of the officeholder from exogenous occurrences. Rather than directly observing "policy," he is restricted to monitoring "performance," which is defined to be a product of policy and exogenous occurrences. Thus, the elector's single-period preferences are represented as

$$u(a,\theta) = a\theta.$$

Lacking an ability to observe the activities of the incumbent, the elector adopts a simple performance-oriented (or retrospective) voting rule: if the utility received at the end of the incumbent's term in office is high enough, he votes to return the incumbent to office; otherwise he removes the incumbent and gives the job to someone else. It is clear that, under certain conditions, such a rule will induce the incumbent to pay attention to the requirements of retaining office. It is also clear that the elector must be careful to set the required utility level appropriately, since if it is set too high the incumbent will not find it worthwhile to try to retain office and will instead choose to take advantage of the opportunities currently available to him as an officeholder. On the other hand, if the level is set too low, the incumbent will find it sufficiently easy to sustain his hold on the office that he will choose too low a level of a.

It will turn out that the incumbent's behavior depends critically on his likelihood of being able to return to office in the future in the event that he is defeated. In the following analysis we consider two polar cases: (1) in the event of a loss of office, the incumbent has no chance of returning; (2) in the event of a loss of office, the incumbent is replaced by another agent and returns to office if and when that other agent loses. We think of the first assumption as corresponding more or less to multiparty competition with small parties, in which a party out of office has a relatively small probability of regaining it at the next election. The loss of office would appear to be quite final from the standpoint of the incumbent party in such a system. This case could also model the candidate's perspective as opposed to the party perspective in two-party system in which the competitors are party "teams" that alternate in office.

Several remarks about this formulation seem important. First, the model contains an extreme informational asymmetry. The incumbent official is able to resolve all uncertainty before taking his action, while the voter cannot. At the cost of complicating the notation somewhat, we could introduce an additional disturbance representing uncertainty that the candidate is unable to resolve prior to his choice of policy. In this case, the candidate would view his election

prospects as uncertain. While this case is perhaps more realistic, it does not permit us to gain any additional insights into either incumbent or voter strategies.

Both officials and voters are assumed to be risk neutral. This assumption simplifies the analysis somewhat and also affects the nature of optimal strategies. If the candidate and voter differ in their risk aversion, issues related to risk sharing would arise. Again, while such cases may be more realistic, they would needlessly complicate the present analysis and so we leave them aside.

Finally, for reasons alluded to in the introduction, the challenger plays no active role in the model. The importance of challengers lies entirely in their availability. It is the existence of willing officeseekers that gives the voter whatever leverage he has on the incumbent. For this reason, it is important that the elective office is valuable enough relative to alternative sources of employment to attract challengers.

Given the one-period preferences outlined above, and assuming that the elector employs a retrospective voting rule, we can utilize standard techniques of dynamic programming to determine optimal candidate behavior. Once the incumbent has observed a value of θ_t, he will choose an action which maximizes his (discounted) utility from that time onward, assuming that the voter employs a retrospective voting rule with cutoff levels, K_t, K_{t+1}, K_{t+2}, ..., from time t forward. Under the conditions assumed above, this amounts to choosing $a(\theta_t)$ to maximize the present value of utility stream. Obviously, if θ_t is so small that it is not possible to be reelected, then he will choose $a(\theta_t) = 0$. If it is possible to be reelected, then the candidate may choose $a(\theta_t)$ so the reelection constraint is just satisfied: $a(\theta) = K_t/\theta_t$. In no event would he be willing to choose any $a(\theta_t)$ larger than the smallest amount that will ensure his reelection.

In the remainder of this section, we present a characterization of equilibrium voter and incumbent strategies (Propositions 1 through 3). Then, we examine alternative party systems from the standpoint of electoral control (Proposition 4). Finally, in Proposition 5, we present a comparative static result that implies that control of incumbents is greater for more valuable offices.

