

# Paying informally in the Albanian health care sector: a two-tiered stochastic frontier model

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**Abstract** Informal payments are deeply ingrained in the health care sector of most Central, Eastern and Southern European countries. Evidence suggests that the price paid informally to medical staff is negotiated either directly or indirectly between patients and medical staff. The aim of this paper is to measure the imperfect information that exists on the amount that has to be paid informally to medical staff. We measure the extent to which patients pay more than the amount medical staff expect informally and the extent to which medical staff request less than patients are willing to pay informally. A two-tiered stochastic frontier model is developed to estimate indicators of patients' and medical staff's imperfect information on informal payments and the effects on the amount the other party is minimally expecting or maximally willing to pay informally. The estimates are based on informal payments to medical staff in the inpatient health care sector in Albania. We use data from the Albania Living Standards Measurement Survey 2002 and 2005. The pooled samples include 707 individuals who have visited inpatient health care services in these 2 years. Our results show that medical staff has less information on the patients' maximum

willingness to pay informally than patients have on medical staff's minimum expected amount. These estimates do not depend on categories of illnesses but on certain socio-demographic characteristics.

**Keywords** Informal payments · Imperfect information · Stochastic model · Maximum willingness to pay informally

**JEL Classification** I11 · I19 · D82

## Introduction

Paying informally for health care services is a wide spread phenomenon in many Central, Eastern and Southern European countries [13, 16, 24, 31, 32, 35]. Generally, health care seekers are asked or expected to pay various forms of under-the-table payments to health care practitioners, which are usually defined as 'informal payments' [17, 23].

Evidence from many countries suggests that the amount paid informally, is negotiated between patients and physicians either directly or indirectly [11, 31, 35]. The process is described as an 'unofficial health care market' [32] where physicians participate directly in the negotiation process, or the negotiation is done by their 'brokers'<sup>1</sup> [36]. Despite the fact that the existence of informal payments is widely recognised, little evidence is available on the role of information that patients and physicians have, in determining the amount paid informally.

<sup>1</sup> 'Brokers' are evidenced by Vian et al. [36] as people (not necessarily medical staff) who serve as intermediaries between patients and doctors. An example can be the nurse who tells how much a patient should give to the doctor (some time this is also done by guards, etc.).

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The aim of this paper is to estimate the imperfect information that exists on the amount paid informally to medical staff for inpatient health care and measure its effect on the actual amount paid. Imperfect information in health care markets is mostly studied either from the perspective of information on medical conditions and treatment [5], or health insurance markets [1, 30]. However, physicians may (mis)use their power and market position to impose extra payments on patients. As it is often the case in post-communist countries [15], these extra payments refer to money paid informally as gifts or under-the-table payments. Both physicians and patients are aware of the ‘costs and benefits’ involved, and are active players in this ‘informal market’. Such payments allow patients to jump the queue, receive higher quality of service and sometimes to receive more care [2, 23, 24]. From an economic perspective, informal payments can be seen as a way to allocate scarce resources, where the market prevails over the rationing systems thought up by the government. The market price (or the amount paid informally) is influenced by the information that the medical staff has on the patient’s willingness to pay, and information that the patient has on the medical staff’s expected amount.

As otherwise similar patients may pay different amount informally, we focus on the information that both parties (patients and providers) have on the final amount paid. Here, the maximum willingness to pay refers to the maximum amount that the patient intends to pay, and the minimum expected amount refers to the amount medical staff at least expects to receive informally and is not related to the direct costs of health care. These are derived from variation in the actual amount paid informally. We develop a two-tiered stochastic frontier model to measure the effect of imperfect information of medical staff and patients on the amount paid informally [19, 20, 29].

We use data from the Albanian Living Standards Measurement Survey 2002 and 2005<sup>2</sup> (ALSMS) to obtain estimates of informal payments for inpatient health care service. As it is difficult to define and measure all these payments, we use data on gifts to medical staff gathered by the Albania LSMS.<sup>3</sup> We hereafter refer to these gifts as informal payments. Informal payments are widely prevalent in Albania with the largest incidence in the inpatient care services [2]. These payments account for about 25 per cent of total out-of-pocket expenditure [36] in inpatient services and 7 per cent in outpatient services [22].

<sup>2</sup> Albania Living Standard Measure Survey. World Bank. [www.worldbank.org/lsm](http://www.worldbank.org/lsm) [4].

<sup>3</sup> Albania LSMS gathers specific information on gifts made to medical staff. Such gifts are considered informal in Albania’s health care context and are not allowed by the legislation in place. We have used this as the best possible measure of informal payments in the country.

Albania has inherited a universal health care system from the communist regime with a widespread net of public health care services and limited private providers [27]. In the period 2002–2005 (when the data for our analysis were collected), the financing of the health sector in the country was fragmented, with the Health Insurance Institute paying for most of the salaries of primary care physicians, selected drugs and few high-end diagnostics [2]. All other public health care costs were covered by the Ministry of Health budget. Formal payments were limited to a small fees paid mostly for outpatient health care, while services in inpatient care were supposed to be ‘free of charge’. Despite this, the scarcity of drugs, low paid medical staff and inefficiency of the system has led to a situation where patients pay for (otherwise free) drugs or services.<sup>4</sup>

The paper is divided into six sections. Section two reviews the international empirical evidence on informal payments and discusses the main aspects of informal payments in the Albanian health care sector. Section three outlines the theoretical model, while section four and five discuss the dataset and empirical results. Section six provides the concluding remarks.

