Social Science & Medicine 151 (2016) 173–186

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Socioeconomic inequalities in informal payments for health care: An assessment of the 'Robin Hood' hypothesis in 33 African countries

Hyacinthe Tchewonpi Kankeu [a, *], Bruno Ventelou [a, b]

[a] Aix-Marseille University (Aix-Marseille School of Economics), CNRS & EHESS. GREQAM – Centre de la Vieille Charité, 2 Rue de la Charité, 13236, Marseille, Cedex 2, France
[b] ORS PACA, Observatoire Régional de la Santé, Provence Alpes Côte d'Azur. 23 rue Stanislas Torrents, 13006 Marseille, France

ARTICLE INFO

Article history:
Received 28 April 2015
Received in revised form
31 December 2015
Accepted 9 January 2016
Available online 13 January 2016

Keywords:
Africa
Socioeconomic inequalities
Informal payments
Supply side factors
Concentration index
Decomposition technique

ABSTRACT

In almost all African countries, informal payments are frequently made when accessing health care. Some literature suggests that the informal payment system could lead to quasi-redistribution among patients, with physicians playing a 'Robin Hood' role, subsidizing the poor at the expense of the rich. We empirically tested this assumption with data from the rounds 3 and 5 of the Afrobarometer surveys conducted in 18 and 33 African countries respectively, from 2005 to 2006 for round 3 and from 2011 to 2013 for round 5. In these surveys, nationally representative samples of people aged 18 years or more were randomly selected in each country, with sizes varying between 1048 and 2400 for round 3 and between 1190 and 2407 for round 5. We used the 'normalized' concentration index, the poor/rich gap and the odds ratio to assess the level of inequality in the payment of bribes to access care at the local public health facility and implemented two decomposition techniques to identify the contributors to the observed inequalities. We obtained that: i) the socioeconomic gradient in informal payments is in favor of the rich in almost all countries, indicating a rather regressive system; ii) this is mainly due to the socioeconomic disadvantage itself, to poor/rich differences in supply side factors like lack of medicines, absence of doctors and long waiting times, as well as regional disparities. Although essentially empirical, the paper highlights the need for African health systems to undergo substantial country-specific reforms in order to better protect the worse-off from financial risk when they seek care.

1. Introduction

Out-of-pocket expenses continue to represent important shares of total health expenditure in many low- and middle-income countries. In fact, according to the World Health Organization (2015), in 2013, out-of-pocket expenditure accounted for more than 50% of the total health financing in 35 countries. Except Singapore and Saint Kitts and Nevis, all these countries are classified as low- or middle-income by the World Bank (2015). Because of widespread corruption, low and irregular remuneration of health workers, information asymmetry between patients and care providers and other factors, important proportions of these out-of-pocket expenses are made in the form of informal payments – e.g. bribes, kickbacks – (Stringhini et al., 2009; Vian et al., 2006; Balabanova et al., 2004). These unofficial payments are generally made to access care, avoid queues, receive high quality care or express gratitude and can be initiated by the patients or the health personnel (Maestad and Mwisongo, 2011; Tatar et al., 2007; CEEHN, 2002).

Although this issue has been well studied in the literature, very little work has been done in Africa, since most existing studies mainly cover countries of Central and Eastern Europe (Chereches et al., 2013; Stepurko et al., 2010). According to Ensor and Savelyeva (1998), informal payments may lead to a quasi-redistribution, with physicians subsidizing the poor at the expense of the rich. Although Szende and Culyer (2006) who refer to this behavior as a 'Robin Hood' role showed that it was not verified in Hungary, it is interesting to confront this idea to the African context where access to health care for the poorest remains an important issue. In their paper, Ensor and Savelyeva (1998) suggest that "providers may price discriminate so that the rich are charged more than the poor". If this hypothesis is verified, informal payments would therefore lead to a redistributive systems in favor of the poorest. Following

* Corresponding author.
E-mail addresses: hyacinthe.kankeu@inserm.fr (H.T. Kankeu), bruno.ventelou@inserm.fr (B. Ventelou).

http://dx.doi.org/10.1016/j.socscimed.2016.01.015
0277-9536/

Kessel (1958) and Szende and Culyer (2006), two main reasons can make this happen. First, price discrimination can be observed because doctors represent a 'collection agency for medical charities' (the'Robin Hood' role) that charges the better-off above the marginal cost and uses the generated income to provide care at a lower cost to the worse-off. The second argument explains price discrimination by doctors from an economic perspective, since it is viewed as the rational profit-maximising behaviour of a discriminating monopolist. In fact, when informal payments are analysed in a rent-seeking model, doctors can expect the economic rent they want to extract to be higher for rich patients than for the poor. Whatever its explanation, price discrimination means that patients with higher living standards pay more than poorer patients for the same medical care (Szende and Culyer, 2006). This paper aims to study the socioeconomic gradient in demands for informal payments and in the actual payment of bribes in public health facilities in Africa. In other terms, we want to estimate the extent of living standards-related inequalities in informal payments in the selected countries and attempt to identify the main factors that contribute to these inequalities. The primary objective is not to compare countries, but to describe the distribution of informal payments along a socioeconomic scale in each country and check if this distribution is in favor of the poorest in some countries.

