

Bureaucratic Provision: ‘Influencing’ Vs. ‘Lying’^{*}

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Abstract: In this paper a public bureau can extract surplus value from the services it provides not only by misrepresenting its production costs to its oversight committee but also by influencing the perceptions of the legislative body such as the parliament or the congress and the public at large by costly argumentation. By juxtaposing the bureau’s ability to ‘influence’ with its ability to misreport or ‘lie’, I examine the impact influencing might have on the bureau’s incentives to lie and on the efficiency of bureaucratic provision. I find that a truth-telling equilibrium could exist where the bureau’s ability to influence would deter it from lying and the level of bureaucratic provision would be efficient. However, there could also be an equilibrium where the bureau would lie in which case there would be either over-production or under-production. This suggests that even when the bureau only cares about extracting the surplus value of its production, there could still be over-production simply due to the bureau’s ability to distort cost information.

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“In Washington, you can be successful if you appear to be successful...appearances are as important as reality.” - Michael Blumenthal.¹

1. Introduction

The allocation of budgets to government agencies typically involves suspicion and cynicism amongst politicians, academicians and people at large. The budgets of such agencies are often controversial with doubts lingering over whether the assigned budgets are sufficient or whether the bureaus are actually capable of delivering the benefits for which the funds are assigned. Further, since many bureaus exclusively provide the service they are assigned, there is no natural way of learning about the true minimum cost of operations, as would be the case in a decentralized competitive market setup.² Hence it is hardly surprising that concerns about the efficacy of the budgeting process have generated a sizable literature in this area.

Early contributions such as Niskanen (1975) and Migue and Belanger (1974) hypothesized that the monopoly nature of supply and the superior information on production cost would give public bureaus an enormous advantage over their political bosses in the budget appropriations process. Hence they focused on characterizing the bureau's objective function to predict its impact on the nature

¹ See Wilson (1989), pg. 197.

² See Carroll (1989) for a contrary perspective on the monopolistic set up of government agencies.

of budget allocation. Niskanen (1975) argued that the bureaus were obsessed towards expanding their size and as a result public bureaucracies would be characterized by excessive budgets and oversupply of output. However, Migue and Belanger (1974) argued that instead of maximizing the absolute size of the budget, the bureau would be primarily concerned with maximizing its discretionary budget (the excess of its budget over the minimum cost of production), to fund its preferred expenditures.

Subsequent research focused more on the strategic relationship between the bureau and its oversight committee while adopting a “middle path” in modeling the bureau’s objective function: some weight was put on both the discretionary budget and the level of output produced. Breton and Wintrobe (1975) asserted that Niskanen’s model had attributed excessive bargaining power to the bureau. They argued that the congressional oversight committees have access to control devices to monitor, ascertain information about and reproach erring bureaus. Later research along these lines explicitly incorporated the strategic roles of the bureau and congressional oversight body into their analysis (Chan and Mestelman (1988), Marselian (1998), Miller (1977), Miller and Moe (1983), Moene (1986)), showing that the nature of production inefficiency in bureaucratic provision would be sensitive to the structure of the game between the two, and even under-production could not be ruled out despite a bureaucratic preference for output. This further led to an examination of the usefulness of specific auditing procedures that might be available to the congressional bodies to significantly limit the information

advantage of the bureaus (For example, see Bendor, Taylor and Gaalen (1985, 1987), Banks (1989), Banks and Weingast (1992)).

However, while examining the nature of bureaucratic preferences and delving deeply into the effectiveness of various instruments available to the congressional committees for controlling the bureaus, the existing literature has overlooked another conspicuous feature of the budgeting process: the game of arguments and counter-arguments between the bureau executives and their oversight-committees played out in front of a larger audience comprising the much less informed: the floor of the parliament or the Congress and through the various media channels, the public at large. Even when the budgetary oversight committee and the bureau have exactly the same understanding about the true costs of provision, it might not be verifiable to a larger body of congressmen and important public personalities (hereafter referred to as “public”) whose opinions can be manipulated by carefully crafted arguments and whose support might be important in shaping the outcome of the budgetary process.

Hence the contest of arguments and persuasive appeals between the bureau and its oversight committee can affect the size of the budget the former can wrestle from the latter (hereafter called the ‘committee’). I call this aspect of the budgetary process ‘influencing’. In the ensuing analysis, I juxtapose the bureau’s ability to influence the public with its ability to mislead or lie to the committee regarding the production cost. I examine the incentives for the bureau to lie given that it has the ability to extract surplus budget through influence. It turns out that lying might not

be inevitable. The bureau might prefer to report accurate costs to the committee and fight with it in the public arena. In such situations, the committee decides on the output with accurate cost information and the production decisions are efficient. However, although ‘truth-telling’ is feasible, it is not guaranteed. Lying might occur, in which case production decisions are made on inaccurate information and hence inefficient. The inefficiency may go either ways. Neither over-production nor under-production can be ruled out. However, since the specified objective function of the bureau (to be defined precisely in the next section) does not necessarily imply a special preference for output, in contrast to the existing literature, in my model over-production may result purely due to asymmetric information rather than any bureaucratic preference for output. In the next section, I describe the model and the timing of events. The subsequent sections discuss the plausibility of the different equilibria.

