Retrospection, Present Value, and Incumbent Electoral Strategies: A Political Benefit-Cost Calculus

Kenneth A. Shepsle
Barry R. Weingast
Christopher Johnsen

At least since Downs (1957), students of elections and voting behavior have been interested in the relationships between policies and electoral outcomes. Policy outcomes, on the one hand, constitute the record on which basis an incumbent politician or party is retrospectively judged. Policy promises, on the other, provide a prospective basis on which to compare competing politicians or parties. The relationships between policy and elections has spawned a large theoretical literature on spatial models (summarized in Davis, Hinich and Ordeshook, 1970; Rike and Ordeshook, 1973; and Shepsle, 1974) and has produced a veritable revolution in the study of voting behavior (under the rubric of "issue voting"). Most recently, following Kremer's (1971) seminal article, there has been heightened empirical interest in the role and impact of economic conditions and policies on electoral fortunes and incumbent popularity (Stigler, 1973; Arcelus and Meltzer, 1974; Bloom and Price, 1974; Goodman and Kremer, 1974; Niskanen, 1975; Nordhaus, 1975; Lindbeck, 1975; Frey and Schneider, 1975; Tufte, 1975; MacRee, 1977; Alt and Chrystal, 1978; Fair, 1978; Fiorina, 1978; Frey and Schneider, 1978; Kernell, 1978; Tufte, 1978; Fiorina, 1979, Levi and Monroe, 1979).

Our analysis in this paper draws heavily on the ideas and analyses of the economic conditions/political business cycle literature. As well, our work is motivated by the research on the electoral incentives of politicians (Mayhew, 1974; Fiorina, 1977). In contrast to these rich empirical literatures, however, ours is a more theoretical exploration. In particular, we focus on the meaning--indeed, the various meanings--of the quintessential retrospective
question, "what have you done for me lately?" Fundamentally, we are concerned with the retrospective evaluative rules, time horizons, and discounting practices of voters, and with the prospective, i.e., future-oriented, expectations of voters and preferences of politicians for electoral security. We construct several models to illuminate the question above, concentrating on benefit flows. We see that optimal incumbent behavior (vis-a-vis an incumbent objective function) depends on his "models of (voting) man."

1. Incumbents and Reelection--What Can They Do?

The reelection objective for incumbent politicians is not a particularly controversial one. Few dispute that most politicians much (if not most) of the time have their sights set on the next election (though the recent rash of early retirements in the U.S. House of Representatives gives one pause). In addition, most theories of democratic accountability place great weight on recurrent elections and reelection ambition as the chief sources of incentives for the responsiveness of elected politicians to constituency wishes. Once, however, one attempts to provide operational content to this objective or to spell out its consequences, intellectual comity evaporates. There are at least three general areas of controversy and a host of more specific disputes.

First, there is the matter of ambition. Although there is some question whether electoral ambition is of significant importance in explaining the behavior of all politicians (see Schlesinger, 1966, on "discrete ambition" and Prewitt, 1970, on "volunteerism"), few doubt its role in national electoral politics. There is, however, some ambiguity over its domain, viz. ambition for what? In federal systems with several tiers of national office, electoral ambition may take either a "static" or a "progressive" form (the terms are Schlesinger's)--that is, an ambition to retain an office
or to attain a higher office, respectively. Thus, there is some ambiguity concerning the relevant constituency for an incumbent and, therefore, the set of voters from which the incumbent seeks positive retrospective or prospective evaluations.\textsuperscript{2}

A second difficulty with the reelection objective is the extent to which it is the only objective. Fenno (1973) and others have suggested policy preferences and institutional influence as alternative motivational factors. On the other hand, Downs (1957) suggests that policy, ideology, and reputation are best viewed not as substitute objectives but rather as inputs in a vote production function. Under the first interpretation, the politician's objective function is not exclusively a vote production function; under the second, it is. The first interpretation admits a multiplicity of objectives with tradeoffs among them; the second urges us not to miscategorize vote production inputs or exogenously imposed constraints on vote production as alternative objectives.

A third controversy surrounding the reelection objective concerns the time horizon of politicians. That they look to the next election is not at issue here. Rather the question is whether or not they look beyond it. Put differently, the controversy revolves around the discount rate on electoral careers. The myopic politician is one who applies an infinite discount rate to the future; he looks only to the next election and no farther. His objective is to maximize his probability of reelection or his plurality at the next election. For politicians with longer planning horizons, the objective is stated in terms of maximizing length-of-career or, more appropriately, some time-discounted variant of length-of-career.

We examine the politician's maximand more explicitly below. Fortunately, in order to answer the question posed in the title of this section, we need not take a position on the controversies just reviewed. We simply need to
assume that elections matter to politicians, without committing ourselves to questions of "how much" or "in what form." In order to explore what resources an incumbent can bring to bear on his reelection problem (and with what effect), it is useful to contrast executives and legislators.

For both legislators and executives, the reelection task requires credible credit-claiming and blame-ducking, on the one hand, and position-taking, promise-making, and competence-displaying, on the other. The first two activities are based on the assumption that a voter's total assessment of an incumbent possesses a retrospective component. The incumbent's electoral imperative is one of inducing voters to employ a discriminating version of "post-hoc-ergo-propter-hoc" reasoning, namely: if it's good, I did it; if it's bad, don't blame me! The second pair of activities—position-taking and promise-making—are directed at the prospective components of a voter's total assessment. Here the incumbent's electoral challenge is one of convincing voters of his proximity to their preferences on matters currently on the public agenda. Finally, there is competence-displaying, an activity that serves a dual purpose. As voters come to respect the competence of an incumbent, they are both less prone to blame him for past failures and more prepared to entrust him with their welfare in matters lying in an uncertain future.

The weight of each of these electoral activities falls differently on executives and legislators because, we believe, voter decision-making varies, in national and predictable ways, according to whether they are choosing a President or a Member of Congress. Let us examine this proposition.

**Credit-Claiming and Blame-Ducking**

Credit-claiming and blame-ducking are campaigning techniques enabling an incumbent to provide voters with some perspective on political events. They are, in particular, opportunities for him to advertise his past political
successes and to disassociate himself from past failures. But these opportunities are constrained both by the limits on manipulation of recent political history and by the intuitions of voters about cause-and-effect relationships. Indeed, these constraints define the boundaries of credibility. And the constraints cut differently for legislators and executives.

As Mayhew (1974) and others have noted, it is only the occasional, rare legislator who can credibly claim credit for broad national policy initiatives. A legislator is only one of many in his legislature and, even in those instances in which he occupies an institutional power position, his opportunities to claim credit for broad policy are limited. Rather than claiming credit for the interstate highway system, a major weapons program, or revamping the social security system, a legislator is more likely to advertise his responsibility for the Littletown exit on Interstate 70, the defense contract for the textile plant in Metropolis or the employment increases at Fort Warhawk, and the numerous constituent problems with the regional Social Security Administration resolved. In most instances, legislative credit-claiming must involve relatively small potatoes to be credible.

Executive credit-claiming, on the other hand, is a different matter altogether. In matters of war and peace, macroeconomic policy, and other federal policy, the president has a near-monopoly on credit-claiming. Although he may choose to share that credit with selected legislators, in bill-signing ceremonies and on trips through the district with the local congressman in tow, it is his administration that "whips inflation now," that develops a military capability "second to none," that reforms the tax laws so that they are no longer "a disgrace to the human race," or that consummates the SALT and Midwest peace treaties.
Credit-claiming, however, can cut two ways. On matters of national policy, there are voters who favor and voters who oppose. Thus on national policy, credit and blame are entwined; he who claims credit must also accumulate some blame. District-related pork-barrelling and casework, on the other hand, are "pure profit" (Fiorina, 1978). It is counterintuitive, but nonetheless true, that in the credit-claiming game the state legislator and congressman, because their credit-claiming credibility delimits the sphere in which they can persuade voters of their role, are advantaged as incumbents in comparison to those who are more visible in major policy-making—governors, presidents, and to some extent senators.

In blame-ducking, as in credit-claiming, those who are out front on broad national policy are in the more vulnerable position. It is tougher for an executive to disassociate himself from a policy failure than it is for a legislator. If a president fails to whip inflation or if he permits the nation's military posture to deteriorate, he suffers at the polls (see Popkin et al., 1976, and Page, 1978). The congressman would seem to be more insulated from the ebbs and flows of policy. He has his 534 colleagues plus the president on whom to heap the blame (see Fenno, 1975). While there is some evidence that the fates of congressmen are linked to executive performance (see Tufte, 1975), the link appears to have attenuated in recent years.

