

INVESTIGATING LOW PRODUCTIVITY IN THE NIGERIAN CIVIL SERVICE: A CASE OF ASYMMETRIC INFORMATION

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ABSTRACT

The role of the civil servant in ensuring the daily running of governance is pivotal to any economy. Hence the need for a well-motivated, committed and devoted civil service workforce with a positive attitude to their respective work schedule as designated in their employment contracts written by the government as the employer. The paper investigates, using an asymmetric information model, the rationale behind the choice of level of effort that the civil servant exerts towards his work. Intuitively, if adequate effort as prescribed in the employment contract is exerted, there will be increased productivity, better performance and induced public output. The analysis of the asymmetric information model found out that, civil servant's choice of level of effort to exert towards their work depended on the incentive structure availed to them, monitoring scheme of the government, their risk preferences, level of asymmetric information during contracting, and the degree of responsiveness to incentives.

Key Words: *Asymmetric Information, civil service, Productivity, Moral Hazard*

Introduction

Over the years, respective Nigerian governments have relied heavily on its public institutions in achieving its long and short term goals. This reliance, heralds the emphasis and importance on the need for an advanced and structurally developed public institutions that can allow for both efficient and effective attainment of these goals (Iheriohanma, 2006). From economic to social, political to religious, public institutions perform a necessary and pivotal role in the process of governing. In Nigeria however, there has been a continuous outcry over the

failures of public institutions to perform, especially with reference to the level of commitment and attitude to work as shown by workers in these institutions¹.

In this paper, we will accentuate more on an aspect of these public institutions, the civil servant. The civil servant refers to all individuals who work and provide essential services in one of the governments public institutions and is being paid for such service. Of primary concern in our study, is the productivity of the civil servant. The paper is concerned with enhancing productivity in the civil service as well as provides reasons for productivity inadequacies. Civil service productivity, captured by the amount of effort exerted by civil servants, is directly related to the achievement of the objectives of the institutions they work for and ultimately the governments' aspirations. Intuitively, one will expect that as the civil servant exerts effort in performing his duty, the consequence of such efforts are an expected institutional output / objective, enhanced productivity and ultimately achieve the set goals of the government. If this is achievable, it translates to better outcomes for respective public institutions as well as general governance in retrospect. Normatively, this is the ideal situation. However, the civil service in Nigeria has been plagued with productivity problems. Why would a policeman put more efforts to collecting bribes at check points than actually performing checks at these road checks? Why would a civil servant dedicate more efforts to duties that have a potential for personal reward rather than expected social benefits? This paper will attempt to investigate the productivity of the civil servant (also referred to as public worker) through the lens of the Principal – agent analysis. Given divergent objective functions of both the government and the public worker, how can productivity be enhanced? We make this analysis through a moral hazard model of asymmetric information in employment contracts.

As earlier stated, Productivity in this instance will refer to the amount of effort exerted by the civil servant. To this end, productivity and its effects will be viewed from the decisions making process of the public worker. In a nut shell, we want to find out why public workers in Nigeria are not fully committed and dedicated to public work? Can asymmetric information in their employment contracts stymie productivity? Does incentive structure affect productivity? How can we ensure productivity through incentives?

For the analysis, there is a reliance on the assumption of asymmetric information in employment contracts written by the government. The paper will be able to show a first best solution which involves a form of contract that can ensure full commitment and participation of the public worker, if government has all information and can adequately observe workers effort. Also a remodel of our first best solution will be done to include asymmetric information in employment contracts. This will show the necessary trade-offs, possible incentives to increase worker efforts and at the same time reduce worker's risks that arise through wage variability and information from within and outside the public institutions. The

¹ See Ezulike (2001) and Tongo (2005), for a comprehensive overview of the failures of the public worker with regards to his level of commitment and attitude to work in Nigeria.

investigation will also show through our model, how government can ensure productivity through an optimal level of incentive and monitoring of the civil servant.