After each election, the officeholder observes the value θ_t and

chooses $a(\theta_t) = K_t/\theta_t$ if and only if

$$W - \phi(K_t/\theta_t) + \delta V^I_{t+1} \geq W + \delta V^O_{t+1}, \tag{1}$$

and, if (1) is not satisfied, he chooses $a(\theta_t) = 0$. In (1), V^I_{t+1} and V^O_{t+1} stand for the expected values of staying in office or leaving office, respectively, given optimal play by voters and candidates from the next election forward, and δ represents the (common) discount factor employed by all agents. It is important to note that V^I_{t+1} and V^O_{t+1} are independent of θ_t and K_t. Re-arranging terms permits us to establish the following characterization of optimal incumbent strategies:

PROPOSITION 1: Given the retrospective voting rule $\{K_t\}_{t=0}^{\infty}$, the optimal incumbent strategy is

$$a(\theta_t) = K_t/\theta_t \text{ iff } \theta_t \geq K_t/\phi^{-1}(\delta(V^I_{t+1} - V^O_{t+1})). \tag{2}$$

PROOF: (1) implies that $a(\theta_t) = K_t/\theta_t$ if and only if $\theta_t \geq \theta^*_t$, where θ^*_t satisfies $\delta(V^I_{t+1} - V^O_{t+1}) = \phi(K_t/\theta^*_t)$. The inequality then follows from the fact that ϕ is positive monotone, convex, and $\phi(0) = 0$.

In other words, the incumbent will expend effort only if he observes a sufficiently favorable value of θ_t. Notice that this expression implies that if the value of office is relatively small, the incumbent may choose to accept defeat though he could have been re-elected.

REMARK: Given the retrospective voting rule, the incumbent's optimal strategies are optimal at each time t forward. Thus an optimal strategy is credible because the incumbent would actually carry it out for each value of θ_t that he could realize. Or, to put it another way, they are equilibrium strategies in each subgame (e.g.,. subgame perfect).

In order to characterize an equilibrium, we must determine the optimal retrospective rule. The expected utility of the voter may be expressed as follows:

$$U = \sum_{t=0}^{\infty} \delta^t K_t \Pr\{\theta_t \geq K_t/\phi^{-1}(\delta(V^I_{t+1} - V^O_{t+1}))\} \tag{3}$$

We can give a characterization of optimal retrospective rules by maxi-

mizing (3) over all retrospective rules.

PROPOSITION 2: If the θ_t are independent, identically distributed random variables with cumulative distribution function $F(\cdot)$ and density $f(\cdot)$, an optimal retrospective voting rule satisfies the following equality:

$$K_t = \frac{[1 - F(\theta_t^*)]}{f(\theta_t^*)} \phi^{-1}(\delta(V_{t+1}^I - V_{t+1}^O)) \tag{4}$$

PROOF: This follows directly from the first-order conditions derived from equation (3).

The important thing to notice about equation (4) is that K_t depends positively on $V_{t+1}^I - V_{t+1}^O$. The larger is the value of remaining in office to the incumbent, the more the voter can ask of him. In the special case in which F is uniform and ϕ is the identity function, we obtain a clearer characterization.

COROLLARY: If the θ_t are independent, uniform, random variables on [0,1], and if $\phi(a) = a$ and $a \in [0,1]$, an optimal retrospective rule must satisfy the following equation:

$$K_t = \min\{1/2, \delta(V_{t+1}^I - V_{t+1}^O)/2\} \text{ for all } t. \tag{4'}$$

Equations (4) and (4') can be interpreted as follows. In each period, the elector sets K_t to equate the expected value to the incumbent of staying in office to the value of choosing $a(\theta_t) = 0$ and accepting defeat.

PROPOSITION 3: If $[1-F(x)]/f(x)$ is monotone decreasing function, then θ_t^* is independent of δ, t, and W.

PROOF: Substitute for K_t using equation (4) in the following expression

$$\theta_t^* = K_t / \phi^{-1}(\delta(V^I - V^O)) \tag{5}$$

yields the equation $\theta_t^* = [1 - F(\theta_t^*)]/f(\theta_t^*)$, which has a unique solution under the assumption of monotonicity.

REMARK: An optimal retrospective voting rule is subgame perfect in the sense that its restriction to any subgame is an equilibrium strategy in that subgame. Assuming he is restricted to employing some retro-

spective voting rule, the elector can do no better than employing a rule that satisfies (4). For this reason, incumbents will regard optimal retrospective rules as credible.

