HEALTH AND HOSPITAL ECONOMICS

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ISBN: 978-605-7736-63-5 (e-Book)
KSP Books 2019

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Preface

Ch.1) This Chapter analyzes and highlights the most practised forms of corruption in public hospitals of Douala metropolis in Cameroon, namely corruption with theft and that without theft. The results of our analyzes show a predominance of the form without theft, this regardless of the hospital, and this allowed us to classify hospitals based on the dominant form. It appears that the General and Deido Hospitals are health facilities where corruption without theft is the least and the most practiced respectively, while the Cité des Palmiers and New Bell hospitals are those where corruption with theft is the least and the most practiced. An estimate through odds ratios revealed for instance that the odds would be about 5.46 times higher that the form without theft is not practiced at the General hospital compared to other hospitals, and about 11.11 times that it is practiced at Deido hospital compared to all hospitalsh.

(Ch.2) 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 that the State agent in a monopoly situation can discriminate users according to their characteristics in order to collect more possible bribes. The Shleifer and Vishny' simple monopoly model is therefore limited. The survey of patients of nine public hospitals in

Douala revealed the existence of two forms of corruption at consultation: corruption without theft and corruption with theft. An evaluation of maximizing the earnings of medical doctors using odds ratios, showed that in the pursuit of these gains and whatever the form of corruption practiced, the State agent plays not only on amounts of bribes paid, but also on users' characteristics. However, for amounts between 3,000 FCFA and 5,000 FCFA, our results revealed that the doctor will tend to practice the form of corruption without theft on men, the wealthiest, the learned and the old where he/she would draw the greatest possible gain.

(Ch.3) 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.

(Ch.4) This chapter deeply analyzes the characteristics of corrupters during consultation in the Douala public hospitals, as well as the amounts of bribe they pay. A survey of patients in these hospitals reveals that the majority of bribes paid during consultation is between 1,000 and 3,000 CFA Francs, interval which corresponds to the 25th and 75th percentile of the amounts of bribe paid respectively. Our estimates indicate that for the amounts of bribe paid falling within this interval, it appears that the rich, the women, the older and the more educated are more likely to

corrupt practices. However, when such amounts are set outside of that interval, the amounts of bribe paid and the characteristics of corrupters are no more the same as before. This contradicts for instance to some extent some theoretical results that do not include the setting of the level of bribe. It finally emerges from our analysis that with regard to each of the characteristics highlighted, correspond specific amounts of bribe paid, which are related to the socio-professional and socio-demographic categories of patients. In particular, senior staffs and business men / contractors would be most likely to pay bribes, whatever the amount.

(Ch.5) This chapter studies the characteristics of victims of corruption in the different public hospitals of the city of Douala in Cameroon. A survey of 407 frequent users of at least one of these hospitals allowed us to identify, using corruption indexes, the services mostly affected such as hospitalization, reception, medical certificate, illicit sales of drugs and hospitals in which they are located. Estimates obtained through odd ratios showed that the characteristics of victims vary not only from one hospital to another, but also from one service to another. For example, in the case of hospitalization, the victims are in general of male sex, aged 40 or below, and earners of incomes above 250,000F CFA, meanwhile in the case of illicit sales of drugs, men as well as women with incomes less than 250,000F CFA are affected. This allowed us to classify hospitals in terms of the magnitude of the phenomenon in the various services.

(Ch.6) This chapter highlights the initiative taken for the corrupt habits of health services suppliers and users of healthcare in Cameroon. An analysis through proportions reveals that generally in the regions, 83.33% of health workers take the initiative for the corruption, mainly justified by the prominence of some motives such as the deficit of nursing staff and drugs, the inadequate infrastructure and medical equipments, and the difficulties encountered in the implementation of the budget. An analysis through odds ratios for the entire country and by region revealed that in the health care market, the initiative for the corrupt act usually comes from the medical personnel in about 58% of cases, compared to the paramedical staff (33%). In 9% of cases, there is no conclusion between the first and the second. The

use of a log-linear model through the Poisson regression enabled us to highlight the characteristics of patients in regions where the corrupt act is initiated by them. Indeed, the women, the younger and the workers are most prone to corrupt actions. However, the residential environment (urban or rural) does not influence the corrupt practices.

B. Yamb & O. Bayemi
October 17, 2019

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1 Corruption forms and health care provision in Douala metropolis public hospitals of Cameroon

Introduction

Health is a fundamental right and an engine of both personal and social development. It has a significant positive impact on economic growth, poverty reduction and consequently on the well-being of populations. Unfortunately, the 2006 global report by Transparency International shows that corruption pervasiveness in the health sector undermines populations' access to health care. Certainly, corruption negatively affects all countries of the world, but its effects are particularly dramatic in developing and transition economies already under-resourced (Vian, 2002). Gangrened by corruption which is both the cause and consequence of their ills, developing countries have seen their health system being deteriorated (World Bank, 2004). Several studies demonstrate that informal payments are responsible for the deterioration of the quality of health care provided to the poorest patients (Szende, & Culyer, 2006). Investigations carried out in Eastern Europe and Asia highlight that corruption in the form of informal payments of health care encourages patients to postpone their medical consultations (Lewis, 2000), hence the call of the

United Nations Development Program (UNDP, 2011) to fight against this scourge in all its forms (gifts, embezzlements, bribes, etc.) in the health sector.

To better cope with this phenomenon, investigations have been carried out over the last thirty years by various institutions (World Bank, Transparency International, the International Monetary Fund and Universities). Thus, starting from the popular definition that corruption is the abuse of public property for personal gain, most of these studies can be divided into two groups: those relating to grand corruption (Mauro, 2002; Akunyili, 2006) and those on petty corruption (Maestad, & Mwisongo, 2007).

Great corruption distorts the allocative role of the State in that it affects the structure of public expenditure for programs facilitating the taking of bribes (Mauro, 2002). In this perspective, investments in the health sector often favour the building of new hospitals, and the purchase of very expensive high-tech equipment at the detriment of primary health care programs such as vaccination and family planning (Mauro, 2002; Winston, 1979). As concerns petty corruption, it introduces discrimination of patients and creates scarcity of goods and services. For instance, to allow patients to pay bribes, medical staff may be tempted to create queues, simulate drugs shortage or pretend that the most effective drugs are expensive. Because they lengthen the consultation period and shorten the time devoted to patients, artificial queues contribute to lower the quality of medical services (Maestad, & Mwisongo, 2007). Shleifer & Vishny (1993) argue that the ability of the State agent to handle the consultation period for his/her own account increases when the latter is in a monopoly situation. He/she can collect bribes in two ways: corruption with stealing or corruption without stealing. In the first case, the price of the service is equal to the bribe and in the second case, the service price is equal to the official price plus the bribe. These works are important because they enable to refine strategies to fight against corruption. In particular, it is now known that to reduce corrupt practices, State agents should be asked to give account for their actions (Klitgaard, 1989; Vian 2007). However, they are limited not only because of the ignorance of consequences of the phenomenon, but also, because they did not take into account the different forms of corruption.

Thus, if the theoretical literature provides a detailed reading grid (Shleifer & Vishny, 1993; Kaufman & Wei, 1999; Lui, 1985) of specific situations, the empirical literature on contrary remains limited.

In particular, Gupta *et al.* (2002) tried to fill these gaps, by applying the model of Shleifer & Vishny (1993) for 71 countries based on data from CIET (Community Information, Empowerment, Transparency) International, World Bank and Transparency International. This study is important because it helped to know that corruption negatively affects indicators of health care provision. It also reveals that corruption has a negative impact on girls' education. Unfortunately, it does not highlight the practiced forms of corruption which are the foundation of Shleifer & Vishny's model (1993).

Indeed, the data used by Gupta *et al.* (2002) are the result of surveys of businessmen plying countries worldwide, unfortunately without getting in touch with users of public hospitals. As these authors themselves stated, the respondents do not have information about corruption which is practiced between officials of these hospitals and users. However, such information enable to test for each hospital and in relation to all the selected hospitals, if according to Shleifer & Vishny's (1993) view, the price of a service is equal either to the bribe only (corruption with theft) or to the official price plus the bribe (corruption without theft). In contrast, the data used in this study allow us to distinguish these forms of corruption on the one hand, because they result from a survey (Thanks to the African Economic Research Consortium (Nairobi, Kenya) for the funding of the survey) of users usually attending these hospitals, and to make a typology according to the dominant form of corruption, and this by hospital and for all hospitals in general on the other.

The second part of this work succinctly presents a brief review of the literature on the impact of corruption forms on health care supply. The methodological aspects are presented and discussed in the third part. The fourth part highlights the functioning of health system in Cameroon, and the various corrupt practices encountered in this system. The results obtained are presented,

interpreted and discussed in part five, this before concluding the study.

Literature review

It is difficult to set corruption boundaries; they are closely linked to local laws and customs. Due to the difference in customs, an act considered as corrupt in region A may not be the same in region B. However, in many so-called corruption cases, everyone can much agree to say that this type of behaviour is reprehensible and socially harmful to the society (Klitgaard, 1989). Vian (2006) proposes a series of very common forms of corruption in hospitals' administration. These forms can be classified into three categories, as they are primarily related to the functioning of private health facilities; secondly, to the recruitment of students in medical training schools, thirdly, to the transfer of health professionals in high positions and finally, the abuse of medical goods and services.

In the first category, the common corruption forms are absenteeism and diversion of patients. Prado & Chawla (2006) define absenteeism as the unjustifiable or unexplained absence of employees. When public hospitals' workers benefit from absenteeism by making profit for instance from income generated by a second job (Yamb, & Bikoué, 2016), the concept of absenteeism joins the definition of bribery stated by the World Bank: "the use of the position of manager of public service for personal profits". Based on the statistics of countries as disparate like Bangladesh, Ecuador, India, Indonesia, Peru and Uganda. Chaudhury *et al.* (2006) estimate an average absenteeism of 19% for education and 35% for health workers.

The diversion of patients is also related to the functioning of the private sector. Indeed, several private health facilities have as promoters, the medical doctors working in public hospitals. For these doctors, this practice aims at welcoming patients in public hospitals, and then guide them to their private clinics for medical follow up (Yamb, & Bayemi, 2015). This form of corruption is related to the privatization of public hospitals insofar as doctors make good use their functions to get private clients.

In theory, absenteeism and diversion of patients are explained both by the level of wages, the flexibility of worked hours as well as the risks incurred (Allen, 1981). In developing countries, low wages, job loss which is not a big risk could therefore encourage absenteeism. It also seems that the possibility of finding a new job is another factor favouring absenteeism and diversion of patients (Shapiro & Stiglitz, 1984). Thus, when the labour market is buoyant, absenteeism and diversion of patients increase.

To address this first category of corruption forms, it is necessary to increase the salaries of health professionals. But for most developing countries, this solution is not possible, given the insufficiency of budgetary resources. In contrast, in some countries where wages can be increased, it is questionable whether this measure alone is sufficient. However, wages increase reduce bribes, but do not cancel them (Rose-Ackerman, 1998). As a matter of fact, a high salary may simply lead a civil servant to require a consistent bribe able to compensate the risk of losing what is now a quite interesting job.

In the second category of corruption forms adopted by Vian (2006), we can retain the privileged access to medical training schools and the sale of offices in hospital administrations.

Students or parents who agree to rely on bribes for admissions in medical schools threaten the expertise of the well-trained medical staff. In her article on the "Taxonomy of Corruption in Higher Education," Rumyantseva (2005) notes that Higher Education has a decisive influence on youths' values and beliefs on the concepts of good and evil, and on leaders of a country. Thus, corruption in education is a priority problem.

Another common abuse is, for a medical doctor, to pay bribe to his/her hierarchical superior in order to be either maintained or transferred to a "juicy" position. The Sale of positions is opposed to merit principle. Generally speaking, in systems where rent seeking provides better opportunities for gains than the productive sector, the allocation of talents will experience inflection, and members of the elite will turn to non-productive activities, thus determining a reduction of social surplus and growth (Murphy, Shleifer & Vishny, 1991; 1993).

To deal with the two last forms of corruption, meritocracy must be institutionalized not only in the recruitment of candidates in medical schools, but also in the processes of officials' appointments to senior positions.

The institutionalization of merit principles is made difficult by the fact that some actors of officials' promotion through corrupt acts do not consider actions they take as such. For example in Africa, some elected officials who use their discretion power, their hierarchical position to promote the appointment of their nationals (clan, community, association), do not consider this practice as corruption, since it is not perceived as such by the actors. Corruption there would simply be an extension of traditional practices of gifts exchange (Médard, 2002).

The third category which is the abuse of goods and services that public hospitals' officials are supposed to provide patients with is basically translated in the stealing of drugs, improper payments and intervention of personalities.

The stealing of drugs is another common problem in public hospitals. Certainly, all thefts are not part of corrupt actions, but from the moment which those who have power systematically abuse their position to appropriate medications belonging to hospitals, we can talk about corruption. Large quantities of drugs and medical equipment are diverted from the central reserves and individual stocks to be sold for personal gain (Ferinho, *et al.* 2004).

In developing countries, health expenditure on pharmaceuticals and drugs can represent between 20 and 50% of public health budget (Vian, 2002). On average, the share on corruption is from 10 to 25% of the public purchasing in the health sector (WHO, 2008). Corruption in the field of medications and medical equipment reduces access to essential drugs, particularly for the most vulnerable groups. The absence of drugs can make a treatment to be postponed or stopped. Corruption reduces the quantity of drugs available in hospitals. The quality of health care decreases. To put essential drugs at affordable prices at the disposal of everyone is a required condition to improve national health indicators.

To curb corruption in drugs promotion activities, governments are called upon to prohibit the practice of gifts according to the

WHO Ethical guidelines on drug promotion (WHO, 2008). But such a measure is limited in many African countries where the practice of gifts is part of the custom (Klitgaard, 1989). According to the World Health Organization, to improve access to drugs might save the lives of over 10 million people each year (WHO, 2004).

In many developing countries, some patients have access to public services thanks to the intervention of high personalities from officials managing these services. Other patients access through informal payments. According to surveys that the National Institute of Statistics conducted in Cameroon (INS, 2011) from households in 2007, these two approaches are common in hospitals with a high prevalence of irregular payments grouped into corruption without theft and corruption with theft. However, the survey conducted by the INS in 2007 did not highlight these two forms of corruption, hence the relevance of this study.

Methodological aspects

We will first present the basic model, secondly, the technique used in determining the sample size and, finally, the estimation method.

The basic model

Among corruption models, that of Shleifer & Vishny (1993) appears to be the easiest to analyze, within the framework of the provision of social services by the State, the causes and consequences of corruption. In their scheme, bribes are paid by consumers for goods and services provided by the State. State officials are supposed to exercise monopoly power by determining the quantities of goods or services offered, either by multiplying the deadlines or simply refusing to serve them. Two cases of corruption are considered, and all have harmful consequences for the provision of goods and services.

In the first case, the official gives a higher price that is official. P = Value + bribe. For the official, the marginal cost is equal to the official price, and the agent determines the quantity offered by equating the marginal revenue to the marginal cost as in the case of a classic monopoly. Bribe is a tax. The official retains the bribe

and transfers the official price to the public Treasury. Figure 1 below illustrates this case as "corruption without theft ". The result is that bribe increases the price and decreases the amount. In these circumstances, some consumers will inevitably be squeezed out of the market.

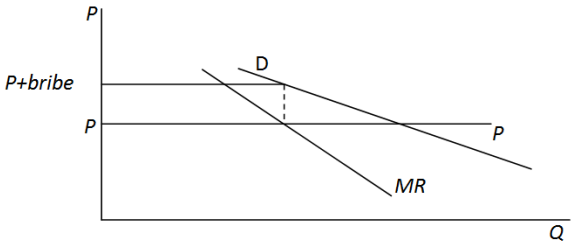

Figure 1. *Corruption with Theft*
Source: Adapted from Shleifer & Vishny (1993)

In the second case, the official does not transfer to the public Treasury the official amount required by the State for the service rendered. This is "corruption with theft" (Fig.2). In another perspective, the State service is stolen by the agent in charge of delivering it, and the bribe is collected from the consumer. In this case, the State agent still equates marginal revenue to marginal cost, but the latter remains zero for him/her. Thus, the bribe that the consumer pays may be lower than the official price. From this point of view, the cost of the provision of goods and services is under-charged. Such a situation is attractive for the consumer, and aligns his/her interests with those of the official, thus making corruption more difficult to detect. This creates a loss of revenue to the public Treasury, and the agent is able to exercise more discretion than in the case of corruption without theft. He/she may choose to lower the price level, and thus increase the demand for a good or service, and increase the loss of the public Treasury income. A smallest bribe has the advantage of reducing the risk of being detected.

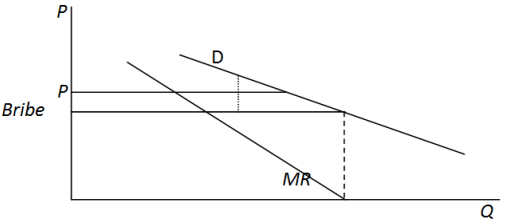

Figure 2. *Corruption without Theft*
Source: Adapted from Shleifer & Vishny (1993)

Determination and characteristics of the sample size [1]

As we are unable to determine an approximate P value through a prior survey (because to our knowledge, no investigation about corruption in public hospitals has yet been carried out in Cameroon), that is to say, the proportion P of respondents in the context of a preliminary study, we set P to 0.5, this value representing the worst case, that is to say, the value which gives the greatest possible standard deviation for the sampling distribution of $\overline{P}$. In this case, the required sample size to ensure an error margin E (in absolute value) not exceeding 5% with a confidence level of 95% will be about (Baillargeon, 1989):

$n = \frac{Z^2_{\alpha/2} \times (0,5)(0,5)}{4E^2} = \frac{(1,96)^2}{4 \times (0,05)^2} \approx 384$ with E The margin error, Z The standard normal distribution, $\overline{P}$ the estimator of P in the preliminary study. The distribution of the number of individuals to be interviewed is done from the number of medical and paramedical staff in each hospital selected as shown in the following Table.

The first column describes the type of hospital, the second column the total number of medical and paramedical staff, the third indicates the weight or importance of the personnel of each hospital as compared to the staff of all hospitals in general, and the last column, the approximate number of people who should be interviewed by hospital, based on the weight of each hospital. We came up with a total of 384 interviewees.

Table 1. *Distribution of the Number of Patients to Interview per Hospital*

[1] This determination of the sample size and its features are inspired from the Article (Yamb, & Bayemi, 2015).

Hospital	Staff Number	Hospital Importance (In %)	Number of Users to Interview
Laquintinie	630	41	157
General	326	21	81
New-Bell	113	7	27
Bonassama	103	7	25
Palmiers	100	6	25
Deido	84	5	21
Logbaba	80	5	20
Nylon	62	4	15
Bonamoussadi	57	4	14
Total	1, 555	100	384

Source: Our estimates based on information collected at the Regional Health Delegation Littoral on the number of hospitals

For prudence sake, we distributed 415 questionnaires with the assumption that all incorrectly completed questionnaires would be eliminated, this to help approximately achieve the sample's size. Thus, 407 questionnaires were filled out correctly and therefore validated. It is on the basis of these 407 questionnaires that the analysis was performed.

Estimation methodology: An approach through odds ratios

To highlight the two corruption forms most practiced in the provision of health care in Cameroonian public hospitals and those of Douala in particular, two types of questions were asked to users namely: to be consulted, the patient only pays a bribe (corruption with theft) on the one hand, and, to be consulted, the patient pays the required official fees plus the bribe (corruption without theft) on the other. We then preceded with an estimate through odds ratios while identifying different hospitals affected by the phenomenon. This was apprehended by constructing for each hospital the following double entry contingency table for each of the forms practiced (with and without theft):

Table 2. *Contingency Table for the Form Practiced*

	Corruption	Form practiced	
Hospital		No	Yes
Hospital *i*		N_{11}	N_{12}
All hospitals *j*		N_{21}	N_{22}

In table 2 and for a given form, each hospital i is compared with all hospitals j, this through the calculation of the following odds ratio:

$$\theta_{i/j} = \frac{N_{11}N_{22}}{N_{21}N_{12}}$$

An odds ratio $\theta_{i/j} \succ 1$ stipulates that for hospital i, the practiced form has a smaller effect compared to all remaining hospitals j, and an $\theta_{i/j} \prec 1$ will have the opposite effect.

Hospitals' functioning and corrupt practices

As in the entire Cameroon, in Douala, the health sector is made up of private and public hospitals. If we take into account the last category on which the present study is based, there are essentially reference and district hospitals which operate under the Ministry of Health. The first two are: the Laquintinie and the General Hospitals, and the second: the Deido Hospital, the Bonassama hospital, the Bonamoussadi hospital, the Cité des Palmiers Hospital, the New-bell hospital, the Nylon hospital and the Logbaba hospital. District hospitals are dedicated in particular to firstly ensure a better quality of health care through motivated and disciplined staff, and for whom the patient becomes their only concern. Then, these hospitals must ensure a better decentralized management of money recovery of medical procedures, drugs and prepayments to be set up for progressive empowerment. And finally, they must support emergencies and hospitalized patients. Reference hospitals are above district hospitals. It is all about high level technical structures which in terms of specialized health care assure reference and anti-reference, and welcome patients from district hospitals. To assure the reference, these two hospitals have specialized doctors and special medical equipment which are absent in district hospitals. However, the status of the Laquintinie hospital is somewhat different from that of the General hospital. With legal personality and financial autonomy, the General hospital is more independent from the Ministry of Health than the Laquintinie hospital. The first recruits its own medical doctors and pay them higher salaries than those earned by doctors at the

Laquintinie hospital and others. The latter are paid by the Ministry of Finance. In early 1990s, Cameroonian civil servants have experienced a decrease of more than 50% of their salaries within the framework of the structural adjustment programs enacted by the Bretton Woods' institutions. Meanwhile, they have certainly recorded some salary increases. But these have failed to meet their former living standards.

Thus, following ECAM3 (National Institute of Statistics of Cameroon, 2007), nearly 85% of households' heads living in urban and semi-urban feel that the level of corruption in the health sector is high in this country. But the magnitude of the phenomenon varies from one region to another (69.8% in Douala and 61.1% in Yaoundé). This reflects a general malaise. As a matter of fact, if access to basic social services including health is a constant concern of the public authorities, corruption in the health sector is like a gangrene which tends to negate the efforts of the State (INS, 2011).