Measuring socioeconomic inequalities in a population's health variables is relevant since the average values often hide differences within and across subgroups. In fact, some authors have found no significant effect of the income on the probability and amount of informal payments (Kankeu et al., 2014; Tomini and Maarse, 2011; Aarva et al., 2009; CEEHN, 2002) or mitigated associations (Özgen et al., 2010; Balabanova and McKee, 2002). Therefore, there is still a need to elucidate how the occurrence of informal payments for health care is distributed among patients. Following this section is the methodology used in this work, including the data source and selected background information on the countries covered. The third section contains results and the final section presents a discussion of the results and identifies areas for further research.

2. Data and methods

2.1. Data

We use data from rounds 3 and 5 of the Afrobarometer surveys conducted in 18 and 34 African countries respectively, from March 2005 to February 2006 for round 3 and from October 2011 to June 2013 for round 5 (Afrobarometer data, 2005–2006, 2011–2013). Afrobarometer is an independent research project that produces a series of national public attitudes surveys on democracy and governance in Africa. These datasets are all publicly available and for the present work, an ethical approval was not needed. The informed consent of all interviewees was obtained and all the members of Afrobarometer country teams (fieldworkers, supervisors, data entry clerks, data manager, national investigator, etc.) had to sign a research ethics agreement. Nationally representative samples of people aged 18 years or more were randomly selected in each country, with sizes varying between 1048 and 2400 (a total of 25,397 individuals) for round 3 and between 1190 and 2407 (a total 51,605 individuals) for round 5 (Dulani et al., 2013; Afrobarometer, 2006). Interestingly, countries can be compared since a standard set of questions was asked for both rounds. Two outcome variables are considered in this paper. First, a binary variable indicating whether the individual had to make an informal payment at least once during the last 12 months when seeking care at the local health facility. The question was: *In the past year, how often, if ever, have you had to pay a bribe, give a gift, or do a favor to government officials in order to: Get treatment at a local health clinic or hospital?* The possible answers were: *Never; Once or twice; A few times; Often* and *No experience with this in the past year*. The phrasing of the question does not allow to know whether the informal payment was initiated by the patient or health workers, but it highlights the fact that the bribe was a condition of obtaining the needed health care (Peiffer and Rose, 2014). Previous research has already shown that identifying the initiator of the informal payment is important to better understand this phenomenon (Stepurko et al., 2010). With respect to this, we have considered a second binary variable indicating whether the individual has faced at least one demand for informal payments during the last 12 months (The question was: *Have you encountered any of these problems with your local public clinic or hospital during the past 12 months: Demands for illegal payments?* With the same possible answers as previously). However, this question was asked only in round 3 of the Afrobarometer surveys and is therefore not available for round 5.

The variable used as indicator of living standards or socioeconomic status is the Lived Poverty Index (LPI) which was introduced by Mattes et al. (2003) and is consistently used in Afrobarometer studies (Peiffer and Rose, 2014; Dulani et al., 2013). It is an aggregated measure of how frequently people actually go without basic necessities during the course of a year. Interviewees were asked: *"Over the past year, how often, if ever, have you or your family gone without enough – food, water, cooking fuel, cash income –"*. The possible answers were *0 = Never, 1 = Once or twice, 2 = Several times, 3 = Many times* and *4 =* Always. For each individual, this deprivation index is obtained as a simple mean of his scores on the four domains and ranges from 0 (no lived poverty) to 4 (constant absence of all basic necessities). To avoid endogeneity issues, we have excluded the question on unmet needs of medicines or medical treatment in the calculation of this index. Also, we have inverted the values for each domain, so that the LPI provides a classification of individuals from the 'poorest' (the most deprived) to the 'richest' (the least deprived). Mattes et al. (2003) have showed that national means of the LPI are strongly correlated – in terms of relative country rankings – with alternative poverty measures (e.g. GNP per capita, GNP PPP) and that the LPI also provides virtually the same cross-provincial (within a country) results as other measures. For this reason, the methodological choice made by the author of the Afrobarometer survey was to rely on the LPI which was considered as a simple and direct, measure of household living standards, especially in the context of developing countries where assessing income, expenditure or assets may require extensive questioning of relatively large household samples (Mattes et al., 2003). Such deprivation indices for individuals – with different methods of aggregation – are often used in the literature to study socioeconomic inequalities in health or social outcomes (Urbanos-Garrido, 2012; Salmond et al., 2005).