COROLLARY: If F is uniform on [0,1], $\phi(a) = a$ and a is restricted to lie in [0,1], then $\theta_t^* = 1/2$ and $Pr(\{\theta_t \geq \theta_t^*\}) = 1/2$.

REMARK: It follows from the formulation that any solution to (3) must be stationary in the sense that $K_t = K$ for all t. To see this, note that if equation (3) is rewritten as follows,

$$U_0 = K_0 Pr(\theta_0 \geq \theta_0^*) + \delta U_1 \qquad (3')$$

$U_1 = U_0$ since strategies and payoffs are the same at time 1 as at time 0. Moreover, U_1 does not depend on K_0. Thus, if K_0 maximizes (3'), K_0 must maximize U_1, too, and so on for each t.

In the special case of uniformly distributed disturbances, stationarity implies the following convenient expression for the expected utility of the voter, using an optimal retrospective voting rule, K:

$$U = K/2(1-\delta) = \min\{1/2, \delta(V^I - V^O)/2\}/2(1-\delta). \qquad (3'')$$

Thus, up to the point where the expected marginal value to the incumbent of continuing in office exceeds 1/2, the voter's expected utility depends on this marginal value. The more attractive the present value of office is to the incumbent, the more satisfaction the voter can anticipate. However, this effect holds only for relatively unattractive offices. Indeed, for very unattractive offices, the voter can expect to receive almost nothing from the officeholder. For more valuable offices, the effects of increasing value do not accrue to the elector in increased control of the incumbent but flow, instead, to the politicians.

Having described optimal strategies, we may now calculate the equilibrium payoffs to the game. Turning first to the incumbent we see that if the voter is playing a stationary retrospective voting strategy with criterion K, we may write the expected value of being an incumbent, before observing θ, as follows:

$$V^I = \int_{\theta^*}^{m} [W - \phi(K/\theta) + \delta V^I]dF(\theta) + \int_{0}^{\theta^*} [W + \delta V^O]dF(\theta) \qquad (6)$$

The discounted expected utility of a candidate out of office may be similarly written.

$$V^O = \int_{0}^{\theta^*} [\lambda\delta V^I + (1-\lambda)\delta V^O]dF(\theta) + \int_{\theta^*}^{m} \delta V^O dF(\theta) \qquad (7)$$

where λ is the probability of obtaining office if the current incumbent is defeated at the next election, which is taken to be exogenously determined. In this interpretation a pure two-party system corresponds to $\lambda = 1$, so that $V^O = \delta(V^I+V^O)/2$. At the other extreme, a "pure" multicandidate system would have $\lambda = 0$, and therefore, $V^O = 0$.

Solving (6) and (7) we obtain the following expressions for V^I and V^O,

$$V^I_\lambda = \frac{[W - \int_{\theta^*}^{m} \phi(K_\lambda/\theta)dF(\theta)][1 - \delta(1-\lambda p)]}{[1-\delta(1-\lambda p)][1-\delta(1-p)] - \lambda\delta^2 p^2} \qquad (8)$$

$$V^O_\lambda = \frac{\lambda\delta p[W - \int_{\theta^*}^{m} \phi(K_\lambda/\theta)dF(\theta)]}{[1-\delta(1-\lambda p)][1-\delta(1-p)] - \lambda\delta^2 p^2}, \qquad (9)$$

where $p = F(\theta^*)$ and where the subscripts indicate the dependence on λ. We can now state our major results.

PROPOSITION 4: An increase in λ lowers the utility of the voter.

PROOF: By implicitly differentiating $V_\lambda = V^I_\lambda - V^O_\lambda$ with respect to λ and rearranging terms, we see that $\partial V_\lambda/\partial\lambda$ is negative and, from equation (4), this implies that the derivatives of K_λ and U_λ with respect to λ must be negative as well.

REMARK: As the number of parties is restricted, the welfare of the elector declines. As the proof suggests, this occurs as the number of parties falls (i.e., as λ gets larger) and the incumbent's relative valuation of office declines. He becomes less concerned with losing office and is, therefore, less controllable by the voter.