2. The model

The model consists of two active agents: a budgetary committee and the bureau. While the bureau tries to ‘pocket’ the surplus value of production to fund its preferred expenses, the committee tries to decide on a level of output and budget that maximizes the net benefit the public might derive from the bureau’s services. In doing so, the committee must evaluate the bureau’s reported cost estimates; decide on the level of output and budget and present arguments before the public to defend its budget in the face of the bureau’s assertions. The bureau might want to deceive the committee by inflating cost estimates and argue for a higher budget

over the committee's recommendation by persuasive appeals to the public. Both are assumed to be risk-neutral.

An important assumption through out the analysis is the difficulty faced by the committee in conveying information about production costs accurately and credibly to the less informed public. Hence despite the fact that it acts in public interest, the public opinion might still be manipulated by clever argumentation from the bureau generating political pressure to raise budgets over the committee's recommendation. However, arguments are not 'cheap' and impose costs on both the bureau and the committee.³

I now proceed to describe the information structure and the time line of the model more precisely.⁴ Let $B(Q)$ denote the total benefits derived by the public from the output (Q) produced by the bureau.⁵ For the purposes of simplicity and analytical clarity, I assume that both the committee and the bureau have perfect information about the benefits function. The bureau on the other hand has private information regarding the true cost of provision. The exact nature of this information asymmetry is as follows: For simplicity, let the cost function be $C(Q) = c * Q$ where c represents the per-unit cost of provision. The true value of c is either c_h or c_l (where $c_h > c_l$). Nature picks up the true level of c (either

³ These costs would typically involve both money and time: resources spent on collecting/fabricating evidence to buttress the case and time spent to organize the evidence and prepare a persuasive presentation.

⁴ See figure 1 for a diagrammatic representation of the game.

⁵ To ensure concavity of the payoff functions I assume that $B'(Q) > 0$ and $B''(Q) < 0$.

c_h or c_l) at the beginning of the game. It chooses c_h with the probability of p_h .

Accordingly, it chooses c_l with a probability of $1 - p_h$.

Only the bureau observes the nature's pick and decides what to report to the committee. On account of prior investigation, the committee knows the structure of the cost function and the prior probabilities of c_h or c_l . However it does not observe the nature's pick and must evaluate the veracity of the bureau's report while making its cost-estimates. Having made its cost-estimates, the committee decides on the level of output (Q), the least cost budget to finance the output and its argument-related expenses (m_s) to back its budget recommendations. At this stage, the bureau also simultaneously determines its argument-related expenses (m_b) to support its requests for budget raises.

Hence the bureau's strategy has two components. It must decide what to report and the level of its argument-related expenditures (m_b) after observing either of the two possible cost levels picked by nature. The reporting component of its strategy comprises of a mapping from the set $C = \{c_h, c_l\}$ onto itself. Let me denote this mapping by $R^i(C)$ where $i=T$ or L depending on whether it decides to report the costs truly or lie about them. Within this framework, a truthful report would entail transmitting the nature's pick accurately to the committee. The strategy to lie would amount to reporting either c_h or c_l irrespective of what is observed by it. Similarly, $M_b(C)$ associates a level of argument-related

expenditure (m_b) for each of the two levels of c . Hence its strategy can be described as $[R^i(C), M_b(C)]$ where $m_b \in [0, \infty)$.

Similarly, the committee's strategy also has two components.⁶ It must decide on the level of output (Q) and the argument-related expenditures (m_s) (to counter the bureau's influence) after receiving each of the two possible bureau reports. Hence it associates for each level of c the pair $[Q, m_s]$ where $Q, m_s \in [0, \infty)$. I denote the committee's strategy as $S(C)$. $M_b(C)$ and $S(C)$ are determined simultaneously. In determining $S(C)$, the committee's belief about the true per-unit cost of production becomes important. The committee's belief is its posterior probability of the true cost being c_h , which is derived by updating its prior probability of c_h on the basis of bureau's reported cost-level using Baye's Rule. Let it be denoted by $m_h(C)$.

Let $\tilde{c} [= m_h(c') * c_h + \{1 - m_h(c')\} * c_l]$ denote the committee's expected per unit cost of production given the bureau's reported cost-level $c' \in \{c_h, c_l\}$.

