TRANSPARENCY AND PERFORMANCE IN BUREAUCRACIES

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Prior research suggests the optimal behavior of bureaucrats is to maximize the budgets of their respective agencies where the size of the budgets is determined by the total social benefit of the services provided. The existing literature, however, does not adequately account for information imperfections in the budget negotiation process.

This paper addresses this shortcoming. It proposes a theoretical model that incorporates the inability of individual politicians to perfectly forecast the social benefit delivered by the actions of any given agency. The model pays special attention to the relationship between performance, transparency and the budget. The major conclusion of the model is that the degree to which an agency is transparent can affect the size of its budget, where high performing agencies prefer to be highly transparent and vice versa.

These results could be an indication that bureaus are inefficient at utilizing their resources. If changing the level of transparency is a costly endeavor then it seems that bureaus are not only inefficiently big, as suggested by Niskanen (1971), but could also be inefficient in utilizing their supra-optimal budgets.

The great majority of previous research on bureaucracies is set in the context of government bureaus and this paper follows this tradition. However, the arguments and conclusions presented in the paper can be applied to any situation in which a principal rations financial resources to several different agents. The different departments and functional areas of a corporation that have budget cycles fit that description perfectly.

Key words: bureaucracy, budget, budget maximization, transparency, performance, imperfect information, principal, agent, budget cycle, department, division, functional area
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I. Introduction

“Nothing is so permanent as a temporary government program.” - Milton Friedman

The peculiar words of Milton Friedman are quite fitting to the observed rapid growth of government in modern day industrialized democracies. The government section of the US economy has grown steadily throughout the 20th century, rising from 9% of the total in 1927 to almost 30% in 2007.¹ This exceptional growth rate spurred numerous studies in the natures and causes of government growth. A subsection of this body of literature deals specifically with government bureaucracies, their behavior and interaction with the legislative body.

Niskanen (1971), one of the best known papers in the field, introduces the idea of the budget-maximizing bureaucrat. In this framework, self-interested bureaucrats are able to successfully use their information advantages over politicians to extort inefficiently large budgets. While most of the assumptions supporting these conclusions have been debated extensively in the literature, the bureaucrat’s information advantages have not seen a lot of scrutiny. It seems that the lack of data and the clear plausibility of the assumption have combined to lure the main body of researchers in other directions.

The goal of this analysis is to study the specific effect of these information advantages by utilizing data on bureaucratic transparency that has become available recently. It rigorously incorporates imperfect information in the budget-maximizing bureaucrat model, and the resulting model is analyzed to gain insights into the optimal behavior of a budget-maximizing bureaucrat. Lastly, the theoretical findings are empirically tested.

¹ All GDP numbers come from the Bureau of Economic Analysis www.bea.gov
Among other things, the paper is unique in that it considers the level of transparency as a variable the bureaucrat can affect when deciding on an optimal strategy. Moreover, it also considers ways in which these line of analysis can be applied to the business world.

II. Literature Review

Empirical studies documenting the growth of government have existed for a long time, and unsurprisingly, economists have tried to explain this phenomenon for just as long (Larkey, Stolp and Winer 1981). Wagner (1877, 1890) is the first series of public finance articles published on this topic; it proposed what has come to be known as Wagner’s Law. This conjecture that public expenditures growth inevitably accompanies the growth of an industrialized economy has found little empirical support but provides the basis for the subsequent articles. Some of these articles focus on the complicated revenue structure of governments and hypothesize it induces fiscal illusion: the inability of the taxpayer to comprehend the full cost of government (Buchanan, 1967; Goetz, 1977; Pommerehne and Schneider, 1978). Others attempt to create formal models of political behavior. The earliest of those were the median voter models developed in Downs (1957) and Black (1958), with later ones examining the effect of the public employees’ votes on political outcomes (Busch and Denzau, 1977). This literature was consequently expanded by a detailed formal examination of the institutions and procedures of the US Congress by Ferejohn (1974) and Fiorina and Noll (1978).

