Outside Information and the Degree of Monopoly Power of a Public Bureau*

I. Introduction

The presence of monopoly power in bureaus financed directly by the government has only recently become a focus of attention for economic analysis. Much of traditional public finance has been based on the assumption that once a decision has been made regarding the optimum combination of public goods and services, the bureaucracy will produce the desired output at least cost. Implicitly it is assumed that the trustees, who are responsible for monitoring the bureau, have full information on costs. Recently a number of economists, most notably Niskanen [7; 8] and Migue and Belanger [5], have addressed the problem of monopoly power using economic analysis derived from the theory of the firm. These authors assume the government bureau can present all or nothing budget and output demands leaving no net surplus to the public from the production of the good,[1] as is the case with a perfectly discriminating monopolist in the private sector. This extreme case is plausible only if the trustees, which in Niskanen's case are a legislative committee, have "no information" on the minimum costs of operation within the bureau. There is no information on costs known "outside" the bureau.

Neither the standard public finance approach nor this extreme monopoly case explain the behavior of the bulk of public bureaus which are in neither of these extreme categories. It is shown in this paper that the trustees need only some minimal information on the true cost of production within the bureau to reduce the power of the bureau to at most that of an ordinary monopolist. The information required is simply that the average cost intersects the demand curve. The total budget which obtains under these circumstances lies between the extremes of the traditional public finance model on the one hand and the "no information" models on the other. Furthermore there is a tendency for output to be too low relative to output under full information. In contrast an excessive output level is predicted by the extreme monopoly models.

Naturally, some inefficiency in the provision of public services is a consequence of factors outside the bureau's control. For example the preference functions which rationalize legislative choice may allow a representative to obtain overgenerous funding for a program in his district, which improves his chances for reelection since his district pays only a portion

1. To be fair, Niskanen [8, 621] argues that his model needs to be modified if there is any competition for the provision of the service of the bureau.

228

of the cost. Indirectly the voting power of bureaucrats may increase the budget allocation [13; 2]. These possibilities are not analysed here since my concern is the divergence from optimal operation arising from differences in goals between the bureau and the trustees. It is therefore appropriate to assume a single body of trustees with a well defined demand curve[2] for the output of the bureau and a desire for output to be produced at a minimum cost.

The trustee's information regarding the minimum cost of production is of central importance in determining the degree of monopoly power of a public bureau. As Breton and Wintrobe argue [1], if the trustees could costlessly obtain information, then any bureaucrat who did not supply the optimal output at minimum cost would be replaced. The preferences of the bureau head would then be irrelevant for the level of budget and output.

It is not easy for any group of trustees who may be responsible for a large number of government bureaus to learn all the relevant information on costs. As Downs [3, 248] writes, "There is an economic disparity between the complexity of bureau operations and the limited information absorbing capacity of any individual or small group. This disparity lies at the heart of the budgeting process." For example consider the problem of estimating the minimum budget necessary for the internal administration of a bureau. Whether or not the best procedures are followed is difficult to estimate since these procedures typically vary with the size and function of the bureau. The effort required by the head in supervision and coordination is generally known only by the head himself. Also it is difficult to agree with Thompson's suggestion [12, 951] that "any striving underling who knows what's going on can surely raise his wage by informing the trustees of the true costs". In the first place, this is likely to make the individual's life unpleasant within the agency. In the second place the trustees may not believe the information presented by the underling who may have ulterior motives. Documentary proof would be very costly if not impossible to obtain.

The basic approach of this paper is presented in section II. The third section contains a brief review of existing models which assume the trustees have either full or no outside information. The fourth section shows the implications for budget and output choices of the trustees' simple information that the average cost curve intersects the demand curve. This minimal information drastically reduces the bureau's options relative to the situation of no outside information.

II. Organizationl Framework

As a convenient simplification I follow Niskanen [7; 8] and Migue and Belanger [5] in assuming that all the decision making power of a bureau is embodied in its head and that the head acts so as to maximize his utility subject to the constraints he faces.