## Theoretical background

There are no studies available that have analysed imperfect information of medical staff and patients on the amount paid informally in health care. The studies reviewed here include studies on the process of paying informally (when do patients pay informally, what is paid for, to whom and how) and the determinants of informal payments and in post-communist countries.

Studies find that both patients and medical staff may influence the amount paid informally. Ensor [15] argues that one of the main types of informal payments is when medical staff misuse their power and market position to impose extra payments, (other reasons include payments for extra services due to insufficient funding). Carlton and Perloff [12] emphasise that the availability of information may influence the price of a good by lowering it.<sup>5</sup> This implies that the actual amount paid informally to medical staff is determined by the knowledge of consumers and providers about the actual ‘informal market’ price.

<sup>4</sup> Although Albanian legislation provides for free inpatient hospital care for all, out-of-pocket expenditures in the event of hospitalisation are substantial, with informal payments accounting for at least one-quarter of all payments [2].

<sup>5</sup> Carlton and Perloff [12] show that improving information can lower the prices. When information is more available customers may better estimate the real price.

We assume that determinants of the actual amount paid informally for inpatient health care services are factors related both to the demand for health care (e.g. including income or wealth, education and age), and supply side factors (e.g. quality of the physician's service and type of treatment). Patients' motives to pay informally to medical staff in hospitals are implicitly linked to patients' maximum willingness to pay informally for better quality and access to services. Looking at the attitudes of patients towards publicly provided care in Bulgaria, Pavlova et al. [28] find that individuals are willing to pay if they are offered good quality and quick access.

Wealth is usually considered an important determinant of health care demand. Evidence shows that usually those who cannot afford to pay for health care find alternative means (i.e. using saving, or borrowing money) to pay for such services [16, 31, 33]. As a result, wealth and income are believed to be less important in determining the amount paid than informal payments. Although it is usually stated that in post-communist countries, the rich pay more for health care than the poor [6, 14, 26], when it comes to the amount paid informally, no significant differences are documented between these groups [31, 34].

Age and education, as determinants of health care demand, are also believed to influence the amount of informal payments. Evidence suggests that elderly patients pay lower amounts for health care services [31] and higher educated people higher amounts [24]. However, the evidence remains mixed on how these two factors influence informal payments to medical staff, depending also on the type of services [36].

On the supply side, informal payments are believed to be triggered by restrictive circumstances like the low wages of medical staff in the public sector [14, 21, 31]. Shahriari et al. [31] argue that with the increase of the number of physicians, the equilibrium price that they charge should go down. In public health care services of most post-communist countries, the prices for services are fixed and what is observed in practise is a large variety of services that would match patients' increased expectations. Generally, the highest informal payments are observed in hospitals and the lowest payments are made to general practitioners [31]. Given the specifics of some treatments (e.g. giving births) medical staff may also be approached for an informal payment before the services are provided to secure their availability. In these cases, negotiations over the price may also be done in advance [11].

Studies looking at the determination of prices related to informal payments (in Albania or elsewhere) are limited. However, there is evidence showing that the way patients are asked for such payments vary. Based on qualitative data, a study conducted in Albania [36], reports that patients mainly get information on the amounts to be paid

by: (1) asking directly the nurse or the physician, or (2) getting information from relatives or friends who have had similar procedures. The authors also mention that the process often is not hidden at all, and in cases of inpatient treatment (i.e. surgeries), the amount is often agreed beforehand while the payment is done after the treatment or operation. The amount paid is not always fixed and is determined by certain characteristics of both parties. Attributes of patients (e.g. economic status, place of residence, political or intellectual status) and features of providers (e.g. qualification of medical staff, speciality, location of facility, etc.) influence the amount of informal payments [35].

## Methodology and model

In this section, we present the two-tiered stochastic frontier model used to measure the effect of imperfect information on informal payments in inpatient health care services, and also discuss some of its limitations.

We start by assuming that both patients and medical staff have less than perfect information about the minimum expected informal payments or maximum willingness to pay informally, respectively. The main reasons behind this imperfect information are the nature of informal health payments. Direct payments and gifts to medical staff in Albania are not legally allowed, but they are very often tolerated. However, medical staff may face legal consequences if they explicitly ask for such payments. Often, patients are aware of this, but they are also aware of the fact that without such payments, they may be denied the service, or that the quality of services delivered will be simply poorer. Given this, patients could try to get a certain quality of treatment with the lowest amount of 'gift' possible. They could try to seek good quality medical staff and pay just the 'minimum expected amount' for a particular service. However, in the absence of perfect information, patients may end up paying higher amounts than the minimum expected amount. The difference between the actual payment and the medical staff's minimum expected amount represents 'patient's ignorance'. On the other hand, the medical staff could try to maximise the profits by asking for the amount that the patient is willing to pay. However, the informal nature of such payments increases the costs of gathering information, and medical staff may also end up in getting lower amounts than the maximum that patient would be willing to pay informally. The difference between the actual payment and patient's maximum willingness to pay informally represents 'medical staff's ignorance' [19, 20].