The work of William Niskanen (1968, 1971, 1975) has presented one of the best known explanations of why government output is larger than what is predicted by the median voter models and comes as a logical extension to this body of literature. Niskanen (1967) develops a formal model of the behavior of the bureaucrat in the spirit of public
choice economics. His model assumes that the bureaucrats are rational and self-interested human beings, who maximize their utilities by maximizing the budgets of their respective governmental agencies. According to Niskanen, bureaucrats not only attempt to, but also succeed in enlarging their budgets for two main reasons. First, they possess significant information advantages over the revision committee and second, their services are rewarded with lump-sum budget appropriations, rather than at a per unit price.

As summarized by Andre Blais and Stephane Dion (1990), Niskanen’s model has been critiqued, modified and extended a number of times. Maurice Kogan (1973) and Julius Margolis (1975) criticize the model for its assumption that bureaucrats serve their own interest, rather than the public interest. As Niskanen himself acknowledges, however, even if some bureaucrats might be genuinely serving the “public interest,” this is a vague term that most people would tend to define according to their subjective beliefs (1971). Then while bureaucrats might believe they serve the “public interest,” in practice they are primarily self-interested because of the fuzzy definition of “public interest.” Moreover, it would certainly be implausible to assume most bureaucrats are completely unconcerned with their own self-interests. Combining those two points leads to the conclusion that Kogan and Margolis’ criticism is at best marginal and does not diminish the implications of the budget-maximizing bureaucrat model. Lastly, Niskanen (1975) expands the model by including a formal proof of the proposition that budget-maximization equates to utility maximization for the bureaucrats which has silenced most such criticism.

Other studies point out some more fundamental problems with the static Niskanen model. Patrick Dunleavy (1985) argues that if Niskanen’s logic is carried out completely, it would suggest an end result of gigantic bureaucracies, which are rare for liberal
democracies. Dunleavy makes a potent argument, but its strength is diminished if the budget-maximizing bureaucrat is viewed in a more realistic, dynamic framework. In this context, the bureaucrat is striving for increases in his current budget, rather a large static budget. And while liberal democracies have not resulted in leviathan bureaucracies, it is indeed the case that the active bureaucracies enjoy routine increases in their budgets. Another important study is Migue and Belanger (1974), which suggests that bureaucrats are primarily interested with the discretionary budget (total budget minus minimum cost) rather than the total budget itself. In fact, Niskanen (1975) adopts this revision of the original model but also points out that the discretionary budget inevitably depends on the total size of the budget.

The second major assumption, the fact that the bureaucrats succeed in expanding their budgets, has come under fire as well. In general, there are two main arguments in favor of the proposition. First, Niskanen (1971,1975) argues the review committees are dominated by high demand politicians who both desire high output and are faced with time constraints weakening their monitoring motivation and, second, he suggests that bureaucrats have superior information of the production process. A major criticism is that Niskanen’s proposition that politicians lack a strong motivation and the needed discretionary time to reel in the bureaucrats’ expansionary tendencies holds only in the context of the weak American executive (Rogowski, 1978). Another major attack falls on the assumption that the elected politicians also lack the capacity to restrain the bureaucrats, regardless of their motivation. The major critique in this area comes from Miller and Moe (1983), which demonstrates not only that there are numerous limits to the informational advantage of the bureaus but also that the political review committees have their own
advantages in the bargaining game. This paper concludes Niskanen (1975) exaggerates the bargaining power of the bureaucrats, but it also nevertheless acknowledges that bureaucrats do retain certain, if not dramatic, advantages.

Other papers focus on the fact that politicians will undoubtedly establish monitoring systems, which would reel in the bureaucrats’ behavior regardless of the degree of their imperfection (Bendor et al. 1985; Breton and Wintrobe 1975). Niskanen (1975) answers to such criticism by pointing out that in monitoring the bureaus, the politicians are faced with time constraints and significant free-rider problems. Moreover, he contends that review committees are not chaired by the median politician but rather by high demand politicians who have incentives to prefer higher outputs of the respective public goods as well. Those problems make monitoring highly ineffective at best, and while it does indeed reduce the budgetary slack, such criticism does not fundamentally change the conclusions of Niskanen.