2.2. Analysis

2.2.1. Measuring inequalities

The main tool we use for our analysis is the concentration index which is a usual means of quantifying the degree of inequality in a specific variable. Here, it is used to quantify the degree to which demands and occurrences of informal payments are more concentrated towards the poor or the rich. Eq. (1) shows how the concentration index (C) can be computed with individual-level data (Wagstaff, 2005; Kakwani et al., 1997). Individuals are ranked according to their socioeconomic status (Lived Poverty Index), beginning with the most disadvantaged.

$$C = \frac{2}{n\overline{Y}} \sum_{i=1}^{n} Y_i R_i - 1 \quad (1)$$

where n is the sample size, $\overline{Y}$ is the mean of the outcome variable Y and R_i is the relative rank of the ith individual in the distribution of the socioeconomic status. From its mode of computation, the Lived Poverty Index allows many individuals to have the same value, which may lead to unstable and inconsistent estimates of the concentration index. To correct for these multiple repetitive values of the ranking welfare variable, we use an appropriate extension for grouped data proposed by Chen and Roy (2009). Also, when the outcome variable is unbounded, the concentration index lies in the interval [-1,1]: a negative value of C indicates that y is more concentrated among the poorest, a positive value of C means that Y is more concentrated towards the richest, while $C = 0$ indicates absence of inequality in the distribution of Y.

Wagstaff (2005, 2009) has shown that when the outcome variable is bounded – i.e. $Y \in [a,b]$ – (in the case with a binary variable, $a = 0$ and $b = 1$), the minimum and maximum possible values of the concentration index depend on $\overline{Y}$. In this case, he suggests a correction of the concentration index, especially when undertaking cross-country comparisons. The "normalized" concentration index proposed by Wagstaff can be computed as:

$$W = \frac{\overline{Y}(b-a)}{(b-\overline{Y})(\overline{Y}-a)} C. \quad (2)$$

To check the robustness of the results obtained with the concentration index, we also use the poor/rich gap in bribe payment rates and the odds ratio (OR), two simple and well-known measures of relative inequality (Spinakis et al., 2011; Houweling et al., 2007; Mackenbach and Kunst, 1997). For each country, we use the median LPI as a cut-off point to divide the sample into two groups: the poorest 50% and the richest 50%. The poor-rich gap is simply the rate difference between these two groups ($p^{poor} - p^{rich}$), while the odds ratio is a regression-based indicator that expresses the risk of paying bribes for health care for those at the bottom of the social hierarchy (the poorest 50%) compared with those at the top (the richest 50%) and is obtained as:

$$OR = \frac{\frac{p^{poor}}{(1-p^{poor})}}{\frac{p^{rich}}{(1-p^{rich})}} \quad (3)$$

where p^{poor} is the proportion of individuals belonging to the lowest social group who reported having had to pay bribes at least once at the local public health facility, and $p^{rich}$is that proportion for those belonging to the highest social group. An odds ratio below 1 indicates inequalities in favour of the worse-off (they are less likely to pay bribes than the better-off), while a value over 1 indicates inequalities in favour of the better-off (they are less likely to pay bribes than the worse-off) and an odds ratio equal to 1 indicates equal distribution of informal payments among all the individuals. For all the countries included in this study, we use a logistic regression to estimate the odds ratio and we adjust for some variables that have been found to be significantly associated (or can potentially be associated) with a higher or lower risk/level of informal payments (Maestad and Mwisongo, 2011; Tomini and Maarse, 2011; Özgen et al., 2010; Vian et al., 2006; Belli et al., 2004; Balabanova and McKee, 2002). These covariates are described in Table 1 and include gender, age, education, employment status, place of residence, religion, presence of a health facility in the enumeration area, lack of medicines, absent doctors and long waiting time at the local public health facility, and regional dummies (within the country). The regression model used can be written as:

$$\log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 * Poor_i + \sum_k \beta_k * X_{ki} + \varepsilon_i \quad (4)$$

where p_i is the probability that individual i has paid a bribe at least once at the local public health facility, *Poor* is a binary variable taking the value 1 if the respondent is among the poorest 50% and 0 if the respondent belongs to the richest 50%, the X_k are all the control variables included and ε is the error term. The odds ratio is obtained as the exponential of coefficientβ_1: $OR = \exp(\beta_1)$.

The use of such broad socioeconomic groups (poorest 50% and richest 50%) is not unusual in the literature (Houweling et al., 2007) and as we will see in the last part of the next section, having groups of similar sizes is interesting for the decomposition of the poor/rich gap in bribe payment rates. However, it is obvious that the real cut-off point between the poor and non-poor can differ from one country to another (even from one region to another), but we do not have the reference values to implement such a grouping strategy. We have tested an alternative grouping, comparing the poorest 20% (or 25% in certain countries) to the rest of individuals.

