

The Journal of LAW & ECONOMICS

BUREAUCRATS AND POLITICIANS

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"The whole hotel has a disease called The Only Game in Town. If you don't like it, too bad. It has a secondary infection called No Ownership. In other words, management has a contract without a piece of the action."

John D. MacDonald¹

VOLUME XVIII (3) DECEMBER 1975 PRICE \$5.00

INTRODUCTION

FIVE years ago I completed the manuscript that was published as *Bureaucracy and Representative Government*.² This book—an attempt to match a now conventional theory of the demand for government services in a representative government with a new theory of bureaucratic supply—provoked a minor stir, some misunderstanding, and some useful subsequent research. This paper summarizes my reflections on this book and the findings of several empirical studies that bear on some of its conjectures.

These reflections, like the perspectives of the book, are based on a combination of personal experience, the comments and contributions of others, and the available empirical studies.³ Part I of this paper outlines several suggested modifications to my earlier theory of bureaucracy and representative government. Part II summarizes a set of relevant empirical findings.

¹ John D. MacDonald, *The Turquoise Lament* 220 (1973).

² William A. Niskanen, *Bureaucracy and Representative Government* (1971).

³ My personal experience during this period involved two years as an official in the Federal Office of Management and Budget and three years as an academic. The government experience generally reinforced my earlier perspectives, most importantly by improving my understanding of the review process; more on this later. The academy made it possible to read a larger body of academic literature and to conduct several empirical studies.

The most constructive comments on this book, not surprisingly, are also the most critical. The comments that have most affected my views are those by Earl Thompson, *Book Review*, 11 *J. Econ. Lit.* 950 (1973); Jean-Luc Migue and Gerard Belanger, *Toward a General Theory of Managerial Discretion*, 17 *Public Choice*, Spring 1974, at 27; Albert Breton & Ronald Wintrobe, *The Equilibrium Size of a Budget-Maximizing Bureau*, 83 *J. Pol. Econ.* 195 (1975). An important paper by Armen Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 *Am. Econ. Rev.* 777 (1972) provided a perspective on how bureaus fit within a general theory of economic organizations.

A coherent set of critical tests of the hypotheses developed in the book has not been performed. Several independent studies that I and others have completed during this period, however, bear on some of the central hypotheses. These studies are identified in the text. I am indebted to Seymour Neustein for assisting me with the statistical work on voting behavior and the effects of bureau consolidations.

Economic Analysis of Political Behavior

Universities-National Bureau Conference Series Number 29

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I. MODIFICATIONS OF THE THEORY

My theory represents the relation between an elementary bureau and its government review group as that of a bilateral monopoly. The bureau "sells" its service only to the government, and the government "buys" the service only from the bureau. This market, however, involves the exchange of some output for a budget rather than at a per unit price. In any such bilateral monopoly condition, output is indeterminate within a range without determining the conditions affecting the bargaining between the two parties. My model of bureaucratic supply determines only the bureau's preferred output based on an assumption that the bureau acts to maximize its budget. The government's preferred output is determined from conventional majority rule models or from my special model of decisions by a "high demand" committee.

The two major criticisms of my theory are (1) that budget maximization by bureaus is not obviously consistent with utility maximizing by bureaucrats and (2) that the theory does not develop the conditions for an equilibrium output between the output preferred by the bureau and the output preferred by the government. Both criticisms are correct and substantial; they have motivated me to suggest the modifications to the theory outlined in this section.

A. *Utility Maximizing Bureaucrats*

My earlier model of bureaucratic supply starts with an assumption that bureaucrats act to maximize their budget. Although I made some plausible arguments for this maximand, I did not derive this maximand from a more general utility maximizing framework.⁴ Earl Thompson⁵ correctly suggested that this leads to the awkward two-region solution where bureaus are perfectly efficient at equilibrium outputs for which the marginal value to the government is positive and are inefficient only at outputs for which marginal value is zero. This conclusion seemed most inconsistent with perceptions about bureaucratic behavior, including mine.

Jean-Luc Migué and Gérard Bélanger⁶ suggested an approach that both generalizes and simplifies this model in a way that resolves this inconsistency.⁷ They developed a model of bureaucratic discretion based on an assumption that a bureaucrat maximizes an objective defined in terms of his "discretionary budget" (the difference between his total budget and the

⁴ In fact, there is good empirical evidence for my earlier assumption—that a bureaucrat's salary, status, and discretion are a positive function of the bureau's budget. For example, see Robert Staaf, *The Public School System in Transition, in Budgets and Bureaucrats: The Sources of Government Growth* (Thomas E. Borcherding ed. 1975).

⁵ Earl Thompson, *supra* note 3.

⁶ Jean-Luc Migué & Gerard Belanger, *supra* note 3.

⁷ They deserve an apology for my failure to recognize the substantial nature of their contribution in my original comment on their article, *Comment*, 17 *Public Choice*, Spring 1974, at 43.

minimum cost of producing the expected output) and the bureau's output. This model leads to a general conclusion that a bureau's budget is always too large and that the output is generally too large. At one limit, if bureaucrats do not value output, the output level will be correct but this output will be produced most inefficiently. At the other limit, if bureaucrats do not value the discretionary budget, the output level will be substantially too high but will be produced efficiently—the conclusion of my earlier model. Migué and Bélanger have started in the right direction, but they also fail to derive the bureaucrat's maximand from an explicit model of utility maximization in a specific institutional setting. This is the first issue to be resolved.

Consider an individual bureau manager with the following utility function:

$$U = \alpha_1 Y^{\beta_1} P^{\gamma_1} \quad A.1$$

Y is the (present value of the) bureaucrat's income from his position, and P is the set of non-monetary perquisites of his position; P includes leisure time, the social and physical amenities of his position, the regard of others, etc. The bureaucrat is not, in this formulation, assumed to have any direct preferences for the budget, output, or efficiency of the bureau. The parameters of this utility function may be different for each bureaucrat, although the common reward structure probably leads the set of bureaucrats to have a relatively high preference for perquisites.

The relations between the conditions valued by the bureaucrat and the performance of the bureau are determined by the reward structure of the institution, as established by the government review group. This reward structure is common to all potential candidates for a specific position, although it may differ among positions. The reward structure is defined by

$$Y = \alpha_2 Q^{\beta_2} (B - C)^{\gamma_2} \quad A.2$$

and

$$P = \alpha_3 Q^{\beta_3} (B - C)^{\gamma_3}, \quad A.3$$

where Q is the output of the bureau, B is the maximum budget that would be approved by the government review group, C is the minimum cost of producing the output of the bureau, and $(B - C)$, thus, is the "discretionary budget" of the bureau.

The general structure of the three equations A.1 through A.3 could be used to analyze managerial behavior in any form of economic organization. A specific theory of bureaucratic behavior must be based on the characteristics of the reward structure in the bureaucratic environment. The distinguishing feature of the reward structure for managers in a profit-seeking firm, for example, is a relatively high value of the parameter γ_2 . In contrast, a bureaucrat's reward structure is characterized by a relatively low value of γ_2 . A bureaucrat is not able to appropriate any of the bureau's discretionary

budget as personal income, except by promotion to a higher paid position.⁸ The parameter β_2 , β_3 , and γ_3 , however, are relatively higher in a bureaucratic environment.