The empirical study Hood, Dunsire and Thomson (1988) shows that governments with strong convictions can indeed decrease the size of the bureaucracy in certain areas, albeit at a high political cost. The latter part of the argument has also been affirmed by Dillman (1986). The politicians’ inability to check the growth of the bureaucracy remains the weakest link in Niskanen’s theory, but as he has theorized himself, any successful efforts come at high cost and are thus rare.

Mackay and Weaver (1979, 1983) extend the original model by introducing the concept of agenda control. Their research shows that depending on who has the power to decide on the exact public services mix and the expenditure level, the conclusion of inevitable supra-optimal budget is not always true. Their work has paved the way for a
more exhaustive treatment of the bargaining game between bureaus and politicians by Banks (1990). His game theoretic analysis of the problem is one of the first to analyze it in the context of imperfect information, where the reviewing body is not certain about the payoffs it faces. The most important conclusion of this paper is that agenda-setting bureaus can utilize their monopoly power to always obtain budgets that are better than or equal to the “reversion level” (the budget that would be approved if the bureau’s proposal were defeated.) A most rational assumption would be that such reversion levels would be previous (last year’s) budgets and thus Banks shows the bureaus, utilizing their informational advantages, can ensure growing or at least flat budget. This study is of major importance to the current paper, as it is one of the few that redefines the original model in the context of imperfect information and reaches similar conclusions.

Another study incorporating information imperfections into the problem is Bendor, Taylor and Gaalen (1985). In this model, the bureaucrats are not sure how much monitoring exactly they are facing. Taking the availability of this information into account, it concludes equilibrium bureaucratic output moves closer to the efficient point given risk-aversion on the part of the bureaucrats. Despite this improvement, however, budgets remain supra-optimal. Thus, imperfect information from the viewpoint of bureaucrats moves the equilibrium point from the over production extreme closer to the inefficient production extreme.

Empirical work testing the conclusions of the original model has been conducted by De Alessi (1969, 1974), Wagner and Weber (1975), Orzechowski (1977), Deacon (1979), Bennett and Johnson (1979), and Ahlbrandt(1973), who identify overly large budgets and employment across government bureaus. De Alessi (1969) shows that the government tends

\footnote{Those extremes were first specified in Niskanen (1975)}
to use lower discount rates than private firms, which leads to overestimating the benefits of investments, but at the same time he finds no bias in cost estimates; this leads to overinvestment in the public sector. Wagner and Weber use data from metropolitan areas to conclude that the provision of public services is more appropriately classified as a monopoly, supporting Niskanen’s proposition that bureaus act as the single supplier of their respective services. Deacon and Ahlbrandt identify large expenditure differences between purchasing and providing public services by local governments, which suggest bureaucratic overproduction.

As described, the original model has been criticized, extended and reworked numerous times, and several weak links in it have indeed been found. Even the most potent critiques, however, have only succeeded at toning down the strength of some of the conclusions of Niskanen (1975) but not completely overturning them. None of the extensions of the originally proposed model reach significantly different conclusions either. Nevertheless, there has been only a modest amount of studies done on how performance, transparency and imperfect information affect the results. This paper will attempt to shed more light on those questions.

III. Methodology

A. Theoretical Model

As outlined by bureaucracy theory, a bureau’s budget equals the total social benefit provided by its services (Niskanen 1975). In the case of a firm, a bureaucracy is any unit or department that operates on a budget and the budget committee corresponds to the legislature in this model. In this situation, a department’s budget is still equal to the area under the demand curve for its services, but it will be more suitable to call it the total
benefit of its services and not social benefit. In the sake of conciseness, the paper will discuss the model in its original context of the political system. But the reader is advised to remember that at any point “Congress” can be substituted with “budget committee” or “CEO” and the bureaus are equivalent to a company’s departments.