One final point should be made. Credit and blame are not opposite sides of a symmetric coin. The research of Bloom and Price (1975) and Kernell (1977) lends support to the view that voters disproportionately weigh negative factors in coming to their vote decisions; they will stand in line longer at the polls to vote "against" than to vote "for". If this is the case, then the legislator's enhanced capacity to claim credit on "pure profit" circumstances and to duck blame for policy failures multiplies his advantages over an incumbent executive.
In sum, the credit-claiming/blame-ducking gambit is tailormade for legislative incumbents. The incumbent legislator associates his candidacy with the "small potatoes" successes of pork barrelling and casework and remains aloof from failures in natural policy. That is, credit-claiming and blame-ducking are major components of his reelection strategy, an option available to incumbent executives to a much lesser extent. Executive strategy is, to a considerably greater extent, dominated by position-taking and promise-making.

Position-Taking and Promise-Making

While "what is past is prologue" describes (prescribes?) the rational basis for retrospective evaluation by voters, other information allows for a prospective assessment. In terms of campaign activity, this takes the form of position-taking and promise-making involving efforts by candidates to persuade voters that their future official actions will be inspired by the preferences and welfare of their constituents. But, in order for these factors to play a consequential role in a vote decision, they must possess credibility in three senses. First, they must appear technically feasible. It is one thing to promise to "do something" about inflation, quite another to promise to "whip inflation now." Second, the promise or position must bear some resemblance to the promise-maker or position-taker, respectively. Senator McGovern's recent declaration in favor of sending American troops to invade Cambodia in order to bring an end to the Pol Pot regime was incredible, not only in terms of the insanity of its policy content, but also (even more so) because the urging came from one of the most prominent American doves. Third, the promise or position must be related to the official capacity of the promise-maker or position-taker. A congressman's promise to solve the inflation problem is not likely to be taken very seriously (unless he happens to chair an appropriations or budget committee).
Promises and positions—the stuff of prospective evaluations—are probably more ambiguous (see Shepsle, 1972; Page, 1974) and imprecise than the more tangible record that comprises the basis for retrospective evaluation. To the extent that incumbents successfully employ promise-making and position-taking, however, we conjecture that executives have an advantage over legislators. Given the three characteristics of credibility to which we just alluded, executives are no more advantaged or disadvantaged than legislators on the first two, but are believed to have a much greater capacity to deliver on policy promises and positions than individual legislators. No doubt many voters heavily discount executive promises and positions, but then, a fortiori, they will discount legislative promise-making and position-taking as well.

**Competence-Displaying**

Competence-displaying by incumbents, as we noted above, serves two strategic purposes. It purchases good-will and trust. The former provides a basis for voters to give credence to promises and claims of credit, on the one hand, and to de-emphasize blame and unpopular positions, on the other. The latter permits the voter to maintain the hypothesis that the incumbent will faithfully represent the voter on issues not yet on the public agenda and on matters in which the voter lacks either the inclination or the ability to monitor incumbent performance.

Both legislators and executives attempt to display competence to their constituents. Fenno (1978, p.57) calls it qualification, about which he writes, in reference to the campaign "home style" of legislators,

> Every congressman tries to convey to his constituents a sense of his qualification for the job he seeks. Contextually and verbally, he gives them the impression that "I am qualified to hold the office of United States representative." "I understand the job and I have the experience necessary to do a good job." "I can hold my own—or better—in any competition inside the House." It is important for House members to convey this impression.
He notes elsewhere (Fenno, 1978, p.169), "'Issues,' as one member said, 'are not as important as the treatment of issues.'" On the executive level, one of the main discoveries of Popkin et al. (1976) is the importance of competence in voter evaluations of presidential aspirants. Their analysis of the 1972 election suggests that it was voter perceptions of McGovern's incompetence "that led to loss of votes not only among voters in general but even among voters who agreed with him on the issues (Popkin et al., 1976, p.794)."

In sum, incumbent campaign strategy is a mix of credit-claiming, blame-ducking, promise-making, position-taking, and competence-displaying. The particular mix of activities, of course, varies from incumbent to incumbent. But we believe a large proportion of the variance in mix is accounted for by the office being contested. The legislator's campaign is characterized by small-potatoes credit-claiming, aloofness from conspicuous policy failures, and general displays of competence, with issue-oriented policy promises and position-taking of lesser significance. The executive's campaign is much more heavily issue-related and, therefore, much more prospective. Executive credit-claiming and blame-ducking, as well as promises and positions, involve grand national issues of current salience or of historical importance. Similarly, displays of (in)competence are entwined with performance or issues.

What this distinction suggests is not that retrospective evaluation by voters is the primary criterion for legislators and of little importance for executives. Retrospective evaluation, based on the hard evidence of the public record, is undoubtedly of paramount importance in both kinds of elections. What it does suggest is that models of legislative elections should have a slightly different emphasis than those of presidential races. The crucial distinction, then, involves the credibility of candidate claims and promises which, in turn, depends on the ways in which voters respond to candidate
appeals. We turn shortly to several models of voting where we examine various interpretations, both prospective and retrospective, of the question "what have you done for me lately?" Before doing that, it is necessary to develop the concepts of benefit and cost in political terms.

2. Political Meanings of Benefits and Costs

To the economist, benefit-cost analysis is fairly straightforward. Although there is controversy concerning the measurement of benefits and costs, spillovers, appropriate time horizons and discount rates (see McKean, 1958; Hitch and McKean, 1967), the principle of efficiency is clear: Invest in a project until the benefit produced by the lost dollar of investment is just equal to the cost. Formally, if \( x \) is the control variable or input resource, and \( B(x) \) and \( c(x) \) are the benefits and costs, respectively, from an investment of \( x \) units of this resource, then the principle of efficiency implies a level of investment, \( \hat{x} \), (scale of project) with the property:

\[
B'(\hat{x}) = c'(\hat{x})
\]

(1)

where

\[
B'(\hat{x}) = \frac{dB(x)}{dx} \bigg|_{x=\hat{x}} \quad \text{and} \quad c'(\hat{x}) = \frac{dc(x)}{dx} \bigg|_{x=\hat{x}}.
\]

In political contexts, institutional arrangements impose serious obstacles to the satisfaction of the principle of efficiency. We focus on two—the law of 1/N and the disparity between economic and political costs and benefits.

The Law of 1/N

Representative democratic institutions often rely on geographically-based districts as the modus operandi of representation. The Law of 1/N is a statement of the public investment tendencies, and concomitant efficiency distortions, of an N-member legislature. Any given legislator has
incentives, for credit-claiming reasons, to seek legislative enactments
that concentrate benefits in his geographic district. Consider such a
project and suppose the benefits depend upon the scale of the project which
is measured by an input resource (like money) \( x \) -- \( B = B(x) \). Similarly,
economic costs are a function of scale -- \( C = C(x) \). Unlike benefits, however,
costs are shared by all districts, relative burdens of districts depending
on the revenue-raising system in place. For the \( k \)th district, the tax share
is \( t_k \), where \( \sum_{k=1}^{N} t_k = 1 \), and its tax price for the above project is \( t_k C(x) \).
We assume that tax share is independent of scale. The rational legislator
will push for a project of scale \( x = \hat{x} \) that equates district marginal benefits
with district marginal costs:
\[
B'(\hat{x}) = t C'(\hat{x})
\]  
(2)
Thus, if the tax burden is equally shared by the \( N \) districts, we have
\[
B'(\hat{x}) = 1/N \cdot C'(\hat{x})
\]  
(3)
Comparing (3) with (1) reveals the way in which caricatures, but nevertheless
do point to institutional tendencies. The Law of \( 1/N \) then, is a character-
ization of the Prisoners' Dilemma faced by all credit-claiming legislators.
Each has an incentive to push collectively inefficient projects since his
constituents are saddled with only a fraction of the costs. And this incen-
tive persists, especially in large legislatures, despite the fact that
when everything is totalled up, total costs may exceed total benefits in
every constituency. This situation is exacerbated by the disparity between
economic and political costs.

**Disparity Between Economic and Political Accounting**

Suppose we "unpack" costs by allowing it to be a simple sum of two
distinct components: the districting mechanism combines with credit-claiming
incentives to violate the principle of economic efficiency.\(^4\) In particular,
(3) implies that the magnitude of the project sought by a credit-claiming legislator is one in which, at the margin, the benefits are only \(1/N\) of the cost.

Equation (3), and more generally equation (2), is based on a particular view of legislators and legislatures. The view of legislators is the Mayhew-Fiorina view\(^5\)--namely, that legislators are reelection maximizers who seek to bring home the bacon as part of their reelection strategy. The view of legislatures is the Weingast-Fiorina view\(^6\)--namely, that collusive mechanisms of reciprocity and universalism are institutionalized to facilitate legislator electoral strategies. Both views, of course, are

\[
C(x) = C_1(x) + C_2(x) \tag{4}
\]

\(C_1(x)\) are the resources devoted to the production of the public good or project which are spent entirely within the district. \(C_1\)-type costs, then, involve contracts let to firms in the district, payrolls used to hire employees in the district, various tax revenues going to municipalities and counties in the district, etc. \(C_2\)-type costs, like \(C_1\)-type costs, are spent to hire production inputs, except these are spent outside the district in which the project is sited.