Findings and discussion

Descriptive statistics and estimate through odds ratios

The table below identifies the two most practiced corruption forms in public hospitals in the city of Douala, namely the form with theft and the one without theft, as well as a classification of hospitals based on the least practiced form: it is common that whatever the hospital, the form without theft predominates.

Table 3. *Typology of Hospitals Based on the Least Practiced Corruption Form*

	To be consulted, the patient only pays a bribe (corruption with theft)					The patient who wants to be consulted must pay official fees plus the bribe (corruption without theft)			
Hospital	No	Yes	Total	Rank	Hospital	No	Yes	Total	Rank
Palmiers	23(88.5%)	3(11.5%)	26(100.0%)	1	General	54(64.3%)	30(35.7%)	84(100.0%)	1
General	74 (88.1%)	10(11.9%)	84(100.0%)	2	Logbaba	13(61.9%)	8(38.1%)	21(100.0%)	2
Logbaba	18 (85.7%)	3(14.3%)	21(100.0%)	3	Bonassama	13(39.4%)	20(60.6%)	33(100.0%)	3
Bonamoussdi	12(85.7%)	2(14.3%)	14(100.0%)	3	New-bell	11(39.3%)	17(60.7%)	28(100.0%)	4
New-bell	23(82.1%)	5(17.9%)	28(100.0%)	5	Palmiers	10(38.5%)	16(61.5%)	26(100.0%)	5
Bonassama	26(78.8%)	7(21.2%)	33(100.0%)	6	Bonamoussadi	4(28.6%)	10(71.4%)	14(100.0%)	6
Laquintinie	114 (69.9%)	49 (30.1%)	163(100.0%)	7	Laquintinie	26(16.0%)	137(84.0%)	163(100.0%)	7
Deido	15 (68.2%)	7 (31.8%)	22(100.0%)	8	Nylon	2(12.5%)	14(87.5%)	16(100.0%)	8
Nylon	4(25.0%)	12(75.0%)	16(100.0%)	9	Deido	1(4.5%)	21(95.5%)	22(100.0%)	9
Total	309(75,9%)	98(24,1%)	407(100,0%)		Total	134(32.9%)	273(67.1%)	407(100.0%)	

Source: Our estimates based on the survey results

The above table shows a classification of hospitals from the least to the most corrupt (from 1 to 9), based on the form practiced.

We see that if we take for example the form without theft, the General Hospital ranks first. In other words, it is the least corrupt health facility compared to all hospitals. The same thing goes with the Deido Hospital which ranks ninth, that is, the last, thus appearing as the most corrupt health facility.

The table below shows the estimated odds ratios for each hospital compared to all hospitals, as well as the corresponding confidence intervals for each form practiced. Indeed, the estimate through odds ratios not only refines the analysis of the descriptive results of table 3, but it also confirms them: in fact, we find that the General Hospital comes as the structure that has the least probability for a `particular form of corruption to be practiced, compared to other hospitals. Estimates by odds ratios stipulate for example that for the form without theft, we have about 5.46 times more likely that it is not practiced in this hospital compared to other hospitals, while these odds are about 11.11 (1/0.09) times higher that this form is practiced at the Deido hospital compared to other hospitals.

Table 4. *Odds Ratios and Estimated Confidence Intervals of Hospital i Compared to all Hospitals j*

Hospital	Corruption with theft		Corruption without theft	
	$\hat{\theta}_{i/j}$	Confidence Interval at 95% $\hat{\theta}_{i/j}$	$\hat{\theta}_{i/j}$	Confidence Interval at 95% de $\hat{\theta}_{i/j}$
General	2.77	(1.37 ; 5.60)	5.46	(3.27 ; 9.13)
Laquintinie	0.58	(0.37 ; 0.92)	0.24	(0.14 ; 0.38)
Logbaba	1.95	(0.56 ; 6.80)	3.55	(1.43 ; 8.81)
Deido	0.66	(0.26 ; 1.67)	0.09	(0.01; 0.67)
Bonamoussadi	1.93	(0.42 ; 8.82)	0.80	(0.24 ; 2.62)
Bonassama	1.19	(0.50 ; 2.84)	1.35	(0.65 ; 2.82)
Palmiers	2.54	(0.74 ; 8.67)	1.30	(0.57 ; 2.93)
Nylon	0.09	(0.029 ; 0.03)	0.28	(0.06 ; 1.25)
New- Bell	1.49	(0.55 ; 4.04)	1.34	(0.61 ; 2.96)

Source: Our estimates based on the results of Table 3.

Discussion

Estimates results through odds ratios show that the General hospital reveals itself as the structure where the form with or without theft is less common. On the contrary, these forms are the

most practiced at Nylon (form with theft) and Deido hospitals (form without theft) respectively.

That said, hospitals where the form with theft is quite high can be considered as structures where the basic rules of hospital management are not respected either by managers or by the agents, and even less by users. Indeed in these hospitals, the patient acts as if he/she was in a conquered territory. The informal outweighs the formal. During consultation for example, some doctors do not hesitate to appeal to intermediaries who informally welcome patients and direct them to their offices. These patients are not officially registered by the administration of the hospital. It is precisely during this registration that the patient pays the official ticket that gives him/her access to consultation by the doctor. Consequently, the actual number of patients care for at the end does not correspond to the number recorded. A situation obviously profitable to the doctor, his/her intermediaries, and even the user (Shleifer & Vishny 1993). However, in hospitals where registration is done according to the regulations in force (in the formal case), this practice is scarce. In this case, the number of patients care for almost matches the number recorded. The doctor in this case may require from the patient a bribe in addition to the registration fee. Institutional failures can therefore promote corrupt practices, notably the form without theft.

Conclusion

This study aimed at highlighting the most obvious corruption forms in public hospitals in Douala, namely the form without theft and that with theft. A classification based on different forms and by hospital was also performed according to the least practiced form: it can be seen that in all hospitals, the form without theft is the most practiced. And with regard to the latter, the General Hospital stands as the health facility where it is the least practiced, and the Deido Hospital as the one where it is most practiced. The Nylon and Cité des Palmiers hospitals for the form with theft are those in which it is the most and the least practiced respectively. In fact, the quality of institutions set up plays a key role in the practice of any form of corruption. Indeed, hospitals where hospital regulations are not respected excel in the practice of the

form with theft. Informal in this case takes over the formal insofar as some patients are not registered by the administration of the hospital when they are care for. This is what favours this form of corruptive practice where nothing goes into the State's coffers. On the contrary, the form without theft is more practiced in hospitals where patients' registration is done according to standards. In this case, the required official amount for consultation goes into the hospital's coffers. However, the doctor pockets the bribe.

This study is limited at least on two points. Firstly, it concerns public hospitals only. Private hospitals are not taken into account. Yet, it is possible that some forms practiced in the public are not seen in the private. Secondly, it ignores the users' characteristics which nevertheless can serve as discrimination tools for the doctor looking for a higher gain in his/her collection of bribe. Several studies (Rose-Ackerman 1978; Johnston 1986; Cartier & Bresson, 1995) show that corruption effects highly depend on transaction characteristics and on agents who develop them. Future researches can help fill those gaps.

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2 Corruption and discrimination in Douala metropolis public hospitals of Cameroon

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 (Acemuglu & 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 (Hindriks, Keen & Muthoo, 1999), which in turn can decrease the quality of public services offered (Bearse, 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 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, 1998).

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 shows 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.

Empirically, Gupta, Davoodi and Tiongson applied in 1998, the model of Shleifer & Vishny (1993) for 62 countries, using corruption indices of the World Bank (World Development Report, 1997), that of CIET International and PRS / ICRG (Political Risk Services / International Country Guide). This study is instructive because it reveals that corruption negatively affects the provision's indicators as far as health and education are concerned. But it also has some limitations. First of all, as the authors themselves point out, these indices are not always reliable, because they do not necessarily capture the corrupt practices that take place between minor civil servants and ordinary citizens who daily ask for services in hospitals and public schools. Therefore, it does not identify the various forms of corruption prevailing in public services of these countries. In contrast, Yamb & Bayemi (2017) studied the forms of corruption in the provision of health care in Douala metropolis public hospitals of Cameroon, based on a

survey of users of these hospitals. The importance of this study highlights two forms of corruption, namely corruption without theft and corruption with theft. However, this study is somewhat limited insofar as it does not take into account the fact that the State agent can discriminate patients according to their characteristics and the amount of the bribe paid.

Thus, the purpose of this study is to fill these gaps by showing that the State agent in a monopoly situation can discriminate patients in order to collect more possible bribes; secondly, the discrimination made by medical doctors can be illustrated through a survey of patients in nine public hospitals of the city of Douala, the Cameroon's economic capital. In particular, we will test for different amounts of bribes set, the relationship between corruption without theft and the income level on the one hand, and corruption with theft and the income level on the other. In each of these cases, we will seek to ascertain, as suggested by the theoretical models (Kaufman & Wei, 1999; Lui, 1985), whether health workers discriminate their patients based on their ability to pay. Such an argument implies that the wealthiest should be those to whom bribes are asked the most.

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.

The evaluation of the phenomenon reveals that the State agent, regardless of the form of corruption practiced, maximizes his/her earnings by playing not only on the characteristics of individuals, but also on the levels of bribe amounts. The rest of the study is organized around the following points: we secondly present the methodological aspects of the model evaluation while highlighting the estimation methodology. Results are presented and discussed later before concluding the study.

The methodological aspects of the model evaluation

The empirical evaluation of the model involves the construction of a triple entry contingency table that shows not only the different forms of corruption, but also the characteristics of the users and the different amounts of bribes paid. Thus, to highlight the users' characteristics victims of corruption with and without theft at consultation, we have preceded by an estimate through odds ratios while identifying the different amounts of bribe paid by users. The age, income, educational level and gender variables were selected for the occasion. The estimate by odds ratios were apprehended through the construction of triple entry contingency tables of the form 2x 2 x2 below for each characteristic studied:

Table 1. *Contingency table of size 2x2x2*

Amounts fixed for bribes paid (control variable)	Users' characteristics (Independent variable)	Corruption with or without theft (dependent variable)	
		No	Yes
Less than 1,000FCFA	C_j	N_{11}	N_{12}
	C_j	N_{21}	N_{12}
[1,000 ; 3,000[	C_j	N_{11}	N_{12}
	C_j	N_{21}	N_{22}
[3,000 ; 5,000[	C_j	N_{11}	N_{12}
	C_j	N_{21}	N_{22}
[5,000 ; 7,000[	C_j	N_{11}	N_{12}
	C_j	N_{21}	N_{22}

Sources: Authors'Conception

N_{12} and N_{11} represent the number of people of modality1 (C_1) of characteristic C victims or not of a particular type of corruption, given an amount of bribe paid. The same interpretation can be made for modality2 (C_2) for the numbers N_{22} and N_{21}.These different joint distributions N_{ij} were used to calculate the following conditional (partial): odds ratios:

$$\theta_{ij/c_i} = \frac{N_{11}N_{22}}{N_{12}N_{21}}$$

The different contingency tables of 2x2 dimension obtained when the amounts of bribe paid are fixed contains each, the above identified characteristics, and are divided into two modalities and

the type of corruption that the user is being victim of (with or without theft).The estimates θ_{ij/c_i} of the relationship between each type of corruption and the users' characteristics, given the amount of bribe paid, are shown in Tables 6 and 7 below, together with their respective confidence intervals. When $\theta_{ij/c_i} \prec 1$, the first modality of characteristic C is more likely to be victim of a particular type of corruption than the second, and $\theta_{ij/c_i} \succ 1$implies the opposite.

Hospitals' functioning and corrupt pratices

As generally in Cameroon, the health sector in Douala is made up of private and public hospitals. If we stick to the latter category to which the present study is based, we essentially distinguish the reference hospitals and the district hospitals which operate under the Ministry of Health. The first two are: the Laquintinie and the General Hospitals and the latter seven are: the Deido, Bonassama, Bonamoussadi, Cité des Palmiers, New-bell, Nylon and Logbaba hospitals. The district hospitals are dedicated in particular to ensure first a better quality of care by a motivated and disciplined staff, and for which the patient becomes the only concern. Then, these hospitals must ensure a better decentralized management of costs recovery on medical procedures, medications and prepayments set up for a progressive empowerment. And, finally, they must support emergency and sick internees. Reference Hospitals are above district hospitals. These are technical high level structures which in relation to specialized care provide reference and anti-reference, welcome patients from district hospitals. To ensure the reference, these two hospitals are equipped with specialized doctors and special medical equipments absent in district hospitals. However, the status of the Laquintinie hospital is a little bit different from that of the General hospital. Empowered with a legal personality and a financial autonomy, the General hospital is more independent of the Ministry of Health than the Laquintinie hospital. The first recruits its own doctors and pay them higher wages than those earned by doctors at the Laquintinie hospital and others. They are paid by the Ministry of Finance. In early 1990s, Cameroonian civil servants' salaries have

declined by more than 50% as part of the structural adjustment programs enacted by the Bretton Woods institutions. Certainly, in the meantime, they have recorded some wage increases. But these have failed to regain their former standard of living, pushing them to collect wrongly or rightly non-statutory fees from users. This collection is favored by the almost non-existence of health insurance system, and the fact that each user is required to officially pay cash, the services for which he/she wants to access.

Thus, following ECAM3[1], nearly 85% of households' heads living in urban and semi-urban areas feel that the level of corruption in the health sector is high in this country. But the magnitude of the phenomenon varies from one region to another (69.8% to 61.1% in Douala and Yaoundé). For example, during consultation, corruption occurs mainly through the payment of non-regulatory fees and through the interventions of personalities to be quickly served and avoid waiting for a long time (INS, 2011, P. 84). We do not take this last aspect into account in this study. Patients in public hospitals also complain of the unavailability of medical doctors. This unavailability can be explained by the fact that private health facilities that accompany the government in the offer of health services to populations mostly have as promoters, medical doctors working in the public sector. Many patients who visit public health facilities are oriented by these doctors to their private health centers for their medical care. Thus, being interviewed on their perception of the level of corruption in the health sector as parts of the households' survey in 2007, almost six out of ten households in the city of Douala believe it is high. This reflects a general malaise. As a matter of fact, if access to basic social services including health is a constant concern for public authorities, corruption in the health sector is like a gangrene which tends to negate the efforts made by the State (INS, 2011).

[1]Survey of households by the Cameroon National Institute of Statistics (INS, 2007).

Results and discussion

Determination and characteristics of the sample's size[2]

As we were unable to determine an approximate P value through a prior survey (because to our knowledge, no investigation about corruption in public hospitals has yet been carried out in Cameroon), that is to say, the proportion of respondents in the context of a preliminary study, we set P to 0.5, this value representing the worst case, that is to say, the value which gives the greatest possible standard deviation for the sampling distribution of $\overline{P}$. In this case, the required sample size to ensure an error margin E (in absolute value) not exceeding 5% with a confidence level of 95% will be about (Baillargeon, 1989):

$$n = \frac{Z^2_{\alpha/2}(0,5)(0,5)}{E^2} = \frac{Z^2_{\alpha/2}}{4E^2} = \frac{(1,96)^2}{4(0,05)^2} = 384$$

With: E: the error margin, Z: the standard normal distribution, $\overline{P}$: The estimator of P in the preliminary study. The distribution of the number of individuals to be interviewed is done from the number of medical and paramedical staff in each hospital selected as shown in the table below:

Table 2. *The distribution of the number of patients to be interviewed by hospital*

Hospital	Staff Number	Importance of the hospital (in %)	Number of patients to be interviewed
Laquintinie	630	41	157
General	326	21	81
New-Bell	113	7	27
Bonassama	103	7	25
Cité Palmiers	100	6	25
Deido	84	5	21
Logbaba	80	5	20
Nylon	62	4	15
Bonamoussadi	57	4	14
Total	1 555	100	384

Source: Our estimates based on information collected at the Regional Health Delegation

[2]The determination of the sample's size and its characteristics is inspired by the article Yamb, & Bayemi, (2015).

The first column describes the type of hospital, the second column the total number of medical and paramedical staff, the third indicates the weight or importance of the personnel of each hospital as compared to the staff of all the hospitals in general, and the last column, the approximate number of people who should be interviewed by hospital, based on the weight of each hospital. We came up with a total of 384 interviewees. For prudence sake, we distributed 415 questionnaires with the assumption that all incorrectly completed questionnaires would be eliminated, this to help approximately achieve the sample's size. Thus, 407 questionnaires were filled out correctly and therefore validated. It is on the basis of these 407 questionnaires that the analysis was performed.

The table below specifies the characteristics of the patients' sample: age, school level (education), income, marital and employment status:

Regarding the age characteristic, it has been split into two categories: young people between 20 and 40 years old and the old over forty years old. This nomenclature at the age level reflects the country's socio-economic situation as concerns employment insofar as five years ago, authorities launched recruitment campaign in the public sector for the youth (25,000 in total), thus considering as young any person aged forty and less. The income characteristic also obeys to this dualistic nomenclature, that is, those with an income of 250, 000 CFA Francs and less, and those who earn more than 250,000 CFA Francs. This classification took into account the socio-economic characteristics of the respondents. This choice is justified by the fact that initially, we considered four classes of income namely less than75,000, between75,000 and 150,000, from 150, 000 to 250,000 and the class of more than 250,000. It is worth mentioning that among the 407 respondents, almost 83% have an income of 250,000 and less, and only about17% earn more than 250,000.This latter percentage represents the senior staffs in companies and businessmen/contractors, who are considered in the Cameroonian environment as people belonging to the richest social class. 80% of the first mentioned earn more than 250,000 CFA Francs, and nearly 50% of the second category as much, hence the justification for the classification in terms of

income distribution in the two categories, that is, 250,000 and under, and above 250,000. This is also applied to the education variable where two categories were retained: higher level and no higher level.

Table 3. *The characteristics of users' sample*

	Male	Female	Total	% Male	% Female	Total %
Age						
40 years old and Less	134	190	324	41,4	58,6	100
More than 40 years old	52	31	83	62,7	37,3	100
Education						
Primary and secondary Education	97	145	242	40,1	59,2	100
Higher Education	89	76	165	53,9	46,1	100
Average montly Income						
Less than 75, 000 CFA Francs	78	106	184	42,4	57,6	100
Between 75,000 and 150, 000	48	52	100	48	52	100
Between 150,000 and 250, 000	26	28	54	48	52	100
More than 250,000	35	34	69	50,7	49,3	100
Matrimonial Status						
Maried	72	99	171	42,1	57,9	100
Single	74	82	156	47,4	52,6	100
Divorced	10	9	19	52,6	47,4	100
Other	30	31	61	49,2	50,8	100
Socio-professionnal Category						
Senior staff	17	7	24	70,8	29,2	100
Control Agent	21	14	35	60	40	100
Enforcement to officer	22	15	37	59,5	40,5	100
Contractor (Business man)	25	4	29	86,2	13,8	100
House Wives		55	55		100	100
Trader	25	42	67	37,3	62,7	100
Unemployed	30	29	59	50,8	49,2	100
Others (informal)	46	55	101	45,5	54,5	100
Total	186	221	407	45,7	54,3	100

Source: Our Surveys' results

We also identified for all hospitals in general some measures of position (percentiles and mode), useful in determining the characteristics of those who pay amounts of bribe. We use the table below to determine these measures:

Table 4. *Amount of bribes paid (in CFA Francs) per scale*

Amount of bribes	Classes	Number	Percentage
0 to 1,000	1	122	30.0
1,000 to 3,000	2	128	31.4
3,000 to 5,000	3	102	25.1
5,000 to 7,000	4	55	13.51
Total		407	100.0

Source: Results obtained from the survey data

This table shows the proportion of users' who pay bribes depending on amounts. It shows that the amounts mostly paid are in class 1 and 2 (below 1,000 and between 1,000 and 3,000). Class 4 meanwhile shows the proportion of the least bribe paid. From the above table, the following statistics were obtained:

Table 5. *Some descriptive statistics on amounts of bribe paid (in CFA Francs)*

Characteristics		Values	Rounded Values
Mean		2442	2500
Skewness Coefficient		0.335	0.335
Kurtosis coefficient		-0.986	-0.986
Mode		1936.29	2000
Percentiles	25	834	1000
	50	2300	2500
	75	3083.33	3000

Source: Results obtained from the survey data

This table shows the calculated real values and the rounded values. To simplify the presentation, we have rather considered the last, insofar as they more reflect the reality of the amounts of bribe paid which are usually whole numbers (round), not followed by pennies. Considering for example the average bribe, we have put it to 2,500 instead of 2,442. (In fact, it will be easier in practice for a patient to pay an amount of 2,500 instead of 2,442). The same thing goes with the median bribe (2,500 instead of 2,300) and the mode (2,000 instead of 1936.29) and it is noticed that the mean (2,442), the median (2,300) and the mode (1939.29) are in the same class as the modal class. It therefore appears that 2,000 would be nearly the amount of bribe paid, and with a positive asymmetry (Skewness) coefficient (0.335), we came to the conclusion that the majority of bribes paid tend to larger amounts as compared to the average of bribes.

Amounts of bribe paid during consultation

As concerns corruption in consultation, the nurse who is the medical doctor's secretary takes the health parameters of each patient and writes them in the medical book which costs 1,000 CFA francs in each public hospital except the General Hospital. The purchase of this book by the patient gives him/her the right to consultation. On the contrary, at the General Hospital, consultation is 7,000 CFA francs. In both cases, the Secretary is in charge in an orderly manner, of asking patients to enter the consultation room where the medical doctor is. The normal approach is that the "first come must be consulted first." Unfortunately, in reality, this principle is flouted. The patient who puts bribe in his/her medical book is the first to be served. This is what Shleifer & Vishny (1993) called corruption without theft, since the consultation price is equal to the official price plus the bribe. This benefits to the doctor and his/her secretary at the detriment of patients. Some patients will be squeezed out of the public hospital because of rising prices. However, the investigation revealed that the "gombo"[3] varies from one hospital to another, as shown in the table below.

Table 6. *Average amounts of bribe paid during consultation*

List of Hospitals	Official amounts for consultation	Average amount of bribe paid during consultation in CFA Francs	Actual total amount for a consultation
General Hospital	7 000	1494	8 494
Laquintinie Hospital	1 000	3411	4 411
Logbaba Hospital	1 000	2095	3 095
Deido Hospital	1 000	1714	2 714
Bonamoussadi Hospital	1 000	1714	2 714
Bonassama Hospital	1 000	1636	2 636
Cité des palmiers	1 000	2462	3 462
Nylon Hospital	1 000	375	1 375
New-Bell Hospital	1 000	1500	2 500
General Average of bribe	1 665	2433	3 489

Source: Results obtained from the surveys' data.