Substituting the equations for Y and P in the utility function and simplifying yields an expression of the utility function in terms of Q and (B - C), as follows:

$$U = \alpha Q^\beta (B - C)^\gamma, \quad A.4$$

where

$$\alpha = \alpha_1 \alpha_2^{\beta_1} \alpha_3^{\gamma_1}$$

$$\beta = \beta_1 \beta_2 + \gamma_1 \beta_3$$

$$\gamma = \beta_1 \gamma_2 + \gamma_1 \gamma_3$$

The bureau's discretionary budget (B - C), of course, is also a function of the bureau's output. Using the same form of these relations as in my earlier model,

$$B = aQ - bQ^2, \quad A.5$$

$$C = cQ + dQ^2, \quad A.6$$

and

$$(B - C) = (a - c)Q - (b + d)Q^2 \quad A.7$$

The budget function A.5, of course, is the integral of the demand function facing the bureau over the range of output. At this point, it is worthwhile to digress on the nature of the demand function facing a bureau to clarify an earlier misunderstanding. This demand function, except under special circumstances, is *not* the total demand by the government for the service supplied by the bureau. For any marginal value of the service, the output demanded from the bureau is the total output demanded *minus* the output that could be supplied from another source or the estimated output that could be supplied from this bureau with a different management team. If there is any effective competition from other sources of supply or from another management team, thus, the demand function facing a bureau will

⁸ The primary limitations on the bureaucratic promotion process in eliciting efficient behavior are the low salaries of bureau managers (relative to those in other economic organizations) and a bureau's monopoly of information on the minimum potential costs. A lower-level bureaucrat could inform the review group about these costs to increase his promotion opportunities, but the number of such successful examples is minimal. A senior bureaucrat has an incentive to spread the perquisites among critical lower level bureaucrats in a way that presents each of them with a prospect of foregoing large perquisites for a small expected pecuniary gain. Such practices involve a distribution of some of the bureau's monopoly power to strengthen the personal monopoly power of the senior bureaucrat in his position. Some other condition is necessary to explain why governments do not strengthen the pecuniary incentives for efficient management or for leaking information to the review group about inefficient practices.

be both lower and more elastic than the total demand function for the service. A bureau, in turn, cannot appropriate the total "consumer's surplus" for the service but only that portion that represents the monopoly rent of the bureau or its present management team. In the limit, if the government can procure the service from another service or from the same bureau with another management team at a constant unit cost, the demand function facing a bureau is horizontal at this unit cost, and the bureau's budget is a linear function of output.

Substituting A.7 into A.4 yields a utility function of the bureaucrat defined only in terms of the bureau's output, as follows:

$$U = \alpha Q^\beta [(a-c)Q - (b+d)Q^2]^\gamma \quad A.8$$

Maximizing A.8 with respect to Q, thus, leads to a level of bureau output that maximizes the utility of the bureaucrat where

$$Q = \left(\frac{\beta + \gamma}{\beta + 2\gamma} \right) \left(\frac{a-c}{b+d} \right). \quad A.9$$

If $\beta=0$, which would be the case only if the bureau's output did not contribute to either the income or perquisites of the bureaucrat, then

$$Q = \frac{1}{2} \left(\frac{a-c}{b+d} \right). \quad A.10$$

This output level is optimal to the government, but at a high cost of perquisites and inefficiency throughout the bureau. In contrast, if $\gamma=0$, which would be the case only if the bureaucrat could not appropriate any of the discretionary budget as income or perquisites, then

$$Q = \left(\frac{a-c}{b+d} \right). \quad A.11$$

This output is twice the optimal output, but is produced at the minimum possible cost. This last case, of course, is the solution for the bureaucrat's preferred output in my earlier model.

An examination of the general output function A.9 indicates that the output will be a positive function of the marginal effect of output on a bureaucrat's rewards and a negative function of the marginal share of the discretionary budget appropriated by the bureaucrat. The directional effects on output of the parameters of the budget and cost functions are the same as in my earlier model, although the magnitude of the partial effects, in each case, are multiplied by the constant factor $\left(\frac{\beta + \gamma}{\beta + 2\gamma} \right)$.

Substituting the general output function A.9 into the budget function A.5 yields the following general budget function expressed in terms of demand and cost conditions and the parameters of the reward functions:

$$B = a \left(\frac{\beta + \gamma}{\beta + 2\gamma} \right) \left(\frac{a-c}{b+d} \right) - b \left(\frac{\beta + \gamma}{\beta + 2\gamma} \right)^2 \left(\frac{a-c}{b+d} \right)^2 \quad \text{A.12}$$

An examination of this function indicates that a bureau's budget will also be a positive function of the marginal effect of output on a bureaucrat's income and perquisites and a negative function of the marginal share of the discretionary budget appropriated by the bureaucrat. The directional effects on the budget of changes in the demand and cost conditions are also the same as in my earlier model, although all of the partial effects are weaker the larger is the importance of the discretionary budget in a bureaucrat's rewards.

Substituting the general output function A.9 into the discretionary budget function A.7 yields the following function for the discretionary budget expressed in terms of the demand and cost conditions and the parameters of the reward functions:

$$B-C = \left(\frac{\beta + \gamma}{\beta + 2\gamma} \right) \left[1 - \left(\frac{\beta + \gamma}{\beta + 2\gamma} \right) \right] \left[\frac{(a-c)^2}{b+d} \right] \quad \text{A.13}$$

The discretionary budget is highest when $\beta=0$, that is, when a bureau's output does not contribute to either the income or perquisites of a bureaucrat. At this limit, the ratio of the discretionary budget to the minimum potential cost is the following:

$$\frac{B-C}{C} = \frac{(a-c)(b+d)}{2c(b+d) + d(a-c)} \quad \text{A.14}$$

If the review authorities use the tactic of approving a constant budget per unit of output, as suggested by Earl Thompson, then this expression reduces to

$$\frac{B-C}{C} = \frac{a-c}{a+c} \quad \text{A.15}$$

This expression illustrates how the production inefficiency of a bureau is a positive function of the unit cost (a) at which the government can purchase this service from some other source. If $(a-c)$ is small, a bureau will be quite efficient even if $\beta=0$.

The above expressions identify the maximum per cent of production inefficiency by a bureau when the government can measure the actual budget and output of a specific service. The discretionary budget decreases as β increases relative to γ . At the other limit, when $\gamma=0$, the discretionary budget disappears, and a larger output is produced at a minimum factor cost.

The general output and budget functions are defined for each bureau and for each bureaucrat. They will differ among bureaucrats depending on their preferences for income and the several types of perquisites. There are

two processes, however, that probably make these functions more homogeneous among bureaucrats: for a given reward structure, the set of potential bureaucrats probably have higher preferences for perquisites relative to managers of other economic organizations. And the government review group may design a specific reward structure for each bureaucrat, based on their perceptions of his preferences, to elicit more responsive behavior. Nevertheless, some variance in the behavior of different bureaucrats in the same position should be expected.

B. *Vote Maximizing Legislators*

So far, this analysis has developed only the output and budget preferred by bureaucrats. A theory of government output and budget, however, must also incorporate the behavior of the government officials who establish the demands for government services and monitor the behavior of the bureaus. For this discussion, these functions are assumed to be performed by an elected legislature.⁹ The four characteristics of the legislature that are central to this analysis are majority rule decision making, committee review, vote maximizing behavior by legislators, and legislator discretion in the use of his own time and available staff resources.

My earlier model established only the boundaries of the bargaining between a bureau and the legislature. Albert Breton and Ronald Wintrobe¹⁰ have suggested a model of the review process that reduces the range of indeterminacy of the final output and budget. Legislatures can use a variety of control devices—"including direct monitoring, overlapping bureaus, duplication of services, and the purchase and acquisition of information from alternative sources, including sources at lower levels in the bureau itself"¹¹—to reduce the misallocation and inefficiency of bureaucratic supply. These control devices are costly, however, and they will be used only to the point where their marginal value equals their marginal cost.