Now let us suppose that the nation is one big district and there is no international market for project inputs. Thus \(C_2(x) = 0\) and \(C(x) = C_1(x)\). To an elected official, but not to his economic advisors, \(C_1(x)\) is both a benefit and a cost--it is a transfer from some of his constituents to other of his constituents.\(^7\) Thus, net benefits are \([B(x) + C_1(x)] - C_1(x) = B(x)\) and the maximizing politician will pick the scale \(x = \bar{x}\) for which \(B'(\bar{x}) = 0\). For the legislator dealing with a project in his district for which, typically, \(C_2\)-type costs are nonzero, net benefits are

\[
[B(x) + C_1(x)] \ t\bar{x} [C_1(x) + C_2(x)] \tag{5}
\]
and the legislator's optimum scale is \( x = x \) where

\[
B'(\hat{x}) = t_{x} C_{2}(\hat{x}) - (1-t_{x}) C_{1}(\hat{x})
\]

(6)

Under reasonable conditions, it may be shown that this sort of political accounting convention further distorts economic efficiency.

In sum, the districting mechanism effect, reflected in the Law of \( 1/N \), and the political accounting of costs and benefits, underpin an explanation of the public goods production process by providing politically-relevant content to the concept of net benefits. That content, however, is static; there is no time dimension and no recognition of the fact that benefits and costs flow over time.

3. Benefit and Cost Flows

In the previous section, we suggested that the districting mechanism and the political accounting of economic costs alter the meaning of net benefits. In this section, we explore the fact that benefits and costs flow over time with an occasional, but regularly scheduled, evaluative interruption called an election. At that interruption, voters look both backward and forward, so we require some methodology for time accounting.

Let us first establish the terms of discourse. Consider a project for the \( \xi \)th district, \( P_{\xi}(x) \), the scale of which depends upon an input vector \( x \). Associated with \( P_{\xi}(x) \) is a flow of benefits (concentrated entirely in district \( \xi \))

\[
B(x) = (B_{1}^{1}(x), B_{2}^{2}(x), \ldots, B^{T}(x))
\]

(7)

and a flow of costs (to be financed from all districts)

\[
C(x) = [(C_{1}^{1}(x) + C_{2}^{1}(x)), (C_{1}^{2}(x) + C_{2}^{2}(x)), \ldots, (C_{1}^{T}(x) + C_{2}^{T}(x))]
\]

(8)
The superscript reflects the time periods $1, \ldots, T$ and $T$ is taken to be an arbitrary time horizon. The subscripts in the $C(x)$ vector reflect the "unpacking" of economic costs into $C_1$-type and $C_2$-type. To capture the considerations of the previous section, define

$$\beta(x) = (\beta^1(x), \beta^2(x), \ldots, \beta^T(x))$$

and

$$K(x) = (K^1(x), K^2(x), \ldots, K^T(x))$$

where

$$\beta^t(x) = B^t(x) + C_{1}^t(x)$$

$$K^t(x) = t^x_{\lambda}[C_{1}^{t*_{\lambda}} + C_{2}^{t}(x)]$$

and $t^x_{\lambda}$ is the tax share of the $x$th district. Thus, $\beta^t(x)$ and $K^t(x)$ are the $t^{th}$ period political benefits and costs for district $\lambda$ flowing from $p_{\lambda}(x)$,

and

$$N^t(x) = \beta^t(x) - K^t(x)$$

are the net political benefits for the $t^{th}$ period. Finally, let us suppose that $E_1$ and $E_2$, with the property $1 \leq E_1 < E_2 \leq T$, are two distinct periods after which an election is held.8

A governmental policy or project, according to this view, is not a one-shot affair, but rather is an activity that produces benefits and consumes resources over time. For the typical pork barrel project--dam, river widening and dredging operation, federal building, etc.--the political benefits early in the life of the project are twofold:

(1) $C_1$-type costs

(2) expected $B$- benefits

As the project matures toward completion, the political benefit mix changes as $C_1$-type costs decline and expected future $B$- benefits become current.
real B- benefits. There are, then, several ways to conceptualize costs and benefits. As well, there are several ways, depending on temporal and political position, to assess the benefit and cost flows.

**Ex Ante Economic Present Value**

The traditional economic\(^9\) assessment of a project \(P_x\) is a computation of net economic benefits, or of the ratio of economic benefits to economic costs, over the planning horizon \([1,T]\). However, a benefit consumed (or a cost borne) is period \(t\), differs *ex ante* from that in period \(t_2 (t_1 < t_2)\). In particular, future benefits and costs are discounted.\(^{10}\) Thus, the discounted present value of \(P(x)\) is

\[
PV_E(p) = \sum_{t=1}^{T} \frac{1}{\gamma^t} [B^t(x) - C^t(x)]
\]

where \(\gamma\) is the discount rate, \(0 < \gamma < 1\), and the subscript \(E\) distinguishes this as an economic calculation.

Since, for many public projects, costs loom large in early periods and economic benefits do not flow until later, most are economically "efficient" only if the discount rate is kept unrealistically low, costs are underestimated, or benefits overestimated. In rivers and harbors legislation produced by the House and Senate Public Works Committees--the traditional pork barrel--Ferejohn (1974) documents precisely these political manipulations of the net benefit calculation. What remains to be answered is "Why?" It should come as no surprise that efficiency is no more than a rhetorical weapon for politicians; it is certainly not a guiding light. But what is?

**Ex Ante Political Present Value**

In this subsection we retain the basic benefit cost structure and compute presidential and legislative prent values for project \(P(x)\) -- \(PV_p(p)\) and \(PV_x(p)\), respectively. Equations (13) and (14) below differ
from (12) only in the distinct ways costs and benefits are counted in political contexts.

\[
P V_p(p) = \sum_{t=1}^{T} \tau^t[B^t(x) + C_1^t(x)] - C_1^t(x)] = \sum_{t=1}^{T} \tau^t B^t(x) \quad (13)
\]

\[
P V_\xi(p) = \sum_{t=1}^{T} \tau[B^t(x) + C_1^t(x) - t(\xi C_1^t(x) + C_2^t(x))] = \sum_{t=1}^{T} \tau[B^t(x) + (1 - t \xi) C_1^t(x) - t \xi C_2^t(x)] \quad (14)
\]

A comparison of (12), (13), and (14) yields several interesting conclusions:

1) Comparing (12) and (13) on a term-by-term basis, we conclude that \( PV_p(p) > PV_\xi(p) \). A President will see more virtue in a public project than his economic advisors (at least in this narrow benefit-cost context). This is true even though the benefits are low and the costs high in the early (not heavily discounted) periods in the life of the project.

2) Comparing (13) and (14) on a term-by-term basis, it follows that \( PV(p) > PV_p(p) \) if

\[
(1 - t \xi) C_1^t(x) - t \xi C_2^t(x) > 0 \quad (15)
\]

or

\[
\frac{C_1^t(x)}{C_1^t(x) + C_2^t(x)} > t \xi \quad (16)
\]

The first conclusion, though straightforward, highlights the fact that politicians do not see the same costs that economists see. The President sees benefits derived from \( P(x) \) concentrated in his district (the nation), \( C_1 \)-type costs as transfers (thus netting out), and \( C_2 \)-type costs assumed zero (no international purchases of inputs). Of course, as \( C_2 \)-type costs grow relative to \( C_1 \), \( PV_p(p) \) declines and, in the limit, when \( C_2 \)-type costs heavily dominate \( C_1 \)-type costs, the President comes to evaluate \( P(x) \) much the same as his economic advisors.
The second conclusion reveals the way in which political cost accounting and tax sharing affect the \textit{ex ante} calculations of politicians. The legislator \( j \) has all the economic benefits concentrated in his district (as does the President) and \( C_1 \)-type costs expended in his district. So long as the proportion of costs that are \( C_1 \)-type exceed the district's tax share, \( t_j \) (equation (16)), \( PV_j(p) > PV_p(p) \). That is, if \( t_j \) is small (say, 1/N) and if \( j \) has a strong incentive to "encourage" the bureaucracy to use local firms and employees in the production of \( P(x) \), then \((1 - t_j)c_1^t(x)\) is bound to exceed \( t_j c_2^t(x) \)--equation (15). If, however, it is not possible to use local inputs, the result fails. In the limit, with \( C_1 = 0, -t_j c_2^t(x) < 0 \), contrary to (15), for any \( t_j > 0 \). On the other hand, if the district's tax share rises--say, via user fees to finance \( P(x) \)--the result ultimately fails. In the extreme, \( t_j = 1 \) and \(-c_2^t(x) < 0 \), again contrary to (15).