By taking into account the official price, this last table shows that the cost of consultation is equal to the official price plus 3,411 FCFA at the Laquintinie hospital or more of 2,095 FCFA at the

[3] Term most often used to illustrate bribe

Logbaba hospital. In general in each of the hospitals, corruption makes more expensive the cost of consulting a sick as compare to the official price as shown in the diagram below:

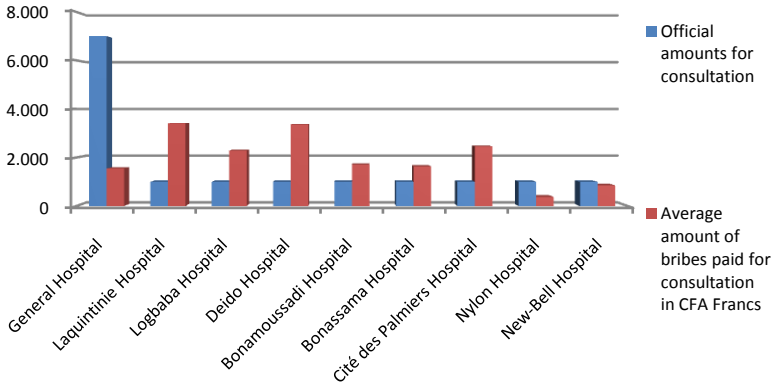

Figure 1. *The official price and the average bribe during consultation*
Source: Our surveys

It appears that the average bribe is more expensive than the official cost of consultation in all hospitals (except at the General and Nylon Hospitals). On average, the price of consultation is equal to the official price plus 2,433FCFA. According to Shleifer & Vishny (1993), corruption is more easily practiced when the head of medical care supply is in a monopoly situation. In this case, he/she determines both the quantity and the price of the good or service. The discretionary power held by the doctor allows him/her to reduce the quantity of service rendered, either by refusing to honor the appointment given to patients, or by simply refusing to serve them or even by discriminating them (and this is the most frequent case).

Characteristics of victims through discrimination

Two types of questions to be answered by *no* or *yes* were asked to users to illustrate corruption with and without theft namely: to be consulted, the patient only pays the bribe (corruption with theft)for the first case, and for the second case, the patient who wants to be consulted must pay the official fees plus the

bribe(corruption without theft). The question that arises is therefore to know the type of corruption that would most maximize the doctor's gains for different characteristics of users, given the amount of bribe paid (conditional or partial aspect of the phenomenon). The results of estimates through odds ratios presented in the tables below allowed us to have an idea of the phenomenon's magnitude, by a simple comparison of the coefficients of both forms of corruption.

Table 7. *Corruption with theft*

AMOUNTS	Gender		Income		School level		Age	
	$\hat{\theta}_{S/H}$	Confidence Interval at 95% of $\hat{\theta}_{S/H}$	$\hat{\theta}_{R/H}$	Confidence Interval at 95% of $\hat{\theta}_{R/H}$	$\hat{\theta}_{NS/H}$	Confidence Interval at 95% of $\hat{\theta}_{NS/H}$	$\hat{\theta}_{A/H}$	Confidence Interval at 95% of $\hat{\theta}_{A/H}$
< 1,000	0.66	(0.26 ; 1.62)	0.33	(0.07 ; 1.53)	0.90	(0.36 ; 2.27)	1.02	(0.34 : 3.08)
[1,000 ; 3,000[	0.47	(0.20 ; 1.09)	0.66	(0.17 ;2. 49)	1.20	(0.52; 2.76)	1.38	(0.48 ; 3.95)
[3,000 ; 5,000[	0.95	(0.40 ;2. 27)	0.58	(0.17 ; 1.93)	0.88	(0.37 ; 2.09)	0.48	(0.16 ; 1.43)
[5,000 ; 7,000[	1.89	(0.54 ; 6.61)	0.97	(0.17; 5.48)	0.70	(0.20 ;2. 49)	0.20	(0.02 ;1. 79)
Estimate with amounts not taken into account	$\hat{\theta}_S$ =0.76	(0.48 ; 1.21)	$\hat{\theta}_R$ = 0.56	(0.28 ; 1.13)	$\hat{\theta}NS$ = 0.95	(0.59 ; 1.51)	$\hat{\theta}_A$ =0.74	(0.41 ; 1.33)

Source: Results obtained from the survey data

Table 8. *Corruption without theft*

AMOUNTS	Gender		Income		School level		Age	
	$\hat{\theta}_{S/H}$	Confidence Interval at 95% of 95% de $\hat{\theta}_{S/H}$	$\hat{\theta}_{R/H}$	Confidence Interval at 95% of $\hat{\theta}_{R/H}$	$\hat{\theta}_{NS/H}$	Confidence Interval at 95% of $\hat{\theta}_{NS/H}$	$\hat{\theta}_{A/H}$	Confidence Interval at 95% of $\hat{\theta}_{A/H}$
< 1,000	0.66	(0.31 ; 1.40)	0.73	(0.27 ; 1.94)	0.51	(0.23 ; 1.13)	1.52	(0.62 : 3.72)
[1,000 ; 3,000[	1.13	(0.49 ; 2.60)	2.41	(0.51 ;11.22)	0.92	(0.39; 2.13)	1.92	(0.52 ; 7.06)
[3,000 ; 5,000[	0.91	(0.30 ; 2.75)	4.53	(0.56 ; 36.44)	1.25	(0.42 ; 3.77)	2.70	(0.57; 12.82)
[5,000 ; 7,000[	1.80	(0.44 ;7.28)	0.51	(0.08; 3.12)	0.47	(0.12 ;1.81)	1.02	(0.18 ;5.70)
Estimate with amounts not taken into account	$\hat{\theta}_S$ =0.93	(0.59 ; 1.48)	$\hat{\theta}_R$ = 1.26	(0.65 ; 2.41)	$\hat{\theta}NS$ = 0.72	(0.45 ; 1.15)	$\hat{\theta}_A$ =1.71	(0.92 ; 3.17)

Source: Results obtained from the survey data

For amounts of bribe paid less than 1,000 FCFA, we find for the gender that the men are most prone to the phenomenon with a rating of about 51% (1 / 0.66 = 1.51) higher than that of women. Thus, the State agent, whatever the form of corruption practiced, maximizes his/her gains over men to the same extent.

As far as the income characteristic is concerned, our estimates show for both forms of corruption, that the least fortunate are the most victims. However, the magnitude being more pronounced for victims of corruption with theft than for victims without theft. The medical doctor maximizes his/her gains over the least fortunate by practicing corruption with theft. It is the same thing for the education characteristic, where the least educated would be more victims with a higher scope for corruption without theft (a rating of 96% compared to 11% for the form with theft). The public official takes over his/her gains on the least educated, by practicing the form of corruption without theft. Finally as concerns age, we find that whatever the form of corruption considered, the old are most victims. The State official would maximize his/her gains much on the old by practicing corruption without theft (odd of 52% against 2% for the form with theft).

For bribe amounts between 1,000 and 3,000, the results show that for gender, it is on men that the medical doctor maximizes

much his/her gains by practicing the form of corruption with theft. On the contrary for the income characteristic, he/she would have interest to practice the form without theft on the wealthiest for whom the odds of maximizing his/her profits would be approximately 2.41 times higher. If the form with theft was practiced in this case on the least fortunate, his/her chances are rather most likely to the form with theft, and the least educated for a corruption without theft. The doctor then pulls more gains by practicing corruption with theft on the most educated on whom his/her chances of maximizing are 20% higher. The same thing goes with age where he/she would have nearly 92% more likely to maximize his/her gains on the old when practicing the form of corruption without theft.

For amounts between 3,000 and 5,000, our estimates show that the public official has interest in practicing the form without theft whatever the characteristic, compared to the coefficients obtained for the form with theft: thus, he/she would take much gain from men, the wealthier, the most educated and the old.

Finally, for amounts between 5,000 and 7,000, the agent would be interested in practicing the form with theft on women on whom his/her chances of maximizing would be 89% higher. However, he/she takes more gains rather by practicing the form without theft on the wealthiest on whom his/her chances of maximizing would be about 96% higher. This is also applied to the most educated on whom he/she would be about 2.12 times more likely. Finally, our estimates reveal at the age level that the State officer draws much his/her gains on the youth by practicing a form of corruption with theft on whom his/her chances of maximizing would be 5 times greater.

We can also get an idea of the evolution of the phenomenon when we do not take into account the different bribe amounts paid (marginal aspect of the phenomenon): In this case, we just assume the relationship between the characteristics and the form of corruption practiced. By always proceeding through comparison, we note that at the gender level, the men are most likely, whatever the form of corruption, but however, with a higher scope for the form with theft. On the contrary with income, gains are much drawn from the side of the less fortunate for a form of corruption

with theft, with maximizing odds for about 78% greater. As concerns the education characteristic, we notice as for the gender, that the State agent pulls more gains from the least educated, this whatever the form of corruption practiced, but with greater magnitude with the form without theft. Finally, the age characteristic reveals that by practicing a form without theft, the older people are the most victims.

The table below summarizes the discussion developed above. In fact, it reveals that to maximize his/her gains[4], the medical doctor takes into account not only the form of corruption, but also the users' characteristics and the levels of bribes' amounts. Thus, for bribes paid below 1,000FCFA, the doctor maximizes his/her gains on men and the less fortunate in the case of the form of corruption with theft, and in the case of the form without theft on the men, the least educated and the old. Similarly for bribes paid between 1,000 and 3,000, earnings will be maximized on men's characteristics and that of the most educated for a form of corruption with theft, and for the form without theft, on the wealthiest, the least educated and the old. We find that the public official has no interest in applying the form with theft for amounts of bribes paid between 3,000 and 5,000. It is rather on the form without theft that he/she has most income, especially from the men, the wealthiest, the most educated and the old. Finally, for bribes paid between 5,000 and 7,000, a form of corruption with theft are practiced on women and the youth for a maximization of gains on one hand, and on the wealthiest and the most educated for the form without theft the other.

[4]We are talking about maximizing gains rather than profit because in this case, we are noting possession of the cost function of the medical doctor providing the service.

Table 9. *Characteristics to consider in the maximization of gains by the agent with regard to the corruption form*

amount of bribe	Gender	Income	Education	Age
< 1,000	*Men*	Corruption with theft *The least fortunate* Corruption without theft		
[1,000-3,000[	*Men*		*The least educated*	*The Old*
	Men	Corruption with theft	*The most educated*	
		Corruption without theft *The wealthiest*	*The least educated*	*The Old*
[3,000-5,000[		Corruption with theft		
		Corruption without theft		
[5,000-7,000[	*Men*	*The wealthiest*	*The most educated*	*The Old*
	Women	Corruption with theft		*The Younger*
		Corruption without theft *The wealthiest*	*The most educated*	

Source: Results obtained from the survey data

Conclusion

The aim of this study was to highlight the maximization of bribes collected by the State agent from patients in public hospitals in the city of Douala, Cameroon, taking into account the characteristics of the users as well as the different amounts of bribes paid. The results obtained on users of nine public hospitals in the city of Douala reveals that unlike the simple monopoly used by Shleifer & Vishny (1993) and whatever the form of corruption practiced (with or without theft), the State agent plays on the individuals' characteristics (discrimination at the first degree) and the levels of bribes' amounts paid to maximize his/her gains. For instance, for bribe payments between 1,000 and 3,000, the results indicate that the gains will be maximized on men, the most educated for the form of corruption with theft on one hand, and on the wealthiest, the least educated and the old for the form without theft on the other. However, for amounts of bribes paid between 3,000 and 5,000, our results show that the State agent would be interested in practicing only the form without theft for all the characteristics which he/she would draw the greatest possible gain. In maximizing gains, the 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. The State agent can also maximize its gains by segmenting markets, i.e. divert some users by sending them to seek medical care in private health facilities. This is another form of discrimination (discrimination at the third degree) not considered in this study. Future researches could be guided towards this direction.

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

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 (Bearse, 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 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 shows 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 maximizes 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), it discussion this before concluding the study.

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 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:

[1]In 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

$$T(w) = A + pw \quad (1)$$

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:

$$\begin{cases} T(w) = A_i + Pw & w \neq 0 \\ T(0) = 0 & otherwise \end{cases} \quad (2)$$

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:

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

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 contraints

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

With $T(w_i) = a_i + p_i w_i$

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

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

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 apart 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.

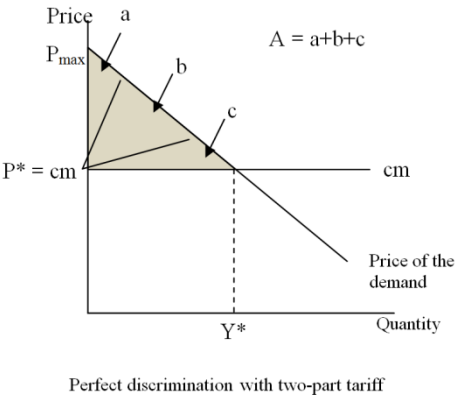

Figure 1. *Corruption without theft*

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:

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

$$\Leftrightarrow P_i D_i(P_i) - cm D_i(P_i) = D_i(P_i) \qquad (11)$$

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

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

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

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

$\frac{p_i - cm}{p_i} = \frac{1}{\varepsilon_p}$ 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, $p_i \succ cm$ .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,ε> 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, ε< 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.

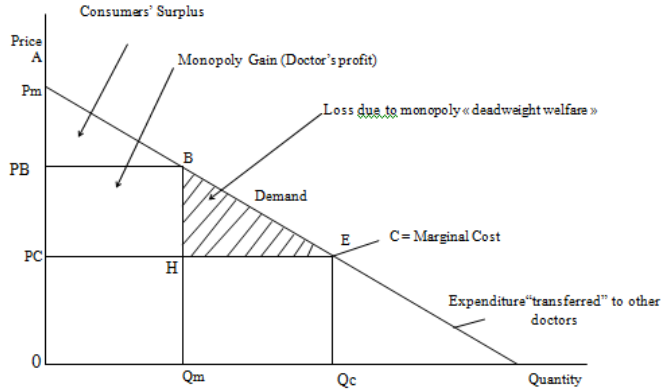

Figure 2. *Corruption with theft*

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 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).

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, 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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4 Bribery in Cameroonian public hospitals: Who pays and how much?

Introduction

The empirical literature on corruption has identified the causes and consequences of the phenomenon in the health sector in many countries. Gupta *et al.* (2002) established from a study based on 71 countries, that the countries highly affected by corruption showed the highest infant mortality rates than others, even after adjustment based on income, girls' schooling, health spending and urbanization. Mauro (2002) showed that corrupt countries spend less on education and health. In the same vein, Lavallee *et al.* (2010) highlighted in a study of 18 countries that corruption would lead to a reduction of public expenses in health, education and social protection sectors.

The works of this literature are important because they have led to a better understanding of corruption in the health sector and, consequently, to the proposal of relevant measures against the phenomenon. For instance, there is evidence that by increasing the transparency and obligation to give account in public health services, the level of corruption will decrease (Vian, 2008). However, these works have at least one shortcoming because they do not inform us about the corrupt

exchanges practiced between caregivers and patients. Indeed, these works explore the Transparency International corruption indexes (TI), those of the Political Risk Services / International Country Risk Guide (PRS / ICRG) and those of the World Wide Governance Indicators (W.W.G.I) of the World Bank, which derived from the surveys made from investors plying the world's countries, but who are not in touch with health care personnel in public hospitals of those countries.

Yet, in recent years, the availability of microeconomic data (from companies and households) on corruption provides the opportunity to better understand the causes and consequences of the phenomenon. However, up to date, and despite a recent commitment, microeconomic studies on this topic remain limited, and confined to certain geographical areas such as the Eastern Europe (Balabanova & McKee, 2002; Lewis, 2002) and Latin America (Hunt, 2004; Hunt & Lazlo, 2005; Seligson, 2006). Although Africa is one of the world's areas where corruption is very acute, very few microeconomic studies on this phenomenon are devoted to this continent. Certainly, thanks to the Afro-barometer project based on surveys of households conducted in 18 countries in Sub-Saharan Africa, works on this theme have being multiplied. These works relate in particular to the relationship between corruption and trust, or satisfaction in public institutions (Bratton, 2007; Cho & Kirwin, 2007; Lavallee *et al.*, 2010). But this project has at least one gap. It omits some African countries, which however, are sometimes classified among the most corrupt countries of the world. It is the case of Cameroon which ranked first of corrupt countries successively in 1998 and 1999.

In Cameroon, the National Institute of Statistics (Institut National De La Statistique, 2011) studied, from a survey of households in 2007, corrupt practices in the health sector. This study is important because it helps to know that annually, each patient pays an average bribe amounting to 1,089 CFA Francs for consultation and medical care. But it is limited insofar as it does not inform us neither on socio-demographic characteristics (age, education, gender, income) of such a patient, nor about different amounts of bribe he/she pays. The purpose of this study is therefore to fill this gap, as part of a field survey conducted among 407 patients in public hospitals of the city of Douala in

Cameroon. According to this survey, the majority of bribes paid during consultation is between 1,000 CFA Francs and 3,000F CFA, amounts representing respectively the bribes corresponding to the 25th and the 75th percentile of the amounts paid. This interval which represents not only the modal class, but also the median and the mean class, was used as reference to highlight the characteristics of individuals who pay bribes not only in amounts below and above these percentiles, but also those in this interval.

In general, the theoretical literature suggests that holders of low incomes, young people and women are respectively less exposed to corrupt practices than holders of higher incomes, older people and men (Lavallee *et al.*, 2010). However, the results obtained in this study rather discuss those presented by the theoretical literature because by setting the amounts of bribes paid below or beyond the above mentioned percentiles, individuals' characteristics vary depending on the set percentile. Thus, if for example we take income into account, theoretical expectations are more or less verified by our results, insofar as when the bribe amount is set beyond the 75th percentile, holders of 250,000 CFA Francs income and less, will tend to pay more bribes to a certain amount (under 1,000 CFA Francs) than those with a higher income of 250,000 CFA Francs; on the contrary, if the amount of bribe paid is set beyond the 25th percentile, it is rather the holders of income of more than 250,000 CFA Francs who will tend to pay bribes of a different amount (less than 3,000 CFA Francs). In principle, it was expected that the same trend be observed regardless of the amount of bribe paid, which unfortunately is not the case.

The purpose of such a study therefore lies in the fact that not only it allows to identify the profile of those most exposed to the phenomenon, but also, it constitutes a basis for the proposal of the most appropriate anti-corruption measures. Because of the secret nature of corruption (Shleifer & Vishny, 1993) many researchers discuss the characteristics of people who are often victims of the phenomenon without mentioning the amounts. On the contrary, this study presents, analyzes and discusses these amounts. The inclusion of the latter is particularly important as in some countries, they are socially acceptable and justified as a way

to compensate public health professionals who are poorly paid, or it is an understandable reaction from people who might have an urgent need of health care (Savedoff & Hussmann, 2006).

The second section briefly presents the Cameroonian health system while highlighting the causes and corrupt practices. The implemented methodology and the description of characteristics of the sample used form the basis of part three. As for Section four, its models while considering the characteristics of patients victims of the phenomenon. The results of different estimates obtained are discussed in section five, and section six concludes the presentation.

Health, health care and corruption in Cameroonian hospitals

Health and health care

During the last two decades, Cameroonian populations have made some progress in the evolution of their health status as shown by some indicators, including the infant mortality rate(IMR), the neonatal mortality rate(NMR) and the juvenile mortality rate (JMR) shown in the Table below.

Table 1. *Douala Health indicators (1990-2011)*

		1991	1998	2004	2011	2015
Neonatal mortality rate(per 1,000births)	Cameroon	33,1	37,2	29	31	
	Douala	36	28,3	30	33	
	Rural zone	42,9	44,3	37	35	
Infant mortality rate(per 1,000births)	Cameroon	65	77,0	74	62	75,6
	Douala	67,2	51,5	55	54	
	Rural zone	86,1	86,9	91	77	
Juvenile mortality rate(per 1,000births)	Cameroon	65,6	79,9	75	63	
	Douala	38,6	41,9	40	23	
	Rural zone	79,7	80,2	85	82	
Maternal mortality rate(100,000 births)	Cameroon	454	430	669	782	344

In this table, the neonatal mortality rate as well as the infant mortality rate has dropped from 1991 to 2011 respectively from 36 to 33 per thousand, and from 38.6 to 23 per thousand for the city of Douala. At the same time, the neonatal mortality rate has dropped from 36 per thousand to 33 per thousand. In the whole country, these rates decreased from 33.1 to 31 between 1991 and

2011 for the neonatal mortality rate, and from 65 to 62 during the same period for the infant mortality rate. These improvements, however, are still insufficient, due in part to malfunctions of the offer of services in public hospitals.

In Cameroon, the health sector comprises three sub-sectors: the public, the private and the traditional. In general, the public sub-sector is the most important because not only it is the major provider of medical services, but in addition, it regulates all activities related to it. Unfortunately, this sub-sector does not have sufficient human and material resources to meet the demand for care. For instance, as far the personnel is concerned, public hospitals in Douala have an average of eight medical doctors for a population of 159,211 inhabitants, that is, 19,901 inhabitants per doctor (Institut National De La Statistique, 2010). The WHO's (World Health Organization) standard is one medical doctor per 10,000 inhabitants. Compared to this standard, every doctor is required to accommodate on average a surplus of 4,211 patients. These doctors are therefore overworked. Moreover, in early 1990, civil servants' salaries, including those of health workers, have been reduced by over 50%. Wage increases of about 5%, 15% and 5% made meanwhile did not allow these workers to recover their former purchasing power. Impoverished employees have therefore turned to the corrupt maneuvers to try to improve their living conditions.

Thus, following the Bamako Initiative, the government adopted a new policy based on the decentralization of service delivery, focusing on primary health care and the participation of beneficiary communities to the financing and management of public health services establishments, given the virtual absence of health insurance. Since then, households must pay for the services officially offered to them in public hospitals. To these official payments are added some irregular payments.

Corruption in health services

Access to basic social services including health is a constant concern for the Cameroonian public authorities. But the efforts that they are making, with the support of development partners to facilitate access to these services, are unfortunately affected by corruption. Indeed, after ECAM3, nearly 85% of households' heads living in urban and semi-urban areas feel that the level of

corruption in the health sector is high in this country. But the magnitude of the phenomenon varies from one region to another (69.8% to 61.1% in Douala and Yaoundé). For example, during consultation, corruption occurs mainly through the payment of non-regulatory fees and through the interventions of personalities to be quickly served and avoid waiting for a long time (INS, 2011). Patients in public hospitals also complain of the unavailability of medical doctors. This unavailability can be explained by the fact that private health facilities that accompany the government in the offer of health services to populations mostly have as promoters, medical doctors working in the public sector. Many patients who visit public health facilities are oriented by these doctors to their private health centers for their medical care.