Figure I illustrates their simple model of the review process. The triangle OHJ is the difference between the budget preferred by a bureau and that preferred by the legislature and is equal to the consumer surplus that would be appropriated by the bureau at its preferred output and budget position; the line HJ, thus, is the marginal value of control devices to the legislature. The line LM is the marginal cost of control devices. Breton and Wintrobe conclude that the legislature will use OK units of control devices. At this point, the bureau's budget is reduced by an amount OHIK, the total cost of control devices is OLIK, the increase in consumer surplus from the use of control devices is LHI, and the budget is KIJ. The total loss due to bureaucratic supply—the sum of the costs of control devices and the remaining

⁹ No assumption is made about how well a legislator knows or represents the interests of his constituency; this is an important issue but is far beyond the scope of this paper.

¹⁰ Albert Breton & Ronald Wintrobe, *supra* note 3.

¹¹ *Id.* at 6.

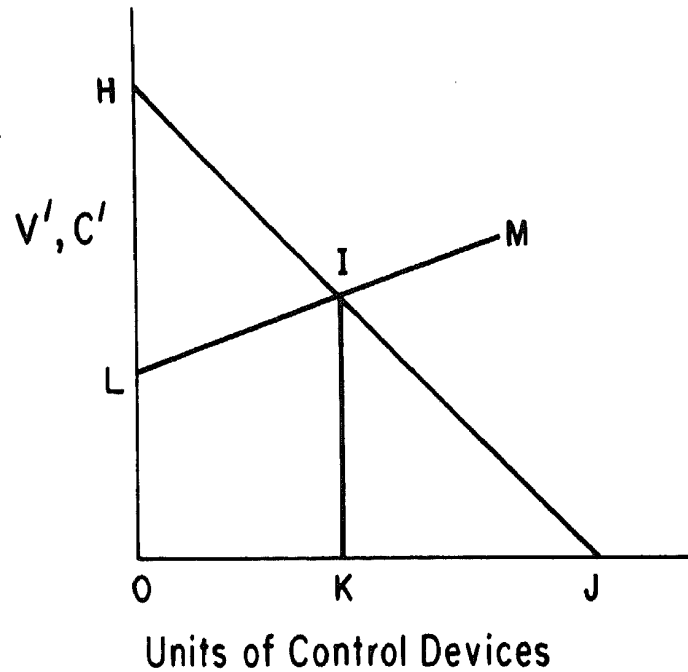


Figure I

discretionary budget—is OLIJ. This model is not sufficient to determine the allocation of control devices between correcting the oversupply of output and reducing the costs at a given output, although the authors speculate that it is less costly to control oversupply and, thus, that most of the losses to bureaucratic supply will be in production inefficiency.

The model developed by Breton and Wintrobe provides a starting point for analyzing the review process but does not incorporate the specific institutions of the review process or the incentives of the legislators. What is known about legislatures that would suggest how many "units of control devices" they use? Is there any reason to believe they would use an amount of control devices that maximizes the net benefits to the population? This section suggests two modifications to the model developed by Breton and Wintrobe to reflect the specific institutions of the review process and the incentives of legislators.

First, it is important to recognize that a committee, not the whole legislature, conducts the review process for each bureau. More important, at least in the United States, most committees are dominated by legislators who have higher demands for the services reviewed than the median demand in

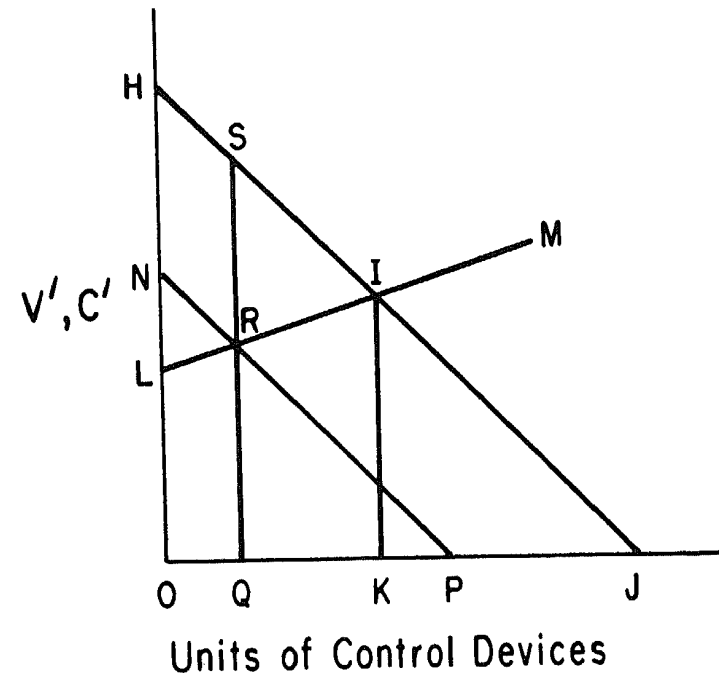


Figure II

the whole legislature and the committee decisions are very seldom amended or reversed by the whole legislature. Several recent studies of the committee assignment process—by Rohde and Shepsle,¹² by Shepsle,¹³ and by Cohen¹⁴—have confirmed the casual observations that most legislators receive the committee assignments they request and that the requests are correlated with services that are most important to their regional constituencies.¹⁵ My earlier assertion that review committees prefer a higher

¹² David Rohde & Kenneth A. Shepsle, *Democratic Committee Assignments in the House of Representatives: Strategic Aspects of a Social Choice Process*, 67 *Am. Pol. Sci. Rev.* 889 (1973).

¹³ Kenneth Shepsle, *A Model of the Congressional Committee Assignment Process: Constrained Maximization in the Institutional Setting*, *Public Choice* (forthcoming).

¹⁴ Michael D. Cohen, *The Importance of Member Preferences in Committee Assignment: An Assessment against Optimal Standards and a Simple Process Model* (unpublished paper presented at MSSB Conf. on Math. Models of Congress, Aspen, Colo., 1974).

¹⁵ The following comment by Senator William Proxmire is characteristic of the perceptions of legislators about the assignment process: "In the deliberation of this [assignment] committee, there are enormous pressures to place those Senators whose states benefit from, say, public works appropriations on . . . the Senate Interior Committee. . . . In fact, a Senator who is from a state which benefits from these programs is, at least in the short-run, rather clearly serving his own best interests and those of at least some of his constituents if he obtains a seat on one of

output than that preferred by the representative legislator does not require that committee members have a higher absolute demand for the services reviewed, merely that they have a higher demand relative to the tax costs in their constituency.

A high-demand committee will use a different amount and type of control instruments than would a randomly-selected committee. Figure II illustrates this condition. In this case, the line HJ represents the marginal value of control devices to the representative or median legislator. If a bureau uses its discretionary budget to increase its output, the marginal value of control devices designed to reduce over-supply will be lower for the representative member of the high-demand committee, here represented by the line NP. A high-demand committee, then, will use only OQ units of control devices to reduce the oversupply of output. At this point, the bureau's budget is reduced by OHSQ, an amount OLRQ is spent for control devices, the gain in consumer surplus from use of the control devices is LHSR, and the remaining discretionary budget of the bureau is QSJ. The total loss due to bureaucratic supply is now OLSRJ. And the loss of consumer surplus due to delegation of the output decision to a high-demand review committee is RSI.

This illustrates my earlier conclusion that the output preferred by a bureau will be much closer to that of a high-demand review committee than to that preferred by the median legislator. A high-demand committee, however, has the same incentives to control production inefficiency as would a randomly-selected committee. Given the costs of control devices to reduce oversupply and to reduce production inefficiency, therefore, a high-demand committee will use relatively more control devices to reduce production inefficiency. This conclusion would be weakened if the bureau used some of its discretionary budget to purchase higher-cost factors in the constituencies represented in the review committee. In general, a high-demand committee is "in the bureau's pocket" only with respect to the output decision.