2.2.2. Explaining inequalities

To identify the factors explaining the observed inequalities, we carry out a decomposition of the concentration index and a decomposition of the poor/rich gap in bribe payment rates.

The decomposition of the concentration index into the contributions of explanatory factors was proposed by Wagstaff et al. (2003) in the case of a continuous outcome variable. They start with a linear model that can be written as:

$$Y_i = \sum_k \beta_k X_{ki} + \varepsilon_i \quad (5)$$

where the variables X are a set of regressors (including the indicator of socioeconomic status) associated with the outcome variable Y. Given this relationship, Wagstaff et al. write the concentration index as:

$$C = \sum_k \left(\frac{\beta_k \overline{X_k}}{\overline{Y}}\right) C_k + \frac{GC_\varepsilon}{\overline{Y}} \quad (6)$$

where $\overline{Y}$ is the mean of Y, $\overline{X_k}$ is the mean of X_k, C_k is the concentration index for X_k (defined analogously to C) and GC_ε is the generalized concentration index for ε_i. In Eq. (6), the concentration index appears to be made of two components. The first is the 'deterministic component' which is equal to a weighted sum of the concentration indices of the regressors, where the weight for a given X_k is the elasticity of Y with respect to X_k. The second is the residual component which represents the inequality in Y that cannot be explained by systematic variations in the X_k across socioeconomic groups. This decomposition method also allows to separate the contribution of each regressor to the total inequality into two parts: its effects on Y measured by the elasticity ($\frac{\beta_k \overline{X_k}}{\overline{Y}}$) and its own degree on inequality measured by its concentration index (C_k). A negative contribution means that the variable contributes to inequalities to the disadvantage of the poor.

In the present work, the outcome variable (actual payment of a bribe at least once during the last year at the local health facility) is binary. We therefore follow the approach proposed by van Doorslaer et al. (2004) in which the coefficients β_k are replaced by the marginal effects from a logistic regression model. While this approach uses a linear approximation of the non-linear

Table 1
Definition of the variables used in the study.

Variable		Description
Outcome variables		
	Demands for informal payments	Binary variable = 1 if respondent has faced at least one demand for informal payments at the local public health facility during the last year; 0 = Never faced this problem.
	Bribe payment	Binary variable = 1 if respondent has had to pay a bribe, give a gift, or do a favor to get treatment at the local public health facility at least once during the last year; 0 = Never faced this problem.
Indicator of living standards	Lived Poverty Index (LPI)	Continuous variable (from 0 to 4) indicating how often respondent (or his family) was able to secure four basic necessities of life (food, water, cooking fuel and cash income)
Other demand side factors		
	Gender	Binary variable = 1 if respondent is a man; 0 otherwise.
	Place of residence	Binary variable = 1 if respondent lives in an urban area; 0 otherwise.
	Education	Binary variable = 1 if respondent has at least secondary education; 0 otherwise.
	Age	A series of dummy variables indicating respondent's age group (18–29, 30–39, 40–49, 50–59 and ≥ 60).
	Employment status	Binary variable = 1 if respondent is working (part or full time); 0 otherwise
Region	Regional dummies	A series of binary variables indicating respondent's region.
Supply side factors		
	Presence of a health facility within easy walking distance	Binary variable = 1 if there is a health facility in respondent's primary enumeration area or within easy walking distance; 0 otherwise.
	Importance of religion	Binary variable = 1 if religion is somewhat or very important in respondent's life and = 0 if it is not at all or not very important.
	Lack of medicines	Binary variable = 1 if respondent has faced the problem of lack of medicines or other supplies at the local public health facility at least once during the last year; 0 = Never faced this problem.
	Absent doctors	Binary variable = 1 if respondent has faced the problem of absent doctors at the local public health facility at least once during the last year; 0 = Never faced this problem.
	Long waiting time	Binary variable = 1 respondent has faced the problem of long waiting time at the local public health facility at least once during the last year; 0 = Never faced this problem.

relationship between the outcome variable and regressors, it produces estimates that depend on the choice of reference groups (Yiengprugsawan et al., 2010). A less sensitive methodological alternative using coefficients from a Generalized Linear Model (GLM) with binomial distribution and identity link has been introduced by Yiengprugsawan et al., but attempts to run such models with available data were unsuccessful (convergence not achieved). This is why we implement a decomposition of the poor/rich gap in bribes payment rates as a robustness check.

