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Corruption and health care provision: An extension of the Shleifer and Vishny' Model

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Abstract. The problem that arises is how the State official in a monopoly situation maximizes the value of bribes collected, by selling public services to users? To answer this question, we show first that in the case of health care provision, the Shleifer and Vishny' simple monopoly model which highlights two forms of corruption (with theft and without theft) is limited insofar as it underestimates not only the value of bribes likely to be collected, but also the loss of income that corrupt practices cause to public services. Our model rather reveals that the State agent in a monopoly situation can discriminate users according to their characteristics in order to collect more possible bribes. Indeed, our model shows that when a medical doctor maximizes its earnings and whatever the form of corruption practiced, he plays not only on amounts of bribes paid and a part of the official price, but also on users' characteristics. However, for some amounts the State agent will tend to practice the form of corruption without theft on certain users' characteristics where he/she would draw the greatest possible gain.

Keywords. Corruption with and without theft, Discrimination at first degree, Lerner's index, Profit-sharing scheme, Health system.


JEL. D40, I10, I14, I15.


1. Introduction

In an economy, social services are often characterized by markets' failure. To correct these failures, the State intervenes through the provision, the financing and the regulation of these services. It is well known that corruption emerges as a by-product of the State's intervention (Acemoglu & Verdier, 2000). However, what remains less understood is the impact of the phenomenon on these public services.


The theoretical literature identifies three channels through which corruption negatively affects the provision of public services by the State. First of all, corruption can increase prices and decrease the amount of goods and services offered by the State (Shleifer & Vishny, 1993). Secondly, corruption can reduce investment in human capital (Ehrlich & Lui, 1999). Finally, it can reduce the State's revenues (Gupta, Verhoeven, & Tiongson, 1999), which in turn can decrease the quality of public services offered (Bears, Glomm & Janaba, 2000). The poor quality of services discourages some individuals to use them, and reduce their willingness to payment (through tax evasion). Consequently, the tax basis decreases, as well as the ability of the State to provide quality public services (Alesina, 1999). The poor quality of public services also creates


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Turkish Economic Review

incentives that lead individuals to opt for services offered by the private sector. However, in countries where private markets for health and education services are limited, this situation can lead to congestion, increasing delays in obtaining public services, increasing the rent-seeking opportunities and a frequent use of the discretionary power by civil servants. Even in the case where private markets are well developed and extensive, the poor may lack the ability to pay for services and private goods (Gupta, Davoodi & Tiongson, 2002).

In particular for Shleifer & Vishny (1993), the State official in a simple monopoly situation maximizes his/her collection of bribes. With this situation, he/she may determine the amount of services to be provided, either by multiplying the appointments to users, or by simply refusing to serve them. This maximization is done in two ways: In the first case, the user pays the bribe plus the official price; this is corruption without theft, and in the second case, he/she only pays the bribe; this is corruption with theft. What this model does not explicitly show us is that in some cases (public hospitals), the State agent in a monopoly situation can discriminate users in order to collect more possible bribes. Moreover, the model does not take into account the various forms of profit-sharing scheme whose aim is to improve the healthcare and the performance of the official (Grignon *et al.*, 2002). In particular it does not highlight the fact that the official price (A) paid by the user in the case of corruption without theft can be shared and redistributed between the State agent (a), the hospital administration (b), and the public treasury (c) (unlike the Shleifer and Vishny' model where (A) only belongs to the public treasury).

Thus, the purpose of this study is to fill these gaps by showing that the State agent in a monopoly situation can not only discriminate patients in order to collect more possible bribes, but also plays on a part (a) of the official price (A) in order to maximize its earnings this regardless of the form of corruption practiced.

The importance of this study is twofold. First of all, it helps to show that the simple monopoly used by Shleifer & Vishny (1993) underestimates not only the value of bribes likely to be collected, but also the loss of income that corrupt practices cause to public services. Secondly, since the users' discrimination mechanism is at the origin of corrupt practices, this study leads us to better understand these practices and therefore, propose appropriate measures to reduce if not eliminate them.