Explaining Asymmetric Information²

In the study of incentives and contracts theory, asymmetric information deals with situations in which there are forms of discrepancies in the amount and quality of information being possessed by parties in a transaction, contract or social interaction (Jensen and Vestergaard, 2007). In such situations, two main problems can emerge; Adverse selection (hidden knowledge) and moral hazard (hidden action) (Laffont and Martimort, 2002). This paper employs the concept of moral hazard to show how, some form of hidden action in employment contracts written by the government can lead to low productivity by civil servants.

Moral hazard model is akin to the classic principal-agent problem, which arises whenever an individual or public agency (principal) hires another person or individual (agent) to performing some form of function in its stead. This form of interaction can bring about potential conflicts of interest between the principal and agent given the realistic assumption that the principal cannot fully observe the agents' actions and thus the presence of asymmetric information (Kwerel, 1977; Stanley, 2007). The underlying presumption is that the interest of the agent may differ from those of the principal. Thus, strategies to stymie the problem of conflicting interest introduce some form of cost to the principal, thereby barring any form of pareto efficiency (Tirole, 1990).

Macho-stadler and Perez-castillo (2001), viewed moral hazard as a source of asymmetric information problem where, "agents can perform some costly action to improve outcomes for the principal, but the principal cannot observe that action". The challenge for the principal becomes to set up a feasible employment contact that can ensure the action taken by the agent is at the desired optimum. Such optimal contracts and the sequential timing of the decision making during the contact are important. This is so because; both agents and principal have to make decisions based on available information (Macho-stadler and Perez-castillo, 2001).

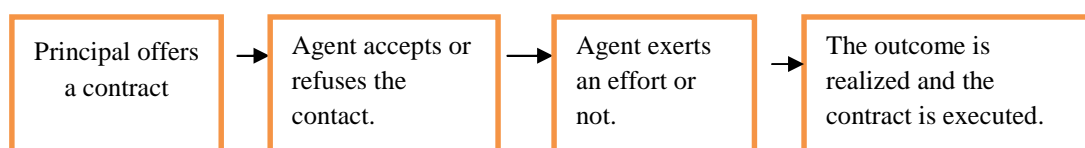


Figure 1: Moral hazard interactions between principal and Agent. A contact is offered to the agent, with the option of refusing or accepting. If the agent refuses, the interaction stops. On the other hand of if the agent accepts, the contract is executed (Jensen and Vestergaard, 2007).

² It is advised to read Milgrom and Roberts (1992) for a better understanding of asymmetric information as it relates to the problem of moral hazards.

Features of the Model

This paper investigates civil servant's productivity through the effort levels exerted by the civil servant in compliance to the employment contract between the government as the employer, and the civil servant as the worker. The role of asymmetric information on these employment contracts are therefore investigated, with emphasis on the decision making process of both the government and the civil servant, and how these translate to enhancing productivity and proffering possible solutions. The basic features of the model to be used are:

1. There is asymmetric information in the interactions between the government and the civil servant, because the principal (government) cannot fully observe the action exerted by the agent (civil servant)
2. The principal (government) is concerned about achieving its set out goals through the mechanism of the civil service. This implies the government depends on the civil service work-force in order to achieve its long and short term goals. This relationship between government's attainment of goals and the productivity of the civil service is a direct and positive one.
3. The government is the employer. However, the worker chooses his level of effort to exert which directly influence the attainment of government goals and objective.
4. The government cannot observe the level of effort directly but can observe the level of attainment of its objectives.
5. We assume a single principal entity interacting with a single agent entity.
 - a. Assume further that;
 - e = effort exerted by the civil servant, which can be used to explain his productivity.
 - G = Public service output.
 - s = Desired social welfare which is used to proxy the attainment of government's goals.

Thus:

$$G = e + x \quad 1$$

Public sector output is a function of the level of effort exerted by the civil servant and a random variable, x. This random variable captures all other factors that can affect the level of public service output. The expected value of x, E_x is 0 and x is unobservable directly.