Therefore, being interviewed on their perception of the level of corruption in the health sector as parts of the households' survey in 2007, almost six out of ten households in the city of Douala believe it is high. This reflects a general malaise. As a matter of fact, if access to basic social services including health is a constant concern for public authorities, corruption in the health sector is like a gangrene which tends to negate the efforts made by the State (INS, 2011).

Methodology and descriptive statistics

To highlight the characteristics of patients who pay bribes during consultation in the Douala public hospitals, we initially determined the sample's size of individuals to interview and then, through odds ratios, we established a typology of patients' characteristics whose bribe amounts are below and above the 25th and 75th percentiles, given that each of the percentiles was previously set. A typology of patients' characteristics whose bribe amounts are inside the modal class, that's to say, between the 25th and 75th percentile, given the socio-professional category of the victim, has also been highlighted.

Determining the sample

As we were unable to determine an approximate P value through a prior survey (because to our knowledge, no investigation about corruption in public hospitals has yet been carried out in Cameroon), that is to say, the proportion of

respondents in the context of a preliminary study, we set P to 0.5, this value representing the worst case, that is to say, the value which gives the greatest possible standard deviation for the sampling distribution of P. In this case, the required sample size to ensure a margin error E (in absolute value) not exceeding 5% with a confidence level of 95% will be about (Baillargeon, 1989):

$$n = \frac{Z^2_{\alpha/2}(0,5)(0,5)}{E^2} = \frac{Z^2_{\alpha/2}}{4E^2} = \frac{(1,96)^2}{4(0,05)^2} \approx 384.$$

E: the error margin; Z: the standard normal distribution; P: The estimator of P in the preliminary study. The distribution of the number of individuals to be interviewed is done from the number of medical and paramedical staff in each hospital selected as shown in the table below:

Table 2. *The distribution of the number of patients to be interviewed by hospital*

Hospital	Staff Number	Importance of the hospital (in %)	Number of patients to be interviewed
Laquintinie	630	41	157
General	326	21	81
New-Bell	113	7	27
Bonassama	103	7	25
Cite des Palmiers	100	6	25
Deido	84	5	21
Logbaba	80	5	20
Nylon	62	4	15
Bonamoussadi	57	4	14
Total	1 555	100	384

Source: Our estimates based on information collected at the Regional Health Delegation of Littoral on the number of hospitals

The first column describes the type of hospital, the second column the total number of medical and paramedical staff, the third indicates the weight or importance of the personnel of each hospital as compared to the staff of all the hospitals in general, and the last column, the approximate number of people who should be interviewed by hospital, based on the weight of each hospital. We came up with a total of 384 interviewees. For prudence sake, we distributed 415 questionnaires with the assumption that all incorrectly completed questionnaires would

be eliminated, this to help approximately achieve the sample's size. Thus, 407 questionnaires were filled out correctly and therefore validated. It is on the basis of these 407 questionnaires that the analysis was performed.

Some descriptive statistics

Following the questioning of 407 patients, we obtained by hospital the average amounts of bribe, as well as the prevalence rates of the phenomenon.

Characteristics of the sample

The table below specifies the characteristics of the patients' sample: age, school level (education), income, marital and employment status (Yamb & Bayemi, 2015):

Regarding the age characteristic, it has been split into two categories: young people between 20 and 40 years old and the old over forty years old. This nomenclature at the age level reflects the country's socio-economic situation as concerns employment insofar as four years ago, authorities launched a recruitment campaign in the public sector for the youth (25,000 in total), thus considering as young any person aged forty and less. The income characteristic also obeys to this dualistic nomenclature, that is, those with an income of 250, 000 CFA Francs and less, and those who earn more than 250,000 CFA Francs. This classification took into account the socio-economic characteristics of the respondents. This choice is justified by the fact that initially, we considered four classes of income namely less than 75,000, between 75,000 and 150,000, from 150, 000 to 250,000 and the class of more than 250,000. It is worth mentioning that among the 407 respondents, almost 83% have an income of 250,000 and less, and only about17% earn more than 250,000. This latter percentage represents the senior staffs in companies and businessmen/ contractors, who are considered in the Cameroonian environment as people belonging to the richest social class. 80% of the first mentioned earn more than 250 thousands CFA Francs, and nearly 50% of the second category as much, hence the justification for the classification in terms of income distribution in the two categories, that is, 250,000 and under, and above 250,000. This is also applied to the education variable where two

categories were retained: higher level and no higher level.

Table 3. *The characteristics of patients' sample*

	Male	Female	Total	% Male	% Female	Total %
Age						
40 years old and Less	134	190	324	41,4	58,6	100
More than 40 years old	52	31	83	62,7	37,3	100
Education						
Primary and secondary Education	97	145	242	40,1	59,2	100
Higher Education	89	76	165	53,9	46,1	100
Average monthly Income						
Less than 75, 000 CFA Francs	78	106	184	42,4	57,6	100
Between 75,000 and 150, 000	48	52	100	48	52	100
Between 150,000 and 250, 000	26	28	54	48	52	100
More than 250,000	35	34	69	50,7	49,3	100
Matrimonial Status						
Married	72	99	171	42,1	57,9	100
Single	74	82	156	47,4	52,6	100
Divorced	10	9	19	52,6	47,4	100
Other	30	31	61	49,2	50,8	100
Socio-professional Category						
Senior staff	17	7	24	70,8	29,2	100
Control Agent	21	14	35	60	40	100
Enforcement officer	22	15	37	59,5	40,5	100
Contractor (Business man)	25	4	29	86,2	13,8	100
House Wives		55	55		100	100
Trader	25	42	67	37,3	62,7	100
Unemployed	30	29	59	50,8	49,2	100
Others (informal)	46	55	101	45,5	54,5	100
Total	186	221	407	45,7	54,3	100

Average amount of bribes paid during consultation in public hospitals

The diagram and table below show for each hospital the real cost for consultation, taking into account the bribe paid by the patient. In general, in each hospital, corruption makes more expensive the consultation cost of a patient as indicated in the graph and table below:

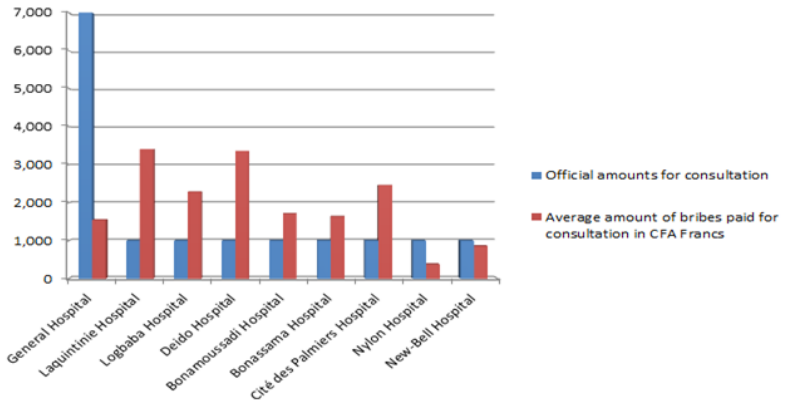

Figure 1. *Comparison between the official price and the average bribe during consultation*

Table 4. *Average Bribe*

List of Hospitals	Official amounts for consultation	Average amount of bribes paid for consultation in CFA Francs	Real total amount for consultation
General Hospital	7 000	1548	8 548
Laquintinie Hospital	1 000	3411	4 411
Logbaba Hospital	1 000	2286	3 286
Deido Hospital	1 000	3363	3363
Bonamoussadi Hospital	1 000	1714	2 714
Bonassama Hospital	1 000	1636	2 636
Cité des Palmiers Hospital	1 000	2460	3 460
Nylon Hospital	1 000	375	1 375
New-Bell Hospital	1 000	857	1857

Source: Hospitals Survey and authors' calculations

We also identified for all hospitals in general some statistics (percentile and mode), useful in determining the characteristics of those who pay amounts of bribe. We use the table below to determine these measures:

Table 5. *Amount of bribes paid (in CFA Francs) per scale*

Amount of bribes	Classes	Frequency	Percentage
0 to 1,000	1	122	30.0
1,000 to 3,000	2	128	31.4
3,000 to 5,000	3	102	25.1
5,000 to 7,000	4	55	13.51
Total		407	100.0

This table shows the proportion of patients who pay bribes depending on amounts. It shows that the amounts mostly paid are in class 1 and 2 (below 1,000 and between 1,000 and 3,000). Class 4 meanwhile shows the proportion of the least bribe paid. From the above table, the following statistics were obtained:

Table 6. *Some descriptive statistics on amounts of bribe paid (in CFA Francs)*

Characteristics		Values	Rounded Values
Mean		2442	2500
Asymmetry Coefficient (Skewness)		0.335	0.335
Kurtosis coefficient		-0.986	-0.986
Mode		1936.29	2000
Percentiles	25	834	1000
	50	2300	2500
	75	3083.33	3000

This table shows the calculated real values and the rounded values. To simplify the presentation, we have rather considered the last, insofar as they more reflect the reality of the amounts of bribe paid which are usually whole numbers (round), not followed by pennies. Considering for example the mean bribe, we have put it to 2,500 instead of 2,442. (In fact, it will be easier in practice for a patient to pay an amount of 2,500 instead of 2,442).

Bribes corresponding to the 25th and 75th percentiles were selected as reference in our analyzes since Class 2, that is, 1,000 to 3,000 that contains these percentiles, is also the modal, the mean and the median class; in other words, the mean (2,442), the median (2,300) and the mode (1939.29) are in this class. It therefore appears that 2,000 would be nearly the amount of bribe paid the most by patients, and with a positive asymmetry coefficient (0.335), it appears that the majority of bribes paid tend to larger amounts as compared to the mean of bribes.

Prevalence rates during consultation

The questionnaire on corruption allowed us to collect information on the phenomenon. However, it was not about corruption itself, but about opinions the actors expressed as far as this scourge is concerned. To achieve this goal, the questionnaire was administered to patients outside the hospital, so that they are not influenced by hospital staff considered as their 'executioners'. We asked each respondent's opinion regarding

the affirmation that corruption is practiced in the consultation service of the public hospital he/she frequents most. To achieve this goal, we used a Likert scale that allowed respondents to have five response options namely, not at all agree, disagree, indifferent, agree, and strongly agree. It was for the concerned to choose the option that best describes their feelings about the following statement: *"The patient who wants to be consulted must pay the official fees plus the bribe."* The choice of the last two options simply means that for the patient, corruption is practiced during consultation insofar as medical doctors abusively use the public responsibility entrusted to them to push their patients to corrupt. We subsequently assigned to each of the response options of this scale, a score n_i which indicates the level of corruption. The n_i varies from 1 to 5. For instance, if i = 1, the level of corruption is $n_i = n_1 = 1$. This is the lowest score corresponding to the view that the respondent does not agree at all that corruption is practiced in the consulting service of the hospital that he/she frequents the most. On the contrary, if i equals to 5, the level of corruption is $n_i = n_5 = 5$. This is the highest score corresponding to the view that the respondent all agrees that corruption is practiced in the hospital he/she frequents the most. On this scale, when we go from $n_i = 1$ to $n_5 = 5$, the level of corruption increases. At the end of the survey, we counted the number (*fi*) of respondents who chose the level of corruption ni (i = 4; 5) relative to each hospital. The prevalence of corruption during consultation and by hospital was therefore determined as follows: $\sum_{i=4}^{5} fini$ the following table showing the prevalence rates for each hospital.

Table 7. *Prevalence rates (in %) during consultation*

HOPITALS LIST	Prevalence Rate (in %) during consultation
General Hospital	20.5
Laquintinie Hospital	76.5
Logbaba Hospital	19
Deido Hospital	81.8
Bonamoussadi Hospital	64.3
Bonassama Hospital	42.4
Cité des Palmiers Hospital	52
Nylon Hospital	12.5
New-Bell Hospital	39.3
Hospitals Average	45.36

Statistical estimate of patients' characteristics victims of the phenomenon

We will highlight the characteristics of patients' victims of corruption during consultation through an estimate by odds ratios, while identifying the bribe amounts paid by the same patients. The age, income, educational level and gender variables were selected for the occasion. The estimate through odds ratios were apprehended by the construction of the following 2x2x2[8] contingency table, this for each of the characteristics studied.

Table 8. *Contingency table of 2*2*2 dimension*

Setting amounts below and above the percentile *i*	Variation of amounts below and beyond the percentile *j*	Patients' Characteristics	
		C_1	C_2
$<C_i$	$<C_j$	N_{11}	N_{12}
	$>C_j$	N_{21}	N_{22}
$>Ci$	$<C_j$	N_{11}	N_{12}
	$>C_j$	N_{21}	N_{22}

N_{11} and N_{21} represent respectively the number of people of modality1 (C_1) of characteristic C, which bribe amounts paid vary above and below the percentile *j* respectively, given that the amounts were set below and above the percentile *i*. The same interpretation can be applied for modality 2 (C_2) for the numbers N_{12} and N_{22}. These different joint distributions N_{ij} were used to calculate the following conditional (partial) odds ratios:

$$\theta_{ij/c_i} = \frac{N_{11}N_{22}}{N_{12}N_{21}} \qquad (2)$$

Each of the different contingency tables of dimension 2x2 obtained when the amounts of bribe paid are set below and beyond the percentile i, contains the different features identified above, and divided into two terms as previously explained namely: age (40 and under and over 40 years), income (250,000 and under and over 250,000), educational level (not higher and higher), gender (male and female). The estimates $\theta_{ij/ci}$ with their

confidence intervals are found in Tables 9 and 10 below.

Highlighting the characteristics of individuals for different amounts of bribe paid was made by setting one of the corresponding bribe amounts either to the 25th percentile or to the 75th percentile (which corresponds to the first and third quartile respectively), while varying the other based on different characteristics: in each of the situations studied, one of the quartiles is regarded as a control variable, and the other as a variable able to explain the characteristics of patients for the different amounts of bribe paid. Thus, if we set for instance the third quartile which is 3,000, this will lead us to study the characteristics of patients for the amounts of bribe paid, that are above and below this quartile (<3,000 or > 3,000), for amounts of bribe paid which are higher or lower to those corresponding to the first quartile.

However, we note that the study of patients' features only makes sense for bribes set lower to the third quartile $[0;Q_3[$. This interval includes the amounts of bribe paid between the first and the third quartile $]Q_1;Q_3[$, and those below the first quartile $[0;Q_1[$.

For bribes above this amount (third quartile), the relationships studied will have no meaning insofar as variations related to the first quartile (< 1,000 and > 1,000) which are supposed to explain the characteristics of individuals , given the amount set beyond the third quartile, do not belong to the interval which corresponds to amounts above

3,000. On the contrary, these variations belong to the interval for bribes paid which are set below 3,000 as shown in the diagram below.

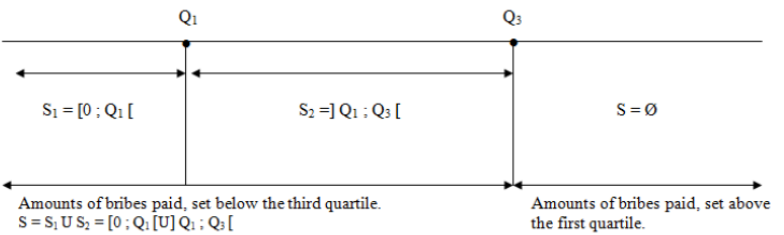

Figure 1.

Also, for bribes set higher or lower to the first quartile, the field of study is valid only for bribes paid, only set above the first quartile: these bribes allow us to highlight the characteristics of

individuals based on changes of bribes paid below or above the third quartile (<3,000> 3,000), the latter belonging to the study field.

Thus, for bribes set above the first quartile $]Q_1; \infty[$, the study is carried out on bribes paid between the first and the third quartile $]Q_1;Q_3[$ on the one hand, and on bribes paid above the third quartile $]Q_3; \infty[$ belonging respectively to the interval of the study on the other. However, bribes paid set inferior to the first quartile cannot be taken into account insofar as this interval $[0;Q_1[$ does not contain the amounts of bribe above or below the third quartile, and which may explain the characteristics of patients. The diagram below well illustrates these different variations.

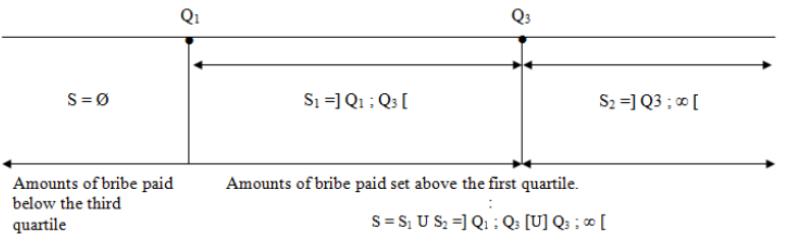

Figure 1.

Tables 9 and 10 below respectively study the characteristics of patients victims of corruption during consultation for bribes paid set below and beyond the 75th and 25th percentiles respectively, this for amounts of bribe higher or lower to those corresponding to the 25th percentile on the one hand, and to the 75th percentile on the other.

Table 9. *Estimate of individuals' characteristics for amounts of bribe below the 75th percentile*

Amounts of bribe paid set below the 75th percentile for bribes paid higher or lower than those corresponding to the 25th percentile	Sex		Income		School Level		Age	
	$\hat{\theta}_{SD/M}$	Confidence Interval to 95% of $\hat{\theta}_{SD/M}$	$\hat{\theta}_{RD/M}$	Confidence Interval to 95% of $\hat{\theta}_{RD/M}$	$\hat{\theta}_{ND/M}$	Confidence Interval to 95% of $\hat{\theta}_{ND/M}$	$\hat{\theta}_{AD/M}$	Confidence Interval to 95% of $\hat{\theta}_{AD/M}$
Less than 1,000	120.43	(7.28 ; 1990)	235.25	(14.44 ; 3830)	175.9	(10.43 ; 2885)	218.99	(13.43 :3569)
Above 1,000	0,008		0.0042		0.0056		0.004	
Estimate disregarding the amounts of bribe paid below or above the 75th percentile	$\hat{\theta}_{SD}$ =148.76	(20.55 ; 1076)	$\hat{\theta}_{RD}$ = 162.75	(21.46; 1234.2)	$\hat{\theta}_{ND}$ =151.28	(20.82;1099)	$\hat{\theta}_{AD}$ =162.54	(21.44; 1232.3)

Source: Our estimates from the survey data

Table 10. *Estimate of individuals' characteristics for bribe amounts above the 25th percentile*

Amounts of bribe paid set beyond the 25th percentile for bribes paid higher or lower than those corresponding to the 75th percentile	Sex		Income		School Level		Age	
	$\hat{\theta}_{SD/M}$	Confidence Interval to 95% of $\hat{\theta}_{SD/M}$	$\hat{\theta}_{RD/M}$	Confidence Interval to 95% of $\hat{\theta}_{RD/M}$	$\hat{\theta}_{ND/M}$	Confidence Interval to 95% of $\hat{\theta}_{ND/M}$	$\hat{\theta}_{AD/M}$	Confidence Interval to 95% of $\hat{\theta}_{AD/M}$
Less than 3,000	1.36	(0.02; 69.46)	0.20	(0.004 ; 10.46)	0.71	(0.01 ; 36.54)	0.31	(0.006 :16.08)
Above 3,000	0.73		5		1.40		3.22	
Estimate disregarding amounts of bribe paid below or above the amount of the 25th percentile	$\hat{\theta}_{SD}$ =0.91	(0.55 ; 1.48)	$\hat{\theta}_{RD}$ = 0.65	(0.33 ; 1.27)	$\hat{\theta}_{ND}$ =0.99	(0.60;1.63)	$\hat{\theta}_{AD}$ =0.75	(0.40;1.41)

Source: Our estimates from the survey data

In Table 9 we find that for bribe amounts set below the 75th percentile, the odds of men are about 120 times higher than that of women, to pay amounts less than 1,000 CFA Francs, instead of paying amounts over 1,000 CFA Francs. This is also true for people with an income of 250,000 CFA Francs and less (their odds are about 235 times higher to pay less than 1,000 CFA Francs instead of paying more than 1, 000 CFA Francs, compared to those with an income of more than 250,000 CFA Francs). People without a university level and the young also fall within this category, with odds of about 176 and 219 times higher than those with a university level, and the less young respectively. An estimate without taking into account the amounts of bribe paid set below or above the 75th percentile confirms the above interpretation. In fact, conditional (partial) odds ratios move in the same direction as the marginal odds ratios, and this, whatever the characteristic studied. The table below summarizes the characteristics of patients based on amounts of bribe paid set below the 75th percentile, for bribes paid higher or lower than those corresponding to the 25th percentile.

Table 11. *Characteristics of patients for amounts of bribe paid during consultation, set below the75th percentile*

Amount of bribe paid	Sex Male (M_1) Female (F)	Income 250,000 and less (M_2) above 250,000 (P_1)	School Level Not superior (P_2) Superior (S)	Age 40 years and less (M_3) Above 40 years (P_3)
Less than 1,000 CFA Francs	M_1	M_2	P_2	M_3
Above 1,000 CFA Francs	F	P_1	S	P_3
Estimate independently of amounts of bribe paid set (<3,000 or >3,000)	M_1	M_2	P_2	M_3

This table presents and summarizes the profile of patients who pay amounts of bribe below or above 1,000 CFA Francs, knowing that the amounts of bribe studied are those below 3,000, while also bringing out the profile of patients when amounts of bribe paid, set below and above 3,000 CFA Francs, are not taken into account.

In table 10 our estimates show that for the amounts of bribe set above the 25th percentile, the odds of men are about 1.36 times higher than that of women, to pay amounts less than 3,000 CFA Francs instead of paying amounts over 3,000 CFA Francs. On the contrary, for those with less income, their rating is about 5 times higher than those with higher income, to pay amounts of more than 3,000 than less than 3,000. It is the same for those who do not have a higher Education level who are about 1.4 times more likely, than those who have to pay amounts over 3,000 than less than 3,000. The less young fall into this category where the trend is to pay amounts over 3,000 than less than 3,000. Their odds are about 3.22 times higher than that of the younger.