It can either be represented as the area under the demand curve or as a function of the consumer preferences for the service, the level of performance of the service (same as the quality of the service) and the quantity provided. Then,

\[ Budget = SocialBenefit = f(a,b,Q) \]  

\( Q \) = quantity of services performed  
\( b \) = quality of performance (quality of the delivered service)  
\( a \) = intrinsic value of the service (consumer preferences)

An implicit assumption of this older model is that the social benefit could be perfectly measured by Congress. Certain types of public goods have existed for decades (e.g. national defense) and it is plausible to assume the level of consumer preferences towards them is generally known. The output delivered by each agency is also well known to Congress, as this is explicitly negotiated for. Assuming that Congress’ forecast of the level of performance is perfectly correct, however, is not plausible. Due to information
problems politicians are unlikely to flawlessly forecast the performance bureaus will realize over the course of the next fiscal year (and budgets are appropriated for delivering public services in the coming year).

In this uncertain environment the \(i^{th}\) politician forms a performance expectation \(\hat{b}^j\) of the \(j^{th}\) agency in time \(t\). In doing so the \(i^{th}\) politician is aware that the performance that will end up being realized in time \(t+1, b^j\), will most likely differ from it. This difference is a two component random error that varies from politician to politician.\(^3\) The first component is the *natural variation*, \(\epsilon\), or all unforecastable macroeconomic shocks affecting a bureau’s performance and the second is the *idiosyncratic observational error*, \(\varphi_j\). This observational error is a combination of imperfect information and possible individual biases.\(^4\) Logically, the natural variation facing all politicians is the same.\(^5\)

Following the framework of Davies and Lahiri (1995), let \(b^j\) be the actual performance that will be realized by the \(j^{th}\) agency, \(\hat{b}^j\) the unobserved value \(b^j\) would take if there were no unforecastable shocks (also known as rational estimate or forecast) and \(\epsilon\) the natural variation:

\[
 b^j = \hat{b}^j + \epsilon 
\]

Possessing neither perfect information, nor the perfect ability to process the available information, the \(i^{th}\) politician’s estimate, \(\hat{b}^j\), deviates from the rational estimate

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\(^3\) More experienced politicians have dealt with many federal budgets in previous years and have learned how to form better perceptions. Their observational error will likely come from a probability distribution with a lower variance than the one of a new member.

\(^4\) The price of a stock in any given day reflects all known information and is the rational (best attainable forecast) of the return that will be realized. The sudden onset of a recession is an unforecastable macroeconomic shock and the ensuing change in prices is an example of natural variation. At any given day, individual investor’s own expectations vary around the market equilibrium prices due to differing personal evaluations of the available information; this variation is the individual observational error.

\(^5\) For more information on the forecasting error structure see Davies and Lahiri (1995) and Palm and Zellner (1991).
with an individual specific idiosyncratic observational error of $\varphi_i$ (Davies and Lahiri, 1995).

$$\hat{b}_i^j = \hat{b}^j + \varphi_i$$

(3)

Notice the natural error does not appear in the above equation. By definition, it is unforecastable, thus a forecast’s “goodness” is only judged by the size of the individual idiosyncratic error (Davies and Lahiri, 1995). Then, Congress’ overall perception of the performance of the $j^{th}$ agency is the average of all individual perceptions or

$$\overline{b}^j = \frac{\sum \hat{b}_i^j}{n}$$

(4)

and it deviates from the actual realized performance according to a normal random term.\(^6\)

Then Congress expects performance $\overline{b}^j$ but knows the actual realized performance will deviate from it. This situation is analogous to Congress facing a lottery where the expected payoff is $\overline{b}^j$ and the utility of the expected payoff is $f(a, \overline{b}^j, Q)$ (Varian 1992, Davies 2005). In such situations, the agent acts on the expected utility of the lottery and this expected value can be approximated by taking the second Taylor-expansion which yields:\(^8\)

$$E(f(a, b^j, Q)) = f(a, \overline{b}^j, Q) + \frac{1}{2} f_{b^j}(a, \overline{b}^j, Q) E((\overline{b}^j - b^j)^2) = f(a, \overline{b}^j, Q) + \frac{1}{2} f_{b^j}(a, \overline{b}^j, Q) \text{var}(\gamma)$$