To this point, we have not exploited either the temporal setting or the electoral connection. True, we have added notation to allow for the representation of benefit and cost flows and discounting. But we have not had any call to exploit these formalizations. As well, we have distinguished the points \( E_1, E_2 \in [1,T] \) as election dates. But we have not made much use of the election mechanism except implicitly in assuming that politicians seek net benefits for their districts to further their own electoral ambitions. There is, however, a more fundamental problem that involves both time perspective and the electoral connection.

\textbf{Modifying Ex Ante Calculations: Introducing the Voter}

In developing our political benefit-cost calculus, we have purposely retained a parallel to the standard normative (economic) view in which net benefits are computed \textit{ex ante}. Normative benefit-cost analysis is conducted with prescription as its objective so that an \textit{ex ante} perspective seems
appropriate. The politician's problem, however, is to worry about how his constituents will assess his performance, ex post, at \( t=E_1 \) (or perhaps over several elections). At \( t=E_1 \) a constituent may retrospectively assess the flow of net benefits over the time horizon \([1,E_1]\) and prospectively assess the flow of future net benefits over the time horizon \([E_1,T]\). Shortly we formalize these ideas into an incumbent objective function, but for now we simply assume the incumbent believes his probability of reelection depends upon voter retrospective and prospective evaluations at \( t=E_1 \) and \( t=E_2 \).

Consider a voter \( v \) and his evaluation at \( t=E_1 \) of project \( P(x) \). We assume that the voter's utility is a monotonically increasing function of district benefits. Thus as \( B \) increases or \( C_1 \) increases, so does his utility; whereas, if \( C_2 \) increases or \( t_\kappa \) increases, his utility declines. Given \( P(x) \) is in place at \( t=E_1 \), \( v \) may compute a present value for future net benefit flow:

\[
PV_v(P) = \sum_{t=E_1+1}^{T} \tau^t [B^t(x) + (1 - t_\kappa)C_1^t(x) - t_\kappa C_2^t(x)]
\]

He may also compute a present value for past net benefit flows (called 
retrospective value):

\[
RV_v(P) = \sum_{t=1}^{E_1 \sim E_1-t} \gamma^t [B^t(x) + (1 - t_\kappa)C_1^t(x) - t_\kappa C_2^t(x)]
\]

where \( 0 < \gamma < 1 \)

\( PV_v(P) \) is simply the present value for \( v \) over the remaining life of \( P \), namely the planning horizon \([E_1+1,T]\). \( RV_v(P) \) is a "present value" assessment of past experience with \( P \). The most recent past is given heaviest weight, i.e., \( E_1 - t \) is relatively large, with the weight given to past experience monotonically decreasing as one moves further and further into the past.

The voter's evaluation of a credit-claiming politician, then, is a mix of retrospective and prospective present value calculations. The particular mix depends upon the voter and the timing of the election. We defer
further discussion of the voter until later, so let us briefly treat the timing of the election. Suppose $E_1$ occurs just prior to $t=1$ -- $E_1=0$. Then $PV_V(P) = PV_{\lambda}(P)$ (consult equations (14) and (17) and $RV_V(P) = 0$ (consult equation (18). That is, if the election is held prior to the first period in which benefits and costs from $P$ begin to flow, then the voter assessment is identically an ex ante present value calculation. There is no retrospective component because there is no past. On the other hand, if $E_1$ occurs at the end of $t=T$, then $PV_V(P) = 0$ (consult equation (17) and $RV_V(P)$ comprises the entire evaluation. There is no prospective component in this case because there is no future. As $E_1$ varies over the time horizon $[1,T]$, so does the relative importance of retrospective to prospective evaluation.

**Summary**

Before proceeding to the incumbent decision problem, we summarize the various strands of our argument. Politicians run for office on the basis of their past records and future promises. We formalize this in terms of a project or policy $P(x)$ which, for different scale values $x$, generates a vector of economic benefits $B(x)$ and economic costs $C(x)$. Each vector component is associated with a time period in the time horizon $[1,T]$. But the relevant net benefits, on which basis voters respond to incumbent vote-seeking appeals, depends not only on economic flows but political accounting as well. Equations (9) and (10) provide the general form for political benefit and cost flows (a President is distinguished from a legislator by setting $t_\lambda=1$ and $C_2^t(x) = 0$. We then demonstrate that ex ante present value assessments of $P(x)$ depend upon these political factors. Thus, ex ante normative judgments depend upon whether the criterion is economic efficiency, on the one hand, or district net benefits on the other. And if the latter, it further depends on what the district is--the entire nation or a
geographically defined subset thereof. A problem remains if we seek a positive theory of incumbent policymaking, for ex ante normative evaluation of projects is no longer relevant. Incumbents seek to win elections and, with that in mind, seek to pass retrospective/prospective evaluative tests on election day. Incumbent behavior is predicated on a future evaluative criterion and, therefore, depends on how he believes his constituents assess his performance.

4. The Incumbent Objective Function

Politicians, we assume, are rational, instrumental, and oriented toward attaining and retaining office. They are expected utility maximizers who derive utiles from the perquisites of office and who, therefore, engage in policy activity instrumentally. Like Downs (1957), and more recently Mayhew (1974), we assume that the electoral connection is the dominant link between the behavior of politicians and institutional decision-making. Decisions in institutional settings, that is, are motivated by prospective competition in electoral settings.

Incumbent Preferences

An incumbent's utility depends on a number of arguments which we choose to ignore. We assume that at \( t=0 \) the incumbent's utility from holding office is \( u_0 \) and depends only on the fact that he holds office during this period. At \( t=0 \) he can count on \( u_0 \) and, with some electoral (and actuarial!) uncertainty, on \( u_1, \ldots, u_T \). Given \( E_1 \) and \( E_2 \), \( 1 < E_1 < E_2 < T \), as election dates, and barring death, expulsion from office, and other intraterm interruptions, the incumbent's ex ante anticipation is a utility flow \( (u_0, u_1, \ldots, u_{E_1}) \) with certainty, \( (u_{E_1+1}, \ldots, u_{E_2}) \) depending on his ability to clear the election hurdle \( E_1 \), and \( (u_{E_2+1}, \ldots, u_T) \) depending on reelection at \( E_2 \). The incumbent is assumed to regard office holding per se as a normal good in the sense that
(i) he prefers holding office to losing office, and 
(ii) he discounts future utility flows.

If we set "not holding office" as the zero-point of the incumbent's utility function, then the first condition implies \( u_t = 0 \) (t=0,...,T). The second condition allows us to treat \( u_t \) as an indirect utility function: Let \( v_t = \text{utility of office in } t^{th} \text{ period} \text{ and } u_t = u^t v_t \text{ where } u \in [0,1] \text{ is the incumbent's time discount rate.} \text{ A simplifying assumption that facilitates further analysis is } v_t = 1 \text{ for all } t \in [0,T], \text{ so that } u_t = u^t \text{ and } \{u_t\} \text{ is a monotone decreasing series.}^{14}

Reelection Probability

By virtue of his incumbency at t=0, the incumbent is assured the utility stream \((u_0,u_1,...,u_{E_1})\). He obtains \((u_{E_1+1},u_{E_1+2},...,u_{E_2})\) if he is reelected at \( E_1 \) and he further commands \((u_{E_2+1},u_{E_2+2},...,u_T)\) if he is reelected at \( E_1 \) and \( E_2 \). The relevant subjective probabilities are \( f(E_1) \) and \( g(E_2) = f(E_2/E_1) f(E_1) \), respectively. If reelectons are independent trials— that is, if an incumbent believes there is no incumbency effect— then \( f(E_2/E_1) f(E_1) = f(E_2) \cdot f(E_1) \). Both \( f(E_1) \) and \( g(E_2) \) depend on the net benefits the legislator can claim he has delivered to his constituency or can credibly promise to deliver in the future, but the precise form depends on the incumbent's subjective "models of men."

Incumbent Objective: Maximize Expected Utility

The incumbent's expected utility may be written as:

\[
I = \sum_{t=0}^{E_1} u^t + \sum_{t=E_1+2}^{E_2} u^t f(E_1) + \sum_{t=E_2+1}^{T} u^t g(E_2) \quad (19)
\]

The incumbent's control variable is his choice of project, \( P(x) \), parameterized by scale factor, \( x \). The kind of project chosen and its scale determine both the magnitude and the flow of district benefits and costs. These, in turn,
affect \( f(E_1) \) and \( g(E_2) \). The choice of \( P(x) \) and \( x \) is constrained both by technological feasibility considerations and by endogenous features of political institutions, e.g., committee system, reciprocity and universalism norms, budget constraints, etc. We discuss these constraints below, but it may be noted here that the task confronting the incumbent is to discover the solution to a constrained maximization problem. To specify the problem fully, however, we must establish the functional relationship between reelection probability and district net benefits. We turn to this problem next.