Accordingly, following the bureau's report, the committee perceives the net consumer's surplus to be $B(Q) - \tilde{c}Q$. Since the committee is guided by public interest, for any level of output Q , it would prefer to assign a budget of $\tilde{c}Q$ so as to provide the maximum net benefit to the public. However, since the bureau can manipulate the public's perceptions about cost to extract a budget above $\tilde{c}Q$, it

must spend resources to counter bureau's arguments. Relative strengths of their arguments determine how much of the surplus is appropriated by the bureau through influencing. In particular, given that bureau spends m_b while the committee spends m_s towards producing the arguments, I posit that the bureau extracts a fraction $\frac{m_b}{m_b + m_s}$ of the surplus through this channel. Accordingly,

$1 - \frac{m_b}{m_b + m_s} = \frac{m_s}{m_b + m_s}$ is the fraction of the surplus that the committee retains for

the public. Hence the more resources spent by the bureau relative to the committee, the greater is its share. Such ratio functions, more generally termed as Contest Success Functions (CSF) have been used in the public choice literature to model outcomes in rent-seeking contests (e.g. Tullock (1980)).⁷ A more relevant context to the one described above where such functions have been used is to model win-probabilities of the plaintiffs and defendants in litigation battles (e.g. Hirshleifer and Osborne (2001)). Following Marselien (1998),⁸ I use this particularly simple and symmetric form of the CSF for analytical ease.

Hence, the net payoffs to the committee and the bureau from the game are as follows:

$$\text{Committee: } \frac{m_s}{m_b + m_s} [B(Q) - \tilde{c}Q] - m_s \quad (1)$$

⁶ After having made the cost estimates and decided on output, the committee's choice of budget is automatic: the least cost of producing the chosen level of output. This follows from the assumption that the committee acts in the public interest.

⁷ For a detailed discussion of the axiomatic properties of such functions see Skaperdas (1996).

$$\text{Bureau: } \frac{m_b}{m_b + m_s} [B(Q) - \tilde{c}Q] - m_b + (\tilde{c} - c^T)Q \quad (2)$$

where c^T is the true per-unit cost of production as picked by nature.

The committee's payoff is the share of the surplus it manages to retain for the public less the costs of competing with the bureau in doing so. The bureau's payoff has two components. $(\tilde{c} - c^T)Q$ is the amount of surplus budget that the bureau is able to extract by misreporting or lying about production cost to the committee.

The remaining component $\frac{m_b}{m_b + m_s} [B(Q) - \tilde{c}Q] - m_b$ represents the net gain to the

to the bureau from influencing. Given the committee's proposed budget $\tilde{c}Q$, the bureau argues for more to the public. To the extent that it is successful, it extracts additional surplus value.⁹ In the following sections, I examine how the bureau's ability to extract surplus this way through influencing interacts with its incentive to lie to the committee regarding production costs and its implication for production efficiency.

3. Is truth-telling feasible?¹⁰

In this section, I begin by examining the possibility of a Perfect Bayesian Nash Equilibrium (PBE) of the above game, which involves truthful reporting by the bureau. In other words I characterize and check the feasibility of $\{(R^T(C),$

⁸ In Marselien (1998), the target of bureau's persuasion is the committee itself. However, in my analysis, the target is the public – relatively much less informed than the committee.

⁹ I make the reasonable assumption that the public would not support a budget raise that would make the surplus negative.

¹⁰ Details of derivations can be made available upon request.

$M^*_b(C), S^*(C), \mathbf{m}_h(C)$ (where $\mathbf{m}_h(c_h) = 1$ and $\mathbf{m}_h(c_l) = 0$) emerging as a PBE.

When the bureau resorts to truth-telling ($R^T(C)$), it reveals c_h upon observing c_h and c_l upon observing c_l . Along the PBE, the committee perceives the veracity of the bureau's reports and hence infers the reported cost information as correct while making its decisions about Q and m_s . Suppose that the true per unit cost of production happens to be c_h . Then under the above assumptions, from (1) and (2), the bureau and the committee's optimal simultaneous choices of m_b and (m_s, Q) respectively are determined as follows:

$$\text{Committee: } \max_{m_s, Q} \left[\frac{m_s}{m_b + m_s} (B(Q) - c_h Q) - m_s \right] \quad (3)$$

$$\text{Bureau: } \max_{m_b} \left[\frac{m_b}{m_b + m_s} (B(Q) - c_h Q) - m_b \right] \quad (4)$$

Solving the above maximization problems simultaneously yields the following conditions regarding the equilibrium magnitudes of the decision variables

(Q_h, m_b^h, m_s^h) :

$$B'(Q_h) = c_h \quad (5)$$

$$m_b^h = m_s^h = m^h = \frac{1}{4} (B(Q_h) - c_h Q_h) \quad (6)$$

It is clear from (5) that the level of output Q_h is efficient as it is determined at the point where marginal benefit equals the true marginal cost of production. Further by substituting (6) into the objective functions of the committee and the bureau it

follows that they share the surplus equally, and accordingly, their net payoffs are equal to $\frac{1}{4}(B(Q_h) - c_h Q_h)$. Since the bureau reports the cost truthfully, it forgoes any potential gains from lying.

Similarly, when the true per unit cost happens to be c_l , the equilibrium values of the decision variables (Q_l, m_b^l, m_s^l) obey the following:

$$B'(Q_l) = c_l \tag{7}$$

$$m_b^l = m_s^l = m^l = \frac{1}{4}(B(Q_l) - c_l Q_l) \tag{8}$$

Again, the level of output is efficient, being determined by the point where the marginal benefit equals true marginal cost of production. Bureau and committee share the surplus equally, and accordingly, their net payoffs are equal to $\frac{1}{4}(B(Q_l) - c_l Q_l)$. Again, since the bureau reports the cost truthfully, it forgoes any potential gains from lying. Hence along a truth-telling equilibrium there is no distortion of cost information and the committee manages to choose efficient quantities of supply. However, budgets are above the minimum cost of production, the magnitude of the excess depending on the relative ability of the bureau to misguide the public.