6. Ultimately, the government is concerned with achieving the highest possible levels of S, given public service output, G and civil productivity captured by level of e.
7. Given that x is random and cannot be observed directly, we introduce another variable y; which is also random but correlated with x and is observable. The essence of variable y is that it helps in identifying x. Also the expected value of y, E_y is 0.
8. w represents the wage to be paid by the principal to the agent. We assume a linear wage scheme.

$$w = \alpha + \beta (G + \theta y)^3 \quad 2$$

³ There are different wage models that can be used (quadratic and polynomials), however the linear wage rate is used for its simplicity and it is similar to that used by Laffont and Martimort (2002)

Which can be further expressed as

$$w = \alpha + \beta (e + x + \theta y) \quad 3$$

With w representing wage, α captures a fraction of the wage that is constant (commonly referred to as basic pay), β represents incentives, e for effort, x captures other factors that can affect G , y helps in identifying x , θ represent the extent to which y can help identify x .

Points 1 to 7 highlight the basic features of the asymmetric information model that we will use to answer the questions already poised.

Allocation of Efforts

In order to understand the rationale behind the allocation of effort by civil servants, that is not in accordance with the contents of the employment contract, certain assumptions have to be made about our model. Assume the civil servant can perform two tasks and can also allocate his effort between these two tasks i.e. e_i = effort of individual civil servant, where i can take values 1 or 2 and represents tasks. Also we assume task 1 is the task as stipulated in the employment contract of the civil servant and task 2 is another task which has personal rewards and requires some level of effort to be performed. Now, the civil servant can allocate his effort freely between task 1 and task 2, thus:

$$e_i = e_1 + e_2 \quad 4$$

if $e_1 = 0$, then the worker does not allocate any kind of effort to task 1 i.e. he does not perform his duties as a civil servant, also if $e_2 = 0$, then the civil servant is wholly committed to his work as a civil servant. A combination of e_1 and e_2 is also feasible.

From (1), we can re-write (4) as

$$G = e_i + x_i \quad 5$$

The government as the principal, still cannot observe e_i or the random term x_i , but can observe G . From the civil servant's point of view, his wage,

$$w = \alpha + \beta_1 G_1 + \beta_2 G_2 \quad 6$$

We assume that the civil servant derives some form of utility from working, which we represent as:

$$U = Ew - c(e) - \frac{1}{2} r \text{ var}(w) \quad 7$$

Where U represent the utility, Ew is the expected wage, $c(e)$ is associated with the cost to the civil servant when he exerts effort level e , r serves as the parameter to measure the risk attitude of the workers and $\text{var}(w)$ measures the variance of the wage. This variance has

⁴ Also we are following the need for simplicity in expressing the utility function for the civil servant. $\text{Var}(w)$ is the variance of the linear wage rate.

important implication for decision making to the civil servant. Wage stability is more desirable to the civil servant than when it is volatile.

Given the two task nature of the civil servant, (7) can be rewritten as

$$U = Ew - c(e_1 + e_2) - \frac{1}{2} r \text{ var } (w) \quad 8$$

Which can be further broken down by taking the expected wage following that $E_x = 0$ and $E_y = 0$, into

$$U = x + \beta_1 e_1 + \beta_2 e_2 - c(e_1 + e_2) - \frac{1}{2} r \text{ var } (w) \quad 9$$

If both task 1 and task 2 can be performed, and the civil servant is rational and maximizes his utility, it follows that the first order condition (F.O.C) by taking partial derivatives for each level of effort e_1 and e_2 will be;

$$\beta_1 - c'(e_1 + e_2) = 0 \text{ and } \beta_2 - c'(e_1 + e_2) = 0 \text{ respectively}^5 \quad 10$$

The implication of (10) is that $\beta_1 = \beta_2$. Recall that β represents incentives, and if this holds, the civil servant will only exert any effort, at both tasks, if and only if the condition $\beta_1 = \beta_2$ holds. This shows that it is the incentive structure associated with each task that helps determine the allocation of effort to such task. For example, if $\beta_2 > \beta_1$, implying that performing task 2 is more rewarding than task 1, the civil servant will allocate more effort to task 2. Also, if $\beta_1 > \beta_2$, the civil servant will allocate more effort to task 1. It becomes obvious that the incentive structure plays a pivotal role in determining the level of effort exerted by the civil servant towards his duties as stipulated in governments' employment contract. It is therefore plausible to say that, a possible cause of low productivity in the civil service can be attributed to the claim that the incentives are inadequate or not attractive enough to convince civil servants to allocate more effort as stipulated in the contract.