The rest of the study is organized around the following points: the presentation of the extended model of Shleifer & Vishny (1993), its discussion before concluding the study.

2. Basic theoretical model

We consider the model of a State that produces a good or service, like consultation, massage or wound dressing.

Let's assume that the property is homogeneous, and sold on the behalf of the State by an official, namely an officer of the public hospital, who has the opportunity to restrict the quantity of goods or services being sold. Specifically, he/she may refuse to consult a patient, or preventing him/her from access to a massage or a wound dressing.

In practice, this refusal can mean a long delay or impose multiple requests. But it is simpler to assume that the official can refuse to provide the service. An important reason for which these services exist is probably to give the officials the power to refuse to provide them and collect bribes in exchange for the offer (De Soto, 1989).

We also assume that the official can reduce the supply without any risk of being detected and sanctioned by the hierarchy. The corrupt officials are not punished because they operate in complicity with their bosses and because public pressure, aims at putting an end to corruption is low. Since the official of the public hospital is a monopolist selling the State's services, it is worth knowing

Turkish Economic Review

how the users' requests are presented. Let's assume that the official is able to discriminate the patients according to their characteristics (which are based on knowledge of any characteristics perfectly correlated with willingness to pay) that is, gender, age, income and educational level, etc. In fact, the medical doctor knows the functions of individual requests. He/she can sell each unit at a maximum price that the consumer is willing to pay, which corresponds to the marginal willingness to pay. This assumption is relevant in the context of hospitals where the official has more information on the patient. As a matter of fact, before the diagnosis, the official of the hospital requires the identity of the patient and particularly his/her socio-professional data. Indeed, this information can help to identify the causes of the disease. But they can also be misused to satisfy the ulterior interests (Phelps, 1995). For instance, the doctor can pay more attention to some patients, particularly those with high incomes, by caring for them in exchange for a bribe. Consequently, the less fortunate will feel somehow excluded from the system. The doctor is therefore a monopolist who enjoys collecting bribes. The latter sells hospital's services by discriminating users. His/her objective is to maximize the value of bribes he/she collects by selling the State's service to the rich at the detriment of the poor. He/she may set different prices for the same service, the sale price being based on the users' characteristics, and for this discrimination through prices being made possible, we assume that the medical doctor has the market power, and that users make themselves available to pay different amounts. The doctor also knows their individual demands that is to say, he/she is able to identify them directly or indirectly (auto selection). The service resale possibilities are almost zero.

What is therefore the marginal cost of the service provided by the civil servant?

As with Shleifer & Vishny (1993)¹, we distinguish two types of corruption. First of all, in the case of corruption without theft, the civil servant goes beyond the official price of the public service. In this case, for the civil servant, the marginal cost of the provision of the service is the official price. For example, when the doctor sells a wound dressing at that price plus the bribe, he/she keeps the bribe but the official amount remains in the coffers of the hospital. In this case, the marginal cost of producing the service is equal to the official price. The doctor then sets a two-part tariff (non-linear) namely:

$$T(w) = A + pw \tag{1}$$

A represents the fixed part which is the official price payable for the service and w the specific characteristic of each user (age, sex, or income for example). p is the price set by the doctor based on the characteristic w (marginal price specific to the characteristic w). Let's note that part A is paid by the user if only he/she decides to enter the market. In other words, A is paid only if the service is being provided and $T(w)$ is noted as the total spending. Each user, giving his/her characteristic, will therefore pay:

$$\begin{cases} T(w) = A + pw & w \neq 0 \\ T(0) = 0 & \text{otherwise} \end{cases} \tag{2}$$

¹In the simple monopoly, we have : corruption with theft where the price = the bribe and corruption without theft where the price = the official price + the bribe