A second problem arises from the condition that legislators have substantial discretion in the use of their time and staff resources. Some uses of these resources have benefits that are largely specific to their own constituency and/or campaign contributors. The monitoring function, however, is a public good within the legislature; the benefits of monitoring accrue to the whole population as a function of their tax costs. This creates a sub-

these Committees. The net result of all of this, however, is that *the Committee structure develops a built-in bias toward higher budgets* [my italics]. Because the people who serve on each committee have an interest in seeing the budget for which they are responsible increase, they often fail to encourage careful evaluation and analysis of expenditures." U.S. Cong., Jt. Econ. Comm., Subcomm. on Econ. in Gov't, *The Analysis and Evaluation of Public Expenditures*, The PPB System (1969).

stantial "free-rider" problem internal to legislatures and the expectation that monitoring activities will be undersupplied.¹⁶

Consider a simple world in which the votes for an individual legislator, over some range, are a linear function of the specific services he performs for his constituents and contributors, the level of output of some aggregate government service, and the taxes paid by his constituents, as follows:

$$V = aX + bY - cT, \quad B.1$$

where V is the number (or proportion) of votes for the incumbent legislator in the next election, X is the number of hours per day that the legislator spends on activities specific to his constituency, Y is the output of some aggregate government service, and T is the level of taxes in his district.

Taxes, of course, are related to the level of government output in the following way:

$$T = SCY, \quad B.2$$

where S is the share of total taxes paid by residents of his district (this will be a function of the number of people, income levels, composition of income, etc. in each district) and C is the actual unit cost of the government service. Substituting B.2 into B.1 yields

$$V = aX + (b - cSC)Y. \quad B.3$$

A legislator's time budget constrains the number of hours per day that he devotes to activities specific to his constituency plus the hours spent on monitoring activity to be equal to the total hours that he spends at work. One form of this relation is the following:

$$H = X + e(C - C^*)^{-1}, \quad B.4$$

where H is the total hours of work time and C^* is the minimum potential unit cost of the government service. The form of this relation assumes that the actual cost of the government service converges to C^* as more of the legislator's time is devoted to monitoring activities and that the marginal time costs of reducing C increase as the government service is produced more efficiently.

¹⁶ A recent *Wall Street Journal* column documents the perception of Congressmen about the monitoring, or oversight, function: ". . . oversight has been infrequent and slipshod. It's usually dull, thankless work; there are more reelection brownie points in running errands for the folks back home, and more satisfaction in passing new laws. Tough oversight can make enemies among congressional colleagues or powerful interests groups. Committees supposed to exercise oversight are often the ones that created the programs in the first place, and thus not overly anxious to spotlight flaws.

"'Everyone recognizes the need for oversight,' says Sen. Edmund Muskie, one of its most effective practitioners, 'but other things come along, and it gets pushed farther and farther down the ladder until it disappears.'" Alan L. Otten, *Oversight*, *Wall Street Journal*, March 6, 1975, at 12, col. 3.

A legislator, for present purposes, is assumed to allocate his time between activities specific to his district and monitoring activities in order to maximize votes in the next election. Maximizing B.3 subject to B.4 yields the following level of C:

$$C = \left(\frac{ae}{cSY}\right)^5 + C^* \quad \text{B.5}$$

An examination of B.5 indicates that actual unit costs will be a positive function of the vote effect of activities specific to his district and of the time costs of reducing C. Actual unit costs will be a negative function of the vote effects of taxes, the share of total taxes paid by his constituents, and the level of government output.

Substituting B.5 into B.4 and solving for X yields

$$X = H - \left(\frac{ceSY}{a}\right)^5 \quad \text{B.6}$$

This relation indicates that the time a legislator will spend on activities specific to his constituents and contributors is a negative function of the vote effect of taxes, the time costs of reducing C, the share of taxes paid by his constituents, and the level of government output; the time spent on district activities, of course, is a positive function of his total hours of work and the vote effect of these activities. The most important observation is that a legislator from a district that pays a small share of the total taxes will spend most of his time on activities specific to his district.

The magnitude of the losses in production efficiency due to the "publicness" of monitoring activities is indicated by the ratio $(C - C^*)$ for a specific value of S over the level for a value of $S = 1$. This ratio is equal to S^{-5} . For the U.S. Congress, for example, the average district pays around 1/435 of the total taxes, so $(C - C^*)$ may be as high as 20.9 times the level if all of the savings due to better monitoring accrued to the district of the representative who conducts the monitoring. These losses would be even higher for services monitored by representatives of low population and/or low income districts because their tax share is lower. The actual losses due to insufficient monitoring are not likely to be as high as this simple model suggests, because the party leadership maintains some internal rewards and sanctions to induce more monitoring by individual legislators and directly controls some of the staff resources. The basic free rider problem, however, is substantial in any political system, such as the United States, in which the party leadership cannot deny membership in the legislature as a sanction to enforce activities in the interests of the group. Individual citizens, of course, face a similar but much more massive free rider problem in monitoring the performance of their representatives.

This discussion suggests the value of some new instrument to induce

legislators and individual citizens to increase their monitoring activity. Maybe public financing of campaigns could be limited to a set of prizes that would be awarded by some independent body to those legislators with the highest perceived monitoring effectiveness. Maybe legislators should be subject to tax rates that are, say, double those on other people with the same income. Maybe class action suits against the government for demonstrably inefficient performance should be authorized. Such ideas are superficially appealing, but an analysis of these and other alternatives is beyond the scope of this paper.