We assume that informal payments are a linear function of characteristics of medical staff and patients,

respectively. The medical staff characteristics are represented in our model by illnesses or diseases (I). The patient's characteristics include: demographic variables (G), insurance status (S), the ln of household income (Y), level of education (E), number of days stayed in hospital (D) and whether the informal payment to medical staff was voluntary or expected/requested (R). The logarithm of the amount expected to be paid informally ( $IP^*$ ) is determined by:

$$\ln IP^* = \beta_0 + \beta_1 I_i + \beta_2 G_i + \beta_3 S_i + \beta_4 \ln Y_i + \beta_5 E_i + \beta_6 D_i + \beta_7 R_i \tag{1}$$

where  $\beta$  are coefficients that measure the impact of medical staff and patients characteristics on the amount paid informally. In our empirical analysis, we have used the natural logarithm of the amount paid informally as this yielded better fitted models.

The observed (ln) amount of informal payment  $IP$  is assumed to be stochastic and can be above or below the actual payment  $IP^*$  depending on the characteristics of patients and medical staff that we mentioned above. The size of the deviation from actual informal payment represents the effect of imperfect information of medical staff and patients. Let  $v$  (medical staff imperfect information) and  $w$  (patient imperfect information) represent respectively the negative and positive deviations of  $\ln IP^*$  and  $\eta$  represents the normal error term. The observed level of informal payments is then related to the expected level by:

$$\ln IP_i = \log IP_i^* + v_i + w_i + \eta_i \tag{2}$$

If we combine Eqs. 2 and 1, we obtain:

$$\ln IP = \beta_0 + \beta_1 I_i + \beta_2 G_i + \beta_3 S_i + \beta_4 \ln Y_i + \beta_5 E_i + \beta_6 D_i + \beta_7 R_i + \eta_i + v_i + w_i \tag{3}$$

We assume that  $v$  and  $w$  are one-sided error terms with expectations  $E(v_i) = -\mu_v < 0$  and  $E(w_i) = \mu_w > 0$ . The term  $\mu_v$  is the negative deviation of informal payment from the actual payment, which can be interpreted as medical staffs' informal market ignorance. Likewise,  $\mu_w$  is the positive or upward bias in paying informally and can be seen as representing patients' informal market ignorance.

Equation (4) constitutes a two-tiered stochastic frontier model developed by Polachek and Yoon (1987) [29]. In order to derive the likelihood function, the following assumptions regarding the error components are made:  $\eta$  has a normal distribution with zero mean and variance  $\sigma_u^2$ ;  $-v$  and  $w$  follow the exponential distribution with  $\mu_v$  and  $\mu_w$ , respectively; and  $\eta, v$  and  $w$  are independent. Polachek and Yoon [29] derive the likelihood function for this stochastic frontier model as:

$$\begin{aligned} \text{Log}L = & n \log \left( \frac{\theta_u \theta_v \theta_w}{\theta_v + \theta_w} \right) + \left[ \theta_u \theta_v \sum_i^n \varepsilon_i + \frac{n}{2} \theta_v^2 \right] + \\ & \sum_i^n \log \left\{ 1 - \Phi(\theta_u \varepsilon_i + \theta_v) + [1 - \Phi(-\theta_u \varepsilon_i + \theta_w)] \right. \\ & \left. * \exp \left[ -\frac{1}{2} (2\theta_u \varepsilon_i + \theta_v - \theta_w)(\theta_v + \theta_w) \right] \right\} \end{aligned}$$

where

$$\begin{aligned} \theta_u &= \frac{1}{\sigma_u} \\ \theta_v &= \frac{\sigma_u}{\mu_v} \\ \theta_w &= \frac{\sigma_u}{\mu_w} \\ \varepsilon_i &= \eta_i + v_i + w_i = \ln IP_i - (\beta_0 + \beta_1 I_i + \beta_2 G_i + \beta_3 S_i \\ & \quad + \beta_4 \ln Y_i + \beta_5 E_i + \beta_6 D_i + \beta_7 R_i) \end{aligned} \tag{4}$$

$\Phi(\cdot)$  is the distribution function of the standard normal distribution and  $n$  is the number of observations.  $\theta_v$  and  $\theta_w$  measure relative medical staff's and patient's informal market information, while  $\mu_v$  and  $\mu_w$  are the medical staff and patient informal market ignorance.