For the decomposition of the poor/rich gap in bribe payment rates, we use a Blinder-Oaxaca type technique proposed by Fairlie (2005, 1999) for cases where the outcome variable is binary. With X^{poor} (X^{rich} respectively) a row vector of the independent variables among the poor (the rich respectively), $\widehat{\beta}^{poor}$ ($\widehat{\beta}^{rich}$ respectively) a vector of coefficient estimates for the poor (the rich respectively) and F the cumulative function of the logistic distribution, the decomposition of a non−linear equation $Y = F(X\widehat{\beta})$ can be expressed as:

$$\overline{Y}^{poor} - \overline{Y}^{rich} = \left[\sum_{i=1}^{N^{poor}} \frac{F\left(X_i^{poor}\widehat{\beta}^{poor}\right)}{N^{poor}} - \sum_{i=1}^{N^{rich}} \frac{F\left(X_i^{rich}\widehat{\beta}^{poor}\right)}{N^{rich}}\right] + \left[\sum_{i=1}^{N^{rich}} \frac{F\left(X_i^{rich}\widehat{\beta}^{poor}\right)}{N^{rich}} - \sum_{i=1}^{N^{rich}} \frac{F\left(X_i^{rich}\widehat{\beta}^{rich}\right)}{N^{rich}}\right] \quad (7)$$

The "poor" coefficient estimates $\widehat{\beta}^{poor}$ are used as weights for the first term and the "rich" distributions of the independent variables X_i^{rich} are used as weights for the second term, but another formulation ("rich" coefficient estimates for the first term and "poor" distributions of the independent variables for the second term) could be used. A third alternative is to weight the first term by coefficient estimates from a pooled sample of the two groups. In our analysis, we use this third weighting strategy as recommended in the literature (Fairlie, 2005). Contrary to the decomposition of the concentration index, the LPI is not included as a regressor here, since this variable was used to assign people to the two groups.

In Eq. (7), the first term in brackets represents the part of the poor/rich gap in bribe payment rates which is due to group differences in distributions of X. The second term captures the part due to differences in the group processes determining levels of Y. As we want to identify the respective contributions of demand side (gender, age, education, employment status, place of residence, religion) and supply side factors (presence of a health facility in the enumeration area, lack of medicines, absent doctors and long waiting time at the local public clinic or hospital) to the observed inequalities, the analysis focuses only on the first term. Following Fairlie (2005), the contribution of each variable to the poor/rich gap is equal to the change in the average predicted probability from replacing the 'poor' distribution with the 'rich' distribution of that variable while holding the distributions of other variables constant. Using coefficient estimates from a logit regression for a pooled sample, the contribution of the specific variable X_1 for example can be expressed as:

$$Contrib_{X_1} = \frac{1}{N^{rich}} \sum_{i=1}^{N^{rich}} \left[F\left(\widehat{\alpha}^{pooled} + X_{1i}^{poor}\widehat{\beta}_1^{pooled} + X_{2i}^{poor}\widehat{\beta}_2^{pooled}\right) - F\left(\widehat{\alpha}^{pooled} + X_{1i}^{rich}\widehat{\beta}_1^{pooled} + X_{2i}^{poor}\widehat{\beta}_2^{pooled}\right)\right] \quad (8)$$

where X_2 represents all other variables and with the assumption that $N^{rich} = N^{poor}$ and that there exists a natural one-to-one matching of "poor" and "rich" observations. If $N^{rich} \neq N^{poor}$, a sample is drawn from the larger group. Since the results depend on the specific sample, the procedure is repeated and mean results are reported. In this work, 2000 replications were performed for each country. Further details on the decomposition technique can be found in Fairlie (2005). Here, a negative contribution indicates that group differences in the variable tend to favor the poorest 50%, while a positive contribution implies that the variable contributes to the poor/rich gap to the disadvantage of the poorest 50%.

All the analyses are carried-out with Stata version 12, sampling

weights are taken into account as well as clustering at the lowest available level (e.g. region, county, district, constituency or locality, depending on the country).

2.3. Background information on studied countries

Among the 33 countries included in this study, 15 are classified as low-income economies by the World Bank (2015), while 12 are lower-middle-income economies and six are upper-middle-income economies. Data in Table 2 show a huge variability in the GDP per capita which ranges from $794 in Burundi to $18585 in Mauritius. These countries also present some notable characteristics as regards their health systems and corruption. In Table 2, the 2014 Corruption Perceptions Index shows that with the exception of Botswana, Cape Verde and Mauritius, all the countries included in this study score less than 50 (0 = Highly corrupt and 100 = Very clean), indicating a serious corruption problem (Transparency International, 2014). This perception of widespread corruption is also reflected in the health sector as highlighted in the Afrobarometer round 3 surveys where except for Cape Verde, non-negligible proportions of interviewees considered that all or most of health workers were corrupt (up to 32% in Namibia and Nigeria).