Turkish Economic Review

However, in some public services, the fixed part A : of Profit-sharing scheme is officially distributed in three proportions ($a + b + c$) with one for the doctor (a), one for the hospital (b) and the other one for the public treasury (c), the distribution keys being different from one hospital to another (Cameroonian public hospitals for example). In fact, contrary to the private monopolist that perfectly discriminates by recovering all the surplus (A) of consumers, the State agent in a monopoly situation will recover only a proportion a of this surplus. Each user will ultimately therefore pay the doctor, based on his/her characteristic:

$$\begin{cases} T(w) = a_i + Pw & w \neq 0 \\ T(0) = 0 & \text{otherwise} \end{cases}$$

Given that the doctor knows the individual demand functions of each user, the variable part (pw) represents the billing to the characteristic, and the fixed part (a) the official service price payable to all users.

Let's assume that there is n potential users, and $D_i(p_i)$ is noted as individual demand. The doctor can then appropriate for him/herself the surplus of users, using a two-part tariff, and for the users to accept medical treatment, the fixed portion of the tariff must be at most equal to the individual surplus,

$$S_i(p) = U(w) - p(w) \tag{3}$$

where $U(w)$ represents the utility drawn by the patient based on the characteristic w . The doctor, knowing the individual demands $D_i(p_i)$ of users, therefore maximizes his/her profit that is:

$$\max_{p, a} \pi = \sum T_i(w_i) - C(\sum w_i) \tag{4}$$

Under the constraints

$$a_i \leq S_i(p_i) \tag{5}$$

$$\text{With } T(w_i) = a_i + p_i w_i \tag{5}$$

$$\pi = a_i + p_i w_i - C w_i \tag{6}$$

$$\pi = S_i(p_i) + p_i D_i(p_i) - C D_i(p_i) \tag{7}$$

At given prices, the benefit increases with a_i . Therefore, the medical doctor has to set the A_i at the most higher possible level; a_i being equal to $S_i(p_i)$. The fixed portion of the tariff therefore enables the medical doctor to take for him/herself part of the surplus of each user. As the doctor appropriates a part of the surplus, he/she thus obtained a part a_i of the collective surplus A_i . He/she must set a marginal price equals to the marginal cost. The first order condition in relation to price gives us:

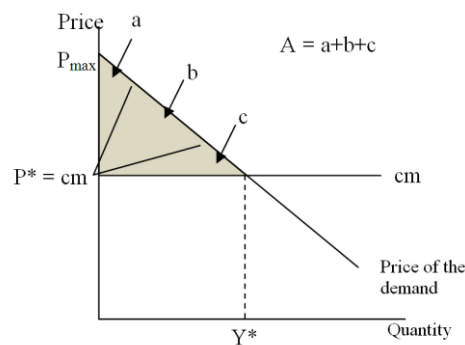
$$\frac{\partial \pi}{\partial p_i} = \frac{dS_i}{dp_i} + p_i D_i'(p_i) + D_i(p_i) - C D_i'(p_i) = 0 \tag{8}$$

$$\frac{dS_i}{dp_i} = -D_i(p_i) \tag{9}$$

and C' means the marginal cost (cm). By dividing all by $D_i(p_i)$, we get

$$p_i - cm = 0 \tag{10}$$

Thus $p_i = cm$. The doctor therefore captures the total of surplus a_i of users through the fixed part of the tariff, and insofar as he/she has adequate information on the characteristics of his/her patients, he/she can perfectly discriminate. The marginal price which is the same for all customers equals to the marginal cost, and the package that is tailored to each customer is equal to his/her surplus as illustrated in the Figure 1 below.