However, our estimates show that if we do not take into account the amounts of bribe paid set above the 25th percentile, women tend more to pay amounts less than 3,000 than those over 3,000 as compared to men. As far as income is concerned, we have the same pattern as when the amounts of bribe paid are set beyond the 25th percentile, that is, those with lower income will tend to pay amounts of more than 3,000 than amounts less than 3,000. At the school level, with an odds ratio substantially equal to 1, we conclude that whatever the school level, the levels of bribe paid hardly differ from one category to another. Finally, concerning age, results also confirm the trend that when bribes are set beyond the 25th percentile, young people have a higher rating than older people to pay amounts of more than 3,000, than less than 3,000. The following table summarizes the profiles of one another, for amounts of bribe paid below or above the 75th percentile, as the studied bribe amounts are those above the 25th percentile.

Table 12. *Characteristics of patients for amounts of bribe set above the 25th percentile during consultation*

Amount of bribe paid	Sex Male (M_1) Female (F)	Income 250,000 and less (M_2) above 250,000 (P_1)	School Level Not superior (P_2) Superior (S)	Age 40 years and less (M_3) Above 40 years (P_3)
Less than 3,000 CFA Francs	M_1	P_1	P_2	P_3
Above 3 ,000 CFA Francs	F	M_2	P_2	M_3
Estimate independently of amounts of bribe paid set (<1,000 or >1,000)	F	P_1	Set P_2	M_3

Sources: Our conception from data in table 10.

As previously stated, this table presents the profile of patients who pay amounts of bribe below or above 3,000 CFA Francs, knowing that the amounts of bribe paid are those set above 1,000. It also presents the profile of patients when amounts of bribes paid set below and above 1,000CFA Francs are not taken into account. The table below summarizes while comparing the two eventualities of tables 9 and 10.

Table 13. *Summary of Tables 11 and12 and profiles comparison*

	Bribes paid set below the 75th percentile (<3,000)		Bribes paid set above the 25th percentile (>1,000)	
Characteristics	Less than 1,000	Above 1,000	Less than 3,000	Above 3,000
Sex	M_1	F	M_1	F
Income	M_2	P_1	P_1	M_2
School level	P_2	S	S	P_2
Age	M_3	P_3	P_2	M_3
Estimate with no consideration of set bribes paid				
	Not taking into account the bribes paid set below and above the 75th percentile (<3,000> 3,000)		Not taking into account the bribes paid set Beyond and below the 25th percentile (> 1,000 <1,000)	
Characteristics	Less than 1,000	Above 1,000	Less than 3,000	Above 3,000
Sex	M_1	F	M_1	F
Income	M_2	P_1	P_1	M_2
School level	P_2	S	S et P_2	S et P_2
Age	M_3	P_3	P_3	M_3

Sources: Our conception from data in table 11 and 12.

Discussion

The previous analysis on the characteristics of individuals, victims of the phenomenon, implies the assumption that one of the percentiles is set, and the other varies according to the different characteristics selected. In reality, bribes are paid simultaneously below the 75th and above the 25th percentile. This approach allows

us to consider much the payment zone between the two percentiles (modal class), where the majority of the amounts paid is located. This brings us to refine the profiles of individuals, victims of the phenomenon, by detecting at the level of the modal class, the dominant modality of the characteristic victim of the phenomenon, given its socio-professional status.

As far as gender is concerned, when bribes are simultaneously set below and above the afore mentioned percentiles, we notice that men pay more bribes below the 25th percentile, and women beyond this percentile. It is therefore established that compared to men, women are more representative of the modal class. This contradicts the idea that women are less prone to corruption compared to men (Lavallee *et al.*, 2010) and confirms the theory that women are more affected by the phenomenon due to their more specialized and frequent health service needs (UNDP, 2011). Similarly, for the income characteristic, when bribes are simultaneously set below and above the 75th and the 25th percentiles, individuals with incomes of 250,000 and less are more likely to pay bribes under 1,000 CFA Francs and over 3,000 CFA Francs respectively, none of these amounts being part of the modal class; On the contrary, holders of an income of more than 250,000 tend to pay more bribes of more than 1,000 CFA Francs, and bribes under 3,000 CFA Francs. This last modality is therefore more representative of the modal class than the first. Holding the same reasoning for the age and school level characteristics, it became clear that the older and the more educated appear as representative modalities of the modal class. The table below presents for each representative category of the modal class, the corresponding socio-professional status.

Table 14. *Number and patients' profiles who pay amounts of bribe corresponding to the modal class given their socio-professional category*

Characteristics / Socio-professionnal Category	Sex			Income			Age			School level		
	Female	Male	Total	250,000 and less	above 250,000	Total	40 years and less	Above 40 years	Total	Not Superior	Superior	Total
Senior staffs	**4 (80%)**	1 (20%)	5 (100%)	2(40%)	**3(60%)**	5(100%)	2(40%)	**3(60%)**	5(100%)	0	**5(100%)**	5(100%)
Control Agents	1(12 .5%)	7 (87.5%)	8 (100%)	7(87.5%)	1(12.5%)	8(100%)	8(100%)	0	8(100%)	0	8(100%)	8(100%)
Enforcement officers	5 (33.3%)	10(67.7%)	15(100%)	15(100%)	0(0%)	15(100%)	14(93.3%)	1(6.7%)	15(100%)	9(60%)	6(40%)	15(100%)
Businessmen / contractors	2(16.7%)	10(83.3%)	12(100%)	6(50%)	6(50%)	12(100%)	7(58.3%)	5(41.7%)	12(100%)	7(58.3%)	5(41.7%)	12(100%)
Housewives	18(100%)		18(100%)	14(78.8%)	4(22.2%)	18(100%)	16(88.9%)	2(11.1%)	18(100%)	17(94.4%)	1(5.6%)	18(100%)
Sellers	17(68%)	8(32%)	25(100%)	24(96%)	1(4%)	25(100%)	19(76%)	6(24%)	25(100%)	22(88%)	3(12%)	25(100%)
Unemployed	7(41.2%)	10(58.8%)	17(100%)	16(94.1%)	1(5.9%)	17(100%)	16(94.1%)	1(5.9%)	17(100%)	10(58.8%)	7(41.2%)	17(100%)
Others	11(39.3%)	17(60.7%)	28(100%)	27(96.4%)	1(3.6%)	28(100%)	25(89.3%)	3(10.7%)	28(100%)	12(42.9%)	16(57.1%)	28(100%)

Source: Our estimates from the survey data

We see from this table that as far as gender is concerned, women constitute the most representative modality: most of them are senior staffs (80%), sellers (68%) and housewives (100%)10. For the income characteristic, those with more than 250,000 constitute the most representative modality which includes among others, senior staffs (60%) and businessmen or contractors (50%). The above 40 years are the representative modality of the modal class of the age characteristic, composed essentially of senior staffs (60%). As concerns the school level, the more educated are the representative group of the modal class who are mostly senior staffs (100%), control agents (100%) and other (57.1%) that can be assimilated to the graduates of the Higher Education working in the informal11. In general, we find that for all the categories representative of the modal class, senior staffs are included: they are usually graduates of Higher Education who earn higher amounts of more than 250,000 CFA Francs, are older than forty years, and are female. Here, the theory is confirmed with regard to income because according to the latter, patients with the highest incomes would be most victims of the phenomenon (Hunt & Lazlo, 2005). For gender, the theory is somewhat debated; in our case with regard to women, they are considered more vulnerable to corruption than men, this because of their socio-professional status (senior staffs and traders) which grants them a high income, confirming thus the theory that the rich would be the most exposed to the phenomenon. Moreover, they are generally more prone to diseases than men, thus requiring them to be much in contact with health professionals and therefore, more exposed to bribe payments. Our results refute the theory that the youngest are the most vulnerable to corruption because in reality, older people have much money and therefore, holders of highest incomes, thus reconfirming the theory that the wealthiest would be most exposed. Similarly, the more educated are the most vulnerable because they are also holders of highest incomes, insofar as in majority, they are essentially senior staffs and control agents.

To the question of who pays and how much, we can say that the most vulnerable to corruption are mostly the wealthiest aged above forty, who are mostly senior staffs, whose education level is quite high, who are female, and whose amounts fall within the

modal class. This result is the same as the one found earlier when the amounts of bribe paid were set below the 75th percentile, this for amounts of bribe paid above 1,000 CFA Francs.

Conclusion

The purpose of this study was to highlight the characteristics of patients who pay amounts of bribe during consultation in the various public hospitals of the city of Douala. Initially, these characteristics were studied respectively by setting the amounts of bribe paid below and above the 75th and 25th percentiles, while varying one or the other percentile, based on the modalities of each characteristic. Secondly, we considered those of individuals whose bribe amounts are between the afore mentioned percentiles, to characterize patients victims of the phenomenon, given their socio-professional status. In the last case, it appears that the wealthiest, the women, the older and the more educated are more likely to corrupt practices than other socio-demographic and socio- professional categories, this last result corroborating with the one found earlier, when the amounts of bribe paid were set below the 75th percentile, this for amounts of bribe paid above 1,000 CFA Francs. We note, however, for all the results, that the level of the amount of the bribe causes a variation of individuals' characteristics, given the purchasing power of everyone linked to his/her socio-professional category. This contradicts for instance to some extent some theoretical results that do not include the setting of the level of bribe. In fact, the idea that corrupt practices would be reserved for certain social classes is discussed because inside the modal class for example, we have the profile-type of the corrupt and once out, this profile changes: in fact, individuals who pay amounts of bribe below the 25th percentile, are also different from those who pay beyond the 75th percentile. So, everyone is involved in the process, each having his/her own level. No one is spared.

Appendix

Appendix 1. *Table 15. Socio-professional category and level of household income*

		Level of household Income				Total
		Less than 75,000	Between 75,000 and 150,000	Between 151,000 and 250,000	Above 250,000	
socio professionnal Category	Senior staff	0	2	3	19	24
	Control Agent	0	8	16	11	35
	Enforcement officer	13	17	5	2	37
	Contractors (Business men)	2	4	9	14	29
	Housewives	24	14	7	10	55
	Seller	25	29	7	6	67
	Unemployed	51	7	0	1	59
	Others (informal)	69	19	7	6	101
Total		184	100	54	69	407

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5 An empirical evaluation of the characteristics of the victims of corruption in public hospitals in Cameroon: The case of Douala metropolis

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 is not understood is that some users are more exposed to corruption than others. The theoretical literature identifies at least three channels through which this exposure can be explained.

Firstly, age appears to be a phenomenon reducing exposure to corruption (Seligson, 2006; Hunt & Lazlo, 2005). Hunt (2005) believes that older people are less victims of corruption because they have had time to build up a "trust network". As for Seligson (2006), young people are more often victims of corruption as they have to settle in life and therefore, are more in touch with the administration. Secondly, from the gender perspective, criminologists have developed potential relevant theories. According to them, women are less tolerant than men with regard to corruption. Women feel more than men - the most physically

strong sex - that the laws that exist are there to protect them. Therefore, they have more will to enforce the laws (Gottfredson & Hirschi, 1990). Thirdly, several theoretical models suggest that wealth or incomes are important determinants of exposure to corruption (Kaufman & Wei, 1999; Lui, 1985). A person is more faced to corruption when he/she is rich. Also, civil servants target their victims based on their willingness or ability to pay. The predictions of the above theoretical arguments are often compatible with the results of empirical works. Within the framework of a study of 18 African countries on education and health, Lavallée *et al.* (2010) found that older people and those who live in rural areas are less likely to be asked bribes. They also found that being a woman reduces by 1.6% the probability of responding that corruption is a solution to administrative problems. Hunt (2007) examined the role of income in determining corruption in public hospitals in Peru and Uganda. In general, he found that wealthy patients are probably more exposed to corruption than others. In particular, he found that in Peru, where the rate of corruption is 0.8%, a doubling of the level of household consumption leads to an increase of the probability of being asked bribes from 0.2% to 0, 4%. In Uganda, where the corruption rate is 17%, when the level of household consumption expenses doubles, the probability of being asked bribes increased by 1.2%.

In the case of Cameroon, the National Institute of Statistics (2011) found from a survey of over 4,000 households in 2007 that corruption is evident and even very evident in the health sector. According to this study, which only focuses on the consultation service, the informal payment for this service is more often the result of non-poor households (7.4%) compared to poor households (2.6%). This study is important because it helps to know that the rich are the most vulnerable to corruption. However, it is unclear whether this result is the same in services such as maternity, hospitalization or emergency. In addition, this study does not allow us to identify the characteristics of victims in relation to gender and age. This study aims to fill these gaps, in relation to small corruption involving small amounts and minor civil servants.

To fight against corruption in public Cameroonian hospitals, the National Commission for the Fight Against Corruption (CONAC) has undertaken awareness campaigns. But the results achieved in this regard remain mitigated mainly because of the lack of knowledge about the phenomenon. This study will partly fill this gap because it will identify, from the supply side, medical services which are very corrupt and, from the demand side, the categories of users more vulnerable to corruption. Therefore, the information obtained will enable the CONAC to formulate targeted and appropriate messages to sensitize populations.

The second section of this paper presents and analyzes the functioning of hospitals in the city of Douala. The methodological approach is described in Section 3. As for Section 4, it calculates corruption indexes and analyzes its manifestations. The results are presented and discussed in Section 5. The last section proposes some recommendations and concludes.

Hospitals and their functioning in the city of Douala

As in the entire Cameroon, in Douala, the economic capital, the health sector is made up of private and public hospitals. If we take into account the last category on which the present study is based, there are essentially reference and district hospitals which operate under the Ministry of Health. The first two are: the Laquintinie hospital and the General hospital and the seconds are seven: the Deido hospital, the Bonassama hospital, the Bonamoussadi hospital, the Cité des Palmiers hospital, the New-bell hospital, the Nylon hospital and the Logbaba hospital. District hospitals are dedicated in particular to firstly ensure a better quality of health care through motivated and disciplined staff, and for whom the patient becomes their only concern. Then, these hospitals must ensure a better decentralized management of monetary recovery of medical procedures, drugs and prepayments to be set up for progressive empowerment. And finally, they must support emergencies and hospitalized patients. Reference hospitals are above district hospitals. It is all about high level technical structures which in terms of specialized health care, assure reference and anti-reference, and welcome patients from district

hospitals. To assure the reference, these two hospitals have specialized doctors and special medical equipments which are absent in district hospitals. However, the status of the Laquintinie hospital is somewhat different from that of the General Hospital. With legal personality and financial autonomy, the General hospital is more independent from the Ministry of Health than the Laquintinie hospital. The first recruits its own medical doctors and pay them higher salaries than those earned by doctors at the Laquintinie hospital and others. The latter is paid by the Ministry of Finance. In the early 1990s, Cameroonian civil servants have experienced a decrease of more than 50% of their salaries within the framework of the structural adjustment programs, enacted by the Bretton Woods' institutions. Meanwhile, they have certainly recorded some salary increases. But these have failed to meet their former living standards.

Materials and method

To highlight the profile of victims of corruption in the different medical services in public hospitals of the city of Douala, we have adopted a three-stage approach: First of all, determining the sample of individuals to interview, then calculating corruption indexes per hospital for each type of service in order to determine the most corrupt services in hospitals and finally, having a statistical estimate through odds ratios to determine the characteristics of individual victims of corrupt acts in the most corrupt services.

Determining the sample's size and its characteristics

Determining the sample

As we are unable to determine an approximate P value through a prior survey (because to our knowledge, no investigation about corruption in public hospitals has yet been carried out in Cameroon), that is to say, the proportion of respondents in the context of a preliminary study, we set P at 0.5, this value representing the worst case, that is, the value which gives the

greatest possible gap in the distribution sampling of P. In this case, the sample size n required to ensure a margin error E (in

absolute value) not exceeding 5% with a confidence level of 95% will be about:

$$\frac{Z^2_{\alpha/2} \times (0,5)(0,5)}{4E^2} = \frac{(1,96)^2}{4 \times (0,05)^2} \approx 384$$

E: the margin error, Z: the standardized normal distribution, P: the P estimator in the prior study. The distribution of the number of individuals questioned is based on the number of medical and paramedical staff of each hospital selected as shown in the table 1. The first column of the table describes the type of hospital, the second column the total number of medical and paramedical staffs, the third indicates the weight or the importance of personnel of each hospital as compared to the staff of all the hospitals in general and the last, the approximate number of people that should be questioned by hospital relative to the weight of each hospital. We end up having a total of 384 interviewees. For prudence sake, we have distributed 415 questionnaires on the assumption that all incorrectly completed questionnaires would be eliminated, this to approximately achieve the sample's size. Thus, 407 questionnaires were correctly filled and therefore validated. It is on the basis of these 407 questionnaires that the analysis was performed.

Table 1. *Distribution of the number of patients to interview per hospital.*

Hospital	Personnel Number	Hospital Importance (In %)	Number of patients to interview
Laquintinie	630	41	157
General	326	21	81
New-Bell	113	7	27
Bonassama	103	7	25
Palmiers	100	6	25
Deido	84	5	21
Logbaba	80	5	20
Nylon	62	4	15
Bonamoussadi	57	4	14
Total	1 555	100	384

Source: Our estimates based on information collected from the Littoral Regional Health Delegation on the number of hospitals.

Characteristics of the sample

The table below specifies the characteristics of users' sample namely age, school level (education), income, marital status and employment status: as far as age characteristic is concerned, it was split into two categories: young people between 20 and 40 years old and the old for more than forty years old. This nomenclature at the age level reflects the country's socio-economic situation as concerns employment insofar as three years ago, the authorities launched a recruitment campaign in the public sector (25,000 in total), considering that any person younger is aged forty and less. The income characteristic also obeys to this dualistic nomenclature namely those with an income of 250,000 CFA Francs and less, and those that earn more than 250,000 CFA Francs. This classification took into account the socio-economic characteristics of the respondents. This choice is justified by the fact that initially, we considered four classes of income namely less than 75,000, between 75,000 and 150,000, from 150,000 to 250,000 and the class of more than 250,000. This indicates that among the 407 respondents, almost 83% have an income of 250,000 and less, and only about 17% earn more than 250,000. The latter percentage mostly represents senior staffs in companies and businessmen/ entrepreneurs who are regarded in the Cameroonian environment as being part of the richest social class. 80% of the first quoted earn more than 250, 000 and nearly 50% in the second category the same thing, hence the justification of the nomenclature at the income distribution of the two categories, that is 250,000 and under, and more than 250,000. This is also applied to the education variable where two categories were retained: university level and not university level.

Table 2. *Characteristics of the users' sample*

Age	Male	Female	Total	% Male	% Female	Total %
40 years old and Less	134	190	324	41,4	58,6	100
More than 40 years old	52	31	83	62,7	37,3	100
Education						
Primary and secondary Education	97	145	242	40,1	59,2	100
Higher Education	89	76	165	53,9	46,1	100
Average montly Income						
Less than 75,000 CFA Francs	78	106	184	42,4	57,6	100
Between 75,000 and 150, 000	48	52	100	48	52	100

Between 150,000 and 250, 000	26	28	54	48	52	100
More than 250,000	35	34	69	50,7	49,3	100
Matrimonial Status						
Maried	72	99	171	42,1	57,9	100
Single	74	82	156	47,4	52,6	100
Divorced	10	9	19	52,6	47,4	100

Calculating corruption indexes

We considered the Likert scale on which each interviewee has 5 opportunities to give his/her opinion about the statement that corruption is practiced in a given service in a hospital he/she goes most frequently. The five options are: not at all agree, disagree, neither agree nor disagree, agree and strongly agree. We assign to each of these options a score n_i indicating the level of corruption, the n_i ranging from 1 to 5. If i equals to 1, the level of corruption is $n_i = n_1 = 1$. This is the lowest score corresponding to the view that the respondent does not agree at all that the confirmed corruption form is practiced in the hospital he/she frequents the most. On the contrary, if i equals to 5, the level of corruption is $n_i = n_5 = 5$. This is the highest score corresponding to the view that the respondent all agrees that the confirmed corruption form is practiced. On this scale, when we go from $n_1 = 1$ to $n_5 = 5$, the level of corruption is increasing. At the end of the investigation, we will count the number (f_i) of respondents who have chosen the level and the corruption form n_i, with respect to each hospital of the sample. The corruption index of a hospital for a given service is the weighted arithmetical mean of corruption levels or bribery scores that the interviewees hold for this hospital. Let's consider

$$\frac{\sum_{i=1}^{i=5} fin_1}{\sum_{i=1}^{5} fi} \quad \text{with} \quad \sum_{i=1}^{5} fi = n$$

the total number of persons interviewed as far as corruption is concerned in a given medical service. When added up corruption indexes of each of the nine selected public hospitals and divide this sum by nine, we find the average corruption index prevailing in all hospitals. From that moment, we can group into two the hospitals in the sample studied: those which the corruption index is superior

or equal to the average index, and those which the corruption index is below the average. This is also applied to corruption in each of the services of these hospitals.

Statistical estimate and characteristics of victims: An approach by odds ratios

With respect to corruption of each given medical service, we have highlighted the characteristics of individuals who are victims through an estimate by odds ratios. Thus, the variables age, income, educational level and gender were used to determine the profile of individuals who are victims of a particular form of corruption for a particular service and per hospital. The estimate by odds ratios were apprehended through the construction of the contingency tables 2 x 2 below:

Table 3. *Joint Distributions*

Characteristics of the victim	Has been a victim of a particular form of corruption	
	No	Yes
Characteristics 1	N_{11}	N_{12}
Characteristics 2	N_{21}	N_{22}

Where N_{11} and N_{21} represents the number of persons of characteristics 1 and 2 who have not been victims of corruption in a particular service, N_{12} and N_{22} being respectively the number of persons of characteristics 1 and 2 who have been victims of corruption. These various joint distributions N_{ij} were used to calculate the following odds ratios:

$$\theta=(N_{11}N_{22}) / (N_{12}N_{21})$$

Thus, when $1 < \theta < \alpha$, we will say that the individuals of characteristic 1 will tend not to be less victims (or to be more victims) of corruption in a particular service than those of characteristic 2. On the contrary, $0 < \theta < 1$ will produce the opposite effect. The level of corruption of the successful medical service can thus be highlighted through four sub- contingency tables of 2x2 dimensions, representing the above different identified variables (age, income, educational level and gender).

Manifestation of corruption and indexes' calculation

Corruption indexes

The table below shows the corruption index by service and by the hospitals. The last line and column of the table represent the average of corruption indexes calculated for each service and for each hospital.