I now demonstrate the feasibility of such equilibrium by checking whether the bureau prefers to deviate from truth-telling given the strategy and the beliefs of the committee. This should be enough to demonstrate the plausibility of such equilibrium as by construction, the committee's strategy is sequentially rational and its beliefs are consistent given truth telling by bureau. Suppose the bureau observes

c_l . Does it make sense for the bureau to lie and report c_h instead, given the committee's strategy and beliefs? Let us assume that the bureau chooses to lie and report c_h . In this case, the committee assuming that the bureau is saying the truth infers the true cost to be c_h . Accordingly, its objective function is still given by expression (3). However, the bureau's objective function becomes:

$$\text{Bureau: } \max_{m_b} \left[\frac{m_b}{m_b + m_s} (B(Q) - c_h Q) - m_b \right] + (c_h - c_l) * Q \quad (9)$$

Only difference between (9) and (4) is the presence of a second component, which represents the gain from lying. Hence by exactly the same logic as before, the bureau's net payoff from reporting c_h after observing c_l becomes:

$$\frac{1}{4} [B(Q_h) - c_h Q_h] + [c_h - c_l] Q_h \quad (10)$$

Let's compare this with the bureau's payoff from truthful reporting as given by

$$\frac{1}{4} (B(Q_l) - c_l Q_l) \quad (11)$$

Hence, reporting c_l truthfully makes sense when (11) exceeds (10) i.e. if:

$$\frac{1}{4} [\{B(Q_l) - c_l Q_l\} - \{B(Q_h) - c_h Q_h\}] - (c_h - c_l) Q_h > 0 \quad (12)$$

The first component of the above expression refers to the increase in the consumers' surplus that the bureau can appropriate if it reports c_l truthfully as against falsely reporting c_h . Clearly this component is positive as $c_h > c_l$. Hence the influence channel makes truthful reporting attractive as it increases the size of the 'pie' to be appropriated. However, this influence related gain has to be weighed

against the chance of directly siphoning off some of the surplus by lying, which is measured by the next component in the above expression. Hence when the increase in surplus by reporting the low cost truthfully is large enough, bureau may well prefer to convey it accurately.

Now suppose that the bureau observes c_h . Can it gain by lying and reporting c_l instead? Should it choose to report c_l , then by exactly the same reasoning as above, its net payoff would be:

$$\frac{1}{4}[B(Q_l) - c_l Q_l] + [c_l - c_h]Q_l \quad (13)$$

Its net payoff by accurately reporting c_h is

$$\frac{1}{4}(B(Q_h) - c_h Q_h) \quad (14)$$

Hence, reporting c_h truthfully would be optimal if (14) exceeds (13) i.e. if:

$$\frac{1}{4}[\{B(Q_h) - c_h Q_h\} - \{B(Q_l) - c_l Q_l\}] - (c_l - c_h)Q_l > 0 \quad (15)$$

However, notice that given the assumption that the marginal benefit is diminishing, it never pays the bureau to report c_l when the true cost happens to be c_h so long as the committee upon receiving the signal c_l puts any positive probability on the likelihood of the true cost being c_l (so that the inferred per-unit cost

$\tilde{c} [= \mathbf{m}(c') * c_h + \{1 - \mathbf{m}_h(c')\} * c_l]$ is strictly less than c_h). Figure 2 demonstrates this point. Essentially the additional perceived surplus created by the bureau (the area ADC or the expression $[B(Q_l) - c_l Q_l] - [B(Q_h) - c_h Q_h]$ in (15)) from under-reporting (to be partially appropriated through the influence channel) is always less

than the direct loss suffered by the bureau (the area ABDC or the expression $(c_h - c_l)Q_l$ in (15)) in the form of a smaller operating budget due to deliberate under-reporting of the true per-unit cost to the committee. Hence one would expect (15) to be always satisfied. Hence truth-telling PBE is possible when (12) holds. This result is summarized in the proposition below:

Proposition 1: *When $\frac{1}{4}[\{B(Q_l) - c_l Q_l\} - \{B(Q_h) - c_h Q_h\}] - (c_h - c_l)Q_h > 0$, the bureau reports the costs truthfully ensuring an efficient level of output despite surplus budgets.*

When the bureau can extract the surplus value of production by influencing the public's perceptions, it would internalize some of the distortion-induced loss in surplus value caused by its misrepresentation of production costs. Hence lying need not be inevitable and truth-telling might emerge to ensure efficient provision of bureaucratic output. However, the influence channel would imply excess budgets. Condition (12), however, also suggests that truth-telling is not inevitable. In the next section I proceed to characterize the nature of lying equilibrium.