An alternative interpretation of this result may be given if we let $\lambda = 0$ depict the incentives of candidates rather than parties. In this case we see that the voters can attain higher levels of control by

holding candidates rather than parties responsible for poor outcomes. This is accomplished by refusing ever to reelect an officeholder who governed in a period of poor performance.

Finally, essentially the same argument as above yields the following result:

PROPOSITION 5: The utility of the voter is increasing in W.

PROOF: By implicitly differentiating V_λ with respect to W and solving for $\partial V_\lambda / \partial W$, we see that V_λ is increasing in W. This implies that U increases in W, too.

Most of the conclusions that are drawn from this simple model of repeated elections are in accord with intuition. Like Barro, we find that voters have more control over officeholders when the value of office is relatively high and when the future is less heavily discounted. To the extent that voters can directly affect the value of office, they should choose it optimally. How this should be done is discussed in Barro's paper, and we refer the reader to his discussion. Roughly speaking, an increase in the value of office can be expected not only to cost something but also to increase the level of competition for office among nonincumbents (this is not explicitly modelled either here or in Barro's paper). To the extent that the value of office is determined by the (legal or illegal) behavior of incumbent politicians, that value may tend to be set at a higher level than the voters would wish. In either case, however, we might expect systems to evolve in such a way that politicians desire to hold onto their offices and in which, therefore, the electorate is accorded a modicum of control.

Perhaps more surprising is our conclusion about the comparative merits of party systems. While our depiction of the two systems is simplistic, we believe that the basic conclusion will hold up in more sophisticated models of repeated elections as long as there is no motive for the development of party reputations. As long as the parties do not differ in their capabilities or preferences in some unobserved way, they have no way of distinguishing themselves in the minds of the voters. In such a setting, the restriction of electoral competition to two parties has the effect of decreasing the level of voter control over officeholders. Voters are better off in this model to the extent that they can prevent the system from evolving into two-party competition. In a two-party system the loss of office is not as consequential as it would

be in a pure candidate (or, indeed, a multiparty) system and so office-holders are not given a strong incentive to pay attention to the interests of the electors.

4. ELECTORAL CONTROL WITH A NONHOMOGENEOUS ELECTORATE

The development of the model of electoral control was based on the assumption of homogeneous voter preferences over government performance. While there is some empirical evidence in favor of the hypothesis that voter evaluations of incumbents are correlated, there is still reason to suspect that voters may disagree in their ratings of government performance. Indeed, many of the real differences among parties and candidates may be due to distributional differences in the policies they pursue. How far may the results of our model be extended in a world in which the voters maintain separate evaluative standards for officeholders?

We begin by considering a simple specialization of the model in Section 2 and extending it to the case of N voters, each of whom cares only about the quantity, x_i that he receives. We let the value of office be W, and the incumbent's objective is to maximize W - a; but, in this case, the incumbent must also decide how to divide the output, $\theta a(\theta)$, among the voters. Thus, his strategies are represented by an (N+1)-vector (a,x), where $x=(x_1,x_2,x_3,\ldots,x_N)$ and where $\sum x_i = \theta a(\theta)$.

The game proceeds just as before: the voters announce their retrospective voting levels, K_i, and then the incumbent observes θ_t and chooses (a,x). Then each voter observes the output he receives and votes to re-elect the incumbent if and only if it is satisfactory in the sense that $x_i \geq K_i$. For the present, we restrict our attention to stationary equilibria in order to economize on notation. This will not entail any essential loss of generality.

The following proposition characterizes the equilibria of this model:

PROPOSITION 6: If $\langle K_1,K_2,K_3,\ldots,K_N,(a,x)\rangle$ is an equilibrium, it is equal to zero in all its components.

PROOF: Given the voters' choice of K_i, $i = 1,\ldots,N$, the incumbent will choose the majority coalition, $\hat{c}$, to minimize $\sum_{\hat{c}} x_i$ subject to the

constraint that $x_i \geq K_i$ for all $i \in \hat{C}$. Obviously, this implies that $x_i = K_i$ for $i \in \hat{C}$ and that $\hat{C}$ is a minimal majority. If this minimum is positive, any $j \notin \hat{C}$ would have been better off to offer $K_j < \max\{K_i \mid i \in \hat{C}\}$, which shows that $K_i = 0$ for all i, and, therefore, that a=0.