Perfect discrimination with two-part tariff

Figure 1. Corruption without theft

Conversely, in the case of corruption with theft, the civil servant does not at all go beyond the official price set by the State. In this case, the price at which the customer buys the service is equal to the bribe, and may even be lower than the bribe. For the civil servant, the marginal cost of producing the service is equal to the official price. The doctor simply hides the sale. The price of the medical service merges with the bribe, since the cost of producing the service is zero. Therefore, part A no longer exists, and the first order conditions with respect to p of the profit equation becomes:

$$\begin{aligned} \frac{\partial \pi}{\partial p_i} &= p_i D_i(p_i) + D_i(p_i) - C' D_i(p_i) = 0 \\ \Leftrightarrow P_i D_i(P_i) - cm D_i(P_i) &= D_i(P_i) \end{aligned} \tag{11}$$

And by dividing both members of the equality by $D_i(p_i)$, we get:

$$p_i - cm = - \frac{D_i(p_i)}{D_i(p_i)} \tag{12}$$

By dividing again each member of this equation by p_i we get:

Turkish Economic Review

$$\frac{p_i - cm}{p_i} = - \frac{D_i(p_i) / D_i'(p_i)}{p_i} = \frac{1}{\varepsilon_p}$$

$\frac{p_i - cm}{p_i} = \frac{1}{\varepsilon_p}$ is nothing but the *Lerner's* index which expresses the doctor's

monopoly power on the service demand. This power depends on the elasticity of the demand price and in this case, the service price is above the marginal cost, that is, $p_i > cm$. The more the elasticity is stronger, the higher the market price is close to the marginal cost. The more the elasticity of the demand price ($|\varepsilon_p|$) is bigger (elastic), the better the doctor's power will be low (Lerner's index low, that is, $\varepsilon > 1$). On the contrary, the more the elasticity of the demand price ($|\varepsilon_p|$) will be weak (inelastic), the greater the medical doctor's power (Lerner's index high, that is, $\varepsilon < 1$). The elasticity of the demand will therefore be one of the determinants of the doctor's power. The graph below shows the gains of the doctor who practices corruption with theft.

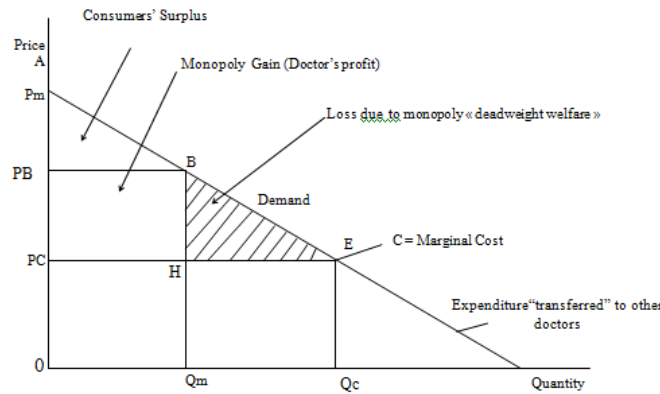


Figure 2. *Corruption with theft*

3. Discussion of the model

The simple Shleifer's and Vishny's monopoly stipulates that the State records a net loss in the case of corruption with theft and that the State agent as well as the user benefit from it insofar as the first pocketed the bribe and the second is exempted of the payment of the official price. In fact, the State agent and the user can agree on the amount of bribe to pay. The user draws much benefit when the bribe amount is less than the official price (surplus of the user).

In the case of corruption without theft, the model stipulates that the State's employee has the bribe, but the official price is paid into the State's coffers. This is not always the case since in some health systems such as that of Cameroon; the official price (*A*) is divided between the State agent (*a*), the hospital (*b*) and the public treasury (*c*). It is therefore followed by a decrease of the surplus of the State which is donated to doctors and hospitals. Unlike corruption with theft, the State no longer records a net loss. The user no longer benefits from the non-payment of the official price. He/she loses the surplus acquired in the case of corruption with theft. The State official not only pockets the patient's bribe, but also a part of the official price.