4. Examining the lying equilibrium

Given, that it never pays the bureau to report c_l when the true per-unit cost is c_h , the only lying equilibrium that one needs to look for is the one where the bureau reports c_h irrespective of what it observes. I denote such reporting as

$R^L(C)$. Hence I check the feasibility of $\{([R^L(C), M^*_b(C)], S^*(C)), \mathbf{m}_h(C)\}$

(where $\mathbf{m}_h(c_h) = p_h; \mathbf{m}_h(c_l) = 0$) emerging as a PBE of the above game.¹¹

Suppose the true per-unit cost happens to be c_h . Accordingly the bureau reports it as c_h . Given committee's belief, its inferred per unit cost of production is

$$\tilde{c} = [p_h * c_h + (1 - p_h) * c_l] = \hat{c} \quad (16)$$

As a result, its perceived consumers' surplus for any given (Q) is $B(Q) - \hat{c}Q$.

Hence its choice of (m_s, Q) given m_b is governed by:

$$\text{Committee: } \max_{m_s, Q} \frac{m_s}{m_b + m_s} [B(Q) - \hat{c}Q] - m_s \quad (17)$$

Similarly, the bureau's choice of m_b taking m_s, Q as given is governed by:

$$\text{Bureau: } \max_{m_b} \frac{m_b}{m_b + m_s} [B(Q) - \hat{c}Q] + (\hat{c} - c_h) * Q - m_b \quad (18)$$

Accordingly, the equilibrium magnitudes $(\hat{Q}, \hat{m}_b, \hat{m}_s)$ satisfy the following:

$$B'(\hat{Q}) - \hat{c} = 0 \quad (19)$$

$$\hat{m}_b = \hat{m}_s = \hat{m} = \frac{1}{4} [B(\hat{Q}) - \hat{c}\hat{Q}] \quad (20)$$

¹¹ The equilibrium beliefs need some explanation. Since the bureau reports c_h irrespective of what it observes, such a report would be uninformative to the committee. Hence, its posterior belief upon getting the report of c_h is the same as its prior belief: i.e. $\mathbf{m}_h(c_h) = p_h$. However strictly speaking, the sending of signal c_l is off the equilibrium path of the game. Hence a PBE does not impose any restrictions on $\mathbf{m}_h(c_l)$ given the bureau's reporting behavior. However since (as argued in the previous section) it never pays the bureau to report c_l when the true per-unit cost is c_h , it is reasonable to say that the committee would place a zero probability on this signal coming from a high-cost bureau. Hence by invoking the Intuitive Criterion (see Gibbons (1992), pg. 239), I set $\mathbf{m}_h(c_l) = 0$.

Hence the bureau's net payoff is given by

$$\frac{1}{4}[B(\hat{Q}) - \hat{c}\hat{Q}] + (\hat{c} - c_h)\hat{Q} \quad (21)$$

Since the committee ignores the bureau's report, it under-estimates the true production cost and hence chooses to produce a larger than optimal level of output as given by (19). There is over-production.

When the true per unit cost happens to be c_l , the bureau signals c_h and by exactly the same reasoning as above, its net payoff is given by:

$$\frac{1}{4}[B(\hat{Q}) - \hat{c}\hat{Q}] + (\hat{c} - c_l)\hat{Q} \quad (22)$$

In this case the committee over-estimates the production cost, and hence there is under-provision.

I now examine the feasibility of the lying equilibrium. From the previous section, it is clear that if the true per-unit cost happens to be c_h , the bureau would never benefit by reporting c_l instead of c_h . Hence this deviation will clearly not be profitable. Now suppose that the true per-unit cost happens to be c_l . If the bureau were to report it truthfully, then as argued above, the committee's inferred per unit cost would be c_l and hence bureau's net payoff would be:

$$\frac{1}{4}(B(Q_l) - c_l Q_l) \quad (23)$$

Hence lying could emerge as equilibrium if (22) exceeded (23) that is, if:

$$\frac{1}{4}[\{B(\hat{Q}) - \hat{c}\hat{Q}\} - \{B(Q_l) - c_l Q_l\}] < p_h(c_h - c_l)\hat{Q} \quad (24)$$

The bureau gains from misrepresenting c_l through the capture of a part of the consumers' surplus as given by the expression on the right hand side of the above inequality (Note that $(\hat{c} - c_l)\hat{Q} = p_h(c_h - c_l)\hat{Q}$). However, this gain comes at a price. The perceived surplus and, hence, the share extracted through influence would be smaller in this case than under truthful reporting. When the direct benefit exceeds this loss in the share extracted through influence, the temptation to lie would be overwhelming. That is to say, the committee would not believe the bureau when it reports c_h and we would have the lying equilibrium.