Table 4. *Corruption Indexes By Hospital And By Service*

Service Hospital	A	B	C	D	E	F	G	H	I
General	2,4	3,5	3	2,7	2,8	3,2	2,9	4	3,06
Laquintinie	3,9	4,5	4	3,8	4	4,4	3,8	4,3	*4,08*
Logbaba	2,4	3,2	2,9	2,1	2	3,1	2,6	4,1	2,8
Deido	4,3	4,9	4,5	4,3	4,9	4,9	4,1	4,6	*4,52*
Bonamoussadi	3,4	4,6	3,4	2,9	3	3,4	2,2	4,1	3,35
Bonassama	3	3,8	3,4	3,2	3,3	3,6	3,2	4,5	3,43
Palmier	3,2	3,8	3,7	3,4	3,3	3,8	3,4	4	*3,57*
Nylon	2,9	3,6	3,4	3,5	3,1	3,5	2,4	3,5	3,23
New-Bell	3,1	3,8	3,5	3,2	3,2	4,1	3	4	3,48
Average	2,9	4	3,5	3,2	3,3	3,8	3,1	4,1	

Sources: *Authors' estimates from the survey data Notes:* "A" represents Consultation; B= Sale of drugs; C= Medical Certificate; D = Surgery; E = Delivery; F = Hospitalisation; G = Emergency; H = Diversion; H = Average

Thus, at the level of services, all figures in bold represent hospitals' services in which the level of corruption index is significant[2], and it is only in these services that we have highlighted the characteristics of the victims. Also, looking at the last column of the table, we can for instance identify hospitals (in italics) that present corruption indexes above average (which is 3.50). This table also determines the most affected medical services by hospital (for example, we see that for the New Bell Hospital, the hospitalization service presents the most vulnerable form of corruption), and the most affected hospital by service (for example, we notice that for the medical certificate service, the Deido hospital is most affected compared to all hospitals).

Manifestations of corruption in services

Unlike private clinics, public health facilities are massively affected: maternity services, surgery, emergency, hospitalization,

drugstores and laboratory are frequently corrupt. The small administrative corruption is so widespread in some medical services that there is often no alternative for patients. If we consider the most corrupt services as showed above in the indexes calculation, this small corruption is being manifested in several ways: Firstly, as far as drugs are concerned, the normal procedure is that the medical doctor prescribes drugs to the patient and that he/she goes to buy them either in the hospital drugstore or in a private drugstore. Thus, the abnormal practices include among others, the sale to patients by doctors of the samples of medical drugs which are given to them for free by medical delegates or moreover, the theft of drugs by some nurses for resale or for use in their private hospitals. Secondly, in hospital rooms, bribes - payment by patients for services which are supposed to be free - are common. The practice consists for the nurse to artificially create a shortage of medical supplies (syringes, alcohol, cotton, etc.) when it is time to treat the patient. The nurse makes the patient to believe that the hospital no longer has medical supplies (syringes, alcohol, cotton, etc.). The patient will then suggest to the nurse the "solution" to pay a certain amount to get the medical tool in question. Once the patient pays that amount, the nurse removes that treatment tool from his bag. Thirdly, the diversion of patients is a practice linked to the existence of private health facilities. Indeed, private health centers have mostly as promoters, doctors working in public hospitals. For these promoters, this practice consists in welcoming patients in public hospitals, and guides them to their private health centers for medical follow up. Fourthly, the issuing of the medical certificate is also surrounded by several anomalies. The normal procedure requires that the patient who was treated or consulted by a doctor and who is in need of a medical certificate officially pays 900 CFA Francs. As far as abnormal practices are concerned, we can name among others the signature by some doctors of medical certificates which relate to false diagnoses to influence for instance the recruitment decisions and the issuing of a driving license.

Results and discussion

Presentation of results

Table 4 identifies the four most corrupt medical services in all hospitals: these are the following services: reception, hospitalization, medical certificate and the sale of drugs. Estimates by odds ratios of the first two forms depending on the characteristics of the victims of the reception service and that of medical certificate are presented in the Appendix 1-8.

The analyses respectively highlights the characteristics of patients who are victims of corruption by diversion and through the issuing of the medical certificate in each of the public hospitals in the city of Douala and for all hospitals; thus, for each of the characteristics studied an odds ratio $\hat{\theta}$p1 will simply imply that in relation to sex, men tend to be more victims than women, low-income people more victims than people with high income for the income variable, those without a university school level more victims than those who have it for the school level variable, and finally the younger people more victims than the older people for the age variable. An odds ratio $\hat{\theta}$f1 will therefore have an opposite effect. An estimate for all hospitals in general for corruption victims through diversion with respect to sex characteristic shows that men as well as women are victims at the same level ($\hat{\theta}_{SD1=1}$) The same estimate for the income characteristic reveals that people with higher incomes are about 10% more likely ($\hat{\theta}_{RD}=1.10$) to be diverted than low-income people. On the contrary, the school level and age characteristics reveal that those without a university education are often the most diverted than those having it. The same thing goes with younger as compared to the older, the first with 22% more likely to be diverted than the latter. An estimate for all hospitals for victims of corruption to the issuing of the medical certificate reveals that in general, men are more victims than women; on the contrary, those who have a higher income would have nearly 24% chance of being victims than those who have less income. However, our estimates show that the less educated and the older appear more like victims of this type of corruption.

Therefore, with respect to the previous analyzes and the various estimates tables of odds ratios, we can simultaneously and

specifically identify hospitals based on the victims' characteristics of different types of corruption.

At the General Hospital for example, we will say that the victims of corruption through diversion are most often male (M_1); they have a monthly income of 250,000 FCFA and less (M_2), have a school level below the Higher education (P_2) and have mostly 40 years old and under (M_3); similarly; compared to age for example, we will simply say that in about over 66% of cases, it is the 40 and under who are victims of abuse in hospitals.

As previously stated that at in the Laquintinie hospital for example, victims of corruption through the issuing of the medical certificate are male and earn over 250,000 CFA Francs. Besides not having studied in Higher Education, these victims are in majority aged over 40 years. About sex characteristic, we will also say for example that in over 66% of cases, men are victims of corruption through the issuing of medical certificate in hospitals.

An estimate for all hospitals in general for victims of corruption through the sale of drugs for the sex characteristic shows that both men and women are victims at the same level ($\hat{\theta}_{SD1=1}$). However, income, school level and age characteristics reveal that low-income people are more victims than people with higher incomes, those without a university level more victims than those who have it, and finally the younger people more victims than the older. An estimate for all hospitals for victims of corruption through hospitalization reveals that in general, men are less victims than women, and low-income people less victims than those who have high incomes (the odds ratios here are superior to 1). With odds ratios inferior to 1 for the university level and age characteristics, it is concluded that corruption through hospitalization most affects those who don't have a university level and the younger respectively. Tables 11 identify hospitals based on the characteristics of victims of corruption through the sale of drugs.

Table 13. *Table of Profiles Comparison*

	Sex	Income	School Level	Age
	Male (M_1)	Less than 250000 (M_2)	Not superior (P_2)	Less than 40 years old (M_3)
	Female (F)	More than 250000 (P_1)	Superior (S)	Above 40 years old (P_3)
Reception	M_1 et F	P_1	P_2	P_3
Medical Certificate	M_1	P_1	P_2	P_3
Drugs	M_1 et F	M_2	P_2	M_3
Hospitalization	M_1	P_1	P_2	M_3

Sources: Our estimates from the survey data

Table 13 shows that the characteristics of victims of corruption for all hospitals are different from one service to another (reception, medical certificate, hospitalization and drugs). However, from the reception service to that of medical certificate, one realizes that the profile of the victims is the same when it is men who are victims of corruption at the reception service. Among the four characteristics (gender, income, education and age), education is the characteristic that is identical in all the four services. But there is no specific study on the relationship between exposure to corruption and education. On the one hand, it is possible that more educated people are less victims of corruption because they have a better understanding of their rights and means of defense. On the other hand, civil servants can use the educational level as a proxy variable of the contributive ability of people being administrated (Lavallée *et al.*, 2010).

Theoretically, age appears to be a phenomenon reducing exposure to corruption (Seligson, 2006; Hunt & Lazlo, 2007). The more age increases, the least users are victims of corruption because older people have had time to build up a "trust network". However, we notice that in the context of corruption at reception (diversion of patients) and through the issuing of the medical certificate, the older people are more victims than the younger. This means that health workers collect bribes from all patients including those with whom they have trust relationships. This can be explained through the behavior of health care providers. More specifically, when the health care workers are poorly paid, they are tempted to collect bribes from all patients including those with

whom they have built trust relationships. Without bribes, health workers cannot make ends meet. In this case, it can be assumed that the corrupt do not make discrimination between patients who are members of the trust network and those who do not belong to it.

Theoretically, women are less tolerant than men with regard to corruption. But when one considers the corruption prevailing in the reception and drugs services, we realize that women are as much victims as men. This situation can be understood by the specificity of women as far as health is concerned. Indeed, the physical and psychological vulnerability of individuals is also considered in the literature as a factor favoring corruption (Lavallée *et al.*, 2010). From this point of view, women have more specific and frequent needs than men as far as health is concerned (UNDP, 2011). The fact that diseases afflict women more than the opposite sex explains why they are so vulnerable to corruption, not forgetting that they are the ones in Africa that often follow up and keep patients in the hospital.

The comparison of victims' profiles from one hospital to another concerning the same service

Appendix 5-8 shows that the characteristics of victims of corruption are not the same from one hospital to another for the same service. For example, if we consider corruption at reception (diversion of patients) with regard to income, it is clear that in four hospitals namely: General, Cité des Palmiers, Nylon and New - Bell, victims of corruption are holders of an average monthly income above 250,000 CFA Francs. On the contrary, in Laquintinie, Logbaba, Deido and Bonassama hospitals, victims are holders of an average monthly income below 250,000 CFA Francs. If relatively to gender we keep the same service, it is observed that in four hospitals namely Laquintinie, Deido, Cité des Palmiers and Nylon, the victims are women. On the contrary, in the General, Bonamoussadi, Bonassama and New Bell hospitals, victims are men. Clearly, no one is immune from corrupt practices in all the medical services in public hospitals of Douala. In each hospital, each service, women and men, the older and the younger, the

holders of incomes inferior and superior to 250, 000 CFA Francs are all victims of corruption

Conclusion and recommendations

Theoretically, age appears to be a phenomenon reducing exposure to corruption (Seligson, 2006; Hunt & Lazlo, 2007). The more age increases, the least users are victims of corruption because older people have had time to build up a "trust network". However, we notice that in the context of corruption at reception (diversion of patients) and through the issuing of the medical certificate, the older people are more victims than the younger. This means that health workers collect bribes from all patients including those with whom they have trust relationships. This can be explained through the behavior of health care providers. More specifically, when the health care workers are poorly paid, they are tempted to collect bribes from all patients including those with whom they have built trust relationships. Without bribes, health workers cannot make ends meet. In this case, it can be assumed that the corrupt do not make discrimination between patients who are members of the trust network and those who do not belong to it.

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The purpose of this study was to determine the characteristics of victims of corruption in the various services in public hospitals of the city of Douala in Cameroon. We used an estimate through odds ratios to identify the most vulnerable socio-economic

categories in selected services. The variation of the magnitude of corruption from one service to another allowed us to highlight for each service, a type of profile of corruption victims. For example, in hospitalization, victims are in general males, aged forty and less, and holders of an income above 250,000 CFA Francs. In this case, the theory is confirmed in relation to gender, income level and age. On economic policies, we propose two measures: The first concerns the organization of services. In the case where the cost, in terms of efficiency of corruption only results in its illegality, informal payments should be legalized. For example, it is worth instituting a dual file system: a fast line, expensive, for those who value speed and a slower line for others. Patients who are vulnerable to corruption in hospitalization should be oriented towards the fast and expensive line, given that they are holders of higher incomes. In this system, a portion of payments related to "speed" could be used to reward medical doctors and nurses for their results (Paul, 1995). When such a system is being implemented, it is important to make sure to hinder the bureaucrats to have a monopoly power they could use to extract rents from an increased amount (Rose-Ackerman, 1978).

The second measure is based on salaries. Corruption in public hospitals in the city of Douala in Cameroon is in part due to low salaries. As earlier said, in the early 1990s, the salaries of civil servants - including medical doctors and nurses- were reduced by over 50%. Since then, the collection of bribes is a survival strategy. It is true that meanwhile, these civil servants have already received three wage increases of 5%, 15% and 5% respectively. But these increases remain insignificant. It is therefore necessary to substantially increase the salaries of medical and paramedical personnel. However, salary increase only reduces attraction towards bribe, but does not cancel it. A high salary may simply leads the civil servant to require a significant bribe, able to compensate the risk of losing what is now an employment somehow interesting (Rose-Ackerman, 1998)

Similarly, victims of corruption through hospitalization for the Nylon hospital are female with a monthly income of 250,000 CFA Francs and less, not having a university level education and aged 40 years and less.

Appendix

Appendix 1. *Corruption through diversion of patients: an estimate through odds ratios*

Hospital	Sex		Income		School Level		Age	
	$\hat{\theta}_{SDH}$	Confidence Interval to 95% of $\hat{\theta}_{SD/H}$	$\hat{\theta}_{RD/H}$	Confidence Interval to 95% of $\hat{\theta}_{RD/H}$	$\hat{\theta}_{ND/H}$	Confidence Interval to 95% of $\hat{\theta}_{ND/H}$	$\hat{\theta}_{AD/H}$	Confidence Interval to 95% of $\hat{\theta}_{AD/H}$
General	0.72	(0.28 ; 1.81)	0.75	(0.27 ; 2.11)	0.33	(0.13 ; 0.88)	0.91	(0.33 ; 2.47)
Laquintinie	1.09	(0.44 ; 2.66)	1.34	(0.41 ; 4.38)	1.05	(0.44; 2.50)	1.14	(0.39 ; 3.34)
Logbaba	1.0	(0.16 ; 6.25)	2.16	(0.11 ; 40.8)	1.87	(0.28 ; 12.4)	0.22	(0.01 ; 4.87)
Deido	1.42	(0.02 ; 78.1)	8.2	(0.13; 511.8)	2.53	(0.04 ;141.9)	3.18	(0.05 ;179.9)
Bonamoussadi	0.38	(0.01 ; 11.1)	1.0	(0.03 ; 30.6)	4.63	(0.15 ;135.5)	1.0	(0.03 ; 30.6)
Bonassama	0.83	(0.20 ; 3.35)	2.9	(0.45 ; 18.7)	1.09	(0.27 ; 4.33)	8.5	(0.86 ; 83.5)
Palmiers	1.81	(0.27 ; 11.8)	0.88	(0.07 ; 10.3)	0.62	(0.05 ; 6.80)	17.7	(0.74 ;426.4)
Nylon	8.07	(0.34 ; 187)	0.22	(0.003 ;13.6)	0.60	(0.04 ; 9.15)	1.5	(0.05 ; 39.7)
New- Bell	0.88	(0.18 ; 4.37)	0.36	(0.01 ; 8.49)	1.07	(0.15; 7.30)	0.46	(0.04 ; 4.9)
Estimates of hospitals	$\hat{\theta}_{SDi}$ =1.00	(0.62 ; 1.62)	$\hat{\theta}_{RD}$ = 1.10	(0.59 ; 2.07)	$\hat{\theta}_{ND}$ = 0.8	(0.49 ; 1.34)	$\hat{\theta}_{AD}$ =1.22	(0.66 ; 2.24)

Sources: Our estimates from the survey data

Appendix 2. *Corruption when issuing medical certificate: an estimate through odds ratios*

Hospital	Sex		Income		School Level		Age	
	$\hat{\theta}_{SCM/H}$	Confidence Interval to 95% $\hat{\theta}_{SCM/H}$	$\hat{\theta}_{RCM/H}$	Confidence Intervalto 95% to $\hat{\theta}_{RCM/H}$	$\hat{\theta}_{NCM/H}$	Confidence Interval to 95% of $\hat{\theta}_{NCM/H}$	$\hat{\theta}_{ACM/H}$	Confidence Interval to 95% $\hat{\theta}_{ACM/H}$
General	0.58	(0.23 ; 1.46)	1.28	(0.47;3.43)	0.54	(0.21;1.36)	1.5	(0.57 : 3.98)
Laquintinie	0.95	(0.45 ; 2.00)	1.48	(0.47;4.68)	0.62	(0.30;1.27)	1.38	(0.52 ; 3.67)
Logbaba	4.9	(0.7 ; 34.3)	1.37	(0.07;25.4)	2.4	(0.37;15.31)	0.62	(0.047 ; 8.2)
Deido	0.11	(0.005 ; 2.6)	0.67	(0.025;18.5)	2.24	(0.09;53.5)	1.77	(0.07 ; 43.02)
Bonamoussadi	0.6	(0.07 ; 5.13)	1.67	(0.11;24.2)	0.6	(0.07;5.13)	1.67	(0.11 ; 24.25)
Bonassama	0.72	(0.18 ; 2.9)	0.8	(0.13;4.7)	0.55	(0.14;2.23)	1.85	(0.29 ; 11.90)
Palmiers	4.6	(0.66 ; 32.7)	0.88	(0.074;10.4)	4.61	(0.22;96.0)	0.26	(0.014 ; 4.98)
Nylon	1.4	(0.145; 13.5)	2.77	(0.047;161.9)	11	(0.81;147.8)	3.67	(0.17 ; 77.55)
New- Bell	0.41	(0.091 ; 1.9)	1.0	(0.056;17.7)	0.41	(0.06;2.76)	5.2	(0.50 ; 54.05)
Estimates of hospitals	$\hat{\theta}_{SCM}$ =0.87	(0.55 ; 1.36)	$\hat{\theta}_{RCM}$ =1.24	(0.68;2.25)	θ_{NCM} =0.73	(0.50;1.21)	$\hat{\theta}_{ACM}$ = 1.5	(0.85 ; 2.62)

Sources: Our estimates from the survey data

Appendix 3. *Characteristics (profile) of victims of corruption through diversion in a given hospital*

Hospital	Sex Male (M_1) Female (F)	Income Less than 250000 (M_2) More than 250000 (P_1)	School Level Not superior (P_2) Superior (S)	Age Less than 40 years old (M_3) Above 40 years old (P_3)
General	M_1	M_2	P_2	M_3
Laquintinie	F	P_1	S	P_3
Logbaba	M_1 et F	P_1	S	M_3
Deido	F	P_1	S	P_3
Bonamoussadi	M_1	M_2 et P	S	P_3
Bonassama	M_1	P_1	P_2 et S	P_3
Palmiers	F	M_2	P_2	P_3
Nylon	F	M_2	P_2	P_3
New- Bell	M_1	M_2	S	M_3
All hospitals	M_1 et F	P_1	P_2	P_3

Sources: Our estimates from the survey data

Appendix 4. *Characteristics of victims of corruption when issuing medical certificate in a given hospital*

Hospital	Sex Male (M_1) Female (F)	Income Less than 250,000 (M_2) More than 250,000 (P_1)	School Level Not superior (P_2) Superior (S)	Age Less than 40 years old (M_3) Above 40 years old (P_3)
General	M_1	P_1	P_2	P_3
Laquintinie	M_1	P_1	P_2	P_3
Logbaba	F	P_1	S	M_3
Deido	M_1	M_2	S	P_3
Bonamoussadi	M_1	P_2	P_2	P_3
Bonassama	M_1	M_2	P_2	P_3
Palmiers	F	M_2	S	M_3
Nylon	F	P_1	S	P_3
New- Bell	M_1	M_2 et P_1	P_2	P_3
All hospitals	M_1	P_1	P_2	P_3

Sources: Our estimates from the survey data

Appendix 5. *Corruption through diversion of drugs: an estimate through odds ratios*

Hospital	Sex		Income		School Level		Age	
	$\hat{\theta}_{SD/H}$ [11]	Confidence Interval to 95% of $\hat{\theta}_{SD/H}$	$\hat{\theta}_{REVH}$ [12]	Confidence Interval to 95% of $\hat{\theta}_{REVH}$	$\hat{\theta}_{ND/H}$ [13]	Confidence Interval to 95% of $\hat{\theta}_{ND/H}$	$\hat{\theta}_{AD/H}$ [14]	Confidence Interval to 95% of $\hat{\theta}_{AD/H}$
General	0.38	(0.09 ; 1.56)	1.15	(0.27 ; 4.74)	0.85	(0.23 ; 3.05)	2.20	(0.44 ; 11.00)
Laquintinie	0.30	(0.01 ; 6.40)	0.80	(0.03 ; 17.3)	0.80	(0.05; 13.16)	1.20	(0.05 ; 25.77)
Logbaba	6.25	(0.83 ; 46.5)	3.00	(0.12 ; 71.3)	0.53	(0.08 ; 3.54)	0.04	(0.002 ; 1.03)
Deido	0.70	(0.01 ; 36.6)	0.12	(0.002; 7.61)	0.39	(0.007 ; 22.0)	0.31	(0.005 ;17.77)
Bonamoussadi	0.21	(0.007 ; 6.3)	1.0	(0.03 ; 30.6)	0.21	(0.007 ; 6.3)	1.0	(0.03 ; 30.61)
Bonassama	0.70	(0.08 ; 5.73)	0.62	(0.05 ; 7.31)	0.81	(0.10 ; 6.58)	2.48	(0.11 ; 52.46)
Palmiers	5.21	(0.19 ; 141)	0.62	(0.02 ; 18.0)	0.8	(0.02 ; 22.62)	0.32	(0.01 ; 10.11)
Nylon	5.00	(0.20 ; 122)	0.17	(0.002; 10.9)	0.27	(0.01 ; 5.76)	1.00	(0.03 ; 27.8)
New- Bell	1.37	(0.19 ; 9.83)	1.27	(0.05 ; 30.6)	1.11	(0.10; 12.30)	0.84	(0.07 ; 9.68)
Estimates of hospitals	$\hat{\theta}_{H}$=1.00	(0.50 ; 2.00)	$\hat{\theta}_{RH}$ = 0.94	(0.39 ; 2.25)	$\hat{\theta}_{ND}$ =0.68	(0.32 ; 1.43)	$\hat{\theta}_{AD}$ =0.87	(0.39 ; 1.95)