The disadvantage of the above model is that negative and positive stochastic deviations based on medical staff and patient informal market ignorance (measured by  $\mu_v$  and  $\mu_w$ ) are assumed to be the same for everyone. To avoid this, we have parameterised them [19, 20]. This way, we allow these parameters to vary with observable characteristics:

$$\begin{aligned} \theta_{v_i} = & \alpha_{v0} + \alpha_{v1} G_{\text{rural}} + \alpha_{v2} D_i + \alpha_{v3} R_i + \alpha_{v4} I1_i \\ & + \alpha_{v5} I2_i + \alpha_{v6} I6_i \end{aligned} \tag{5}$$

$$\begin{aligned} \theta_{w_i} = & \alpha_{w0} + \alpha_{w1} G_{\text{rural}} + \alpha_{w2} D_i + \alpha_{w3} R_i + \alpha_{w4} I1_i \\ & + \alpha_{w5} I2_i + \alpha_{w6} I6_i \end{aligned} \tag{6}$$

The first terms of Eqs. 5 and 6 represent characteristics of patients like if they come from rural areas ( $G_{\text{rural}}$ ), days spent in hospital ( $D_i$ ) and if the informal payment was requested/expected ( $R_i$ ). Other variables in these equations represent information on illnesses and diseases.  $I1, I2$  and  $I6$  represent the illness and diseases of the categories 1, 2 and 6, respectively (see Table 1 for the full list of categories of illnesses/diseases). Category 1 includes very mild conditions or no conditions; category 2 is more related to blood and cardiovascular diseases; and category 6 groups together diseases of digestive organs and those caused by infections. The choice of these categories was based on the different impact that these illnesses/diseases have on the health status but also on the characteristics of the data (categories 1 and 2 have the highest incidences among all others).

**Table 1** Diseases and illnesses grouped according to the factor analysis

Category 1 No chronic diseases; acute illness cold/flu; no acute illness	Category 1 includes very mild conditions or no conditions at all. Conditions grouped here are: acute cold/flu, having no chronic diseases, or having no acute illness.
Category 2 Chronic diseases of blood and blood producing; chronic other disability; acute illness heart	Category 2 is more related with blood and cardiovascular diseases and includes: chronic diseases of blood and blood producing organs, other chronic disabilities and acute heart conditions. All these conditions have similar consequences and affect the patients' abilities (they contribute to disability, and lower the quality of life).
Category 3 Chronic congenital abnormalities; acute illness headache	Category 3 groups together diseases which are more related with chronic anomalies and acute disorders and includes: chronic congenital abnormalities and acute headache. They all share common consequences, (i.e. constant or abrupt pain).
Category 4 Chronic diseases of respiratory organs; acute illness lung	Category 4 groups diseases which are related with respiratory organs like; chronic respiratory organs diseases, and acute lung illnesses. All these conditions have similar causes and consequences, share the same symptoms and they also may lead to irreversible conditions.
Category 5 Chronic nervous system and sense organ diseases; acute illness kidney; acute illness other trauma	Category 5 groups together conditions of the nervous system, kidney and other traumas. Conditions included here are: chronic nervous system and sense organ diseases, acute kidney illnesses and other acute traumas. They all bring psychological problems as they are associated with pain and sensitivity losses.
Category 6 Chronic infectious diseases; chronic diseases of digestive organs; acute illness stomach; acute other illness	Category 6 groups together diseases of digestive organs and those caused by infections and include: chronic infectious diseases, chronic diseases of digestive organs, acute stomach illnesses and other acute illnesses. All these conditions have similar causes (infectious diseases, immunological causes, or dietetic issues), and share similar symptoms (nausea, diarrhoea, and similar pain).
Category 7 Chronic diseases of urinary-genital system; acute illness liver; acute illness broken bone	Category 7 includes chronic diseases of urinary-genital system, acute liver illnesses, and acute broken bone illnesses. These conditions share similar consequences (broken bones are related with issues of other internal organs resulting from traumas, such as liver rupture, and urinary problems).
Category 8 Chronic endocrine diseases; acute illness diarrhoea; acute illness ear/nose/throat	Category 8 includes chronic endocrine diseases, acute diarrhoea illnesses, and acute ear/nose/throat illnesses. Most of these conditions can be seen as related to one another (i.e. diabetes causes diarrhoea, disorders of thyroids are related to difficulties in swallowing, etc.).

## Data

The data for estimating the two-tiered stochastic frontier model are taken from the Albania Living Standard Measurement Survey (ALSMS) 2002 and 2005.<sup>6</sup> These datasets

include a set of questions on health care visits and treatments concerning inpatient services, (visits to hospitals for chronic illnesses/diseases). The variables that we use in our analysis come from identical questions used in these

<sup>6</sup> LSMS is a national representative survey that collects information on different indicators of health, education, economic activities, housing and utilities for households all around Albania. The 2002 and 2005 Albania Living Standard Measurement Surveys (LSMS) provides individual level and household level socio-economic data from 3600 to 3638 households respectively drawn from urban and

Footnote 6 continued

rural areas in Albania. The sample was designed to be representative of Albania as a whole, Tirana, other urban/rural locations, and the three main agro-ecological areas (Coastal, Central, and Mountain). The survey was carried out by the Albanian Institute of Statistics (INSTAT) with the technical and financial assistance of the World Bank and the Department for International Development (DfID).