In Fig. 1, the structure of the health financing-mix highlights the important shares of out-of-pocket expenditure (≥40% for 13 countries both in 2005 and 2013) despite an overall decreasing trend clearly observed in 23 countries. In many of these countries, decisions to provide free health care or to subsidize certain health services in public facilities for the whole population or specific groups (e.g. pregnant women and children under five years) have been enacted by the government between 2005 and 2012. This may partly explain the observed decrease of household out-of-pocket expenditure in the total health financing. Only Botswana, Mozambique, and South Africa present relatively low out-of-pocket expenses as a percentage of total health expenditure with a decreasing trend from 2005 to 2013. Moreover, according to the World Health Organization (2015), social security expenditure on health in 2011–2012 were inexistent or very negligible (<1% of total health expenditure) in Benin, Burkina-Faso, Cameroon, Lesotho, Liberia, Malawi, Mali, Niger Sierra Leone, Swaziland, Uganda and Zambia. Fig. 1 also shows that only 16 countries meet the WHO norm of at least 1 physician for 10,000 populations, with Egypt, Tunisia, Algeria and Mauritius presenting the highest densities (>10 per 10,000). Benin, Burkina Faso, Burundi, Guinea, Liberia, Niger, Sierra Leone, Tanzania, and Togo cumulate very low densities of physicians (<0.5 per 10,000) and high shares of out-of-pocket expenditure (>20%).

3. Results

3.1. Description of the samples and incidence of informal payments

The samples selected in the two rounds included approximately the same proportion of men and women in each country (Table 2). For all the analyses that follow, people who had no experience with public health facilities during the past twelve months were excluded. For round 3, Table 2 shows that 58% (Cape Verde) to 95% (Botswana) of the interviewees had a contact with the public health system during the 12 months preceding the survey. For round 5, these proportions vary from 56% (Tunisia) to 94% (Algeria). Overall, relatively high proportions of interviewees had experience with public health facilities (≥70% in 15 countries for round 3 and in 28 countries for round 5) and the distributions according to gender and place of residence remain more or less the same after this restriction. Also in Table 2, the mean value of the LPI (our indicator of socioeconomic status) for those who had experience with public health facilities is very close to the mean value for the whole sample in almost all countries (exceptions are Cape Verde, Egypt, Ghana and Morocco for round 5 and Nigeria, South Africa and Zambia for round 3). This suggests that excluded individuals are neither (on average) richer nor poorer than those included in our analyses.

Table 3 highlights an important variability in the proportion of people who had to pay a bribe at least once during the last 12 months in the local public health facility (from 0.4% in Mauritius to 57.6% in Morocco for round 5 and from 0.9% in Botswana to 33.3% in Uganda for round 3). Considering the Afrobarometer round 5 surveys, this proportion is lower than 10% in 13 countries (including seven from the Southern African region), while it is greater than 40% in Liberia, Sierra Leone, Guinea, Egypt and Morocco. Noteworthy, in half of the countries already covered in round 3, there is a decreasing trend in the proportion of individuals who had to pay a bribe at least once (with Namibia and Nigeria having the largest reductions). The payment of bribes often occurs following demands by health workers. This dimension was studied only in round 3 of the Afrobarometer surveys and Fig. 2 shows that except in Botswana and Lesotho, demands for informal payments are reported by significant proportions of individuals. In Kenya, Malawi, Mozambique, Namibia, Nigeria, Tanzania, Uganda and Zambia, more than 30% of interviewees had faced at least one demand for informal payments during the 12 months preceding the survey. Moreover, these demands seem to be recurrent in many countries, since the proportion of those who reported having been often solicited by health workers for illegal payments is above 10% in Cape Verde, Kenya, Malawi, Mozambique, Tanzania and Zambia. This highlights the importance of informal payments in the relationship between patients and health professionals in Africa and makes it interesting to appraise the distribution of this phenomenon according to the socioeconomic status. In the next section, we present the estimations of the social gradient in informal payments for each of the 33 countries.

3.2. Socioeconomic inequalities in informal payments for health care

The results in Table 3 show relatively high and significant negative values of the concentration index in almost all countries, ranging from −0.356 to 0.099 for the payment of bribes in round 5, from −0.329 to 0.002 for demands for informal payments in round 3 and from −0.277 to 0.083 for the payment of bribes in round 3. This highlights that demands for informal payments as well as the actual payment of bribes are mainly concentrated among the poorest, indicating a regressive payment system in almost all countries. This disproportionate occurrence of informal payments among the poorest is also highlighted by other measures of inequality in Table 4. In fact, considering data from round 5, the proportion of individuals who had to pay bribes at least once to access health care at the local health facility is higher among the poorest 50% than among the richest 50% in all countries, except Côte d'Ivoire, Lesotho, Namibia and Swaziland. Similarly, adjusting for several demand side and supply side factors, the odds ratio in the last column of Table 4 shows that individuals belonging to the poorest 50% are significantly more likely to have paid bribes at the local public health facility in almost all countries (adjusted odd ratio > 1). The results of the alternative grouping strategy (poorest 20%–25% *versus* the rest) reported in Appendix 3 confirm that the most deprived are more likely to pay bribes.