In the lying equilibrium, production distortions are inevitable: there will be either over-production or under-production depending on the actual level of the true per-unit cost of production. However, notice that in this framework, over-production is not due a bureaucratic preference for output: all that the bureau cares about is appropriating the surplus value of production. Over-production results simply because the committee does not have recourse to accurate information regarding the true marginal cost of production. Hence it is not necessary to explicitly incorporate a bureaucratic preference for output if one is worried about the possibility of over-production in bureaucracies. This result is summarized in the proposition below:

Proposition 2: *When $\frac{1}{4}[\{B(Q_l) - c_l Q_l\} - \{B(\hat{Q}) - \hat{c}\hat{Q}\}] < p_h(c_h - c_l)\hat{Q}$, the bureau has an incentive to misreport c_l , which induces a lying equilibrium. The provision of output is sub-optimal. If the true cost happens to be c_l , there is under-production. If the true cost happens to be c_h , there is over-production.*

However, notice that over-production is not due to any bureaucratic preference for output. Rather it is simply due to the fact that bureau's report lacks credibility and hence the committee has to act in accordance to its coarse prior information.

Given that both truth-telling and lying equilibrium are feasible, under which set of parameter values is one more likely than the other? To explore this question, I look at a numerical example in the next section.

1.5 A numerical example

In this section, I explore the set of parameter values for which one kind of equilibrium is more likely than the other. To do this, I assume the following:

$$B(Q) = AQ^{0.5}, \quad A > 0 \quad (25)$$

$$p_h = \frac{1}{2} \quad (26)$$

Given the above assumptions, I identify the set of values for c_h and c_l for which the truth-telling equilibrium is possible. Along a truth-telling equilibrium when the true cost happens to be c_h ,

$$Q_h : B'(Q_h) = c_h$$

Hence by (25),

$$Q_h = \frac{A^2}{4c_h^2} \quad (27)$$

Hence substituting (27) into the benefit function yields:

$$B(Q_h) = \frac{A^2}{2c_h} \quad (28)$$

Similarly when the true cost happens to be c_l ,

$$Q_l : B'(Q_l) = c_l$$

Hence by (25),

$$Q_l = \frac{A^2}{4c_l^2} \quad (29)$$

Hence substituting (29) into the benefit function yields:

$$B(Q_l) = \frac{A^2}{2c_l} \quad (30)$$

Using (27), (28), (29), and (30), the following holds:

$$B(Q_h) - c_h Q_h = \frac{A^2}{4c_h} \quad (31)$$

$$B(Q_l) - c_l Q_l = \frac{A^2}{4c_l} \quad (32)$$

Next, I substitute equations (27), (31) and (32) into (12), which is the condition for truth-telling equilibrium to be feasible to find the relevant parameter values for c_h and c_l .

Condition (12) is reproduced below for convenience:

$$\frac{1}{4}[\{B(Q_l) - c_l Q_l\} - \{B(Q_h) - c_h Q_h\}] - (c_h - c_l)Q_h > 0$$

From (31) and (32),

$$\frac{1}{4}[\{B(Q_l) - c_l Q_l\} - \{B(Q_h) - c_h Q_h\}] = \frac{A^2 (c_h - c_l)}{16 c_h c_l}$$

From (27),

$$(c_h - c_l)Q_h = \frac{A^2 (c_h - c_l)}{4c_h^2}$$

Hence using the above two equations, condition (12) reduces to

$$\frac{c_h}{c_l} > 4 \tag{33}$$

Next, I identify the set of values for c_h and c_l for which the lying equilibrium is possible. Along the lying equilibrium, the imputed per-unit cost as given by (16) is

$$\tilde{c} = p_h * c_h + (1 - p_h) * c_l = \hat{c}$$

Hence substituting (26) in the above expression gives:

$$\hat{c} = \frac{1}{2}(c_h + c_l) \tag{34}$$

Further since

$$\hat{Q} : B'(\hat{Q}) = \hat{c}$$

Substituting (25) and (34) in the above equation gives:

$$\hat{Q} = \frac{A^2}{(c_h + c_l)^2} \tag{35}$$

Accordingly,

$$B(\hat{Q}) = \frac{A^2}{(c_h + c_l)} \quad (36)$$

The condition for the feasibility of the lying equilibrium as given by (24) stipulates that

$$\frac{1}{4}[\{B(Q_l) - c_l Q_l\} - \{B(\hat{Q}) - \hat{c}\hat{Q}\}] < p_h(c_h - c_l)\hat{Q}$$

Using (35) and (36),

$$B(\hat{Q}) - \hat{c}\hat{Q} = \frac{A^2}{2(c_h + c_l)} \quad (37)$$

Also from (26), (34) and (35)

$$p_h(c_h - c_l)\hat{Q} = \frac{A^2(c_h - c_l)}{2(c_h + c_l)^2} \quad (38)$$

Hence using (32), (37) and (38) condition (24) boils down to:

$$\frac{c_h}{c_l} < 7 \quad (39)$$

Conditions (33) and (39) have some interesting implications. Figure 3 provides a graphical comparison of these conditions. When c_h and c_l are very close, truth-telling is not a likely outcome. While the gain to the bureau through an increase in the surplus due to truthful reporting of c_l would be small (essentially of a second order), lying would bring a larger (first order) gain. Further when

$$4 \leq \frac{c_h}{c_l} \leq 7$$

both kinds of equilibrium are feasible. When c_h exceeds c_l considerably, so that (39) does not hold, only truth-telling would be observed in equilibrium. Lying would reduce the surplus at stake considerably through the influence channel. This suggests that truth-telling is much more likely, precisely when the differences between the two possible cost levels are considerable. Hence it would seem that the distortions induced by the lying equilibrium are likely when they tend to be less harmful. It is also instructive to note that the bureau's expected payoff under truth-telling always exceeds that under lying for any given p_h , $0 < p_h < 1$.¹² Hence the bureau may have ex-ante incentives to inculcate the committee's trust in its reported cost estimates. This could be one reason why a bureau chief's ability to build a good understanding with the committee could be important in the bureau's prosperity.