What then is the optimum employment contract?

To fully grasp the workings of the asymmetric information model in explaining its consequence on low productivity in the civil service via employment contracts, we would employ a benchmark scenario where asymmetric information does not exist and effort is fully observable.

Recall our basic model where;

e = effort, G = public institutional output, s = desired social welfare:

and $G = e + x$, where $E x = 0$

We introduced a variable y , which will help in identifying x and $E y = 0$

Wage rate is linear and is in the form;

$$w = \alpha + \beta (G + \theta y) = \alpha + \beta (e + x + \theta y)$$

If we take the expected value of w

$$E w = \alpha + \beta e \quad 11$$

$$\text{Var } (w) = \beta^2 \text{ var } (x + \theta y)^6.$$

⁵ Taking $\frac{\partial U}{\partial e_1} = 0$ and $\frac{\partial U}{\partial e_2} = 0$

To attain its desired level of social welfare, s , the government will have to maximize the difference between the level of public institutional output $G(e)$ and the Ew it pays to the civil servant in return i.e.

$$Es = G(e) - Ew \quad 12$$

This can be written as

$$Es = G(e) - (\alpha + \beta e) \quad 13.$$

The agent's utility U is given as (7) but can be further written as

$$U = \alpha + \beta e - c(e) - \frac{1}{2} r \beta^2 \text{var}(x + \theta y) \quad 14.$$

Recall $c(e)$ is the cost of exerting effort to the civil servant and r is a parameter that measures risk attitude of the civil servant⁷. At this point we introduce a new variable \underline{U} , which represents a reservation utility. This reservation utility \underline{U} represents a minimum level of satisfaction that has to be attained. If this level of utility is not attained, the civil servant will not work at all.

Case of no Asymmetric Information and Risk Neutral Agent

For simplicity, assume there is no form of asymmetric information i.e. the government can observe the effort of the civil servant. The implication of this is that, the government can now offer a wage contract that depends directly on effort, e , rather than indirectly through output G and other information y as in the case of asymmetric information. Given the possibility of observing effort, the government should pay the lowest wage which will induce the agent to work.

$$\text{Hence } w - c(e) = \underline{U} \quad 15$$

$$\text{Or } w = \underline{U} + c(e) \quad 16$$

Thus, $Es = G(e) - w$ ⁸

$$= G(e) - \underline{U} - c(e)$$

Taking the first order condition for maximizing expected social welfare with respect to effort e :

$$G'(e) = c'(e) \quad 17$$

Thus (17) determines the first best level of effort. The government will pay the wage

⁶ The utility function used here is similar to that of Milgrom and Roberts (1992). The variance of the wage rate is gotten by the variance formula $V(az + b) = E\{[(az + b) - (a\mu_z + b)]^2\}$, where $a = \beta$, $z = (e + x + \theta y)$, and $b = \alpha$. The variance can thus be expanded to; $E\{[a(z - \mu_z)]^2\} \rightarrow a^2 E\{z - \mu_z\}^2 \rightarrow a^2 \text{Var}(z)$.

⁷ The risk preference of the civil servant is a very important aspect of the model. If the civil servant is risk neutral, then he does not require any compensation for risk taking. However, with asymmetric information and risk aversion, the need for compensation arises.

⁸ The non-use of the expected wage rate is due to the assumption of non-asymmetry in the model for a benchmark. The government is certain of the level of effort that the civil servant will exert and can thus determine precisely the amount of wage that coincides with that level of effort.

$w^* = \underline{U} + c(e^*)$ if the worker exerts effort e^* , and pays $w = 0$ for any other e . It becomes intuitive to notice that with no asymmetric information, the civil servant has to exert the desired level of effort as stipulated in the employment contract. If he does not exert this level of effort, then he receives no wage and no form of satisfaction.

This postulate is our benchmark for further analysis. We would introduce asymmetric information into our model to capture a realistic scenario in the interactions between government and civil servant when entering a contract. With the introduction of a moral hazard dilemma, we can easily confirm if there are any discrepancies between the level of effort in our benchmark and the model of asymmetric information. We will also be able to show the important role of incentives in encouraging effort and ultimately induce performance.