(5)

\[\overline{b}^j = \frac{\sum_{i=1}^{n} (b^j_i + \varphi_i + \varepsilon_i)}{n} = \frac{\sum_{i=1}^{n} b^j_i}{n} + \frac{\sum_{i=1}^{n} (\varphi_i + \varepsilon_i)}{n} = \frac{nb^j}{n} + \frac{\sum_{i=1}^{n} (\varphi_i + \varepsilon_i)}{n} = b^j + \gamma \quad \text{and} \]

\[\gamma \sim N(0, \sigma) \text{ due to the Central limit theorem.}\]

\(^6\) As Downs (1957) suggests, the median voter decides the outcome of majority voting. Here the average is the same as the median forecast because all random errors in the paper are assumed to come from symmetric distributions.

\(^8\) Varian 1992 shows second order Taylor expansion is adequate for modeling economics objective functions because higher derivatives quickly and asymptotically approach zero.
Where $\gamma$ is the deviation of Congress’ performance forecast around the performance that will actually be realized in the future, and its variance is an increasing function of the variances of the individual observation errors $\varphi_i$ and the natural variation $\varepsilon$.  

The observational errors are affected, among other things, by the ease of constructing an accurate estimate of performance from the available performance data. To this end, let the transparency of an agency be the relative ease (both time and effort) of constructing an accurate estimate of its performance. The more transparent agencies lend themselves to a more effective and less costly analysis by the politicians and the resulting forecasts have smaller observational errors, ceteris paribus. Then,

$$\text{var}(\gamma) = g(T) \text{ such that } \frac{\partial \text{var}(\gamma)}{\partial T} < 0$$  \hspace{1cm} (6)

A peculiar feature of agency performance reporting is the lack of established standardized performance measures; individual agencies are left the discretion to choose the metrics that they believe communicate their past year performance the best. Naturally, the lack of standard benchmarks leaves a lot of room for reporting irrelevant metrics. In this context, let relevancy measure the degree to which the self-reported metrics accurately reflect the impact of the agency’s actions on its stated strategic goals. The potential unreliability of the face value of the reported performance forces the politicians to weigh the relevancy of the reported metrics as well.

If $\bar{b}^j$ is the performance level reported by the $j^{th}$ agency, then the $i^{th}$ politician assigns this report a relevance value of $\hat{r}^i_j$ where the rational estimate of its relevance is $\hat{r}^i$. The individual perception $\hat{r}^i_j$ varies around $\hat{r}^i$ by a random error $\tau_i$.  

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9 Natural variation is unforecastable and beyond the control of politicians, so really, the only practically relevant error here is the individual observation errors.
\[ \hat{r}_r^j = \hat{r}_r^j + \tau_i \]  

(7)

The rational estimate of relevance \( \hat{r}_r^j \) is proportional to the relationship between the rational forecast of performance and the reported performance:\textsuperscript{11}

\[ \hat{r}_r^j = c \frac{\hat{b}_j^i}{\bar{b}_j^i} \]  

(8)

In this set up, when reported performance increases while keeping the rational forecast constant, the rational estimate of relevance declines and vice versa. Similarly,

\[ \hat{r}_r^j = c \frac{\hat{b}_j^i}{\bar{b}_j^i} \]  

(9)

Expressing \( \hat{b}_j^i \) in terms of relevance yields:

\[ \hat{b}_j^i = \frac{\bar{b}_j^i \hat{r}_r^j}{c} \quad \text{and thus also} \quad \hat{b}_j^i = \frac{\bar{b}_j^i \hat{r}_r^j}{c} = \frac{\bar{b}_j^i \hat{r}_r^j}{c} = \frac{\hat{b}_j^i + \bar{b}_j^i \tau_i}{c} \]  

(10)\textsuperscript{12}

Equation (10) implies a new expression for the overall Congressional perception where \( \bar{r}_r^j \) stands for the average of all individual relevancy perceptions \( \hat{r}_r^j \):

\[ \bar{b}_j^i = \sum_{i} \hat{b}_j^i = \sum_{i} \frac{\bar{b}_j^i \hat{r}_r^j}{c} = \frac{\bar{b}_j^i \bar{r}_r^j}{c} \]  