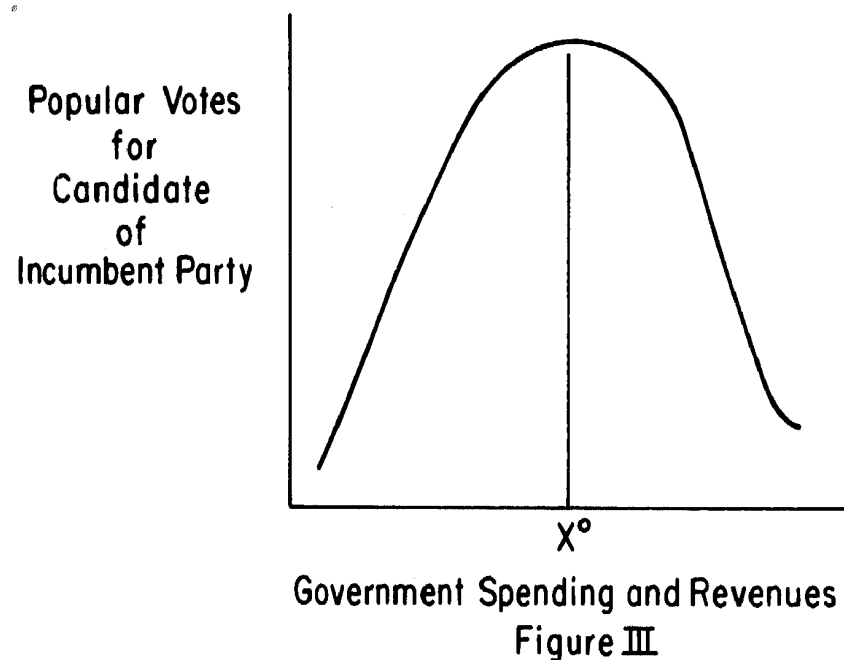
II. SOME RELEVANT EMPIRICAL STUDIES

My book developed a large set of hypotheses concerning the level of government budgets, the production efficiency of bureaus, the level of output of government services, the combination of factor inputs, and the effects of the structure of the bureaucracy and review process. It is important to recognize that these hypotheses are derived from a theory of bureaucracy and representative government. A bureau does not operate in a vacuum, nor does it (usually) sell its output at a price in a competitive market. All of the monopoly power of a bureau derives from the monopoly power of the government that finances its services; a government that has no discretion will be well served by any form of organization used to supply government services. Some of the monopoly power of the government will be appropriated by a bureau, depending on the structure of the bureaucracy and the review process. The data on which any tests of these hypotheses must be based, therefore, reflect conditions that are jointly determined by bureaucracy and representative government. As a rule, we do not have an opportunity to observe bureaus that sell their services at a price in a competitive market. Similarly, we do not have an opportunity to observe governments that purchase their services from competitive profit-seeking firms. The historical reasons why government, at least since the 19th century, have chosen bureaus as the dominant form of organization for the supply of government services are somewhat vague, but the contemporary combination of monopoly bureaus and monopoly governments is a fact that cannot be dismissed. As a consequence, most of the empirical studies summarized in this section do not provide satisfactory estimates of the partial effects of specific characteristics of the structure of the bureaucracy and of the government. Some new empirical approach and, probably the use of less aggregated data will be necessary to provide satisfactory estimates of the partial effects of specific characteristics of the structure of the bureaucracy and of the government. Some new empirical approaches and, probably, the use of less aggregated data will be necessary to provide satisfactory tests of these partial effects. For the most part, at the present time, all we can do is to estimate the joint effects of these two dominant institutions.

A. The Overspending Hypotheses

The most important hypothesis derived from this theory is that government budgets are too large, that is, they will be larger than that preferred by the median legislator and, in a representative government, larger than that preferred by the median voter. Moreover, the amount of overspending will be larger, the larger is the monopoly power of the government and the bureaus that supply the government services.

The most dramatic test of the overspending hypothesis is provided by voting data. The general relation between the popular votes for the candidate of the incumbent party and the level of government spending and revenues is illustrated by Figure III. If government spending is too low, the



observed partial effect of increases in government spending on the votes for a candidate of the incumbent party should be positive. At the vote-maximizing level of spending X^0 , the observed partial effect should be zero. And, if government spending is too high, the observed partial effect of increases in government spending on the popular vote for a candidate of the incumbent party should be negative.

A sample consisting of the popular vote for the President of the United

States in the 20 elections from 1896 through 1972 is used to test this hypothesis.¹⁷ The test equation is summarized below:

$$\ln\left(\frac{I}{1-I}\right)_t = \alpha + \beta_1(\ln NP_t - \ln NP_{t-4}) + \beta_2(\ln FX_t - \ln FX_{t-4}) + \beta_3 ID + \beta_4 WD + U,$$

where

I = fraction of major party popular vote for candidate of incumbent party,

NP = real per capita net national product,

FX = real per capita total federal expenditures,

ID = 1 if incumbent is candidate, 0 otherwise, and

WD = 1 if election is war year, 0 otherwise.

An alternate form of this test equation substitutes the percent change in real per capita total federal revenues for the federal spending variable. For this formulation, the partial effect on I of each of the independent variables is equal to $I(1-I)$ times the β coefficient; in close elections, this effect is approximately equal to .25 times the coefficient.

Estimates of these two test equations, based on ordinary least squares procedures, are presented in Table 1 below. For our purposes, the most

TABLE 1
ECONOMIC AND FISCAL EFFECTS ON THE POPULAR VOTE FOR PRESIDENT

Variables						Test Statistics		
C	DNP	DFX	DFR	ID	WD	R ²	S.E.	D.W.
.020	1.511	-.313		.143	-.190	.732	.176	1.885
(.075)	(.306)	(.077)		(.090)	(.133)			
.077	2.220		-.572	.077	-.351	.864	.126	2.0774
(.055)	(.273)		(.084)	(.066)	(.091)			

Numbers in parentheses are standard errors of the coefficients.

important of these results are the estimated coefficients on DFX and on DFR . A 10 per cent increase in real per capita federal expenditures over the four years between elections appears to reduce the popular vote for the candidate of the incumbent party by around .8 per cent. A 10 per cent increase in real per capita federal revenues appears to reduce the popular vote for the candidate of the incumbent party by around 1.4 per cent. And both coefficients are highly significant. (The difference in these coefficients suggests that there is considerable "tax illusion"; voters appear to be substan-

¹⁷ An earlier version of this test is described in detail in William A. Niskanen, *Economic and Fiscal Effects on the Popular Vote for the President*, (unpublished paper presented at Int'l Soc. for Pub. Econ., Conf. on Measurement of the Demand for Public Services, Siena, Italy, 1973).

tially more affected by changes in taxes than by changes in the total resource costs of federal services.) These results, by my reading, strongly confirm the overspending hypothesis. Moreover, the general set of these results are surprisingly consistent over equal subsamples of the elections from 1896-1932 and from 1936-1972 and over equal subsamples of elections in which a Republican was the incumbent President and elections in which a Democrat was the incumbent President.¹⁸

An estimate of the *amount* of overspending can be derived by using both the DNP coefficient and the DFX (or DFR) coefficient. From the first test equation, at the margin of 1974 conditions, a \$8.86 billion increase in real net national product would be necessary to offset the votes lost by a \$10 billion increase in real federal expenditures. This suggests that voters are only willing to forego \$1.14 billion of other uses of national output for the services financed by an additional \$10 billion of federal expenditures. From the second equation, a \$11.3 billion increase in real net national product would be necessary to offset votes lost by a \$10 billion increase in real federal revenues. This suggests a negative value of \$1.3 billion of the services financed by an additional \$10 billion of federal tax revenues. Voters appear to be roughly indifferent to an increase in federal spending or revenues only if there is no reduction in the resources available for other uses, and the marginal value of federal services appears to be nearly zero. This result is most disturbing but should not be considered conclusive, without support from other forms of evidence.

Other tests of the overspending hypothesis are provided as secondary results from a set of studies of state and local expenditures. The most advanced of these studies are by Tom Borcharding and Robert Deacon and by Ted Bergstrom and Robert Goodman.¹⁹ These two studies independently developed an ingenious technique for estimating demand functions for government services without using output data. This technique, in addition to providing estimates of the price and income elasticities of demand for government services, also provides an estimate of a parameter measuring the degree of "publicness" of a government service; this parameter, if estimated correctly, would be 0 for a purely public service and would be 1 for a purely private service. The most interesting result from these studies is that the estimated publicness parameter is 1 or greater for most state and local services. (The Borcharding and Deacon estimates indicate some degree of publicness only for higher education, highways, and some sewer and sanitation services; the estimated parameters on these services are

¹⁸ The whole set of results are available from the author.

¹⁹ Thomas E. Borcharding & Robert T. Deacon, *The Demand for the Services of Non-Federal Governments: An Econometric Approach to Collective Choice*, 62 *Am. Econ. Rev.* 891 (1972); T. C. Bergstrom & R. P. Goodman, *Private Demand for Public Goods*, 63 *Am. Econ. Rev.* 280 (1973).

around .9.) These results lead Bergstrom and Goodman to "ask why, if there are not increasing returns in the municipal provision of the goods and services we study, is their provision in the public domain?"²⁰

Borcharding, in a subsequent paper with Winston Bush and Robert Spann,²¹ suggests an explanation of this result: the monopoly power of governments and bureaus is a positive function of the population served. The original model, which assumed a government that is perfectly responsive to the median voter and a competitive supply of services at a constant unit cost, thus, is misspecified. As Downs and Tullock²² earlier suggested, voters have less incentive to monitor government the larger is the number of voters. The discussion in Part I, Section B of this paper suggests that legislators have less incentive to monitor bureaus the larger is the number of legislative districts. And the costs of monitoring a bureau, as Tullock²³ suggested, is larger the larger the absolute size of a bureau. Finally, if legislators and/or bureaus prefer larger budgets, they will use some of their monopoly power to supply private services for which expenditures increase with population; this effect was also suggested earlier by Stigler.²⁴ We are left with the somewhat ambiguous conclusion that the services supplied by state and local governments are either (1) public, but that the economies of collective supply are appropriated by monopoly governments and bureaus in the form of overspending and/or (2) private and divisible at the margin of the existing scale of government jurisdictions, in which case there is no obvious reason for governmental supply. In either case, the observed results do not appear consistent with the simple models of responsive governments and efficient production.