Note: We are assuming that $c'(e) > 0$ and $c''(e) \geq 0$ and $G'(e) > 0$ and $G''(e) < 0$ i.e. the civil servant's disutility from effort is strictly increasing and convex while the output from effort is strictly increasing and concave.

Model with Asymmetric Information and Risk Aversion

We would still remain consistent with the structure of the model. With the introduction of asymmetric information, the government has to choose the contract parameters α , β , and θ , in such a way that the expected social welfare can be maximized subject to constraints that are imposed by the civil servants behaviour (Participation and incentive constraints).

The civil servant's participation constraint is derived from his reservation utility. It states that, the civil servant will not work unless the utility derived from working is at least equal to his reservation utility i.e.

$$U \geq \underline{U} \quad 18$$

This can be further written as:

$$\alpha + \beta e - c(e) - \frac{1}{2} r \beta^2 \text{var}(x + \theta y) \geq \underline{U} \quad 19$$

The civil servant's incentive constraint is also derived by maximizing his utility with respect to his effort exerted i.e.

$$\text{Max}_e \alpha + \beta e - c(e) - \frac{1}{2} r \beta^2 \text{var}(x + \theta y) \quad 20$$

Taking differentials with respect to e , we get

$$\beta = c'(e) \quad 21$$

Since $c(\cdot)$ is convex, this is a minimum. Hence, the civil servant's optimal choice for effort level depends on the contract's incentive parameter β . By implicit differentiation, we can observe the degree of responsiveness of effort to incentives i.e.

$$\frac{de}{d\beta} = \frac{1}{c''(e)} \quad 22$$

As usual, the government is interested in maximizing its expected social welfare subject to the level of effort exerted by the civil service. It is this level of exerted efforts that determine both the civil servants participation and incentive constraints.

$$\text{Max } ES = G(e) - Ew = G(e) - (x + \beta e)$$

$$\text{S.t: } \alpha + \beta e - c(e) - \frac{1}{2} r \beta^2 \text{ var}(x + \theta y) \geq \underline{U}$$

$$\beta = C'(e)$$

Assuming the participation constraints binds, hence

$$x + \beta e = C'(e) + \frac{1}{2} r \beta^2 V - \underline{U} \quad 23$$

Where $V = \text{var}(x + \theta y)$.

Substituting for β from the incentive constraint

$$E(s) = G(e) - c(e) - \frac{1}{2} r [C'(e)]^2 V - \underline{U} \quad 24$$

Taking the first order condition for optimal level of effort e ;

$$\frac{dEs}{de} = G'(e) - c'(e) - \frac{1}{2} r 2C'(e) C''(e) V = 0 \quad 25$$

$$\text{This follows that } C'(e) [1 + r V C''(e)] = G'(e) \quad 26$$

Since $C'(e) = \beta$ from the incentive constraint, (26) this

$$\text{becomes } \beta = \frac{G'(e)}{[1 + r V C''(e)]} \quad 27$$

Is there a need for monitoring?

Assume the government decided to increase the accuracy with which the civil servant's performance is measured by monitoring the civil servant's level of effort.

Recall $V = \text{var}(x + \theta y)$ represents the variance. The smaller is V , the more accurate is the government's estimate of effort:

$$e = G - x \quad 28$$

$$e = G - (x + \theta y) + \theta y \quad 29$$

Where θy is observable let $M(v)$ represent the cost of reducing the variance V ,

With $M'(v) < 0$ and $M''(v) > 0$.

The government's expected social welfare will be:

$$Es = G(e) - Ew - M(v) \quad 30$$

$$= G(e) - \underline{U} - c(e) - \frac{1}{2} r v \beta^2 - M(v)$$

Taking the first order conduction for optimal v :

$$M'(v) = -\frac{1}{2} r \beta^2 \quad 31$$

Given that $M''(v) > 0$, the larger is β the smaller will be the variance v . The implication of this is that with higher incentives to the civil servant, the performance of the civil servant will be monitored more carefully.