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. Thus, in the distributive setting, retrospective voting appears to lead to a rather unsatisfactory outcome from the standpoint of the electors. Moreover, from the structure of the argument, it seems clear that similar phenomena will arise in any model in which voter preferences are sufficiently diverse that no majority-rule equilibrium exists.

This phenomenon may be seen as a sort of paradox: seemingly rational individual behavior leads to a collectively undesirable outcome. One might think that the presence of potential competitors for office would prevent the incumbent from exploiting this situation. After all, if the incumbent is entirely uncontrollable, one would expect that the office would be very valuable and that challengers would compete vigorously for the opportunity to become incumbents.

But challengers are unable to make precommitments to the voters and so any nonzero offer by a challenger to a majority would not be credible; once in office, the challenger would be motivated to violate such a promise. Thus, whatever capacity challengers have to discipline incumbent performance lies entirely in their availability and not at all in any strategic offers they might make.

The problem, therefore, is for the voters to choose a voting rule that allows the presence of challengers to discipline incumbent behavior. It is clear that if the voters are able to coordinate their behavior successfully, they might hope to achieve the level of control exhibited in Section 3. The solution to that problem represents the highest attainable level of performance from incumbents.

The potential for exploitation by incumbents may lead the voters to adopt what are sometimes called sociotropic rules: voting rules in which individual electors base their vote on an index of aggregate performance [Kiewiet (1983)]. Clearly, if voters base candidate evaluations on an aggregate index of performance rather than on their indi-

vidual shares of aggregate output, the incumbent's ability to exploit divisions among them will be reduced. Indeed, the following simple proposition illustrates this possibility.

PROPOSITION 7: If voters agree to utilize expected aggregate output as the criterion, they will be able to induce the incumbent to provide the same level of service as was exhibited in Section 3.

PROOF: The voter problem is represented as equation (3) and the incumbent's problem is unchanged.

Of course, the usual collective-action problems arise in the determination of a sociotropic rule. Voters will disagree among themselves as to which is the best one and candidates, for their part, will try to induce voters or groups of voters to "defect" from the sociotropic rule and vote, instead, on a distributional basis. But once a sociotropic rule is agreed upon, though the temptations to defect and vote "selfishly" may be strong, voters will realize that these temptations are not credible.

5. DISCUSSION

We have illustrated the limits of the electoral control of incumbents in a simple setting in which candidates are essentially identical to one another and where the voters' problem is to motivate them to act in a popular fashion. The limits of control are achieved, not surprisingly, in a setting in which the electorate can act in a unitary fashion and in which there is a set of challengers waiting to assume office should the incumbent fail to perform adequately. In that case, popular control of incumbents rests on the structure of the party system and on the rewards of office.

If, however, we take account of the diversity of preferences in the electorate, the degree of popular control becomes problematic. Insofar as the electorate is able to agree on some performance standard, the incumbent may be subject to the same discipline as he is with a homogeneous electorate.

From the standpoint of the electorate, then, we have seen that control of politicians requires more than simple retrospective voting. It seems to require, as well, a refusal to vote selfishly. This result,

while perhaps surprising at first encounter, may offer hope of explaining heretofore puzzling empirical findings in the voting behavior literature which suggest the widespread use of sociotropic rules rather than more selfish forms of retrospective voting. Of course, this remark poses the question of how voters might come to agree on a particular sociotropic rule.

Less visible, in our model, is the role of challengers. We have assumed, throughout, that challengers and incumbents are unable to collude -- a plausible assumption when there are many challengers -- so that it was unnecessary to examine strategies that involved deliberate alternation in office by two collusive competitors and low performance levels. It is evident that, if binding agreements could be arranged among the set of potential officeholders, the solution concept employed here is not adequate. In that case, we would have to examine the cooperative possibilities explicitly and consider the bargaining problem among candidates. Whether such a model is worth developing depends, of course, on the presence of entry restrictions on officeholding. Perhaps we should think of one-party states -- whether in the American South, Eastern Europe, or in various third-world countries -- as embodying mechanisms that control entry of politicians and, thereby, maintain collusive opportunities for officeholders of the established party. Of course, how these officeholders in the dominant party may prevent competition among themselves remains unresolved.

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