Both of the above studies report, but do not discuss, another similar result: expenditures for many state and local services increase as a function of the *area* of the jurisdiction. For highway services, this probably reflects production costs, but this explanation seems unsatisfactory for general municipal expenditures, local education, and higher education. An alternate explanation is that the monopoly power of a government increases with the area of its jurisdiction due to the higher costs of moving and finding comparable private opportunities. The monopoly power of a government that derives from the area of its jurisdiction, apparently, also leads to increased

²⁰ T. C. Bergstrom & R. P. Goodman, *supra* note 19, at 293.

²¹ Thomas E. Borcharding, Winston C. Bush, & Robert Spann, *The Effects of Public Spending on the Divisibility of Public Outputs in Consumption, Bureaucratic Power, and the Size of the Tax-Sharing Group in Budgets and Bureaucrats: The Sources of Government Growth* (Thomas E. Borcharding ed. 1975).

²² Anthony Downs, *An Economic Theory of Democracy* (1957); Gordon Tullock, *Towards a Mathematics of Politics* (1967).

²³ Gordon Tullock, *The Politics of Bureaucracy* (1965).

²⁴ George J. Stigler, *Director's Law of Public Income Distribution*, 13 *J. Law & Econ.* 1 (1970).

government expenditures. As Richard Wagner²⁵ has suggested, this strengthens the case against the formation of regional governments for our major metropolitan areas.

Four other studies provide estimates of the expenditure effects of more detailed characteristics of the conditions facing state and local governments. Richard Wagner and Warren Weber²⁶ demonstrate that the monopoly power of a government derived from the opportunity for "full-line forcing" will be a function of the number of different services it provides. They estimate, based on a sample of large counties in the South, that total public expenditures in counties with a subordinate school system are 10.5 per cent higher than in counties with independent school systems. A study performed by the (California) Governor's Local Government Reform Task Force²⁷ reports a similar conclusion: total taxes in each tax reporting area appear to be a negative function of the number of different taxing authorities in that area. Any substantial reduction in the overlapping of local governments in a common area, apparently, would increase local expenditures.

Sharon Oster has recently completed a study of municipal water pollution abatement expenditures.²⁸ Although the variance of these expenditures is strongly constrained by federal regulation, she finds that the per capita expenditures in fifty cities and towns in the Merrimack River Basin in New England vary roughly in proportion to the plurality of the elected official in the prior election. Again, an increase of the monopoly power of elected officials appears to be translated into higher expenditures rather than, if their preferences were neutral, merely into a higher variance of expenditures.

The Borcharding, Bush, and Spann study,²⁹ using the model and data developed earlier by Borcharding and Deacon, provides an estimate of the effect of civil service systems on state and local expenditures. One would expect a civil service system to increase government expenditures, through both a change in incentives internal to the bureaucracy and by increasing the returns to collective political activity by civil servants. For five of the six state and local services studies (other than highways) they estimate that expenditures range from 8 to 35 per cent higher in states with a civil service system prior to 1940 than in the other states. Moreover, for the states with a civil service system prior to 1940, state and local expenditures appear to have increased by around one-third of one percent per year the civil service

²⁵ Richard Wagner, *Supply-Side Aspects of the Theory of Local Government: Owners, Managers, and Take-Over Bids*, J. Pol. Econ. (forthcoming).

²⁶ Richard Wagner & Warren Weber, *Governmental Overlapping and Full-Line Forcing*, 18 J. Law & Econ. (1975).

²⁷ Report of the Calif. Local Government Reform Task Force, *Public Benefits from Public Choice* (1974).

²⁸ Sharon Oster, *Municipal Expenditures for Water Pollution Abatement*, J. Pol. Econ. (forthcoming).

²⁹ *Supra* note 21.

system has been effective. (One might ask: Effective for whom?) This study does not provide a basis for separating the bureaucratic and political effects of a civil service system, but the combination of these effects appears to have increased over time.³⁰

No one of the studies summarized in this section, of course, is conclusive, but they all suggest a similar conclusion: conditions that increase the monopoly power of governments and bureaus lead to an increase in government expenditures.

B. *The Production Inefficiency Hypothesis*

Overspending by government bureaus may take the form of inefficiency in producing a given set of outputs and/or a higher level of some output. The theory summarized in Part I suggests that we should observe both inefficiency and higher output, with the relative amounts dependent on the bureaucrat's preferences, the reward structure, and the characteristics of the review process. This section summarizes a set of studies of the production efficiency of bureaus.

Contemporary governmental conditions, unfortunately, provide only a few cases that permit a comparison of bureaus and private firms supplying the same final output. And the number of studies of these cases are even smaller. The evidence from these few studies, however, are roughly consistent: bureaus are significantly less efficient than profit-seeking firms in supplying the same output.³¹ Roger Ahlbrandt's study of public and private fire services³² concludes that the unit cost is 88 per cent higher in public fire departments. David Davies' study of two airlines in Australia³³ with nearly identical routes, schedules, and equipment concludes that the private airline carried 104 per cent more freight and mail per man-hour and 22 per cent more passengers per man-hour than did its bureaucratic twin. Lou De Alessi³⁴ summarizes several studies of private and public production of electricity which conclude that both the capital and operating costs per kilowatt hour are higher in the public firms. Robert Spann's study³⁵ of refuse collection concludes that the unit cost in public firms is 43 per cent higher than in private firms.

³⁰ A dynamic model of government expenditures, based only on the political effects of voting by civil servants, has recently been developed by Gordon Tullock, *Dynamic Hypothesis on Bureaucracy*, 19 Public Choice, Fall 1974, at 127.

³¹ This conclusion holds even though there is other evidence that bureaus supplying services for which there is an alternative private source are more efficient than other bureaus.

³² Roger S. Ahlbrandt, Jr., *Municipal Fire Protection Services: Comparison of Alternative Organizational Forms* (1973).

³³ David G. Davies, *The Efficiency of Public versus Private Firms: The Case of Australia's Two Airlines*, 14 J. Law & Econ. 149 (1971).

³⁴ Louis De Alessi, *An Economic Analysis of Government Ownership and Regulation: Theory and the Evidence from the Electric Power Industry*, 19 Public Choice, Fall 1974, at 1.

³⁵ Robert M. Spann, *Public versus Private Provision of Government Services*, in *Budgets and Bureaucrats: The Sources of Government Growth* (Thomas E. Borcharding ed. 1975).

Two available studies which compare the performance of private stock companies and mutual companies reach a similar conclusion. David Barton and Ted Frech³⁶ estimate that the unit cost of processing insurance claims is 15 per cent higher in the mutual companies and the time is around 60 per cent higher. Alfred Nichols³⁷ estimates that the unit cost of processing new loans is over 60 per cent higher in mutual savings and loan banks than in stock banks. Mutual and non-profit firms are essentially similar to bureaus in their reward structure, so these studies illustrate the inefficiency that is due to the general bureaucratic form even when the output is sold at a price.