1.6 Conclusions

My analysis suggests that when the bureau has access to public platforms such as the media to influence the perceptions of the bigger less informed audience such as the public whose support is also important in the passing of budgets, it might prefer to use only that channel to appropriate the surplus value of production, and not attempt at misleading the relatively more informed committee or the oversight committee by exploiting ' superior information on production costs. Hence, the existing literature might have overlooked the importance of public perceptions in the budgetary process by mainly focusing only on asymmetric cost information

¹² Proof available upon request.

between the bureau and the committee towards budget determination. James Wilson (1989) has noted the importance of public perceptions and constituency building in careers of bureau chiefs and their bureaus. In particular he notes,¹³ “The real work of a government executive *is* to curry favor and placate critics.” Further the possibility that the expected payoff under truth-telling could be higher than that under lying might suggest why confidence-building measures might be important in the agenda of both the bureau and the committee.

Another important implication of the analysis is that when the problem of asymmetric cost information is important as along the lying equilibrium, it might be enough to generate a production distortion of either type (i.e. over-production or under-production). Hence it might be unnecessary to postulate a taste for output in the bureau’s objective function if one is concerned about the possibilities of over-production. In the above framework, the bureau’s objective function does not embody any special preference for output: Left on its own, the bureau would be perfectly happy to produce the efficient quantity of output in either case and appropriate the entire consumers’ surplus. Hence over-production in this framework is entirely due to decisions made on coarse information by the committee. It is also interesting to note that the analysis seems to suggest that production distortions are more likely to take place when they are likely to be less harmful.

¹³ See Wilson (1989), pg. 204.