A large number of simple goals such as salary, prestige and status, budget size and ease of management, have been attributed to the managers of government bureaus. Migue and Belanger [5] point out the risk of being arbitrary in the selection of specific arguments for the maximand. They consider two groups of perquisites or goals for the bureau head that have different observable consequences for the budget and output decisions. In one group the

---

2. This paper abstracts from any difficulty in determining the demand curve. For a discussion of the nature of the demand curve see Niskanen [8] and Hettich [4]. Niskanen's trustee group is a legislative committee consisting of those representatives with a greater than average demand for the bureau's services.

head's perquisites increase with output per se and in the other they increase with the excess of budget over and above the minimum necessary to produce the level of output. These goal categories, which form the basis of the Niskanen [8] revision of his model in [7], are also used in this paper. If q represents the level of output, $C(q)$ the total cost function, and B the total budget, then the bureau head's indirect utility function is $u(q)$ for perquisites in the first category and $u[B - C(q)]$ for perquisites in the second. Any combination of these goals is of course possible. In the context of this paper $C(q)$ represents the minimum total cost required to produce output q, which is not necessarily the actual budget cost as observed by the trustees. For example if the head's perquisite is ease of management, the employment of more staff at any level of output allows the head to spend less effort on supervision and delegate more to subordinates.[3] The productivity of each employee can then be less without reducing the total output of the bureau. The actual budget cost B, which is observed by the trustees, is greater than $C(q)$ in these circumstances.

III. Models with either Full or No Outside Information

With full information, the trustees set both the budget and output of the bureau to obtain the standard public finance solution. The level of output is given by the intersection of the marginal cost curve $C_q(q)$ and the demand curve, represented by $q(b)$. This Pareto Optimal result is shown as output q_2 in Figure 1. The total budget allocated to the bureau is then $C(q_2)$ shown as the area $b_2 P_2 q_2 O$. Since in Figure 1, average cost, $C(q)/q$, is increasing, the allocated budget per unit $b_2 = B/q_2$ is less than the marginal cost at output q_2.

The Niskanen [7; 8] and the Migue and Belanger [5] models postulate the extreme of monopoly power for the bureau. In these models, the bureau head, knowing the trustees' demand curve and the true cost of operation within the bureau, presents an all or nothing budget and output demand. The head's choice maximizes his utility subject to the bureau's ability to produce the output promised at the stated budget. The bureau is thus able to extract the full monopoly rent as is the case with a perfectly discriminating monopolist. Niskanen [7, 130] explains this power of the bureau to set both budget and output in terms of the total lack of information by the legislative body on the minimum cost of provision of the public service.

In more detail let $b = g(q)$ represent the negatively sloped inverse demand curve of the trustees. The maximum budget the bureau can extract at any given level of output in a situation where the trustees have no information is represented by $A(q) = \int_0^q g(q')dq'$, the area under the demand curve up to output q.[4] Given the simplifying assumption that the marginal utility of money is constant, $A(q)$ is the total benefit (before costs) of output q to the trustees. The average total benefit $A(q)/q$ is represented by line $b_0 k$ in Figure 1. Under these circumstances, if the bureau head's perquisites depend on output alone, he chooses B and q to maximize $u(q)$ where $B \leq A(q)$ and $B \geq C(q)$. The head chooses the budget and output combination where $A(q)/q$ cuts the average cost, $C(q)/q$, as indicated by point P_4 in Figure 1. The chosen output is the largest output on the constraint set and is produced at minimum cost. On the other hand if the perquisite depends on excess budget, the bureau head chooses B

---

3. There may be other reasons for preference for staff. See, for example, Williamson [14].
4. The trustees' demand curve for the bureau's services can be viewed as a marginal evaluation curve.
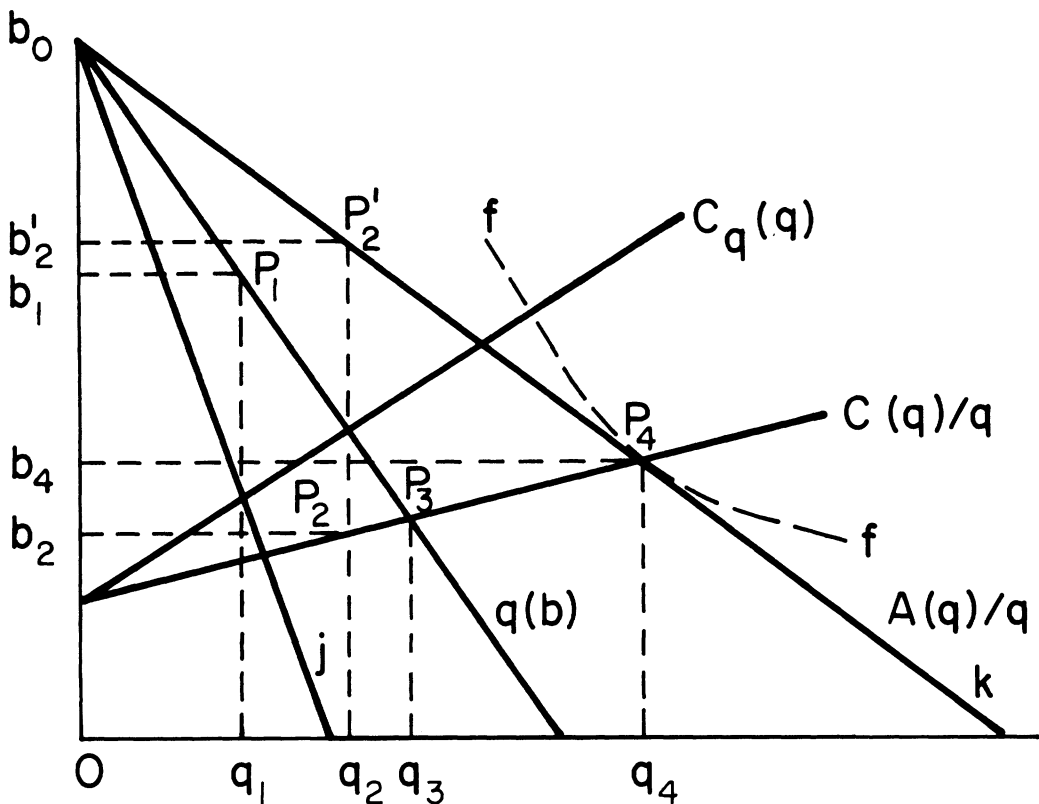
Figure 1.