Sources: Our estimates from the survey data

Appendix 6. *Corruption in hospitalization: an estimate through odds ratios*

Hospital	Sex		Income		School Level		Age	
	$\hat{\theta}_{Sh/H}$ [15]	Confidence Interval to 95% of $\hat{\theta}_{Sh/H}$	$\hat{\theta}_{Sh/H}$	Confidence Interval to 95% of $\hat{\theta}_{Rh/H}$ [16]	$\hat{\theta}_{Nh/H}$ [17]	Confidence Interval to 95% of $\hat{\theta}_{Nh/H}$	$\hat{\theta}_{Ah/H}$ [18]	Confidence Interval to 95% of $\hat{\theta}_{Ah/H}$
General	1.60	(0.61 ; 4.13)	4.68	(1.25; 17.44)	0.68	(0.26 ; 1.74)	1.32	(0.47 ; 3.68)
Laquintinie	4.81	(0.49 ; 47.3)	0.45	(0.04 ; 4.59)	0.26	(0.02; 2.57)	0.75	(0.07 ; 7.46)
Logbaba	6.25	(0.83 ; 46.5)	3.00	(0.12 ; 71.3)	0.53	(0.08 ; 3.54)	1.00	(0.07 ; 13.36)
Deido	0.70	(0.01 ; 36.6)	0.12	(0.002; 7.61)	0.39	(0.007 ; 22.0)	0.31	(0.005 ;17.77)
Bonamoussadi	0.71	(0.03 ; 14.3)	1.84	(0.07 ; 48.6)	0.10	(0.004 ; 2.71)	1.84	(0.07 ; 48.68)
Bonassama	0.20	(0.01 ; 2.21)	0.62	(0.05 ; 7.31)	0.81	(0.10 ; 6.58)	0.62	(0.05 ; 7.31)
Palmiers	1.67	(0.09 ; 30)	1.09	(0.04 ; 27.0)	1.41	(0.05 ; 33.92)	0.55	(0.02 ; 15.14)
Nylon	0.78	(0.01; 44.64)	0.03	(0.0002; 3.7)	0.36	(0.006;20.98)	0.17	(0.002 ; 10.8)
New- Bell	2.79	(0.10 ; 74.6)	0.29	(0.009 ;9.30)	0.90	(0.03; 25.05)	0.06	(0.002 ; 1.82)
Estimates of hospitals	$\hat{\theta}_{H}$=1.61	(0.84 ; 3.06)	$\hat{\theta}_{RH}$ = 1.72	(0.78 ; 3.83)	$\hat{\theta}_{ND}$ =0.56	(0.29 ; 1.08)	$\hat{\theta}_{AD}$ =0.87	(0.42 ; 1.77)

Sources: Our estimates from the survey data

Appendix 7. *Characteristics (profile) of victims of corruption through the sale of Drugs in a given hospital*

Hospital	Sex Male (M_1) Female (F)	Income Less than 250000 (M_2) More than 250000 (P_1)	School Level Not superior (P_2) Superior (S)	Age Less than 40 years old (M_3) Above 40 years old (P_3)
General	M_1	P_1	P_2	P_3
Laquintinie	M_1	M_2	P_2	P_3
Logbaba	F	P_1	P_2	M_3
Deido	M_1	M_2	P_2	M_3
Bonamoussadi	M_1	M_2 et P_1	P_2	P_3 et M_3
Bonassama	M_1	M_2	P_2	P_3
Palmiers	F	M_2	P_2	M_3
Nylon	F	M_2	P_2	P_3 et M_3
New- Bell	F	P_1	S	M_3
All hospitals	M_1 et F	M_2	P_2	M_3

Sources: Our estimates from the survey data

Note: We notice for instance for the Deido hospital that victims of corruption through the sale of drugs are more male with a monthly income of 250,000 CFA Francs and less. Besides not having studied at the university level, these victims are for the majority of cases aged 40 years and less. With respect to sex characteristic, we also found that both men and women are victims at the same level when we take into account all hospitals in general.

Appendix 8. *Characteristics (profile) of victims of corruption through hospitalization*

Hospital	Sex Male (M_1) Female (F)	Income Less than 250,000 (M_2) More than 250,000 (P_1)	School Level Not superior (P_2) Superior (S)	Age Less than 40 years old (M_3) Above 40 years old (P_3)
General	M_1	P_1	P_2	P_3
Laquintinie	M_1	M_2	P_2	M_3
Logbaba	M_1	P_1	P_2	M_3 et P_3
Deido	F	M_2	P_2	M_3
Bonamoussadi	F	P_1	P_2	P_3
Bonassama	F	M_2	P_2	M_3
Palmiers	M_1	M_2 et P_1	S	M_3
Nylon	F	M_2	P_2	M_3
New- Bell	M_1	M_2	P_2	M_3
All hospitals	M_1	P_1	P_2	M_3

Sources: Our estimates from the survey data

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6 Corruption and health services market in Cameroon: Who takes the initiative?

Introduction

Health is a fundamental right and an engine of personal and social development. It has a significant impact on adults' labor productivity on the one hand, and on the enrollment and performance of children at school on the other. Also, three of the eight goals of the Millennium Development Goals of the United Nations - which aim to reduce poverty by half by the year 2020 - are directly related to health: reducing child mortality, improving maternal health and fighting against HIV/AIDS, malaria and other diseases (Nausbaum, 2006).

Unfortunately, the 2006 global corruption report of Transparency International shows that the achievement of these goals within the deadline is severely compromised by the pervasiveness of corruption in the health sector. Certainly, corruption occurs in all countries of the world; however, the consequences of an ill health dramatically weigh on the populations of developing and transition economies, already under-resourced (Rose, 2006; Nussbaum, 2006). Gupta *et al.*, (2002) found that countries with a high rate of corruptionsystematically

experience a superior infant mortality than other countries. And it is always the less fortunate in society who suffer the most because they cannot afford neither to pay bribes nor private care (Transparency International, 2006).

To cope with this scourge, several researches on corruption in the health sector have been conducted over the past three decades by various institutions (World Bank, Transparency International, International Monetary Fund and Universities). These works can be divided into two groups namely: High corruption (Azfar, 2005; Mauro, 2002; World Bank, 2005) involving high-level policymakers and major financial amounts; and small corruption (Chaudury *et al*., 2006; Nussbaum, 2006) where authors examined corrupt practices carried out by civil servants at all levels of the health system and small amounts.

The importance of these researches is that they have contributed to the improvement of strategies to fight against corruption. In particular, they have allowed knowing that by institutionalizing officials' obligation to give account for actions taken in the health sector, they will be forced to improve their behavior. However, these studies are limited because of the lack of knowledge of factors behind this phenomenon, especially small corruption. If the theoretical literature offers a detailed reading key (Mocan, 2004; Lui, 1858; Kaufman & Wei, 1999) of specific situations, the empirical literature however, remains limited.

In Cameroon, the National Institute of Statistics (2011) used the household survey conducted in 2007 to determine from one region to another, people who pay non-regulatory fees to get access to health care on the one hand, and officials who collect these fees on the other. This study is important because it has allowed identifying that from the supply side, for example in the North, 44.9% of non-regulatory fees are collected by the medical staff and 55.1% by the paramedical staff. From the demand side, it shows for example that the rich are more exposed to corruption than the poor. But it does not inform us directly about those who take the initiative for these corrupt actions and why? The purpose of this research is to fill this gap by finding out who initiates the corrupt act and why? In economic literature, the debate on the question of who takes the initiative for corrupt acts often refers to the popular

definition that corruption is the use of public mandate for private gain achievement (Bardhan, 1997). In this context, the initiative for the corrupt act comes from the mandatory agent. This is even more true that this agent is in a monopoly situation, and has a discretion power (Cartier-Bresson, 1998; Klitgaard, 1989) which makes him/her unavoidable. In this case, it is called passive corruption (Dommel, 2003). On the contrary, considering that corruption is a settled contract between the State agent (the corrupt) and the user (the briber), other authors (Mocan, 2004; Seligson, 2006; Lavallée *et al*, 2010) argue that it is possible that the user could be at the origin of the corrupt act given his/her socio-demographic characteristics. In this case, we talk of active corruption (Dommel, 2003). However, empirically, the distinction between active and passive corruption is rarely made. This article is within the framework of this distinction and goes beyond by exploiting the data of the inquiry that the National Institute of Statistics has conducted among households in 2007 and which a part deals with corruption[1].

Indeed, if we find that the initiative comes from suppliers in some Cameroonian regions, we ask ourselves if it is from the medical staff or the paramedical staff. This question helps to test, within the meaning of theoretical models (Schleifer & Visnhy, 1993; Rose-Ackerman, 1978), if civil servants in a monopoly situation are more likely to collect bribes. This argument implies that the staffs embedded with more medical knowledge and therefore, having a monopoly power in the treatment of some diseases, should be more able to collect bribes (Phelps, 1995).

In contrast, if we find that in some Cameroonian regions, the initiative for the corrupt act comes from those asking for medical care (patients), we will seek to determine the characteristics of those who, from the demand side, pay non regulatory fees. In seeking those characteristics, we will test, as suggested by the theoretical models (Kaufman & Wei, 1999; Lui, 1985), if health workers target their victims based on their ability to pay. Such argument implies that the richest people, those having a job or those with the highest tolerance vis-à-vis corruption should be those that are asked bribes the most.

The significance of this study is twofold: firstly, it provides a basis for developing effective measures against corruption in the

health sector. Secondly, it will allow us, relatively in the health sector, to propose a corruption mapping in line with the Cameroonian regions. We therefore classified regions according to the prevalence of the initiative taken for corrupt acts, and raise a healthy competition between regions in relation to the fight against this phenomenon. Section II theoretically describes the mechanisms and factors causing corruption, especially in the health sector. Section III presents and describes the motives and practices of the taking of initiative for corrupt actions in the Cameroonian health System. Section IV presents the conceptual model as well as the implemented methodology. The presentation of statistical estimates obtained and results analysis in terms of supply and demand is the foundation of section V. The last section discusses the proposed economic policies measures to fight against corruption in the Cameroonian health system and concludes the study.

Literature review

Corruption contract of can be established between the briber (the patient) and the corrupt (Medical doctor or nurse). Following the tradition initiated by Becker (1968), the agent and the briber engage in a corrupt relationship when the value of illegality dominates that of honesty. For the agent, the value of honesty depends on the salary received from the employer, his aversion to illegality, the bribe he will receive, but also the probability to be temporarily suspended or sanctioned. For the briber, the decision to establish a corrupt relationship depends on the gain he expects, the amount of the bribe and the cost of initiating the relationship. The latter contains the moral costs incurred by the briber, but also, all the real and monetary costs engaged to allow this encounter; Becker's analysis (1968) shows that the initiative for the corrupt act depends on the economic rationality of the agent that can be the supplier or the user. But it is limited insofar as it appears to put different agents at the same level. On the contrary, for other authors (Klitgaard, 1989), corruption is mainly initiated by the State' agent. According to Klitgaard (1989), opportunities for corruption are greater in situations where the State agent has a

monopoly power over users, a great discretion power and less responsibility in actions taken and results obtained.

Monopoly creates opportunities for corruption by limiting the ability of citizens to choose other suppliers of services. If the government is the only provider of health services for example, patients may be forced to pay bribes to get there. In Bolivia, researchers (Gray-Molina *et al.,* 2001) found that the existence of alternative suppliers to government services was associated with lower informal payments.

Discretion refers to the autonomy of power that the State official has in decisions making, like the fact to decide on the type of drugs someone needs, and the quantity the patient should procure. A discretion power without adequate control can provide opportunities for corruption. For example, the Director of the hospital may decide to get a new drug at a high price and in large quantities in exchange of bribes.

Responsibility is the obligation that the government has to prove its effective capacity to produce goods and services that users need (Segal & Summers, 2002). The lack of responsibility creates opportunities for corruption (Vian, 2007). Klitgaard's equation (1989) as presented above reveals the importance of the predominant role played by the supplier in this initiative taken. But it is limited since it somehow obscures the responsibility of the briber. However, writers such as Mocan (2004), Seligson (2006) and Lavallée *et al*., (2010) point out that the characteristics of users may be at the root of corruption. As a matter of fact, socio-demographic factors like age, sex, income, place of residence can sometimes determine the magnitude of corruption. Lui (1985), Kaufman & Wei (1999) argue that the State official is able to discriminate users based on their income level. In this case, users with high incomes are more exposed to corruption. According to Mocan (2004) and Lavallée *et al.,* (2010), countries where women occupy many important positions in the management of national institutions are less corrupt than those where women have little responsibility. Women are less likely to pay bribes than men (Seligson, 2006). Authors who argue that socio-demographic factors are the roots of corruption help to guide control measures against corruption towards individuals who are most exposed to this phenomenon.

This approach can make the fight against corruption more effective.

Motives and practices of initiative taking

This section describes corrupt practices observed in the Cameroonian health care market in general, the magnitude of such practices as well as actors who initiate them on the one hand, and reasons or motives that could justify the behavior of these actors on the other.

Corrupt practices observed and actors' behavior

This is to describe the corrupt practices of suppliers and demanders in the Cameroonian health care market, in other words, to highlight an explanatory route of their behavior. If the initiative taken for the corrupt act comes from the suppliers, it is important to know from whom it actually emanates: the medical staff or the paramedical staff?

Given a model consists of three actors namely patients, the medical doctor and the nurse. The medical doctor (the boss) is assisted by the nurse (the agent) in providing health care. After buying the medical booklet that officially gives right to a consultation, each patient is first received by the nurse to take parameters: identity, weight, temperature, etc. Then, being in the waiting room, the patient waits for the nurse to allow him/her to enter the doctor's office. Due to the asymmetry of information and the difference of interests existing between the doctor and the nurse, the initiative for corruption can come either from the nurse or the doctor, or both. In the first case, unbeknownst to the boss, the nurse requires that the patient offers him/her bribes for a privileged access (market corruption). But if the patient belongs to the nurse's family, he/she can offer him/her privileged access without receiving a bribe (social exchange corruption; Medard, 1998). In the second case, the nurse allows the patient to see the doctor after taking parameters. The doctor receives the patient but requires that the bribe be paid after. It can also be an agreement between the doctor and his assistant: in this case, he collects bribes from the patient and gives them to the boss for share. In all these

cases, the problem that arises is who of the two takes most the initiative to the corrupt act.

The initiative for the corrupt act may also come from patients to insofar as they are generally many in front of the doctor's office because the supply of services is almost always much lower than the demand. They must therefore be aligned to be received, each patient waiting for his turn. Therefore, to avoid long waiting lines and thus benefit from the attention of caregivers, some patients do not hesitate to propose them bribes; This is most often done discreetly by introducing the amount of bribe into the medical book. Medical books which are submitted to the doctor's secretary according to the arrival order will be carefully searched by the nursing staff who will in priority consult patients who have introduced money in their medical books, thus upsetting the order of arrivals of patients.

Motives for initiative taking: Shortage in service supply

In Cameroon, health services are provided to populations by the public sub-sector, the private sub-sector and the traditional sub-sector. The first referred to this work is the most important because not only it is the greatest provider of health care, but in addition, it regulates all activities related to health. To satisfy populations, public health facilities consist essentially of - in a decreasing order of importance – District Hospitals (DH), District Medical Centers (DMC) and Integrated Health Centers (IHC), need equipped basic infrastructures, human resources and drugs, and finally budgetary resources.

Basic infrastructures are composed among others, of medical laboratories, surgery rooms, consultation rooms, the propharmacy and a mortuary. The inquiry from public health facilities (INS, 2010) reveals that on average, 08 health centers out of 10 have medical laboratories for analyses, two out of five have surgery rooms, 13% have a mortuary, 95% have a pro-pharmacy and 46.8% have tap water. It therefore appears that many health centers do not have, among other things, tap water, surgery rooms and a mortuary. The imbalance also appears when we go from one region to another. In Douala for example, 87.5% of health centers

have tap water while in the East, it is only 7.1%. In general, urban structures are more equipped than rural ones. However, it is not enough to have basic infrastructures; they still need to be equipped. The shortage of basic infrastructures creates a waiting line insofar as each patient want to be first served. Those waiting line are therefore a major motive for initiative of corrupt acts. The "FIFO" principle is no more respected that is, first arrived, first served.

According to the same survey (INS, 2010), in public hospitals in general, medical equipments, among others, are made of a delivery box, a vaccination Team, an operation table, a surgical box, a delivery table, a functional microscope and hospital beds. The same inquiry revealed that about 75.5% of health centers have delivery boxes, 88.4% have vaccination teams, 88.4% have delivery tables and 95.1% have hospital beds. Large deficits in equipments are recorded in the surgery field. Indeed, 63% of health centers do not have operation tables and 55.8% operate without a surgical box. Some equipments are unequally distributed when we go from one region to another. For example in South-West, 64.3% of health centers have a surgical box, while only 21.4% in the Littoral and East regions have it. As in the case of basic infrastructures, we notice that in general, health centers located in town are more equipped than those in rural areas, except in the case of vaccination teams where 87.5% of rural health centers are equipped against 89.2% in urban zone.

In Cameroon, the National Center for the Supply of Essential Drugs' (CENAME) role is to ensure regular supply of quality drugs at lower costs in supply intermediate structures and in public health centers' drugstores and pro-pharmacies. The CENAME has developed a plan that allows each drugstore and pro-pharmacy to procure essential drugs. However, despite this plan of drugs supply established by the CENAME, one deplores the stock shortage of all drugs in health centers. The duration of this shortage varies between 3 and 19 days. As far as the medical and paramedical personnel of these health facilities are concerned, there is a chronic shortage of staff. According to the Demographic Health Survey (DHS, 2011), the ratios are 1 medical doctor for 10,000 inhabitants against 1 nurse per 5,000 inhabitants. The

consequence of the lack of medical doctors is that six out of ten patients have not met a doctor during a consultation. The majority of them exchange with a nurse. It is in private health facilities that patients are consulted by doctors. Moreover, the majority of health workers lack motivation because of the lack of visibility into their status, their career profile and their decent wages. In particular, as most Cameroonian civil servants in the early 1990s, health care workers have experienced a drastic decrease of over 50% of their salaries. Since then, most caregivers have turned to collect bribes to regain some of their lost wages.

The survey on the monitoring of public expenditure conducted by the INS (2010) reveals that 47.5% of health facilities managers in cities have not removed themselves their expenses authorization. In rural areas, this percentage rises to 37.4%. This practice reflects the non-compliance with rules governing finance control services that provide to the only spending authority, the right to withdraw the spending authorizations of the structure for which he is responsible. Thus, the delay in the withdrawal of expenses authorizations reduced the time set for the implementation of the budget. The same survey confirms that in some regions like Adamawa or East, it takes 2.5 months after the launching of the budgetary year to access these authorizations. Also, before receiving them, managers of health facilities are sometimes pushed to ask patients to cover the costs of services that public authorities could have bore. The same survey reveals that some health facility managers pay bribes to some stakeholders (the public treasury management, the Ministry of Finance, etc.) in the expenditure channel to access spending authorizations. As concerns expenditures on medicines, office supplies and computer equipment, 32%, 37.8% and 40.4% of managers respectively have testified. In general, it therefore appears that public agents create delays or administrative harassments solely to receive bribes (Myrdal, 1968; Bardhan, 1997) from managers of health facilities. Thus, in view of the above, it could be that the deficit of nurses and medicines, the lack of infrastructure and medical equipment, and the difficulties encountered in implementing the budget instigate the medical personnel to ask patients financial contributions (non-

regulatory payments) that could be interpreted wrongly or rightly as motives for corrupt actions.

The four-column table below which we used as a working basis for our estimates identifies the region of the study in the first column; the second specifies the category of health personnel (doctors and paramedical staff) who perceives non-regulatory fees in the region concerned, the third column which is split into two specifies the source of the payment initiative (the patient or health personnel) and the fourth which shows the magnitude (in percentage) of the payments of bribes by patients on the health care market in different cameroonian regions, shows that the center is the region where the bribes are most paid, followed by the North and Littoral. On the contrary, the West and Adamawa are the least solicited regions.

Materials and method

To tackle the taking of initiatives for the corrupt actions on healthcare markets, we conceptualized the corrupt behaviors of the suppliers and users of healthcare, in other words, to propose an explanatory diagram of their behavior. This initiative taken for the corrupt act from the supply view point will be tackled through odds ratios but also, through the relative risk and differences in proportions. For each region was drawn the contingency shown in Table 1.

Table 1. *Initiative taking by the patient or health personnel for each region and the magnitude of irregular payments*

Region (R)	Authority who has perceived Non-regulatory Fees (P)	Payment Initiative du (I)		Has paid nonregulatory fees
		From the patient	From the Authority	% Yes
Douala	Medical Doctor	822	1934	3
	Paramedical Staff	2503	19308	
Yaounde	Medical Doctor	0	517	2
	Paramedical Staff	4025	10973	
Adamaoua	Medical Doctor	0	238	0,9
	Paramedical Staff	325	762	
Center	Medical Doctor	0	0	6,3
	Paramedical Staff	2200	4647	
East	Medical Doctor	0	789	1,6

	Paramedical Staff	0	757	
Far North	Medical Doctor	0	582	1,7
	Paramedical Staff	1434	1655	
Littoral	Medical Doctor	0	1549	2,6
	Paramedical Staff	623	1484	
North	Medical Doctor	572	2559	3,3
	Paramedical Staff	1745	2103	
North-West	Medical Doctor	359	0	1,9
	Paramedical Staff	0	3443	
West	Medical Doctor	0	0	0,8
	Paramedical Staff	2265	877	
South	Medical Doctor	0	57	2,3
	Paramedical Staff	596	1418	
South-West	Medical Doctor	1237	0	2,6
	Paramedical Staff	849	2022	

Sources: Table constructed and calculations done on the basis of 2007 ECAM data

Table 2. *Joint and Conditional Distributions*

Official who perceived bribes (P)	Paiement Initiative (I)	
	No	Yes
Medical staff	π_{11} ($\pi_{1/1}$)	π_{12} ($\pi_{2/1}$)
Paramedical staff	π_{21} ($\pi_{1/2}$)	π_{22} ($\pi_{2/2}$)

In Table 2, the connotations of the symbol π_{ij} (medical staff) who received bribes and who take the initiative or not and $\pi_{i/j}$ the number of officials who received bribes given the payment initiative, π_{ij} and $\pi_{i/j}$ representing respectively the joint and conditional distributions used to calculate the following odds ratios:

$$\theta = \frac{\pi 11/\pi 12}{\pi 21/\pi 22} = \frac{\pi 11\ \pi 22}{\pi 12\ \pi 21} \quad (1)$$

The numerator and denominator of the first term of this equation respectively represent the relative risks compared with responses of the payment initiative namely 'no' or 'yes'. Thus, when $1 < \theta < \alpha$, we will say that the medical staff would not tend to take more initiative for the corrupt act (or take less initiative) than the paramedical staff. In this case, at the level of the numerator of the relative risk, we will have $\pi_{11} > \pi_{1/2}$ which will be rather interpreted in terms of probability that the proportion of medical

staff not taking the payment initiative would be x times higher than that of the paramedical staff. On the contrary, if, $0<\theta<1$ we will have the opposite effect at the level of interpretations with $\pi_{11} < \pi_{1/2}$. It is worth turning now on the demand side to highlight the characteristics of patients who initiate corrupt actions.