5. The Various Meanings of "What Have You Done For Me Lately?" (WHYDFML?)

The incumbent politician harbors many uncertainties in his quest for reelection. Three principal concerns, in increasing order of importance to the incumbent, are

(1) Where did my votes come from last time?

(2) Who is my opponent this time?

(3) On what basis will voters decide this time?

Fenno (1978) has noted, in reference to (1), that the congressmen spends considerable effort in attempts to delineate his primary and reelection constituencies. He often knows, in broad form, where the votes came from last time—"I carried Smithville by 3,000 votes," "My northern counties stuck with me," "The good Democratic poor is my reelection base; I lose big with the country club set," and so on. But his information normally is of rough and ready demographic and socioeconomic sort; it is highly qualitative and only occasionally quantitative. More important, the relationship it bears to votes this time is unclear. This time differs from last time in several respects. The salient issues may have changed. Last time may have been a presidential year and this time an off-year, or vice versa. The configuration
of other state and local races, ballot propositions, bond issues, etc.
is different. And, perhaps the most significant change, the identity of
the incumbent's opponent (not known until late in the incumbent's term in
office) may differ from last time.

Fenno (1978), in his travels with a sample of congressmen in their
districts, discovered that anxieties about reelection run high—much higher
than so-called objective indicators of electoral security would suggest.
And the chief source of anxiety surrounds the identity of an opponent. For
much of his term in office, an incumbent is running blind. And, once he
discovers the identity of his opponent, it is generally too late for him to
do anything in Washington to adjust to this new information. While he can
adjust his credit-claiming, blame-ducking, position-taking, promise-making,
and competence-displaying campaign activities to the newly learned electoral
situation, his Washington-based activities—legislating, pork-barreling,
case-work—will, in large measure, have already become part of his public
record in office. It is for this reason that, in writing the incumbent
objective function, we make no explicit provision (as we believe the incumbent
can make no ex ante provision) for electoral competition. Rather, an incumbent's
expected utility, which depends upon reelection probabilities, is assumed to
vary with his effectiveness in delivering (and then claiming credit for)
net benefits to the district. Not knowing the identity of his opponent at
E₁ or E₂, the incumbent acts as if the greater the net benefits produced,
the greater are his reelection chances, regardless of who his opponent might
be. In a sense, the delivery of net benefits to the district, through
legislation, pork-barrel activity, and case-work, is one of the few things
the incumbent can do to further his own cause.

There is a third source of uncertainty, one that bears directly on
an incumbent's ex ante calculations and decisions about the manner in which
to seek reelection: on what basis are the voters going to decide? We assume, as indicated above, that voters are moved by, and hence the probability of reelection is enhanced by, the delivery of net benefits. But this is not without its ambiguities and problems. First, a net benefit evaluation is not the only basis for voter decision-making. Party preference is an obvious alternative.\textsuperscript{15} Cue-taking from opinion leaders and the media is another.\textsuperscript{16} Second, even if net benefit evaluation is a principal basis for voter decision-making (or at least the principal one over which the incumbent has some control), there are a variety of ways in which voters can respond. We discuss this latter point in the remainder of this section.

The Setting

Our task is to illustrate several models of voter response to net benefit flows which entail different meanings, expectations, or anticipations in asking WHYDFML? We suppose that at the beginning of the interelectoral period \([1,E_1]\) the incumbent produces project \(P\) for his district (the scale parameter, \(x\), is depressed in this discussion), which generates net benefits in period \(t \epsilon [1,T]\) (see equation 11):

\[
N^t(P) = \beta^t(P) - K^t(P) = B^t(P) + (1-t_x)C^t_1(P) - t_xC^t_2(P)
\] (20)

But this is not the only flow of net benefits to the district. First, there may be spillover flows from the projects of other incumbents. Second, there are the effects of projects from the efforts of other district representatives. Thus, if we are concerned with a congressman and voters in his district, net benefits may also be produced for the district by the efforts of the President, the two senators from the state, state legislative representatives, county and municipal officials, etc. Voters may or may not be aware of the distinctive sources of public sector benefit flows. Third,
there may be benefits still flowing from projects produced by the incumbent's predecessor in office. We summarize these alternative net benefit flows by the composite project $Q$:

$$N_t^t(Q) = B_t^t(Q) + (1-t_\gamma)c_1^t(Q) - t_\gamma c_2^t(Q)$$  \hspace{1cm} (21)

The Naive Retrospective Voter (NRV)

The NRV brings three distinct prejudices to the evaluation of net benefit flows. First, he is myopic; his discount rate is zero (see footnote 10) so that, for him, there is no future. Second, his memory decay rate is very high; that is, $\gamma$ in equation (18) is close to zero so that only events in the very recent past have any impact on his decisions. Third, he weights only the net benefits produced by actions of the incumbent; thus, he sets $N_t^t(Q) = 0$ for all $t$ (see equation (21)). The operational definition of WHYDFML for the NRV is:

$$P_{NRV} = \theta[B_1^t(P) + (1-t_\gamma)c_1^t(P) - t_\gamma c_2^t(P)]$$  \hspace{1cm} (22)

where $P_{NRV}$ is the probability NRV votes for the incumbent and $\theta > 0$.

The Simple Retrospective Voter (SRV)

The SRV, like the NRV, is myopic and has a high memory decay rate. However, unlike NRV, he is unable to discriminate among the various benefit flow sources. For the SRV, WHYDFML becomes:

$$P_{SRV} = \theta[B_1^t(P) + B_1^t(Q)] + (1-t_\gamma)[c_1^t(P) + c_1^t(Q)]$$

$$- t_\gamma [c_2^t(P) + c_2^t(Q)]$$  \hspace{1cm} (23)

The major distinction between NRV and SRV is the effect of the net benefit flows from the composite project $Q$. If, in fact, $N_1^t(Q)$ is dominated by $C_2$-type costs, then $N_1^t(Q) < 0$ and, ceteris paribus, $P_{SRV} < P_{NRV}$. This will occur
if Q consists primarily of pork-barrel projects in other districts which
generate few benefits and few $C_1$-type costs outside their target districts.
Effective blame-ducking, then, can be measured by the degree to which an
incumbent can convince his constituents to use equation (22) rather than
equation (23).

The Naive Fully-Retrospective Voter (NFRV) and the Simple Fully-Retrospective
Voter (SFRV)

These two voter types are straightforward generalizations of NRV and
SRV, respectively. They differ only in that their respective memory decay
rates are less severe so that the past is weighed more heavily beyond the
previous time period.

$$P_{NFRV} = \phi \left[ \sum_{t=1}^{E_1} \gamma^{1-t} \left[ B_t^e(p) + (1-t) C_t^e(p) - t C_2^e(p) \right] \right]$$ (24)

$$P_{SFRV} = \phi \left[ \sum_{t=1}^{E_1} \gamma^{1-t} \left[ (B_t^e(p) + B_t^e(q)) + (1-t_\gamma) (C_t^e(p) + C_t^e(q)) - t_\gamma (C_2^e(p) + C_2^e(q)) \right] \right]$$ (25)

The Naive Present Value Voter (NPVV) and the Simple Present Value
Voter (SPVV)

Present value voters are the temporal complements of retrospective
voters in the sense that (17) complements (18). They seek an answer to
WHYDFML in the discounted expected future net benefits that will flow from
public projects. For present value voters, there is no past; it is water
under the bridge.17
\[ P_{NPVV} = \emptyset \{ \sum_{t=E_{1+1}}^{T} \tau^t [B^t(P) + (1-t_\chi)C^t_1(P) - t_\chi C^t_2(P)] \} \]  

(26)

\[ P_{SPVV} = \emptyset \{ \sum_{t=E_{1+1}}^{T} \tau^t [(B^t(P) + B^t(Q)) + (1-t_\chi)(C^t_1(P) + C^t_1(Q)) - t_\chi (C^t_2(P) + C^t_2(Q))] \} \]  

(27)

**Sophisticated Voters (SV1 and SV2)**

SV voters are temporarily "ambidextrous." In assessing incumbent performance, they look both to the past and the future. They are neither extremely myopic nor extremely forgetful. They differ from one another only in their capacity to distinguish their own incumbent's activities from those of others (P and Q, respectively).

\[ P_{SV1} = \emptyset \{ \sum_{t=1}^{E_1} \gamma^{1-t} N^t(P) + \sum_{t=E_{1+1}}^{T} \tau^t N^t(P) \} \]  

(28)

\[ P_{SV2} = \emptyset \{ \sum_{t=1}^{E_1} \gamma^{1-t} [N^t(P) + N^t(Q)] + \sum_{t=E_{1+1}}^{T} \tau^t [N^t(P) + N^t(Q)] \} \]  

(29)

where \( N^t(P) \) and \( N^t(Q) \) are the political net benefits in period \( t \), written out explicitly in other equations, given in (20) and (21).