and q to maximize $u[B - C(q)]$, where $B \leq A(q)$. The bureau produces the output, q_2, in Figure 1, given by the intersection of the marginal cost and the demand curve. This is the same output as is chosen by the trustees in the situation of full information. However, the budget, shown as the area $b_2'P_2'q_2O$, is larger than the minimum necessary and leaves the trustees or public with no net benefit from the output. The bureau acts so that its budget and output are the same as the total revenue and output of a perfectly discriminating profit maximizing monopolist.

IV. The Restriction of the Bureau's Choice due to Outside Information

Niskanen would agree [8, 621] that the bureau's ability to present all or nothing budget and output demands is a situation the trustees would endure only if there were no other recourse. The bureau can set the agenda in this way only if it can withold production unless it receives its full demands. In the terminology of Romer and Rosenthal [9; 10] the reversion or status quo point is zero output.[5] Under most institutional arrangements, if the trustees know that output can be produced at other than zero net benefit to the public, they can always replace

---

5. Romer and Rosenthal [9; 10] show the importance of the reversion point in determining the size of a bureau's budget in the context of a referendum process.

the head of the bureau until this is achieved. Hence for the Niskanen "no information" solution to occur the bureau head must convince the trustees that actual costs are such that no such net benefit is obtainable.

The trustees are likely to have great difficulty in believing the kind of misinformation the bureau head must supply to obtain this extreme monopoly result. The trustees must believe[6] that average cost is decreasing in such a way that it does not cut the demand curve and moreover is tangent to the average total benefit line $A(q)/q$. Such a false average cost curve for a head whose indirect utility function depends on output alone is illustrated by the line ff in Figure 1. The tangency of ff with the average budget line at P_4 ensures that any feasible budget and output combination other than the one desired by the head involves a total cost greater than the total benefit of the output to the trustees. If the trustees were informed that the average cost curve intersects the average total benefit line $A(q)/q$, then they would know that there is some level of output at which the total value of output exceeds the total cost. In these circumstances, the trustees would not accept less than the positive net benefit they know to be feasible.

Moreover, if the trustees have only the minimal information that the average cost curve intersects the demand curve, then the bureau's budget setting power is restricted. The bureau can no longer dictate both total budget and output. The fact that the average cost curve intersects the demand curve reveals that at least one per unit budget and output combination on the demand curve is feasible. By insisting that the bureau quote a per unit cost (price) and that the trustees choose the level of output they desire at that price, the trustees are able to ensure a positive net benefit rather than the zero net benefit they obtain when the bureau sets both total budget and output.

If the bureau head's perquisite depends on output alone, the head chooses[7] the level of average costs which will induce the trustees to allocate the maximum output satisfying the following constraints. These are that the per unit budget and output combination lie on the demand curve and that the total budget is sufficient to produce the allocated level of output. More formally, the bureau head chooses b to maximize $u(q)$ subject to $q = q(b)$ and $B - C(q) \geq 0$. In this situation it is in the bureau head's interest to reveal the true level of average cost. A level of output, q_3, is then produced where the true average cost intersects the demand curve (shown by point P_3 in Figure 1). If the head's utility depends on the excess of budget over cost, he chooses b to maximize $u[B - C(q)]$ where $q = q(b)$. The bureau head indicates an average cost which cuts the demand curve at P_1 above the intersection of the marginal cost, $C_q(q)$, and the marginal revenue curve, $b_0 j$, of Figure 1. The output q_1, with a per unit budget of b_1, is analogous to the choice of a profit maximizing monopolist.