Results of the decomposition of the concentration index are summarized in Fig. 3 and Appendix 1. The contribution of the poverty index (logarithm of the LPI) appears to be important and associated with unequal distribution of bribe payments disfavoring the poorest (negative sign as the concentration index) in almost all

Table 2
GDP per capita, corruption perceptions and total health expenditure in the 33 African countries and description of the samples.

Country	GDP per capita 2014 (Int. US$)[a]	Corruption perceptions Index 2014[a]	Total health expenditure per capita 2013 (Int. US$)[a]	Round 5								Round 3								% Who think all or most of health workers are corrupt
				Full sample				Had experience with the health system				Full sample				Had experience with the health system				
				n	Mean LPI	% Women	% Rural	n	Mean LPI (p-value[b])	% Women (p-value[c])	% Rural (p-value[c])	n	Mean LPI	% Women	% Rural	n	Mean LPI (p-value[b])	% Women (p-value[c])	% Rural (p-value[c])	
Algeria	13814	36	778	1206	3.69	50.0	33.9	1128	3.68 (0.4432)	49.8 (0.9288)	33.9 (1.0000)									
Benin	1865	39	82	1200	2.68	50.0	56.0	1037	2.70 (0.5445)	50.0 (1.0000)	54.6 (0.3644)	1198	2.55	49.9	58.1	1066	2.55 (0.8972)	49.7 (0.9025)	60.2 (0.1626)	24.8
Botswana	17531	63	851	1200	2.84	50.0	35.3	1033	2.88 (0.1310)	51.0 (0.5338)	34.3 (0.4943)	1200	3.02	49.9	56.7	1142	3.01 (0.8380)	50.1 (0.9293)	57.1 (0.7882)	12.3
Burkina Faso	1684	38	109	1200	2.21	50.0	74.0	1047	2.20 (0.6105)	50.0 (1.0000)	73.7 (0.8327)									
Burundi	794	20	62	1200	2.02	50.0	80.7	969	2.04 (0.5557)	50.4 (0.8472)	80.1 (0.6545)									
Cameroon	2965	27	138	1200	2.26	50.5	48.0	853	2.20 (0.0654)	49.8 (0.7065)	48.5 (0.7579)									
Cape Verde	6648	57	279	1208	3.06	50.7	30.5	859	3.00 (0.0358)	51.9 (0.4951)	31.9 (0.3737)	1256	3.10	49.8	52.6	725	3.12 (0.5828)	50.2 (0.8527)	51.9 (0.6826)	5.5
Côte d'Ivoire	3484	32	172	1200	2.30	50.0	48.0	858	2.27 (0.2289)	50.5 (0.8111)	46.3 (0.3218)									
Egypt	11312	37	539	1200	3.13	50.3	55.8	824	3.03 (0.0045)	47.9 (0.1743)	62.4 (0.0001)									
Ghana	4143	48	214	2400	3.34	50.0	52.3	1485	3.30 (0.0454)	48.1 (0.1461)	55.1 (0.0353)	1197	3.04	51.7	53.5	820	2.99 (0.1315)	52.6 (0.6497)	54.5 (0.5520)	16.7
Guinea	1236	25	59	1200	2.30	50.0	64.7	976	2.25 (0.0678)	49.9 (0.9745)	63.6 (0.5031)									
Kenya	2910	25	101	2399	2.76	50.0	61.7	2120	2.72 (0.0603)	49.4 (0.5872)	62.0 (0.7887)	1278	2.54	50.4	70.6	1075	2.50 (0.1246)	50.5 (0.9514)	72.7 (0.1409)	20.1
Lesotho	2614	49	297	1197	2.12	50.2	74.8	1074	2.10 (0.5789)	50.0 (0.9029)	74.2 (0.6734)	1161	2.66	50.0	65.5	982	2.66 (0.8479)	52.2 (0.1701)	65.6 (1.0000)	17.8
Liberia	979	37	88	1199	2.56	50.3	52.0	970	2.52 (0.2309)	49.5 (0.6301)	51.5 (0.7724)									
Madagascar	1437	28	58	1200	2.39	50.0	74.7	843	2.40 (0.7841)	51.2 (0.4909)	74.6 (0.9684)	1350	2.75	50.0	76.3	1000	2.72 (0.3544)	50.8 (0.6353)	76.4 (0.9703)	12.1
Malawi	815	33	90	2407	2.66	50.0	80.8	1994	2.68 (0.1958)	50.5 (0.7035)	79.3 (0.0993)	1200	2.30	50.0	86.0	979	2.33 (0.4120)	49.8 (0.9490)	86.4 (0.7472)	23.8
Mali	1733	32	122	1200	2.55	50.0	74.0	712	2.56 (0.8575)	46.2 (0.0469)	77.1 (0.0601)	1244	2.74	49.5	72.8	1145	2.75 (0.6933)	49.6 (0.9529)	72.0 (0.5066)	24.9
Mauritius	18585	54	864	1200	3.73	50.0	62.7	986	3.72 (0.4350)	49.0 (0.5451)	59.8 (0.0701)									
Morocco	7379	39	438	1200	3.42	50.0	42.5	971	3.36 (0.0327)	49.4 (0.7483)	42.3 (0.9225)									
Mozambique	1169	31	71	2400	2.73	50.0	66.0	2181	2.73 (0.8285)	49.6 (0.7159)	64.8 (0.0002)	1198	2.43	50.1	56.6	1037	2.43 (0.8139)	49.5 (0.7094)	57.0 (0.8022)	27.5
Namibia	9964	49	749	1200	2.95	49.8	58.0	818	2.95 (0.8800)	49.1 (0.7530)	54.4 (0.0399)	1200	2.92	50.3	60.0	1001	2.89 (0.2004)	51.1 (0.5911)	58.1 (0.2327)	31.9
Niger	967	35	60	1200	2.11	50.0	78.0	983	2.06 (0.1210)	49.4 (0.7498)	77.1 (0.5128)									
Nigeria	5877	27	217	2400	2.72	50.0	55.7	1912	2.71 (0.7094)	50.3 (0.8014)	55.8 (0.9084)	2363	2.75	49.9	51.3	1487	2.66 (0.0003)	50.4 (0.7557)	54.1 (0.0293)	32.0
Senegal	2312	43	96	1200	2.21	50.0	51.3	976	2.20	50.1	51.8	1200	2.46	48.4	58.7	1050	2.49	47.2	57.2	16.7