Several other studies bear on the comparative efficiency among bureaus providing a similar output. The efficiency of bureaus should be a negative function of the size of both the government and the bureau. A larger government has more monopoly power, and the incentives of both voters and legislators to monitor the bureau are smaller. The costs of monitoring a larger bureau are larger—both to the legislature and to the senior bureaucrat—because the “control loss” is a function of the number of managerial levels. Two studies illustrate these effects. My own study of student performance in California public schools³⁸ indicates that median scores on standard reading and mathematics tests at both the 6th and 12th grade are a significant negative function of school district size for districts larger than 2,000 students. Other studies of the school district size issue reach a similar conclusion.³⁹ These studies control for family and community characteristics and school expenditures per student but not for other possible outputs of the school system. A study by Carr-Hill and Stern⁴⁰ examines the performance of police among police districts in England. This study reports that the “clear-up” rate is a significant negative function of the size of the police district. A similar study by Ehrlich⁴¹ reaches the same conclusion with respect to the population of states in the U.S. Both overspending and production inefficiency appear to be a function of the scale of bureaus at the margin of their present size.

The efficiency of a bureau should also be a function of the potential competition for the supply of the same or similar service. Such competi-

³⁶ David M. Barton & H. E. Frech III, *The Property Rights Theory of the Firm: Empirical Results from a Natural Experiment* (Wkg. Paper 28, Univ. of Calif. at Santa Barbara, May, 1974).

³⁷ Alfred Nicols, *Stock versus Mutual Savings and Loan Associations: Some Evidence of Differences in Behavior*, 57 *Am. Econ. Rev.* No. 2, at 337 (Papers & Proceedings, May 1967).

³⁸ William A. Niskanen, *Cities and Schools: A Case for Community Government in California* (Wkg. Paper 14, Univ. of Calif. at Berkeley, Graduate School of Public Policy, 1974).

³⁹ H. Thomas James & Henry M. Levin, *Financing Community Schools*, in *Community Control of Schools* (Brookings, Conf. on the Community School, 1971).

⁴⁰ R. A. Carr-Hill & N. H. Stern, *An Econometrical Model of the Supply and Control of Recorded Offences in England and Wales*, 2 *J. Pub. Econ.* 1240 (1973).

⁴¹ Isaac Ehrlich, *Participation in Illegitimate Activities: A Theoretical and Empirical Investigation*, 81 *J. Pol. Econ.* 521 (1973).

tion—even if only latent—reduces the cost of monitoring a bureau, increases the credibility of a threat to transfer funding away from one bureau, and increases the incentive for each bureau to compete on an efficiency basis. Some sense of the effects of competition can be derived from a recent study of output per man-year in the federal government.⁴² This study estimated the output and man-years for 114 elements of 17 agencies constituting 55 per cent of the federal work force for five years from fiscal 1967 through 1971. The estimated annual per cent changes in the output per man-year from this study are presented in Table 2.

TABLE 2
INCREASE IN FEDERAL OUTPUT PER MAN YEAR

Service Activity	Annual Percentage Increase	
Final Services	1.25%	
Operating		.84%
Processing		3.62
Support Services	3.24	
Management		1.32
Procurement and Supply		1.11
Maintenance		6.32
Industrial Services	5.38	
Overhead and Repair		5.05
Manufacturing		6.53

These estimates of the rate of increase of output per federal employee are almost perfectly correlated with the extent of existing competition with private firms and among bureaus. The federal government does not contract for any final services and their output is difficult to compare across bureaus. The government contracts for some support services and most industrial services. Among activities, the rate of increase of productivity is correlated with both the extent of contracting and the ease of comparing output across bureaus. The output measures are necessarily crude and the productivity estimates do not control for changes in other factors, but this pattern is too strong to dismiss. (One might plausibly conjecture that the rate of increase of productivity is lower among the services and activities for which no output measure could be identified.) Bureaucrats, like most of us, appear to shirk when they can get by with it and are efficient when they have to be. These estimates suggest the value of developing satisfactory output measures to permit contracting for final services and non-comparable activities with private firms or other bureaus.

In summary, these studies suggest that inefficiency is not a necessary characteristic of the supply of government services. For a given output,

⁴² U.S. Cong., *Jt. Econ. Comm., Measuring and Enhancing Productivity in the Federal Sector* (Jt. Comm. print, 1972).

these studies suggest that costs can be reduced by contracting with private firms, by reducing the size of bureaus, and by increasing the competition among bureaus. Some improvement in output measurement and contracting techniques is probably necessary to make better use of these efficiency-inducing instruments.

C. *The Oversupply Hypothesis*

No available study, to my knowledge, directly addresses the oversupply hypothesis, and I have not been clever enough to formulate a critical test. In its general form, the hypothesis is that a bureau will supply more of some dimension of output valued by the legislature than would be approved by the whole legislature if monitoring were costless. The primary problem of testing this hypothesis is the determination of which dimensions of output are valued by the legislature and what output they would select if the minimum costs of producing that output were known. The Postal Service illustrates this problem. As Earl Thompson observed, first-class mail service in urban areas is not obviously oversupplied. On the other hand, the amount and quality of second-class service (to magazines and newspapers), rural delivery services, and the number of post offices are probably larger, given the demands of postal users, than would be approved by the whole legislature. A formal test of the oversupply hypothesis, however, requires a base case that is not directly observable.

Several studies of the behavior of non-profit and government firms illuminate this issue but do not provide a critical test. Ken Clarkson's comparison of non-profit and proprietary hospitals⁴³ concludes that non-profit hospitals tend to be larger, to produce more research and teaching, to provide a broader set of services, and to provide more philanthropic care; the study does not identify, however, whether the additional output in these dimensions is a result of the non-profit form or is an efficient reflection of the preferences of the trustees of these hospitals. The Barton and Frech study of stock and non-profit insurance companies, discussed in II B above, reports that the non-profit companies have a 55 per cent lower error rate in processing claims and that the marginal cost of reducing the error rate appears to be much higher than its value. The De Alessi study of private and government electric utilities, also discussed above, reports that government utilities are larger, and offer a smaller range of services at a lower price. These conclusions are similar to those of the Clarkson study, except with respect to the range of services, but this study also does not separate the effects of the bureaucratic form from the preferences of the governmental sponsors. Non-profit firms and government bureaus appear to supply more output in some dimensions than do proprietary firms serving the same general market;

⁴³ Kenneth W. Clarkson, *Some Implications of Property Rights in Hospital Management*, 15 *J. Law & Econ.* 363 (1972).

this is consistent with the oversupply hypothesis but is not yet a conclusive test. Some innovation in test procedures and more detailed data are probably necessary to improve the tests of this hypothesis.

D. *The Overcapitalization Hypothesis*

My book, developing on a model suggested earlier by De Alessi,⁴⁴ also conjectures that a bureau will use more capital-intensive production techniques than would a private firm producing the same service. The primary reason for this is that a bureaucrat's rewards are specific to his tenure in that position; this leads him to prefer present spending to future spending and, thus, to prefer production processes with higher capital costs and lower operating costs. This hypothesis is not necessarily inconsistent with an hypothesis suggested earlier by William Baumol⁴⁵ that the production of government services, like private services, are inherently labor-intensive and "non-progressive."

Two recent studies bear on both the De Alessi and Baumol hypotheses. De Alessi's study of electric utilities, discussed above, reports that government utilities are more capital intensive than private utilities—a conclusion that is consistent with his own hypothesis. William Orzechowski has recently provided some estimates of the aggregate capital-intensity of the public sector that permit a rough comparison with the private sector.⁴⁶ His results are presented in Table 3. These results are not strictly comparable because of different aggregations of capital assets, different accounting conventions, and different observation years. Nevertheless, the pattern is dramatic: government civil activities appear to use more than twice as much capital per employee as private industry over five times as much capital per worker as the private service sector. (Moreover, addition of inventories and other excluded assets to the government capital aggregates would increase this difference.) If the production function of public civil activities is similar to that in the private service sector, as Baumol suggests, these results confirm the De Alessi hypothesis that bureaus will choose production processes that use too much capital. In any case, these results are strongly inconsistent with the Baumol hypothesis of low relative capital intensity in the public sector, and one must look for another explanation of the relatively low rate of growth of public sector productivity. In the face of this evidence, it is difficult to understand how the Baumol hypothesis came to be accepted as conventional wisdom.