Implication of the Models' Findings

From equations (26) and (27), important deductions can be postulated with respect to the level of effort exerted in the presence of asymmetric information, and the role of incentives in inducing productivity via increased effort exerted by civil servants.

The following postulates are listed:

1. Since $\beta = c'(e)$, this implies that $c'(e) < p'(e)$, whereas under the assumption of no asymmetric information $c'(e^*) = P'(e)$
 - a. This shows that the civil servants level of effort will always be lower when there is the incidence of asymmetric information during the offer of employment contracts.
2. From the linear wage contract $w = \alpha + \beta (e + x + \theta y)$, we can intuitively deduct that an increase in incentives β , will induce more effort e , but will also allay the civil servant to more risk $(x + \theta y)$, with the degree of risk depending on the identifying power of y on x .
3. The government as an employer faces a trade-off. More incentives will induce more effort, but will also require more pay since the civil servant must be compensated for more risk.
4. The nature of the optimal incentive structure that will induce the civil servant to work is related to some at the variables in equation (27);
 - a) If the civil servant has how risk aversion (r), then the government should increase incentives.
 - b) Once performance can be accurately measured (by reducing V in equation (27), the higher will be the level of incentives.
 - c) Given the expected social welfare is the difference between public institutional output and wage paid to civil servants i.e. $E_s = G(e) - E_w$, it becomes intuitive that increases in $G(e)$ holding E_w constant will lead to increase in E_s . To induce higher levels of $G(e)$, more of incentives β is needed.
 - d) With increases in incentives to the civil servant, we can expect greater responsiveness of effort to such incentives. This responsiveness is measured by $[1/c''(e)]$.
 - e) Increases in the quality and quantity of incentives offered to the civil servant in the employment contract will induce more effort, but will also necessitate the need for a more careful means of monitoring effort. This implies that, from (31) it is obvious that government will have to increase its cost of monitoring the civil servant, whenever it increases incentives. If this is not done, the incentives may fail to achieve the aim of increased level of commitment and attitude to work thereby dipping productivity.

Conclusions

The model presented in this paper clearly shows that with the presence of any form of asymmetric information in writing employment contracts, there is an opportunity for the civil servant to exert a lesser amount of effort than he would have, if the government had perfect knowledge and information. Asymmetric information between contracting parties will introduce some form of cost to the party with lesser information. For the government who enters an employment contract with the civil servant, the cost is in the amount of effort exerted as compared to the stipulates of the contract.

Therefore, the government has to strategize an employment contract that recognises this information lapse and at the same time induce the civil servant to exert more effort. The government strives for pareto optimality. In writing these optimal contracts, the government has to consider the important roles of the incentive structure, the monitoring schemes, the risk attitudes of the civil servants, the responsiveness of the civil servants to wage volatility as well as their responsiveness to changes in incentives.

Without delving into the exact characteristics of the incentives or the methods of monitoring that can ensure increased productivity for the civil servant, the paper has highlighted the important role incentives and monitoring schemes play in the strive for enhanced productivity and better attitude to work. The paper has been able to show that civil servants who have a bad attitude to work (exerting a lesser amount of effort) do so because of the opportunity cost of incentives from other ventures that also demand their efforts. Also, the role of incentives in enhancing productivity comes with a caveat. As incentives increase, there is a need for better monitoring of the civil servant as he is faced with higher risk from wage variability.

Recommendations

Based on the postulates of the paper, the following recommendations are put forward:

1. The incentives given to civil servants should be re-examined with that aim of appropriating adequate incentive structure that will guarantee productivity from the civil servant. Also the nature and type of incentive that will guarantee enhanced productivity should be worker based i.e. these incentives should not be superficial but should reflect and capture the basic needs for effective working conditions as well as other loss from exerting effort.
2. The Government as an employer should provide a monitoring scheme that can adequately monitor the amount of effort exerted by the civil servant. Though this will monitoring scheme may involve the commitment of resources, in the long run, it reduces the loss from civil servants exerting a lesser amount of effort at stipulated in the employment contract. This monitoring scheme will enhance productivity.

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