(11)

Plugging this in the budget function delivers the end form of the model:

\[ E(f(a,b,Q)) = f(a, \frac{\bar{b}_j^i \bar{r}_r^j}{c},Q) + \frac{1}{2} f_{bb}(a, \frac{\bar{b}_j^i \bar{r}_r^j}{c},Q) g(T) \]  

(12)

\textsuperscript{10} This is the individual idiosyncratic observational error that a politician makes in respect to estimating relevancy. Similar to the other observational errors, it comes from a symmetric distribution.

\textsuperscript{11} Relevance is only argued to be proportional but not exactly equal to the ratio because it is not realistic to believe that the relevance of the measures is the only thing affecting this ratio. It only represents past information, while politicians would incorporate future and current information in the forecast as well.

\textsuperscript{12} Notice that this suggests \( \frac{\bar{b}_j^i \tau_i}{c} = \varphi_i \). It is unsurprising to find that the observational errors in terms of relevancy and in terms of performance are related since both are influenced by transparency.
The expected social benefit, equal to an agency’s budget in the equilibrium, is a function of consumer preferences, the quantity of the service provided, the reported performance, the mean forecast of the relevance of this report and overall transparency.

It is only natural to assume that increasing the level of performance would also increase the budget.\(^{13}\) The relationship between the budget and the level of transparency, however, is less intuitive. Derivating in regards to \(T\) yields:

\[
\frac{\partial E(f(a, \tilde{b}, Q))}{\partial T} = \frac{1}{2} f''(a, \frac{\tilde{b}^j\tilde{j}}{c}, Q) \frac{\partial g(T)}{\partial T}
\]  \hspace{1cm} (13)

The second part of the product is negative by definition and I contend that the first term changes its sign at the point where the performance forecast equals some reference level of performance. The idea that Congress evaluates performance against a benchmark level rather than treating it as a normal good that is truncated at 0 is not a new one (Banks 1990, Kouzmin, Loffler, Klages, and Korac-Kakabadse 1999). Expected performance above the benchmark level adds to the positive image and the budget of an agency, while expected performance under it hurts the agency’s budget. From the agency’s point of view, forecasted performance over the benchmark is an economic good, while forecasted underperformance is an economic bad. Consistent with microeconomic theory, diminishing marginal returns apply in both cases which suggests that the function has an inflection point at the reference level of performance, \(b^*\). Graphically, the relationship looks like this:

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\(^{13}\) This assumption is supported by the empirical results of Gilmour and Lewis (2006)
As suggested by Blanks (1991) the past year’s performance is one intuitive reference level. Another one would be the average performance observed among all bureaus.\textsuperscript{14} Whatever the specific format, establishing a benchmark is imperative to evaluating the level of the forecasted performance. In this context, any additional unit of improvement in perceived performance over the reference level brings an ever smaller addition to the budget. Similarly, decreases in perceived performance diminish the budget at a decreasing rate.

Assuming a benchmark level, then the second derivative of the budget in terms of performance changes signs and this implies:

\[
\frac{\partial E(f(a,\bar{b}^{j},Q))}{\partial T} > 0 \text{ for } \bar{b}^{j} > b^* \\
\frac{\partial E(f(a,\bar{b}^{j},Q))}{\partial T} < 0 \text{ for } \bar{b}^{j} < b^* 
\]

From (14) it is immediately obvious that agencies performing over the reference level prefer transparency, while agencies that underperform would attempt to cover up. The analysis could be taken a step further, however. In his attempt to maximize the budget, the

\textsuperscript{14} The actual definition of the reference level is not important for the theoretical solution, thus none is assumed.
bureaucrat can spend time on increasing true performance, dressing up reported performance or altering the transparency of his agency. Assuming rationality, Congress will eventually correctly discern the relevance of the reported performance; any spikes in reported performance that are not coupled with real improvements will be distinguished by Congress and not affect the forecasted performance. This forces the bureaucrat to only focus on influencing the actual performance (at least in the long run) and also the transparency of his agency.