**Table 2** Sample means of individual characteristics for patients that have paid voluntary or have been requested or expected to pay informally

Variables	Voluntary informal payments		Requested or expected informal payments	
Amount of informal payments per day hospitalised (in Euros)	5.48***	(10.60)	9.78***	(22.25)
Year of survey <sup>a</sup>	0.37***	(0.48)	0.56***	(0.50)
Monthly income per capita (in Euros)	45.77	(45.01)	52.80	(74.12)
Rural resident	0.48***	(0.50)	0.61***	(0.49)
Has health insurance	0.41	(0.49)	0.39	(0.49)
Level of education <sup>b</sup>	1.40	(0.63)	1.32	(0.60)
Number of observations	312	436		

Stars indicate if the mean for the group is significantly different from the mean of other groups. Standard deviations are in brackets. \* Significant at 10% level; \*\* Significant at 5% level; \*\*\* Significant at 1% level

All prices are deflated to 2002 prices. 100 ALL = 0.73 Euros in June 2002 [8]

<sup>a</sup> Year of survey is '0' for 2002 and '1' for 2005

<sup>b</sup> Education level is categorical ('0' none education; '1' primary education; '2' secondary education; '3' university education)

2 years. Individuals are asked if they have visited inpatient health care services in the last 12 months. They have provided information on the amounts they have spent as out-of-pocket payments (including informal payment to medical staff, drugs, laboratory work, transport, and other treatment payments). Based on the information available in the survey, we have only used the information about gifts paid to medical staff in the inpatient services (hospitals).<sup>7,8</sup> The same definition is also used in other studies on informal payments in the country [2]. The data we use come from two modules of ALSMS: the individual module, and the household module. The individual module includes information on 707 individuals who visited inpatient services in 2002 and 701 individuals in 2005. For our analysis, we have omitted observations with missing values or zero amount of informal payments. Our final sample consists of 748 individuals who have visited inpatient services either in 2002 or 2005 and have paid informally. The control variables included in the models represent characteristics of the patient (demand side), type of illness/disease (see previous section and 'Appendix').

Table 2 shows the difference in characteristics between patients paying informally on voluntary bases to medical staff and those who are requested or expected. As we can see the mean value of informal payments is significantly higher for patients who have been requested or expected to pay. The value of these amounts can increase significantly when the patients are threatened not to receive the service.

<sup>7</sup> Based on broader definitions of informal payments in health care, they may include also other expenses made privately that otherwise were supposed to be free of charge (i.e. medicines purchased outside the hospital, etc.). This detailed information can not be obtained from LSMS 2002 and 2005, and therefore it is not used in this paper.

<sup>8</sup> The individual amounts of gifts paid in 2005 are deflated to reflect 2002 prices.

The share of patients being requested or expected to pay informally, is larger in 2005 (56 per cent) than in 2002 showing that the situation has become worse in 2005. The share of rural residents is much higher and statistically significant among those who have been requested or expected to pay informally (61 per cent). The difference in the level of per capita income, health insurance or level of education is not statistically significant between groups where these informal payments are voluntary and requested or expected respectively.

In order to increase the precision of the parameter estimates of our independent variables, we have reduced the number of variables on acute and chronic illnesses or diseases by running a factor analysis on the 27 different types of them. We have extracted eight factors (representing 8 groups of acute and chronic illnesses) with a factor loading 0.2 or more. In total, in both years, there are 4906 individuals who provided information on acute illnesses and 3654 on chronic illnesses. Out of these individuals, 954 individuals have reported on both acute and chronic illness during these years. To estimate the factor loadings, we have added one additional category for each variable, 'no chronic disease' (for those reporting only on chronic illness) and 'no acute illness' (for those reporting only on sudden illnesses).

Most of the factors combine diseases which are either related (categories 1 and 8), or can be symptoms of common causes (categories 4 and 6), or can have common consequences (categories 2, 3, 5, 6, 7), or have in common that they provide serious discomfort or pain (categories 5, 6, 7).

## Results

Table 3 presents the estimation results of three sets of estimates: the ordinary least square (OLS), two-tiered