We tackled the initiative taking for the corrupt act by patients through a Poisson distribution, given that the behavior of the latter is materialized by long waiting lines in front of the doctor's office as formerly described in the previous section. In fact, the applicant *i* who waits for his turn completely ignores the behavior of the applicant *j* who was already received by the medical doctor. In view of the above, we can consider the initiatives for the corrupt act taken by users as being random and independent from each other in time and space, the different occurrences of events apparition in a contingency table being often identified as independent random variables that follow a Poisson distribution. The taking of initiative for the corrupt act being the choice of the patient, it may be captured through the various components of a generalized linear model (GLM), this thanks to a Poisson distribution of the following form:

$$f(n_i m_i) = \frac{e^{-m_i} m_i^{n_i}}{n_i} \qquad (2)$$

Where *ni* represent the frequency of the occurrence of the event 'initiative taking for the corrupt act by users', considered as independent random variables constituting the contingency table cells, and *m=E(ni)* being the corresponding expected frequencies. This distribution can also be rewritten as:

$$f(n_i; m_i) = \exp\left[n_i \log(m_i) - m_i - \log(n!)\right]$$
$$= \exp\left[n_i \theta_i - \exp(\theta_i) - \log(n!)\right]$$
$$f(n_i; m_i) = \exp(-m_i)\left(\frac{1}{n_i!}\right)\exp\left[n_i \log(m)\right] \qquad (3\text{-}5)$$

This last expression is but the general expression of the probability distributions belonging to the family of exponential

distributions. Using the various transformations and existing functional links between the GLM components, the last expression above leads directly to the log-linear model used below in our estimates through contingency tables:

$$\log m = X\beta \tag{6}$$

x is the matrix of the model containing the values of the independent variables for N observations and β the vector the model's parameters. The response variable (the frequency of the occurrence of the event taking initiative by users) here follows a Poisson's distribution and the function of the chosen link being the log, the average parameter m of the Poisson distribution will be therefore linked to the linear predictor through the following relationship:

$$\log(m_i) = \sum_j \beta_j x_{ij} \qquad i = 1,\ldots,N. \tag{7}$$

Independent variables used and signs expected

The independent variables used in this study are mostly from the classic literature on the determinants of corruption in developing countries. These are the variables on region, place of residence, gender, standard of living; age and employment status. Thus, for each observation, we will have the following relationship:

$$\begin{aligned} log(m_i) &= \beta_0 \\ &+ \sum_j region_I(j)\,\beta_{j+} \sum_j milieu_I(j)\,\beta_{j+} \sum_j gender_I(j)\,\beta_{j+} \sum_j level_I(j)\,\beta_{j+} \sum_j age_I(j)\,\beta_{j+} \sum_j activity_I(j)\,\beta_j \end{aligned} \tag{8}$$

Each of the above mentioned variables being associated with the j[th] level of independent variables for the *observation* i namely:

$$x_i(j) = \begin{cases} 1 & If \quad x = j \\ 0 & If \quad x \# j \end{cases}$$

Gender appears to be causing the behavior towards corruption. Numerous studies carried out at the individual level emphasize that women are less tolerant than men with regard to corruption (Dollar, Fisman & Gatti, 2001; Swamy & Alii, 2001). Also, at the macroeconomic level, Dollar, Fisman & Gatti (2001) showed that countries where women's representation in politics is high are also those having the lowest levels of corruption.

Age also appears to be a factor in reducing exposure to corruption (Hunt & Lazlo, 2005; Seligson, 2006). According to Seligson (2006), young people are more often victims of corruption as they have to settle in life and thus, be more in touch with the administration. Hunt (2004) believes that older people are less victims of corruption as they have had time to create a "trust network". Gradually as life progresses, reciprocal exchanges (social capital) would replace corruption. Residential environment equally appears to be a factor that exposes people to corruption. For Seligson (2006), corruption is an urban phenomenon. Urban people are more likely to seek services from State officials than rural people who have little contact with them.

The functionalist sees corruption as a way to lubricate a system confronting a pervasive bureaucracy and regulation stifling private initiative (Bhagwati, 1982). In such an environment, those in a waiting line having higher incomes and giving more value to a fast service, tend to take the initiative to pay bribes for a privileged access. Corruption is an auction mechanism for a user to own something he values most (Cartier Bresson, 1998).

Results and discussion

The results of the empirical analysis of the taking of initiative are presented in two steps: the supply side and the demand side. The corrupt act usually takes place between the corrupt and the briber without anyone knowing who takes the initiative. We will initially establish the relationship between the health staff who collects non-regulatory fees, the origin of the payment initiative of such fees, and the region in which the corrupt act takes place (initiative taken by the suppliers). Secondly, we will focus on the demand side (initiative taken by the patients) to highlight the characteristics of patients who take the initiative for corrupt acts.

The table below shows the numbers and proportions from which the various odds ratios were estimated. It establishes the relationship between the health personnel who collects non-regulatory fees, the payment initiative that can come either from the patient or health personnel (medical or paramedical personnel), and the region in which the corrupt act takes place. We have two independent variables namely the region and the type of official who collects non-regulatory fees. The dependent variable here is the source of the payment initiative; thus, we can analyze the various corrupt behaviors between the different actors in relation to each region, the latter variable being seen as a control variable. The table also presents the proportions4 of those who take the payment initiative, and the extent of the difference in proportion of the initiative taken between patients and health personnel. Our first results show that health workers take the initiative to bribery in 83.33% of the regions while in 16.66% of cases, the initiative is taken by the patients.

Initiative taken by Providers

In the first case, we distinguish the following ten regions: Douala, Yaounde, Adamawa, Center, East, Far North, Littoral, North, North-West and South. In these regions, corruption is passive (Dommel, 2003). This result confirms the idea that (Tanzi, 1998; World Bank, 1997) corruption is "the abuse of public property for personal gain." In other words, it is the State agent and not the user who abuses public property entrusted to him/her to satisfy his/her private interests. Thus, we'll examine the side of health care providers to determine the category of officials who take initiative for the corrupt act; This will allow us to make a typology of different categories of officials who are the most corrupt by region because the frequency with which the initiative is taken varies as shown through the data in Table 3. In the Littoral for instance, estimates of the table show that among health workers, the payment initiative is about 29.25% (from 99.97 to 70.42%) higher among medical doctors than among paramedical staff, this with a relative risk of about 1.41 (99.77 / 70.42). In other words, the proportion of officials subject to corrupt actions is about 1.41 times higher (or 41% higher) for medical doctors than for other officials.

The same trends appear in the Adamawa, Yaounde, North, Far North, West and South regions. On the contrary, some regions present a greater initiative taken among the paramedical staff than among the medical staff. It is the case of Douala (a payment initiative higher by about 18.5% for the paramedical staff for a relative risk of about 1.26), Center, North-West and South-West. Finally, we observe for the Eastern Region that the magnitude of the taking of initiative for the corrupt act is almost the same for both categories of officials.

Ultimately, as shown in Table 4 below, the medical staff is the one who at the forefront, initiates at 58.3% corrupt actions in most cameroonian regions. Paramedical staffs are second because they initiate corrupt acts in 33% of regions. Our results do not allow us to conclude in favor of the first or the second in 9% of regions. Theoretically, the rank of the medical staff can be understood by the fact that they have a more important discretion power than that of the paramedical staff (Phelps, 1995). They have more knowledge than the paramedical staff. However, as Phelps (1995) stated: "he who has knowledge has power." Medical doctors have the monopoly power of consultation, prescription and treatment of patients. The paramedical staff only assists in these tasks. This monopoly allows them to take more initiative for corrupt acts. But the lack of medical doctors that characterizes the cameroonian health system gives in some regions more power to the paramedical staff than it is supposed to be. In the absence of medical staff, the paramedical consults, prescribes and treats. That is why in some Cameroonian regions as Douala and the Center, the paramedical appears as the one who takes more initiative for corrupt acts.

Table 5 shows the estimated odds ratios ($\theta_{PI/R}$) reflecting the relationship between the three variables. These odds ratios are obtained from the data in Table 1, and allow us to better understand the magnitude of the corrupt act by highlighting previous analyzes; an odds ratio $\theta_{PI/R} < 1$ will simply imply that for a given region and at the level of health personnel, the chances of the taking of initiative for the corrupt act will be higher for medical doctors than for the paramedical staff; let's note that the more $\theta_{PI/R}$ will be closer to zero, the higher the magnitude of the taking of

initiative by medical doctors, as compared to others; and an odds ratio $\theta_{PI/R} > 1$ will have the opposite effect. We notice through these odds ratios that the Littoral is the region where the chances for the initiative taken for the corrupt act by medical doctors are the highest (1250 times higher) as compared to the paramedical personnel, while in the North-West, the chances are higher for paramedical personnel (4951753 times higher) than for medical doctors. A ranking of the taking of initiative for the corrupt act by health personnel in general and by region reveals that it's in the North-West region that the rating of the initiative taken is the highest.

Some useful basic statistics for a comprehensive analysis of the initiative taken by suppliers are shown in Table 6 below; the Mantel-Haenszel statistic presents the marginal odds ratio which in its estimate ignores the control variable region. It provides a general estimate of the odds ratio of all observations. This ratio stipulates that in general, the corrupt act in the Cameroonian health system is more initiated by health personnel (medical doctors or paramedical staff) than by the patients (which corroborates with the analysis of the conditional odds ratios); However, and as some conditional odds ratios have revealed, the initiative for the corrupt act is sensibly higher (about 14%) among medical doctors than among the paramedical staff. As far as the Cochran-Mantel-Haenszel's Statistics is concerned, it allows testing the hypothesis that the taking of initiative for the corrupt act and health official who received non-regulatory fees are conditionally independent given the region. Through the probability column (p-value <.0001), we reject the hypothesis of independence to conclude that whatever the region, these two variables are related. Finally, the Breslow-Day's statistics that tests the hypothesis of homogeneity of the different conditional odds ratios has a probability (p-value) <.0001; therefore, odds ratios are different from one region to another.

Initiative taken by patients

Table 7 below gives us estimates of the taking of initiative for the corrupt act on the side of the demand, obtained by using equation 8. The table gives us information on the reliability of the

model, the importance of the main effects through likelihood maximum ratios statistics of type 3, and the coefficients of the model. The analysis of type 3 shows that with the exception of the variable milieu, all other main effects are highly significant in the taking of initiative for the corrupt act.

Socio-demographic characteristics influence the taking of initiative for the corrupt act. Thus, our estimates show that in South-West and West, the youth, that is, persons aged 39 years and under, are 7.69 times more likely to take the initiative for corruption than the old. In the same vein, workers are 3.03 times more likely to take the initiative for the corrupt act than the jobless. These results confirm the theoretical analyses. In the first case, young people are more vulnerable to corruption because they have not yet formed a "trust network". In the second case, workers can take initiatives for corruption because not only they have high incomes to do so, but in addition, in an environment where corruption is endemic, holders of important resources who give more value to time, have an interest in taking the initiative to pay bribes. In contrast, our estimates do not allow us to conclude, as predicted by the theory, namely that the phenomenon of corruption is essentially urban. Indeed, our estimates show an odds ratio sensibly equal to 1($e^{(-0.08)} = 0,92 \approx 1$). Theoretically speaking, corruption is primarily an urban phenomenon. Our estimates show that the non-poor are less likely to take the initiative than the poor. This result is contrary to the theoretical analysis. But it can be explained by the fact that faced to the non-poor, health workers take more initiative. Another result contrary to the theoretical analysis indicates that men tend to take less initiative than women. The widespread idea that women are less prone to corruption than men seem rejected. But this result is explained by the fact that in the South-West and West regions, when health workers are in front of men, they take more initiative for the corrupt act than when they are in front of women. In addition, women in the field of health express more need than men and therefore are more vulnerable to corruption (PNUD, 2011). Finally in regions, our estimates show that patients in the West region tend to take more initiative for corrupt actions than those in the South-West (their rating is about 1.8 times higher).

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Conclusion and recommendations

The main purpose of this study was to determine the actors who take the initiative for corrupt acts in the Cameroonian health care market. In general, our results show that health workers take more initiative for corrupt acts than patients on the one hand, and that corrupt actions are more initiated by the medical personnel and less by the paramedical personnel on the other. In one region, the results obtained do not allow us to conclude in favor of the first or the second. In the case where the initiative comes from health personnel, our estimates show that in seven regions, it is initiated by the medical personnel and the paramedical personnel in four regions.

In case the initiative for corrupt actions comes from the patients, it appears that socio-demographic characteristics play an important role. Young people are 7.69 times more likely to take the initiative for corruption than the oldest. In the same perspective, workers are 3.03 times more likely to take the initiative for corrupt acts than the jobless. These two results confirm the theoretical analyzes that support in the first case that young people are more vulnerable to corruption because they have not yet formed a "trust network", and in the second case, the holders of high incomes that give more value to time, have to take the initiative for the corrupt act in an environment where the regulation stifles economic activities and, most importantly, hinders the private initiative. Therefore, faced to all these corrupt practices, measures for the fight against this phenomenon may be proposed from the supply and demand view point.

In the first case, the increase of wages could reduce the attraction towards bribes without deleting them. A high salary can simply allow a civil servant to require a bigger bribe able to compensate the risk of losing what is now a quite interesting job (Tanzi, 1998, Rose-Ackerman, 1998). The study of Di Tella & Shargrodsky (2003), drawn from an experience of the fight against corruption in Buenos Aires' hospitals, shows that the impact of wages on corruption considerably depends on its detection probability. They showed that in the absence of control, an increase of wages does not affect corruption behavior; but it can be effective if it is followed by an increase in control of civil servants.

In the second case, measures should be established to favor patients to have access to health care without them being incited to take the initiative to bribe. Since our estimates revealed that those with high incomes are among those who take the initiative for corrupt act, especially when they value time, the solution may be to ensure that places in a waiting line are for instance allocated on the basis of payments reflecting the value given to a fast service (Lui, 1985). The effectiveness of such procedure depends on the extent to which the agent providing the service "has an interest" on payments made, in such a way that he is incented to speed up the service. A hospital can for example set up a double line system: a fast line, expensive, for those who value speed and a slower line for others. In this system, a part of payments "related to speed" could be used to reward civil servants for their good results (Paul, 1995). When such systems are implemented, it is important to make sure to hinder the bureaucrats to have the monopoly power they could use to extract rents from an increased amount. If the system is not carefully managed, the possibility of obtaining either bribes or performance related bonuses will simply provide the civil servants a push to impose new restrictive conditions which they then agree to steal in exchange for payment (Rose-Ackerman, 1998).

Table 3. *Relationship between (P) and (I) given (R)6*

Region (R)	Official who has perceived bribes (P)	Paiement Initiative (I)		Magnitude[7] difference (in %)
		From the patient	From the official	
Douala	Medical doctor	822.5 (29.8)	1934.5 (70.1)	
	Paramedical Staff	2503.5 (11.4)	19308 (88.6)	
	Total	3326 (13.5)	21242 (86.5)	73
Yaounde	Medical doctor	0.5 (0.10)	517.5 (99.90)	
	Paramedical Staff	4025.5 (26.9)	10973 (73.1)	
	Total	4026 (25.9)	11490 (74.1)	48.2
Adamaoua	Medical doctor	0.5 (0.21)	238.5 (99.79)	
	Paramedical Staff	325 (29.92)	762 (70.08)	
	Total	326 (25.6)	1001 (75.4)	49.8
Center	Medical doctor	0.5 (50)	0.5 (50)	
	Paramedical Staff	2200.5 (32.2)	4647.5 (67.8)	
	Total	2201 (32.1)	4648 (67.9)	35.8
East	Medical doctor	0.5 (0.06)	789.5 (99.94)	
	Paramedical Staff	0.5 (0.07)	757.5 (99.93)	
	Total	1 (0.07)	1547 (99.93)	99.86
Far North	Medical doctor	0.5 (0.09)	582.5 (99.91)	
	Paramedical Staff	1434.5 (46.4)	1655.5 (53.6)	
	Total	1435 (39)	2238 (61)	22
Littoral	Medical doctor	0.5 (0.03)	1549.5 (99.97)	
	Paramedical Staff	623.5 (29.58)	1484.5 (70.42)	
	Total	624 (17)	3034 (83)	66
North	Medical doctor	572.5 (18.3)	2559.5 (81.7)	
	Paramedical Staff	1745.5 (45.35)	2103.5 (54.7)	
	Total	2318 (33)	4663 (77)	44
North-West	Medical doctor	359.5 (99.86)	0.5 (0.14)	
	Paramedical Staff	0.5 (0.01)	3443.5 (99.99)	
	Total	360 (9.46)	3444 (90.54)	81
West	Medical doctor	0.5 (50.0)	0.5 (50.00)	
	Paramedical Staff	2265.5 (72.08)	877.5 (27.92)	
	Total	2266 (72.1)	878 (27.9)	(44.2)*
South	Medical doctor	0.5 (0.86)	57.5 (99.14)	
	Paramedical Staff	596.5 (29.6)	1418.5 (70.4)	
	Total	597 (28.8)	1476 (71.2)	42.4
South-West	Medical doctor	1237.5 (99.96)	0.5 (0.04)	
	Paramedical Staff	849.5 (29.58)	2022.5 (70.42)	
	Total	2087 (50.8)	2023 (49.2)	(1.6)*

Table 4. *Typology of regions with respect to the initiative taken*

Regions where the initiative taken by the medical staff is the highest as compared to that of the paramedical staff				*Regions where the initiative taken by the paramedical staff is the highest.*	
Region	Initiative taken for the corrupt act		Region	Initiative taken for the corrupt act	
	Relative Risk	Magnitude (in %)		Relative Risk	Magnitude (in %)
Yaounde	1.36	26.8	Douala	1.26	18.5
Adamawa	1.42	29.71	Center	1.35	17.8
Far North	1.86	46.31	North-West	714	99.85
Littoral	1.41	29.5	South-West	1760.5	70.38
North	1.5	17			
West	22	1.79			
South	28.74	1.4			

Table 5. *Typology of corrupt Regions and Relationship between (P) and (I) given (R): An estimate by the conditional odds ratios ( )*

Odds ratio ($\hat{\theta}_{PI/R}$) and IC	
Odds ratio ($\hat{\theta}_{PI/R}$)	95% confidence interval of the odds ratio ($\hat{\theta}_{PI/R}$)
$\hat{\theta}_{PI/Douala}$ =3.2790	$\hat{\theta}_{PI/Douala}$ (2.9920, 3.593)
$\hat{\theta}_{PI/Yaounde}$ =0.0026	$\hat{\theta}_{PI/Yaounde}$ (0.0002, 0.0422)
$\hat{\theta}_{PI/Adamaoua}$ =0.0049	$\hat{\theta}_{PI/Adamaoua}$ (0.0003, 0.079)
$\hat{\theta}_{PI/Center}$ =2.1120	$\hat{\theta}_{PI/Center}$ (0.0419, 106.474)
$\hat{\theta}_{PI/East}$ =0.9595	$\hat{\theta}_{PI/East}$ (0.0190, 48.41540)
$\hat{\theta}_{PI/Far North}$ =0.0010	$\hat{\theta}_{PI/Far North}$ (0.0001, 0.016)
$\hat{\theta}_{PI/Littoral}$ =0.0008	$\hat{\theta}_{PI/Littoral}$ (0.0000, 0.0123)
$\hat{\theta}_{PI/North}$ =0.2696	$\hat{\theta}_{PI/North}$ (0.2413, 0.3011)
$\hat{\theta}_{North-West}$ =4951753	$\hat{\theta}_{North-West}$ (98107.5161, 249928433)
$\hat{\theta}_{PI/West}$ =0.3873	$\hat{\theta}_{PI/West}$ (0.0077, 19.5354)
$\hat{\theta}_{PI/South}$ =0.0207	$\hat{\theta}_{PI/South}$ (0.0013, 0.3351)
$\hat{\theta}_{PI/South-West}$ =5892.51	$\hat{\theta}_{PI/South-West}$ (367.94, 94368.5)

Table 6. *Some basic statistics*

Statistics	*Value*	*Probability*
Cochran-Mantel-Haenszel	CMH = 36.0177	<.0001
Mantel-Haenszel	$\hat{\theta}_{PI} = 1.1407$	$\hat{\theta}_{PI}$ (1.0873, 1.1967)
Breslow-Day	Chisquare = 7666.9077	<.0001

Table 6B. *Equation 8 Estimates*

The GENMOD Procedure : Poisson regression
(Response Variable : initiative taken)

Model Information
Criteria For Assessing Goodness Of Fit

Criterion	DF	Value	Value/DF
Deviance	12	3400.4482	283.3707
Scaled Deviance	12	3400.4482	283.3707
Pearson Chi-Square	12	2810.5259	234.2105
Scaled Pearson X2	12	2810.5259	234.2105
Log Likelihood		-5749.2241	

LR Statistics For Type 3 Analysis

Source	DF	Chi-Square	Pr > ChiSq
region	1	165.86	<.0001
milieu	1	0.03	0.8691
sex	1	363.23	<.0001
level	1	519.30	<.0001
age	1	882.64	<.0001
activity	1	343.69	<.0001

Analysis Of Parameter Estimates

Parameter		DF	Estimate	Standard Error	Wald 95% Confidence Limits		Chi-Square	Pr > ChiSq
Intercept		1	-1.8608	0.1070	-2.0705	-1.6510	302.24	<.0001
region	West	1	0.5883	0.0469	0.6802	0.4964	157.45	<.0001
milieu	rural	1	-0.0079	0.0482	-0.1024	0.0865	0.03	0.8691
sex	male	1	-0.8726	0.0464	-0.9636	-0.7817	353.61	<.0001
level	non poor	1	-1.0811	0.0479	-1.1749	-0.9872	509.59	<.0001
age	less than 39 years	1	2.0473	0.0883	1.8742	2.2205	537.00	<.0001
activity	active	1	1.1103	0.0649	0.9831	1.2374	292.97	<.0001

N=6013

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ISBN: 978-605-7736-63-5 (e-Book)
KSP Books 2019
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e-ISBN
978-605-7736-63-5
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