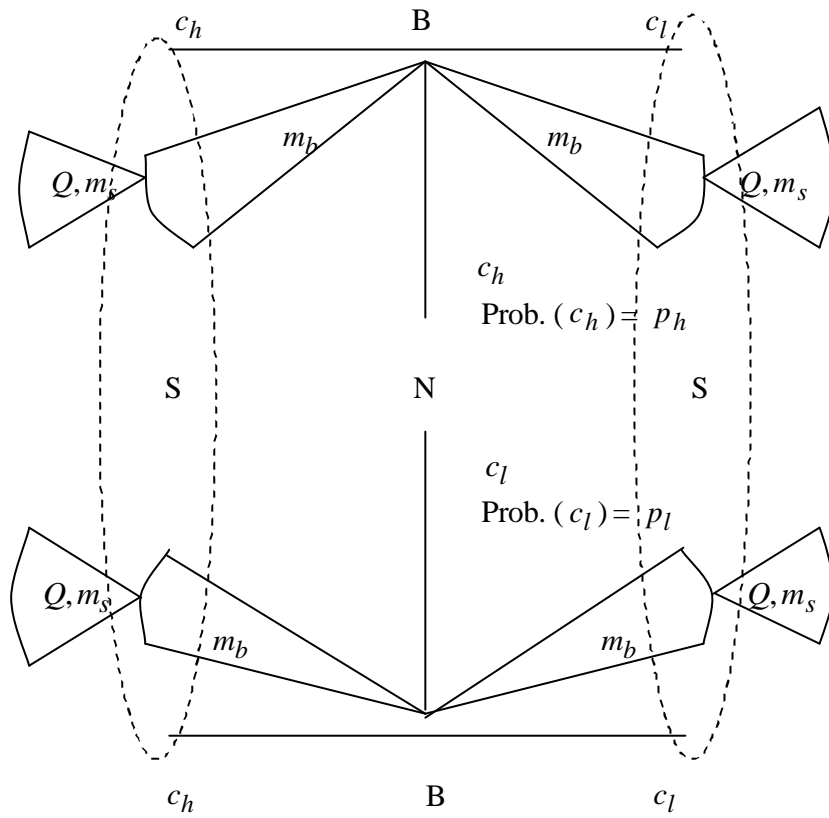


Figure 1: The game between the bureau and the sponsor

B: Bureau
 S: Sponsor
 N: Nature

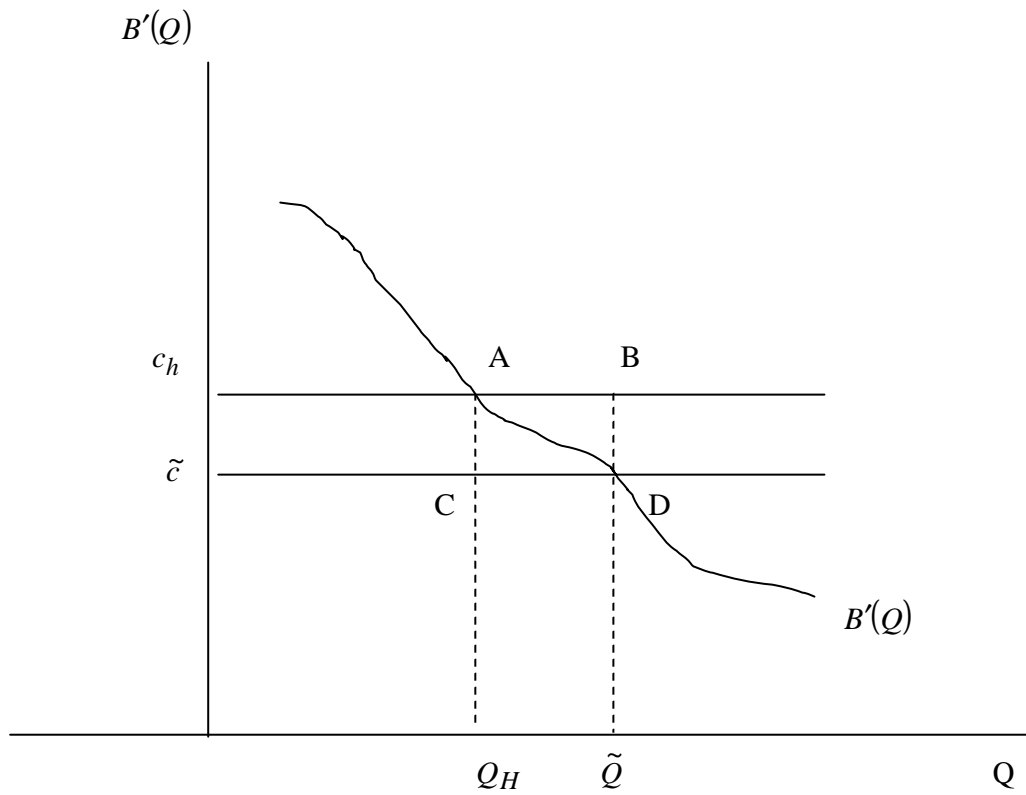


Figure 2: Lying when true cost is c_h

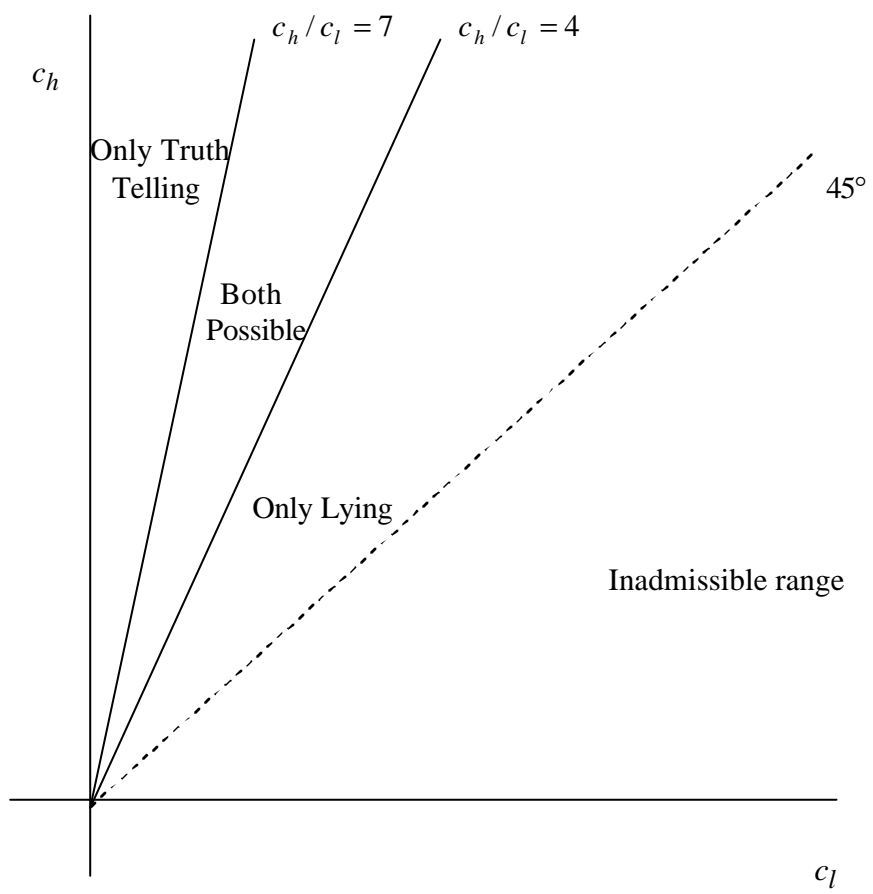


Figure 3: Illustrating the zones of truth and lies

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