Let $T'$ be the inverse of transparency (i.e. non-transparency), such that $T'$ and $T$ (transparency) are two disjoint intervals dividing up the overall transparency continuum (from perfect non-transparency to perfect transparency).

For transparency values greater than average, $T'=0$ and $T$ is the distance from the average to the actual value and vice versa. The average value marked in the graph is not necessarily the expected value of the continuum; it is the average standard observed among governmental agencies. For example it might be standard for agencies to provide succinct and informative quantitative summaries of their results in addition to burying them in the body of the voluminous report. Single agencies are under pressure to achieve this standard level because Congress observes it in their peers; it is a benchmark against which they are evaluated. Any efforts spent on achieving this level of transparency is mandatory and is not counted against the discretionary time of the bureaucrat. On the other hand, achieving
higher levels, or successfully lowering the true transparency while adhering to accepted practices, costs in terms of discretionary efforts. Lastly, for the low performers, $T$ is an economic bad and $T'$ is an economic good and vice versa.

Let us finally assume that the marginal costs of both altering transparency and altering performance are constant. Then the bureaucrat acts so as to

$$
\max E(f(a, \bar{b}, Q)) = f(a, \bar{b}, Q) + \frac{1}{2} f_{bb}(a, \bar{b}, Q) g(T)
$$

s.t. time $= \alpha(\text{Performance efforts}) + \beta(\text{Transparency efforts})$

The first order optimal conditions are discontinuous at $\bar{b} = b^*$ and thus there are two optimal points, depending on what type of a performer the agency is (high or low). In choosing the optimal mix of transparency and performance, the bureaucrat compares the two outcomes and goes with the feasible one that yields the highest budget.

The first order optimality conditions for high performers are as follows: $^{16}$

$$
Budget_b = \frac{\alpha}{\beta} Budget_r
$$

$$
Budget_r = \frac{\beta}{\alpha} Budget_b
$$

In equilibrium, if the marginal cost of performance ($\alpha$) increases relative to the marginal cost of transparency ($\beta$), then the marginal benefit of expected performance increases, ceteris paribus. Due to diminishing marginal returns, this means that the optimal quantity of expected performance has decreased. But if the relative marginal cost of performance increases, then marginal benefit of transparency also changes: it decreases, suggesting an increase in the quantity of transparency chosen. Thus, it seems that given a

$^{15}$ Following Niskanen (1975) the politicians in the negotiation process are assumed to be passive. They will always appropriate budgets exactly equal to the expected social benefit to be delivered by the bureaucrat.

$^{16}$ In this notation, the subscript identifies that the variable is the first derivative in respect to the subscript.
change in the structure of their marginal costs, high performing agencies substitute transparency for performance.

In case of the low performers the opposite happens:

\[
\frac{\text{Budget}_b}{\text{Budget}_T} = \frac{\alpha}{\beta} \frac{\text{Budget}_T}{\text{Budget}_b}
\]

(17)

In this situation the marginal benefit of perceived performance is increasing, not decreasing, and thus increasing performance is always the preferred option. When the time constraint restricts the bureaucrats to operating inside the low performance region, however (e.g. given sufficiently high marginal cost of performance), the preferred high performance point will not be attainable. Assuming such a binding time constraint, a conclusion similar to the one before follows, where bureaucrats trade performance for non-transparency (in this case bureaucrats want to cover up, rather than showcase their achievements).

Two conclusions have been established: transparency (or non-transparency depending on the performance level) is a substitute for performance from the agency’s point of view. On the other hand, if the marginal cost structure of the agency permits it to achieve performance levels above the reference level they will do so. If the time constraints restrict the agency to operating in the underperformance area it will value non-transparency, while otherwise it would prefer transparency. Thus, the model predicts higher levels of transparency among high performing agencies relative to the badly performing ones. Lastly, an important implication is that any changes in the oversight rules that affect the bureaucracy’s marginal costs would affect the equilibrium performance delivered by each agency. For example, increasing the reference performance level and/or decreasing the
marginal costs to transparency would likely decrease the performance delivered by the agencies.  