⁴⁴ Louis De Alessi, *Implications of Property Rights for Government Investment Choices*, 59 *Am. Econ. Rev.* 13 (1969).

⁴⁵ William Baumol, *Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crises*, 57 *Am. Econ. Rev.* 415 (1967).

⁴⁶ William Paul Orzechowski, *Labor Intensity, Productivity, and the Growth of the Federal Sector*, 19 *Public Choice*, Fall 1974, at 123.

TABLE 3
CAPITAL PER EMPLOYEE IN THE PUBLIC AND PRIVATE SECTORS

Sector	Book Value per Employee	Year
Federal ^a		
Defense	\$59,164	1963
Civil	28,252	1963
Public Schools ^b	26,456	1965
Private ^c		
Industry	12,030	1960
Services	4,380	1960

^a Book value of fixed assets other than public domain; excludes inventories, accounts and loans receivable, cash, etc.

^b Book value of fixed assets: Virginia Public School System.

^c Book value of all assets: Victor Fuchs, *The Service Economy* (Nat'l Bur. Econ. Res., 1963).

E. *The Bureaucratic Structure Hypothesis*

Conventional public administration theory and my theory of bureaucracy share one common perspective: the structure of the bureaucracy makes a difference. Almost every President in recent decades has established a commission on government organization. These commissions, reflecting the views of conventional public administration theory, consistently recommend the consolidation of bureaus and departments supplying related services. These consolidations are expected to increase governmental efficiency by reducing the President's span of control, by improving the coordination of related services, and by reducing the administrative overhead. An implicit objective of these consolidations is to reduce the direct ties between bureaus and Congress. As a rule, the proposed consolidations are opposed by Congress.

My theory of bureaucracy, in contrast, suggests that the consolidation of bureaus supplying competitive services would increase the monopoly power of the remaining bureaus, primarily by increasing the costs to Congress (and to the President) of identifying the actual and potential costs of a service and by changing the incentives of bureaucrats from competing on an efficiency basis to promoting the total demand for the service. One might also expect that the additional organizational level would increase the "control loss" and, thus, the production inefficiency within a department. These effects suggest that a consolidation of bureaus supplying competitive services would increase the budget for these services.

The major structural changes in the federal bureaucracy that have been approved since World War II provide a potential test of these two competing theories. Four new departments have been established by consolidation of bureaus supplying related services. The Department of Defense was established in 1949. The Department of Health, Education, and Welfare was established in 1953. The Department of Housing and Urban Development was established in 1965. And the Department of Transportation was established in 1966. My theory suggests that spending by these departments

would be higher than the total spending for each set of services prior to consolidation, controlling for other conditions that affect the total spending for these services.

The following test equation is used to test this hypothesis:

$$O = \alpha(ETO)^{\beta_1} \left(\frac{O_{-1}}{TO_{-1}} \right)^{\beta_2} (X)^{\beta_3} e^{\beta_4 D + u},$$

where O is the outlays for a specific service, by fiscal year, ETO is the estimated total federal outlays in that year, O_{-1} is the outlays for that service in the prior fiscal year, TO_{-1} is the total federal outlays in the prior fiscal year, X is some other variable that affects the outlays for that service and D is a dummy variable that reflects the establishment of a department that includes the service. All outlay variables are in current dollars. The ETO variable is estimated from another equation that estimates total federal outlays in current dollars from another set of variables including the implicit price index on federal services, the implicit price index on private consumption, the real GNP, and the number of armed forces overseas; the economic variables in this equation are specific to the calendar year that includes the first six months of the fiscal year. The departmental dummy is 1 for all years subsequent to the year in which the department was established and is 0 in earlier years.

A positive coefficient on the departmental dummy would be consistent with the hypothesis that the establishment of a department that includes competing bureaus increases spending. I also expect that the coefficient on the lagged budget share will be between 0 and 1; this would indicate that the percentage increase in outlays for a component of the budget is a negative function of its budget share.

This test equation is estimated for six services: national defense, education and manpower, health, income maintenance, transportation, and community development and housing. The sample period for the first four services is FY48 through FY73. The sample period for the last two services is FY60 through FY73, as estimates of outlays for these services in earlier years are not available.

Each of these services, other than education and manpower, is now dominated by one department. Conceptually, education outlays should be separated from the manpower outlays to test the effect of the HEW dummy, but the requisite data are not available for years prior to FY60. In addition, education outlays serve a different constituency than that for health and income maintenance outlays, so education is probably not an effective substitute for the other functions of HEW. For these reasons, the effect of the establishment of HEW on education outlays is expected to be weak.

Several of the test equations include another variable to reflect conditions that may change the demand or cost for the specific service. The national defense equation includes the number of armed forces overseas. The health

and income maintenance equations include the relative price of medical services. And the community development and housing equation includes the corporate bond rate. It is not obvious, of course, that these conditions are fully exogenous, so several of the equations exclude these variables.

Table 4 below presents ordinary least squares estimates of the logarithmic form of each of the test equations.

TABLE 4
FEDERAL OUTLAYS BY FUNCTION

	Constant	Total Outlays	Lagged Share	Departmental Dummy	Other Variable	R ²
Defense	2.040 (.418)	.759 (.044)	.548 (.099)	.428 (.084) [53.4]		.982
	.564 (.411)	.757 (.030)	.488 (.069)	.293 (.064) [34.0]	.235 (.047)	.992
Education and Manpower	-2.985 (4.008)	1.185 (.280)	.797 (.187)	.090 (.117) [9.4]		.984
Health	1.907 (3.587)	.848 (.276)	1.047 (.117)	.224 (.153) [25.1]		.986
	5.982 (3.992)	.504 (.316)	.795 (.171)	-.063 (.207) [-6.1]	3.792 (1.969)	.988
Income Maintenance	-1.962 (1.173)	1.107 (.082)	.654 (.147)	.182 (.099) [20.0]		.987
	2.621 (2.091)	.722 (.169)	.460 (.152)	.222 (.090) [24.9]	1.961 (.774)	.991
Transportation	-23.152 (13.364)	2.384 (1.321)	-1.221 (.787)	-1.235 (1.016) [-70.9]		.886
Community Development and Housing	-20.888 (11.993)	1.613 (1.162)	-.905 (.497)	.739 (1.358) [109.4]	.675 (.393)	.928

Notes: Figures in parentheses are standard errors of the coefficients. Figures in brackets are the estimated percentage change.

The pattern of these results is generally consistent with the hypothesis that the establishment of these four departments increased spending. The coefficients on the departmental dummy are generally positive, highly significant for the two largest services (defense and income maintenance), and nowhere both negative and significant. The magnitudes of the outlay increases associated with the establishment of DoD and HEW are substantial—around 34 per cent for defense, maybe as high as 25 per cent for health, and around 25 per cent for income maintenance. Coefficients on the

other departmental dummies are not significant. These results are not consistent with the public administration hypothesis that the establishment of these departments contributed to efficiency and economy.

These results, however, are consistent with one other hypothesis—that the increased spending and the establishment of these departments are *joint* results of an increased demand for these services that is not reflected in the other variables. This hypothesis is consistent with the rhetoric of these reforms and is quite plausible. The above tests, unfortunately, do not distinguish between the monopoly bureau hypothesis and the demand shift hypothesis if there are any important excluded variables that are correlated with the departmental dummies. For the moment, the burden of proof should rest with those who claim that these results really reflect some important excluded condition. Again, the available tests on the several hypotheses derived from my theory of bureaucracy and representative government seem to be roughly consistent, interesting, and suggestive—but not yet conclusive.