**Extension to Several Elections**

The voter models of equations (22)-(29) are single-election expressions. That is, the voter time horizon begins at the commencement of an incumbent's most recent term of office and, at \( t=E_1 \), retrospective voters evaluate past benefit flows while present value voters examine future benefit flows. Both types, however, concern themselves only with projects initiated during the period \([1,E_1]\), with simple voters of each type also including benefit
flows from a "composite" project. Since the incumbent objective function (19) is a two-election maximand, it is necessary to extend voter responses to a series of elections. Equations (22)-(29) provide information on $f(E_1)$ in equation (19). Their extension will provide information on $g(E_2)$. Since the various voter responses are, in effect, special cases of (29), here we limit ourselves to the extension of that equation.

At $t=E_2$ ($E_1 < E_2 < T$) the SV voters assess the net benefit flows of four projects. $P$ and $P^*$ are projects initiated by the incumbent during $[1,E_1]$ and $[E_1+2,T]$, respectively; $Q$ and $Q^*$ are the comparable composite projects.

$$P_{SV2}(E_2) = \sum_{t=1}^{E_2} \left( \sum_{\gamma=1}^{E_2-t} \left[ N^t(P) + N^t(Q) \right] \right) + \sum_{t=E_2+1}^{E_2} \left( \sum_{\gamma=E_1+1}^{E_2-t} \left[ N^t(P^*) + N^t(Q^*) \right] \right)$$

As equation (30) states, the probability that a SV voter at $t=E_2$ votes for the incumbent depends on: (1) retrospective evaluation of $P$ and $Q$, (2) retrospective evaluation of the more recent $P^*$ and $Q^*$, and prospective, present-value evaluations of all four projects.

* * * * * * * * * * * * * * * * * *

This completes our development of a family of models, the implications of which we develop below. The models consist of credit-claiming, reelection probability maximizing politicians; a districting mechanism that determines constituencies and specifies their share of the taxes for any projects engaged in by the government; a political definition of costs and benefits; and several models of voter response which incorporate alternative psychological/perceptual
assumptions. Some of the theoretical implications of this approach have been mentioned in passing. In the next section, we examine some implications more systematically.

6. Theoretical Results: Statics

All of the models depend upon credit-claiming politicians who desire to retain office and net benefit-seeking voters (of one sort or another) who control the incumbent's electoral fate. We have assumed that the probability of reelection at $E_1$ and $E_2$, $f(E_1)$ and $g(E_2)$ respectively, depends on voter reactions to net benefit flows. The voter reactions, in turn, depend upon the ways they perceive and discount net benefits. For all voter types, however, $\Phi = \frac{dP_j}{dt} \geq 0$, where $P_j$ is the probability that voter type $j$ will support the incumbent in the next election. In the absence of intertemporal constraints to the contrary, then, incumbents will seek to maximize net benefits in each period $t \in [1, T]$. Let us begin our analysis, consequently, with a static assessment of this maximization problem. We assume throughout:

A1: $B'(x) \geq 0$, $B''(x) < 0$

A2: $C_1'(x) \geq 0$, $C_1''(x) > 0$

A3: $C_2'(x) \geq 0$, $C_2''(x) > 0$

That is, benefits increase with $x$ at a marginally diminishing rate while both kinds of costs increase with $x$ at marginally increasing rates.

The Districting Mechanism

From (9)-(11) we have

$$N(x) = [B(x) + C_1(x)] - t_x [C_1(x) + C_2(x)]$$

where $x$ is the scale of project $P_x(x)$ concentrating benefits $B(x)$ in
district and requiring $C_1(x) + C_2(x)$ in inputs (we depress the time superscript). The first-order condition for a maximum implies a scale level satisfying $N'(x) = 0$ or

$$B'(x) + (1-t_x)C_1'(x) - t_x C_2'(x) = 0$$  \hfill (31)

The second-order condition for a maximum requires

$$B''(x) + (1-t_x)C_1''(x) - t_x C_2''(x) < 0$$  \hfill (32)

Proposition 1: If the incumbent is the President, then an optimum scale exists, namely the level at which the project no longer produces any marginal gross benefits.

Proof: The Presidency is modeled as a legislature of size one with no international market for inputs. Thus $t_x=1$ and $C_2(x)=0$. From (31), the first-order condition is $B'(x)=0$. That is, the project scale should be set so as to exhaust all marginal gross benefits. From (32), it is required that $B''(x)<0$, a condition implied by A1.

Q.E.D.

The reader might well regard Proposition 1 as a *reductio ad absurdum* on which basis he can put this paper down! We offer several caveats.

First, the result is simply a statement of a property of a particular mechanism. If there are no other constraints or costs, then a President regards the budgeted costs of production of $P(x)$ as transfers from some constituents (taxpayers) to other constituents (owners of inputs). They cancel in his calculus, leaving $B(x)$ as pure profit. Thus, left unconstrained, the presidential appetite for public provision of goods is virtually unsatiable.

This suggests, secondly, that additional constraints may inhibit a president's proclivity to squeeze every last utile out of a public project. In particular, if there is a budget constraint--say $C_1(x) + C_2(x) \leq K$--then either the unconstrained scale obtains (in which case the budget constraint
is nonbinding) or a corner solution occurs where $x$ is the value at which $C_1(x) = K$ (since $C_2(x) = 0$ by construction). Notice that a budget constraint or ceiling differs from a budget balancing condition. The latter already exists in the unconstrained case (revenues and expenditures are equal); it simply does not alter the president's behavior because he treats revenues and expenditures as transfers.

Third, an identification of the reasons for the seeming absurdity of our result may contain some insights. We have already noted the potential of a budget ceiling in addition to a budget balancing requirement. A more interesting possibility lies in our formulation of the problem in which $C_1$-type costs become transfers. Perhaps there are some asymmetries of which we are not taking account. The most apparent asymmetry to us, unfortunately, reinforces the conclusion of Proposition 1. Specifically, Aranson and Ordeshook and others have conjectured that concentrated interests which sell inputs to government are far more attentive to their status as recipient of $C_1$-type "transfers" than are voters of their tax burdens for particular projects; as well, they are far more involved as lobbyists and electoral activists. The recent surge of tax revolts, "public interest" lobbying, and tax/spending limitation movements may alter that asymmetry, but for now there would appear to be no basis to argue for the existence of an asymmetry in the opposite direction.

The presidential model, though counterintuitive, is, we believe, a reasonable characterization of the "view from Washington" in which taxes are curiously double-counted so as to net out to zero. This, at least, is the case for the nation conceived of as a single district. With multiple districts, as in a legislature, new complexities arise.
Consider a project in district \( \ell \) and its legislator interested in maximizing district net benefits. The scale \( x \) that satisfies (31) is an obvious candidate, where \( t_\ell \) is the district's tax share. However, the second-order condition (32) is not obviously satisfied. From A1-A3, we have \( B''(x) < 0, C_1'(x) > 0, \) and \( C_2''(x) > 0. \) For (32) to be satisfied, we must have

\[
t_\ell C_2''(x) - B''(x) > (1-t_\ell)C_1'(x)
\]

Since both sides of this inequality are positive quantities, there is some ambiguity. Thus, there are several possibilities:

1. Equation (31) has no solution
2. The solution to (31) fails inequality test (32)
3. The solution to (31) is consistent with (32).

Possibilities (1) and (2) arise when \( C_1(x) \) dominates net benefits. To illustrate, consider the limiting case in which \( t_\ell \to 0. \) Net benefits for district \( \ell \) become \( N(x) - B(x) + C_1(x) \) and the first-order condition (see (31)) is \( B'(x) + C_1'(x) = 0. \) But A1 and A2 require \( B'(x) > 0 \) and \( C_1'(x) > 0, \) so if either is strictly greater than zero, the first-order condition cannot be satisfied (possibility (1) above). If, at \( x=x^\ell, \) the first-order condition is satisfied, then, to be a maximum, it must satisfy

\[
B''(x^\ell) + C_1''(x^\ell) < 0
\]

and, if \(|B''(x^\ell)| < |C_1''(x^\ell)|, \) then this condition is violated (possibility (2) above). In particular, a minimum will have been identified.