**IV. Economic Implications and Suggestions for Future Research**

The primary purpose of this model is to gain a better understanding of bureaucratic behavior. Equipped with such knowledge, politicians and political watch dogs can devise strategies to improve the efficiency of the executive arm of the government. On the other hand, it could also have salient implications for businesses as well. The process in which a business’s departmental units obtain their operational budgets is very similar and it only seems logical to extend the conclusion and the analysis to them. With a better understanding of the intra-firm bureaus, management can greatly improve performance.

Proposing specific new policies is not the purpose of this paper, but it is the sincere hope of the author that future research would promptly address this task. Future researchers might want to keep in mind that studies focusing on particular new policies would probably have the biggest and fastest practical impact. Such policies would need to be focused on overhauling the oversight process, and may be the very appropriations mechanism itself. Moreover, some wise restrictions on the scale of the tasks Congress (or the executives) can assign to bureaus could be warranted as well. May be this could be in the form of a requirement for only instituting new programs incrementally, where the first steps do not seek to achieve anything but a few humble goals.

Further down the line, new empirical studies would also be valuable. As time progresses and more performance reports are released, it will be necessary to analyze the data again to re-confirm, or even reject the findings of this paper. On the other hand, it

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17 Increasing the reference level might make the time constraint binding for agencies with high marginal costs of performance. Also, decreasing the relative cost of transparency has been shown to always have a negative effect on the relative level of performance.
could be worthwhile for future researchers to re-do the same analysis but include other control vectors the author might have overlooked or define performance and transparency in more innovative ways.

The theoretical model could be extended further as well. More research in both what drives politicians to appropriate money to bureaucrats and in the field of modeling rational expectations is needed. On the other hand, future researchers can also look at modifying the model so that politicians take on a more active role in the negotiation process (which will also be closer to the realities of profit-maximizing firms). While Niskanen (1975) has found this to have little effect in the perfect information model, results could differ in an imperfect information environment.

Lastly, an underlying current in the whole paper is the fact that this type of analysis can be carried over to for profit companies as well. It will be worthwhile, however, to also formalize this analysis in the setting of profit maximizing firms in a separate study. An analysis of how the model applies specifically to firms might yield different results that the one the author conjectures.

VI. Conclusion

The primary goal of this analysis was to study whether introducing imperfect information in the traditional bureaucratic behavior model would create new worthwhile conclusions regarding bureaucratic behavior. The theoretical model of Niskanen (1975) was revisited and updated in accordance with the way of modeling uncertainty proposed by Varian (1992). The imperfect information envisioned by the author has to do with the informational advantages that the bureaucrats hold over the politicians. This was introduced by transparency, which is defined as the relative ease with which politicians can construct a
correct estimate of the true performance of the bureaucracy. The solution of the model suggests that the level of bureaucratic transparency has salient implications for the budgets. In particular, it was concluded that transparency results in increased budgets for the high performing agencies and budget cuts for the low performing agencies. These results indicate that transparency is preferred by the high performers while the low performers prefer to cover up instead.

The model’s conclusions imply that a traditional budget appropriation process might be rewarding the bureaucratic network with budget increases not only because of increased performance. Information imperfections can get in the way of discerning the actual level of performance of any given agency and could end up rewarding bureaucrats for actions that do not increase the social welfare (or do not increase a firm’s profits). Not allocating all of their available time and efforts to achieving the best possible level of performance might mean that bureaucrats fail to implement any and all governmental projects to the fullest extent of their potential. Likewise, budget-driven departmental units might not be focusing all of their attention and resources on fulfilling management’s strategy to its potential. There is a serious principal-agent problem that is exacerbated by the lack of perfect information and ends up in agents that are not absolutely committed to the goals of the principals.

Future research needs to be done to determine what kind of specific policies would limit this undesirable behavior.
References


Manchester, Patrick E. and Norcross, Eileen C. “Politics and Performance in the Bush Administration’s Program Assessment Rating Tool”, under review