In summary, with all combinations of goals of the bureau, the trustees' partial information that average cost cuts the demand curve reduces the total budget that can be extracted at any level of output relative to the no information case. Also with both goal categories of the bureau head the presence of this outside partial information reduces the output of the bureau, from q_4 to q_3 if utility depends on output alone and from q_3 to q_1 if it depends on excess budget. Niskanen's strong result that the bureau's chosen output is normally in excess

6. Niskanen [7, 63–65] indicates that the cost curves apparent to the trustees would differ from the true cost curves. Thompson [12, 951] argues that "for outputs below that desired by the bureaucrats, trustee expected average costs fall with output (at a rate faster than benefits) even if actual costs do not."

7. It is assumed that the bureau head has full information including knowledge of the trustees' purchasing strategy.

of the Pareto Optimal output no longer holds. If the trustees have only a minimum of information there can be no presumption that the level of service provided is too high. Rather there is a tendency for too low a provision of output similar to the standard monopoly result in the private sector.[8]

Of course the bureau's trustees may in fact have more than this minimum of information at their disposal for control of the bureau. For example Breton and Wintrobe [1] suggest that the trustees may institute control devices and invest in further information until the extra costs outweigh the extra benefits. Spencer [11] analyses a budgetary process which may reveal further information. Various strategic behaviour may determine the actual budgetary outcome [6]. This does not affect the conclusion that only minimal information is required to limit the bargaining gain of the bureau to at most that of an ordinary monopolist. Any further bargaining based on the gain of additional information by the trustees can only reduce the benefit of the bureau below this limit.

<div align="right">

Barbara Spencer

Queen's University and University of Manitoba

</div>

8. There is only one case in which an excessive output is produced. If marginal cost is increasing and the bureau head's utility increases with output, then the level of output is q_3, which is greater than the full information output q_2 (see Figure 1).

References

1. Breton, Albert and Wintrobe, Ronald, "The Equilibrium Size of a Budget Maximizing Bureau: A Note on Niskanen's Theory of Bureaucracy." *Journal of Political Economy*, 83, no. 1, February 1975, 195–207.

2. Chan, Kenneth Shun-Yuen, "A Behavioural Model of Bureaucracy." *Southern Economic Journal*, 45, April 1979, 1188–94.

3. Downs, Anthony. *Inside Bureaucracy*. Boston: Little Brown and Company, 1967.

4. Hettich, Walter, "Bureaucrats and Public Goods." *Public Choice*, 21, Spring 1975, 15–25.

5. Migue, Jean Luc and Belanger, Gerard, "Toward a General Theory of Managerial Discretion." *Public Choice*, 17, Spring 1974, 27–42.

6. Miller, Gary J., "Bureaucratic Compliance as a Game on the Unit Square." *Public Choice*, 29, Spring 1977, 37–51.

7. Niskanen, William A. *Bureaucracy and Representative Government*. Chicago: Aldine Atherton, 1971.

8. ———, "Bureaucrats and Politicians." *Journal of Law and Economics*, 18, No. 3, December 1975, 617–43.

9. Romer, Thomas and Rosenthal, Howard, "Political Resource Allocation, Controlled Agendas and the Status Quo." *Public Choice*, 33, Winter 1978, 27–42.

10. ———, "Bureaucrats vs. Voters: On the Political Economy of Resource Allocation by Direct Democracy." Forthcoming in *Quarterly Journal of Economics*, 1979.

11. Spencer, Barbara, "Asymmetric Information and Excessive Budgets in Government Bureaucracies: A Principal and Agent Approach." G.S.I.A. Working Paper #39-76-77, Carnegie-Mellon University (revised 1979).

12. Thompson, Earl A., book review of Niskanen [7]. *Journal of Economic Literature*, 11, No. 3, September 1973, 950–53.

13. Tullock, Gordon, "Dynamic Hypothesis in Bureaucracy." *Public Choice*, 19, Fall 1974, 127–31.

14. Williamson, Oliver E., "Hierarchial Control and Optimum Firm Size." *Journal of Political Economy*, 75, no. 2, April 1967, 123–38.