The conclusion to be drawn from this little exercise is: if you think the presidential appetite for public projects if (practically) Insatiable--Proposition 1--then, until you look at the legislature, "you ain't seen nothin' yet!" If \( C_1 \)-type costs are a dominant form of boodle for the district, and if the district's tax share is small, then a legislator's preference for
scale of project is unbounded. Neither the district's tax price, 
\( t(C_1(x) + C_2(x)) \), nor the diminishing marginal benefits of the project serve 
to restrain that preference. Institutional solutions are required.

While we believe this conclusion is substantively correct, let us 
explore possibility (3) by supposing there exists an \( x=x^k \) satisfying (31) 
and (32). Moreover, for \( x=x^P \), \( B'(x^P) = 0 \), so that \( x^P \) is the President's 
preferred scale.

Proposition 2: For a project, \( P(x) \), concentrating benefits in district \( \mathcal{A} \), 
the optimum scale for the legislator from that district, 
\( x^k \), exceeds the optimum scale for the President, \( x^P \).

Proof: To establish this result, we assume 
\[ A4: \quad t_{\mathcal{A}} = t_{\mathcal{A}}(n) \]
where \( n \) is the number of districts, \( t_{\mathcal{A}}(n) = 1 \), (the presidential model), 
and \( t_{\mathcal{A}}'(n) < 0 \).

Totally differentiating (31) we obtain:

\[ B''(x)dx + (1-t_{\mathcal{A}}(n))C_1''(x)dx - t_{\mathcal{A}}(n)C_2''(x)dx \]

\[ - C_1'(x) t_{\mathcal{A}}'(n)dn - C_2'(x) t_{\mathcal{A}}'(n)dn = 0 \]

which, upon rearranging, yields

\[ \frac{dx}{dn} = \frac{C_1'(x) t_{\mathcal{A}}'(n) + C_2'(x) t_{\mathcal{A}}'(n)}{B''(x) = (1-t_{\mathcal{A}}(n))C_1''(x) - t_{\mathcal{A}}(n)C_2''(x)} \]

The denominator is, by (32), negative. So is the numerator since \( C_1'(x) \) and 
\( C_2'(x) \) are positive (A2-A3) and \( t_{\mathcal{A}}'(n) \) is negative (A4). Thus,

\[ \frac{dx}{dn} > 0. \]

Q.E.D.

The proof of Proposition 2, in fact, proves the more general
Proposition 3: If district tax share, \( t_x \), is a declining function of the number of legislative districts, then the legislator's optimal project scale is an increasing function of the size of the legislature.

The Tax Mechanism

From the knowledge that \( \frac{dx}{dn} > 0 \) (Proposition 3) and \( \frac{dt_x}{dn} < 0 \) (A4), an application of the chain rule yields the not-so-surprising implication that \( \frac{dx}{dt_x} < 0 \)--the optimal scale is a declining function of the district's tax share. This may be established more generally, for it holds in the absence of A4.

Proposition 4: The legislator's optimal project scale is a declining function of the district tax share.

Proof: Totally differentiating (31) and setting to zero yields, upon, rearranging,

\[
\frac{dx}{dt_x} = \frac{C'_1(x) + C'_2(x)}{B''(x) + (1-t_x)C''_1(x) - t_x C''_2(x)}
\]

The numerator, according to A2 and A3, is positive, whereas the denominator is simply inequality (32). Q.E.D.

Combining the insights from Propositions 3 and 4, we have one further result on the taxing mechanism:

Proposition 5: Let \( t_x = t_x(z) \) where \( z \) is an arbitrary characteristic. Then \( \frac{dx}{dz} \) has the sign opposite that of \( t'_x(z) \).

Thus, if \( t_x \) decreases as \( z \) increases, then the optimal project scale increases as \( z \) increases; if \( t_x \) increases as \( z \) increases, the result is the opposite.

The variable \( z \) reflects the basis, de facto or de jure, on which taxes are levied. Thus, \( z \) could represent the number of members of a state delegation sitting on the legislature's tax-writing committee (presumably writing loopholes and otherwise lessening tax burdens for the districts of fellow state delegation members). Or \( z \) might reflect the seniority of a
legislator or the mean seniority of his state delegation, in which case 
\( t^*_z(z) < 0 \) implies \( dx/dz > 0 \). Or \( z \) might represent the partisan coloration 
of the legislator, the strength of his partisan voting, his support for the 
administration, the partisan composition of his delegation, etc. The variable 
\( z \), of course, need not be institutional in character. For example, \( z \) could 
represent the existence and importance of a presidential primary in the state 
containing district \( z \). Alternatively, \( z \) could measure some demographic or 
socio-economic property of the district, e.g., proportion of population 
below poverty line or in retirement, district land area, size of mineral 
deposits, etc., on which basis taxes are collected. Proposition 5, then, 
has a broad domain and is suggestive of numerous empirical hypotheses.

Cost Accounting Mechanism

We now seek to determine how the way in which costs are (double) 
counted affects optimal project scale. To do this, we let 
\[ r = \frac{C_1(x)}{C(x)} \]
represent the proportion of costs \( c(x) = C_1(x) + C_2(x) \) for a project of 
scale \( x \) that are spent in the district for factors of production. The first-
order condition (31) for maximizing net district benefits becomes 
\[ B'(x) + (r-t^*_z)C'(x) = 0 \] 
and the second-order condition (32) becomes 
\[ B''(x) + (r-t^*_z)C''(x) < 0 \] 
Totally differentiating (33) with respect to \( x \) and \( r \) (assuming \( t^*_z \) fixed) 
and rearranging yields 
\[ \frac{dx}{dr} = \frac{C'(x)}{(t^*_z-r)C''(x) - B''(x)} \]
From (A2-A3) the numerator is positive and from (34) the denominator is positive. We have thus established

Proposition 6: The optimal project scale, for fixed tax share, \( t_x \), is an increasing function of the proportion of project costs spent in the district.

Analytically, this proposition is quite straightforward since, for any \( x \), the district receives \( C_1(x) \) as a benefit and pays only \( t_x C_1(x) \).

Nevertheless, it is one of the more important points of this paper—namely, that one of the most compelling legislative motives for seeking district projects is the economic activity it generates in the district.

To illustrate the effect represented in Proposition 6, consider two polar opposites. At one pole is the typical congressman's attitude toward foreign aid, the latter conceived of as a direct cash transfer from American taxpayers to foreign beneficiarions (who do not vote in congressional elections, though they apparently illegally contribute to campaigns!) At the other pole is earmarked foreign aid as in the Food for Peace program or military assistance:

1. **Foreign Aid:** Assume \( C_1(x) = 0 \) (so that \( r=0 \)). The net benefits for the Lth district are

\[
B(x) - t_x C(x)
\]

If \( B(x) \) is zero for all \( x \), then the congressman will oppose any foreign aid; however, if for altruistic reasons, \( B(x) \neq 0 \) then some foreign aid is supported, i.e., the amount \( x \) for which

\[
B'(x) = t_x C'(x)
\]

(see equation (33))

2. **Earmarked Foreign Aid:** Now consider a senator from a heavy wheat-growing state or from a state with large defense production capacity. Assume here that for Food for Peace or military assistance, respectively, \( C_2(x) = 0 \) (so that \( r=1 \).
The net benefits are
\[ B(x) + (1-t_x)C(x) \]

There is likely to be tremendous enthusiasm for this kind of program, even if \( B(x) = 0 \). Indeed, in my instances, a senator's appetite will be insatiable (no finite \( x \) maximizes the net benefit expression).

Another point may be made about the cost accounting mechanism. It is not at all clear that \( C_1 \)-type expenditures in the district should be regarded as "pure" contribution to net benefit. \( C_1 \)-type expenditures are not transfers of cash to the district. Rather they are exchanges of cash for project inputs--land, labor, goods, etc. If project inputs are occupied prior to the inception of the project, then the (short-run) effect of \( C_1 \)-type project expenditures is to bid up the price of these existing, previously-occupied, inputs. That is, owners of inputs simply do business with the government--at slightly better terms--rather than with some private party. Thus, in a district with fully-employed project inputs, the contribution to net benefits of \( C_1 \)-type expenditures is measured by \( h(c_1(x)) \); we assume \( h' > 0 \) and \( h'' > 0 \). In districts with idle or underemployed project inputs, on the other hand, \( C_1 \)-type expenditures are a much greater contributor to net benefit. Thus, let us amend our measure of the net benefit component of \( C_1 \)-type expenditures by adding a shift parameter \( \beta \) which measures input idleness or under-utilization in the district. Our measure, then is \( h(C_1(x), \beta) \) with \( h_1 > 0, h_{11} > 0, h_2 > 0, h_{22} > 0, h_{12} > 0, \) and \( h_{21} > 0 \). That is, the net benefit component of \( C_1 \)-type expenditures is an increasing function of \( C_1 \)-type expenditures, an increasing function of prior input idleness, with both functions increasing at increasing rates. Moreover, the cross partials are positive, too. That is, the greater the input idleness is (the bigger \( \beta \) is), the greater
the greater is the impact of increases in $C_1$-type expenditures on district net benefits; and, analogously, the greater the $C_1$-type expenditures are (the bigger $C_1(x)$ is), the greater is the impact of increases in prior input idleness on district net benefits.