In our model which rather considers a discriminating monopolist (which in fact is the State official), the user pays the bribe in the case of corruption with theft. This bribe is only paid by those who obey to some characteristics sought by the State agent. This may result in an eviction of some market's users: in this case (such as the simple monopoly), Figure 2 shows that the State also records a net

Turkish Economic Review

loss (surplus of the consumer plus the monopolist's profit). The number of customers eventually decreases for the public official. However, users who are served are supposed to bring more satisfaction to him/her in his/her view to maximizing his/her gains. Those users out of business (losers' users) are a loss to the society, loss caused by the State agent (Hatched part of Figure 2); On the contrary, users who remained on the market (winners' users) share the surplus with the State official. As for the State, it records a net loss as in the case of simple monopoly.

When the State agent discriminates without theft, he/she increases his/her surplus by playing both on a part of A that is a , and especially on the characteristics of individuals, maximizing his/her gains. The State on its part benefits from a part of the surplus of A , namely c . Let's note that this surplus diminishes to the benefit of the hospital and that of the agent, unlike the Shleifer and Vishny's model in which the whole A returns to the State. The user here is like the "weak link" in the system, this because two conditions are imposed for him/her to integrate the market: the official conditions (payment of A) and the informal conditions (payment of pw). Part A as in the simple monopoly is the cost bore by each user to integrate the market. However, the conditions for payment of the bribe vary. In the case of the simple monopoly, this payment does not include the users' characteristics, which is far from the case of the State agent who practices a first-degree discrimination, where users who do not meet some requirements are out of business, leading to a subsequent long-term decrease of A and in turn, the surplus of the State. On the contrary, the agent can recover against his/her part a by practicing a discrimination on patients (Figure 1).

4. Conclusion and recommendations

The aim of this study was to theoretically highlight the maximization of bribes collected by the State agent from patients in public hospitals through a discriminating monopoly model at the first degree. We show that the simple monopoly is limited because the State agent in a monopoly situation can discriminate users according to their characteristics in order to collect more possible bribes whatever the form of corruption practiced. What then to do to reduce these gains, failure to totally eliminate them? The fight against corruption in public hospitals like those of the city of Douala in Cameroon can be at least presented in two aspects: reward and punishment.

On the first aspect, the public authorities can act on A , the official price payable to the consultation which is divided into three proportions ($a + b + c$), one for the doctor (a), one for the hospital (b) and the other one to the Treasury (c). Indeed, it is well known that corrupt practices in these hospitals are justified in part by low wages. One of the measures to be taken would be therefore to increase them. But, according to public authorities, the governmental resources are not sufficient enough to cope with this increase. They may thus play on A by increasing a , and by ensuring that within each public hospital, the most assiduous personal should be the biggest beneficiaries. The distribution of a must therefore be linked to the value of the public service provided (for example, distribute by taking into account the time spent in the service and especially the number of patients treated every day. This would make more visible the effort made by the Agent). The same deterrent effect can be achieved other than through high salaries, offering benefits like retirement pensions increases, which can be received only after a faultless career (Becker & Stigler 1974), that is to say, to ensure that the best qualified officials receive an increase in their pay upon retirement.

As far as the second aspect is concerned, it is essential to put in place a credible monitoring system capable of detecting corrupt officials and users, punish them by law and then, force them to leave public hospitals. However, such a system is difficult to implement insofar as corruption is secret by definition. Furthermore, a corrupt official will have much to lose if he/she is unveiled,

Turkish Economic Review

judged, and forced to seek a job in the private sector where corrupt practices are less common, which could among others, reduce his/her purchasing power. Whatever the penalties under criminal law in cases of corruption, the cost of losing a job in the administration for malpractice will be added upon. The State should adopt a transparent staff recruitment system based on merit, and ensure the non-partisan application of the law ([Rose-Ackerman, 1998](#)).

In maximizing gains, this study does not take into account the costs borne by the State agent when he/she sells public services, hence maximizing gains instead of profit. Then, the other forms of discrimination including that of third degree are not considered in this study. Future researches could be guided towards this direction.

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