**Table 3** Parameter estimates OLS and two-tiered stochastic frontier model (standard errors in brackets)

	OLS Model		Frontier Models			
			$\theta$ Constant		$\theta$ Varies	
Coefficients of the deterministic part of the equation ( $\beta$ )						
Constant term	5.011***	(0.559)	5.582***	(0.549)	5.878***	(0.641)
Household size	-0.050**	(0.025)	-0.041*	(0.023)	-0.044*	(0.023)
Civil status—married & living together	0.284**	(0.138)	0.323**	(0.137)	0.292**	(0.137)
Rural/urban area	-0.202*	(0.108)	-0.208**	(0.103)	-0.222	(0.178)
Log income per capita	0.105**	(0.048)	0.083*	(0.048)	0.076	(0.048)
University education	0.384*	(0.227)	0.383*	(0.207)	0.356*	(0.200)
Age of the individual (16–30 years old)	0.242*	(0.135)	0.209	(0.138)	0.183	(0.139)
Insurance	-0.156	(0.111)	-0.149	(0.103)	-0.129	(0.103)
Year (2002–2005)	-0.104	(0.107)	-0.115	(0.103)	-0.111	(0.102)
Category of illness 1	0.517**	(0.264)	0.511**	(0.216)	0.101	(0.447)
Category of illness 2	0.032	(0.178)	0.060	(0.165)	0.191	(0.265)
Category of illness 3	-0.451	(0.379)	-0.544	(0.356)	-0.489	(0.338)
Category of illness 4	0.018	(0.243)	-0.059	(0.240)	-0.009	(0.232)
Category of illness 5	0.159	(0.226)	0.182	(0.208)	0.169	(0.194)
Category of illness 6	0.055	(0.242)	0.029	(0.215)	-0.354	(0.762)
Category of illness 7	0.454*	(0.253)	0.498**	(0.209)	0.463**	(0.208)
Category of illness 8	-0.017	(0.251)	0.009	(0.253)	0.031	(0.242)
Requested/expected informal payment	0.489***	(0.101)	0.508***	(0.096)	0.702***	(0.199)
Nr of days hospitalised	-0.027***	(0.003)	-0.027***	(0.002)	-0.033***	(0.006)
Random error term ( $\theta_u$ )			1.066***	(0.144)	1.073***	(0.116)
Coefficient of the negative one-sided error term ( $\theta_v$ )						
Constant term			1.180***	(0.222)	1.204***	(0.288)
Rural/urban area			-	-	-0.053	(0.175)
Requested/expected informal payment			-	-	-0.169	(0.181)
Nr of days hospitalised			-	-	-0.002	(0.009)
Category of illness 1			-	-	0.446	(0.357)
Category of illness 2			-	-	-0.236	(0.370)
Category of illness 6			-	-	1.016	(3.917)
Coefficient of the negative one-sided error term ( $\theta_w$ )						
Constant term			3.124	(3.565)	4.401	(6.029)
Rural/urban area			-	-	-0.496	(1.387)
Requested/expected informal payment			-	-	0.632	(1.696)
Nr of days hospitalised			-	-	-0.016	(0.015)
Category of illness 1			-	-	-1.504	(4.496)
Category of illness 2			-	-	0.357	(1.175)
Category of illness 6			-	-	-0.825	(1.515)
Log likelihood	-1253.97		-1224.43		-1215.67	
Number of observations	748		748		748	

Standard deviations are in brackets

- \* Significant at 10% level
- \*\* Significant at 5% level
- \*\*\* Significant at 1% level

stochastic frontier model with constant terms for the one-side error terms only, and two-tiered stochastic frontier model in which the one-sided error terms vary by

different characteristics. We use the OLS model as a benchmark for the results of the two-tiered stochastic frontier estimates. The estimation results of the OLS

model and the stochastic frontier estimations show that the statistically significant parameter estimates are overall similar.

Household size appears to be negatively related to the amount paid informally and the effect is statistically significant in the three estimated models. The results are comparable to the results of other studies on the effect of household size in reducing the amount allocated for health care or informal payments [10]. Larger households can be more exposed to the risk of being sick, have less to spend per capita, and can also call upon informal care from the other family members. They are more likely to have young children or elderly individuals, and therefore, more likely to make use of health services. The same holds for people living in rural areas. Income per capita is also more likely to be low in larger households, which reduces their ability to pay.<sup>9</sup> An additional argument is the lack of a universal child benefit in Albania which makes large households more economically vulnerable.

Rural residents also appear to pay lower amounts informally. Previous evidence [35] suggests that rural residents may pay less when getting services within their village or community but they are likely to pay more when visiting facilities in big cities. Giving the limitations of our data, we cannot control for such effects.

Age is represented by dummy variables and the category 16–30 years old is tested against the other categories. The positive coefficient for this category shows that on average older individuals pay smaller amounts informally in inpatient health care services (probably because of more frequent health care visits and lower income at the same time). This is in the same line with findings of previous studies [7]. Patients who are married and living together pay higher amounts informally to medical staff compared to patients who are widowed, divorced or single. This may also indicate the extent of intra-family support through adults of working age. Higher income patients pay also higher amounts suggesting a close link between income and ability to pay [16, 18].

Higher educated people pay higher informal payments to medical staff. This can relate to the higher opportunity costs that they face when ill, which may increase their willingness to pay for health care. Higher educated people invest more in their health and are also more able to generate income and therefore can afford to pay more for better services or fast recovery [9, 25].

Health insurance decreases the amount paid informally but its effect is not always statistically significant. This

shows that such insurance is of little relevance. This is mainly because in 2002 and 2005 there was no direct and clear link between the Albanian health insurance and inpatient care services [2].

Out of eight categories of illnesses or diseases only category 1 and category 7 appear to have a statistically significant effect on the amount paid informally to medical staff. Category 1 includes very mild conditions or no conditions at all. The positive and statistically significant effect may indicate that patients who do not use health care often are more likely to pay informally if compared to other categories. Category 7 includes internal organ disorders (liver and urinary-genital system) or broken bones. The positive and statistically significant effect may indicate that patients with severe and life-threatening illnesses or diseases pay higher amounts compared to patients with milder illnesses or diseases. The lower level of significance for other categories presents evidence for the homogenous amounts paid informally for illnesses and diseases. This shows that the amount of informal payments is not much influenced by patients' illnesses or diseases.