Rewriting the net district benefit function (11) with this amendment yields

$$N(x) = B(x) + h[C_1(x), \beta] - t_2[C_1(x) + C_2(x)]$$

(35)

The first order condition now becomes

$$N'(x) = B'(x) + h_1[C_1(x), \beta]C_1'(x) - t_2[C_1'(x) + C_2'(x)] = 0$$

The second-order condition for a maximum is

$$N''(x) = B''(x) + h_1[C_1(x), \beta]C_1''(x) + h_{11}[C_1(x), \beta][C_1'(x)]^2$$

$$- t_2[C_1''(x) + C_2''(x)] < 0$$

7. Theoretical Results: Time-Dependence

In the last section we derived a number of theoretical propositions based on some structural features of elections and legislatures—the districting mechanism, the tax mechanism, and the cost accounting mechanism. Many of the complexities that arise from the temporal setting in which maximizing behavior takes place (both by politicians and voters) were suppressed in the assumption that the probability of reelection (whenever the election date happens to be) is an increasing function of net district benefits. In this section, we explore the complications introduced by time-dependent maximization in four district ways. First, we examine the voter's time perspective in answering his fundamental electoral query, WHYDFML? Second, we examine
the effects of the variable, "length of time until next election."

Third, and relatedly, we identify the consequences for P(x) of the length of term. Finally, we inquire into the impact on distributive politics of the politician's time horizon (in effect, the number of future elections that condition his current behavior).

WHYDFML?

Earlier we developed the seemingly obvious idea that answers to WHYDFML? can take several different forms. Political scientists, we suspect, normally conceive of voters as (mostly) retrospective, whereas economists (at least since Downs (1957)) regard voters as prospective, present-value calculators. 21 We now want to inquire into how these various conceptions of the voter held by the incumbent politician alter his behavior. To accomplish this, we consider the time horizon [1, T] with Eε[1, T], 1 < E < T. The politician is concerned only with maximizing his probability of reelection, f(E) which, in turn, depends on the net district benefit he is able to secure in time periods 1, 2, ..., E. The effect of t-th period net district benefits on f(E) depends on the configuration of voter types (see section 5) in his district. In each period through the E-th, our politician chooses a project and seek P_t(x) which generates net benefits in periods t, t+1, ..., E, ..., T. The following net benefit flow grid provides a description of the incumbent's distributive-politics activities. The superscript indicates the time period in which the net district benefits actually flow to the district, whereas the subscript dates the initiation of the project. Thus, in the election period, the district obtains benefits from a project P_E(x) initiated at t=E--N^E --as well as from projects initiated in earlier periods--N^E_1, N^E_2, ..., N^E_{E-1}, respectively. At each time period, the incumbent chooses a project scale, so that P_t(x_t) dates
### TABLE 1: NET BENEFIT FLOW GRID

<table>
<thead>
<tr>
<th>Time Period of Project Initiation</th>
<th>Time Period of Net Benefit Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>$N^1_1$</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
</tr>
</tbody>
</table>

where $N^i_j$ = net district benefits "consumed" in the $i^{th}$ period as a result of a project $P_j(x)$ initiated in the $j^{th}$ period (for obvious reasons $N^i_j > 0$ only if $i > j$; otherwise $N^i_j = 0$).
both the project and the scale decision. We assume he is limited to one project per period, choosing the scale $x_t$ at each period. The net district benefits for the $i^{th}$ period derived from a project initiated in the $j^{th}$ period is

$$N^i_j(x_j) = [B^i_j(x_j) + C^i_{1j}(x_j)] - t_x[C^i_{1j}(x_j) + C^i_{2j}(x_j)]$$
FOOTNOTES

1. The responsiveness may entail delegate behavior, in which representatives accommodate constituency preferences, or trustee behavior in which, according to Burke, constituency interests are the objects of representation.

2. For interesting insights concerning the progressive ambition of congressmen, see Rohde (1979).

3. In the extreme, one can imagine two spatial theories, each quasi-Downsian. A theory of presidential elections is nested in a "prospect space" where candidates, by varying their promise-making and position-taking, move to different points in the space. A theory of legislative elections is nested in the "retrospect space" where candidates, by varying their credit-claiming and blame-ducking appeals, try to persuade voters of their location.

4. It is easily established that the \( \hat{x} \) that satisfies (3) is larger than that satisfying (1) so that the legislative districting mechanism produces both bigger and more inefficient government. This and other results are proved and discussed in Weingast, Shepsle and Johnsen (1979) in detail, and more informally below.


7. See Aranson and Ordeshook ( , , ).

8. Thus \( E_1 \) and \( E_2 \) are separated by two years for House elections, six years for Senate elections, etc. Also assume that all benefits and costs after period \( T \) are zero.

9. Hence use equations (7) and (8) rather than (9) and (10).

10. If one dollar at time \( t_0 \) is invested at the market interest rate \( i \), then it is worth \( (1+i)^0 \) dollars after one period and, generally, \( (1+i)^k \) dollars after \( k \) periods. Reversing terms, a dollar one period hence is equivalent to \( 1/(1+i) \) dollars at \( t_0 \) and, more generally, a dollar \( k \) periods hence is equivalent to \( 1/(1+i)^k \) at \( t_0 \). The (one period) time discount rate is set at \( \tau = 1/(1+i) \).

11. For general discussions, see Arrow and Lind (1970), Hirschleifer (1965, 1966), and Shepsle (1978).

12. Actually \( PV_v(p) \) is a monotonically-increasing function \( \phi \) of the right-hand side of (17). We depress this notation.
13. Throughout we have assumed that $P(x)$ is a project that is district-based so that $B(x)$ is concentrated in the district with no spillovers to other districts. This assumption limits the generality of our discussion in obvious ways. In another paper, we plan to "unpack" $B(x)$ in much the same manner we unpack $C(x)$ in this paper. With $B(x)$ partitioned into $B_1$-type and $B_2$-type, we may talk more generally about policies rather than our more limited discussion of (pork-barrel) projects.

14. In effect, this assumption asserts that one period in office is indistinguishable from another in terms of utility production, with time lags handled by the discount rate. It might be argued, however, that in an institution like a legislature, an incumbent may anticipate that in some future period, he will advance to institutional positions of influence which have impact on utility. Alternatively, it may be argued that as an incumbent advances through the life cycle, his capacity to derive pleasure from legislative life changes. That is to say, there may be good reason to retain the more general framework in which $u_t = u_t v_t$ rather than the simpler $u_t = u_t$.

15. Fiorina (1979) provides an ingenious way to conceptualize party identification as a kind of retrospective summary of past net benefits.

16. MacKuen (1979) provides some intriguing ideas and data on the way in which the media create and channel events that compromise the public agenda. Coombs (1979) presents data on the effect of media endorsements on the outcomes of congressional races.

17. (26) and (27) are directly analogous to (24) and (25), respectively, except for temporal direction. We do not include the analogues to (22) and (23).

18. It is strictly positive, except when $t \not\in E$, or $E_2$ and voter $j$ is an extremely myopic or extremely forgetful type.

19. Elsewhere (Weingast, Shepsle, and Johnsen, 1979) we include a third component of $C(x)$, viz. $C_3(x)$, indicating the nonbudgetary costs of project $P(x)$, which cannot be regarded as transfers to someone else. Examples include environmental change and the destruction of natural beauty. Once included, these constrain the presidential optimization.

20. For example, suppose taxes are assessed only on incomes in excess of $50,000$ (a "soak the rich" tax) and that district $k$ is a low-income district.
21. Why these particular disciplinary biases exist is, in itself, an interesting question. The answers, we suspect, derive from somewhat different conceptions of the purpose of elections. While admitting our ideas are wildly speculative, we believe most economists writing about the role of democratic elections see in them a mechanism for charting a future policy course. Much of democratic theory, especially of the Madisonian variant, on the other hand, regards elections as devices for "throwing the rascals out." Hence economists regard future-oriented, present-value calculations—in effect, the criterion of relative proximity between the voter's vision of and the politician's promise about the future—as the essence of rationality. Political scientists, alternatively, discern rationality in voter responses to credit-claiming and competence-displaying by politicians—retrospective judgments—in the sense that "proper" incentives are provided for the politician in arranging his future behavior. For some discussion of this and related points, see Dahl (1956) and Rilcer (forthcoming).