Patients pay higher amounts informally when they are asked for or when they are expected to pay (the coefficient indicating whether the informal payments were requested is positive and statistically significant in the three models). This shows that informal payments in Albania are not 'gratitude payments' and that medical staff can influence the amount paid. The number of days hospitalised negatively influences the amount paid informally. This relationship shows that patients with more hospitalisation days may have more information on the informal amount expected from the medical staff and at the same time they may also have less income (income is negatively correlated with health status).

#### Estimation of ignorance about informal payments

The lower part of Table 3 gives the estimates of the parameterised specification of  $\theta_v$  and  $\theta_w$  when both  $\theta$ s are constant and when they vary by different characteristics. Except for the intercept in the medical staffs' equation, all other parameters are statistically not significant implying that imperfect information of medical staff and patient is virtually constant in our model and varies little by the characteristics included in the analysis. Table 4 gives the estimated values of the two one-side error terms for both medical staff and patients. We interpret these terms as indicators of the effect of imperfect information on the amount paid informally. The table gives the averages for total sample or sub-samples [19, 20]. For each individual in our sample, the observed value of the informal payment is either below or above the average value of these payments.

<sup>9</sup> A World Bank Report (Albania—Urban Growth, Migration and Poverty Reduction, World Bank 2007) [3] mentions that in 2005 on average a rural resident had about 14 per cent less per capita consumption if compared to an urban resident.



**Table 4** Imperfect information of medical staff and patients for various subgroups

	Medical staff's Imperfect information	Patient's Imperfect information
Constant	0.56	1.43
Varies by characteristics		
Total sample average	0.57	1.45
Rural area resident	0.55	1.31
Requested/expected informal payment	0.53	1.23
Nr of days hospitalised	0.56	1.29
Category of illness 1	0.64	1.47
Category of illness 2	0.51	1.24
Category of illness 6	0.70	1.35

The difference indicates the imperfect information that patients and medical staff have on the amount the other party is requesting or willing to pay respectively.

Medical staff's imperfect information:  $E(e^w) = 1 / (1 - \mu_w)$ ; Patient's imperfect information:  $E(e^v) = 1 / (1 + \mu_v)$ .

We calculate the means of medical staff and patients' imperfect information of  $v$  and  $w$  for the sample as a whole and for some specific groups.<sup>10</sup> The results indicate that imperfect information for medical staff and patient is similar when  $\theta$ s are assumed to be constant and when the  $\theta$ s vary by sample characteristics. For example, for the total sample patients pay on average 45% more than the minimum value expected by medical staff (as the error term is normalised to 1, the deviance is calculated as  $1.45 - 1 = 45\%$  for the positive error term). On the other hand, patients pay on average 43% less than the maximum that they are willing to pay informally (for the negative error term, the deviance is calculated  $1 - 0.57 = 43\%$ ). Generally, we observe that medical staff imperfect information is relatively larger than imperfect information of patients for most of the groups. This indicates that medical staff has less information on the amount that patients are willingness to pay informally than the patient has on the expected value of the medical staff.

Table 5 presents the maximum amounts that patients are willing to pay informally to medical staff, the minimum amounts that medical staff are expecting, as well as the averages of the actual amounts paid. The values calculated

in the table are based on the coefficients of imperfect information indicators in Table 4.<sup>11</sup> The results show that the highest medical staff's expected value is for the residents of rural areas who also pay the highest amount. Another category with high expected value is the one representing patients to whom informal payments are requested or expected. Medical staff in these cases can set their expectations higher than average knowing that they can impose such payments.

Illnesses categories 1, 2 and 6 do not appear to have a big impact on the medical staff minimum expected amount (though as we mentioned before they also have little explanatory power on the imperfect information of medical staff or patients).<sup>12</sup> Medical staff's expected values for all these categories appear to be lower than the total sample showing that the amount medical staff is expecting does not depend significantly on the illness but rather on other characteristics of the patients. The lowest patient's willingness to pay informally estimated in our analysis is for category 2, which includes long lasting chronic conditions showing that patients in this category are less willing to pay (as they know that such conditions will last longer).

### Discussion

Generally, the findings show that the amount paid as informal payment to medical staff is not entirely dependent on the level of income but depends also on socio-demographic characteristics (i.e. the household size, rural/urban area, education and civil status). This suggests that the final amount paid is (to a great share) prone to the particular social situation and position of the patient seeking inpatient health care. Therefore, the actual amount paid informally can be considered as the final outcome of a (explicit or implicit) negotiating process between patients and medical staff. The information that each party has on the other's minimum expected amount or maximum willingness to pay influences the actual amount paid.

We found that medical staff has less information on the patient's maximum willingness to pay informally than patients have on medical staff's minimum expected amount. This seems reasonable as patients can gather more information on the medical staff's minimum expected amount (using their personal network) than the medical staff can gather on patient's maximum willingness to pay

<sup>10</sup> Indicators on imperfect information for patients and medical staff are calculated based on Eqs. 5 and 6. Values are calculated for each observations and the table displays means for the whole sample. Different categories in the table represent the means for that subsample (i.e. imperfect information for patient living in rural is calculated taking into account only those who live in these area).

<sup>11</sup> Patient's willingness to pay informally is calculated as the realistic value paid (the average of the amount paid informally for that particular service) over the difference between hundred percent and imperfect information indicator of patients.

<sup>12</sup> Category 7 is omitted from these calculations as the model could not converge when this was included.

**Table 5** Willingness to pay informally to medical staff and amount expected by medical staff for various groups (The amount paid informally is the average per day hospitalised)

	Medical staff's minimum expected amount (in Euros)	Patient's maximum willingness to pay (in Euros)	The average of actual amount paid (in Euros)
Total sample average	5.18	14.75	8.13
Rural area resident	6.39	14.45	9.92
Requested/expected informal payment	5.33	10.52	8.13
Nr of days hospitalised	4.23	9.34	6.59
Category of illness 1	3.71	11.55	6.08
Category of illness 2	4.18	8.34	6.31
Category of illness 6	4.00	1.52	6.81

All prices are deflated to 2002 prices. 100 ALL = 0.73 Euros in June 2002 [8]

(information is more costly to obtain by medical staff than by patients). This finding is consistent with what previous studies have found on the ways that patients use to get informed on the doctor's expected informal payments [35]. We show that thanks to this information patients can reduce the amount of actual payment paid. However, the actual mean payment remains large and in all cases is larger than the medical staff's expected value. Groups like rural residents or those to whom informal payments are requested from seem to be more vulnerable to such payments as they also pay the highest amounts. It looks like medical staff is expecting much more from such patients having more information on them (e.g. knowing that patients coming from distant areas have higher opportunity costs as travelling costs and time costs are higher since hospitals are located in urban areas).

Although we have tried to use the full potential of the ALSMS data, there are some limitations to what we can actually explore on the interactions between patients and medical staff. Our data provide limited information on the specific treatment performed, and on medical staff's characteristics (i.e. position, salary, etc.). Moreover, we cannot distinguish between payments made to physicians or other medical and supporting staff. Our analysis is therefore limited only to the amounts paid informally to medical staff. This may lead to an underestimation of informal payments in Albania. The specific way the questions are asked in the ALSMS and the context of the country do not allow us to distinguish between other formal and informal payments even if other categories of out-of-pocket payments are considered.

## Conclusion

In this paper, we have shown that the actual amount paid informally to medical staff is influenced by imperfect

information that patients and medical staff have on each other maximum willingness to pay or minimum expected amount. By using a two-tiered stochastic frontier model, we have estimated indicators of such imperfect information and the effect on the actual amount paid. These indicators are an important tool in understanding how characteristics of patients or medical staff can increase or reduce informal payments. Despite the fact that patients seem to have on average better information than medical staff on the amount that the other party is requesting informally, we show that the average amount paid remains considerable and the highest payments are imposed on vulnerable group of society. Such amounts call for more measures that limit the phenomenon in the health care sector. Policymakers could use the information on expected payment or maximum willingness to pay informally to adjust the estimates on formal costs or to calculate the increase in patient's fees that would be accepted both from medical staff and patients. Future research could try to refine such measures by differentiating between different types of treatments and services.

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## Appendix

See Table 6.

**Table 6** Descriptive statistics

Variables	Mean	Std. Dev.
Informal payments made to the medical staff (in Euros) <sup>a</sup>	8.13	(18.74)
Household size	5.28	(2.00)
Civil status—married & living together	0.68	(0.46)
Civil status—widow & divorced	0.06	(0.25)
Civil status—single	0.09	(0.29)
Rural/urban area	0.55	(0.49)
Income per capita (in Euros)	50.11	(64.39)
Age of the individual (0–15 years old)	0.18	(0.38)
Age of the individual (16–30 years old)	0.21	(0.41)
Age of the individual (31–50 years old)	0.28	(0.44)
Age of the individual (51–65 years old)	0.18	(0.38)
Age of the individual (older than 65)	0.13	(0.34)
None educated	0.01	(0.11)
Primary education	0.55	(0.49)
Secondary education	0.21	(0.40)
University education	0.05	(0.21)
Health insurance	0.40	(0.49)
Year (2002–2005)	0.46	(0.49)
Category of illness 1	0.53	(0.49)
Category of illness 2	0.16	(0.37)
Category of illness 3	0.01	(0.13)
Category of illness 4	0.05	(0.23)
Category of illness 5	0.06	(0.24)
Category of illness 6	0.05	(0.23)
Category of illness 7	0.05	(0.21)
Category of illness 8	0.04	(0.21)
Requested/expected informal payment	0.58	(0.49)
Nr of days hospitalised	16.18	(19.31)
Number of observations	748	

Standard deviations are in brackets

All prices are deflated to 2002 prices. 100 ALL = 0.73 Euros in June 2002 [8]

<sup>a</sup> The amount of informal payments is the average per day hospitalised

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