									(0.5190)	(0.9745)	(0.7732)						(0.4404)	(0.4587)	(0.3474)	
Sierra Leone	2053	31	228	1190	2.68	50.1	62.4	955	2.67	50.6	63.1									
									(0.7476)	(0.7709)	(0.6642)									
South Africa	13046	44	1121	2399	3.28	50.0	32.6	1825	3.27	50.1	34.6	2400	3.21	50.0	38.7	1689	3.10	51.3	43.2	24.7
									(0.7313)	(0.9627)	(0.0723)						(0.0001)	(0.2843)	(0.0002)	
Swaziland	6350	43	564	1200	2.61	50.1	78.0	1007	2.57	50.1	77.9									
									(0.1372)	(0.9749)	(0.9092)									
Tanzania	2591	31	126	2400	2.70	49.9	68.3	2115	2.70	49.3	68.0	1304	2.67	50.2	77.3	1192	2.67	50.0	77.2	19.4
									(0.9649)	(0.5867)	(0.7791)						(0.8940)	(0.9308)	(0.9174)	
Togo	1454	29	119	1200	2.10	50.0	57.3	863	2.06	49.4	58.5									
									(0.1731)	(0.7336)	(0.4914)									
Tunisia	11124	40	791	1200	3.33	50.0	35.0	677	3.34	48.3	35.7									
									(0.8014)	(0.3978)	(0.6871)									
Uganda	1717	26	NA	2400	2.62	50.0	85.7	2027	2.61	49.5	86.1	2400	2.50	50.0	70.0	2111	2.52	50.5	70.6	26.5
									(0.5627)	(0.6893)	(0.5684)						(0.3520)	(0.6321)	(0.5370)	
Zambia	4086	38	192	1200	2.80	50.2	56.0	929	2.82	50.6	56.9	1200	2.54	49.2	62.7	796	2.46	50.1	64.2	14.3
									(0.3239)	(0.8184)	(0.5743)						(0.0051)	(0.5951)	(0.3794)	
Zimbabwe	1859	21	NA	2400	2.59	50.0	67.0	1860	2.57	50.2	67.2	1048	2.16	50.5	67.9	980	2.14	50.4	68.7	16.7
									(0.3333)	(0.9077)	(0.9019)						(0.5454)	(0.9745)	(0.6320)	

NA: not available.

[a] Sources: World Bank (2015), Transparency International (2014) and World Health OrganizationThe 2015.

[b] Two-sided p-value of a t test comparing the mean LPI of this sub-sample to the mean LPI of the full sample.

[c] Two-sided p-value of a binomial probability test comparing the proportion of women/people in rural areas in this sub-sample to the corresponding proportion in the full sample.

countries. In Nigeria for example, the concentration index (not normalized) is −0.1866 and the contribution of the lived poverty index is −0.1120, representing 60.0% of the total inequality disfavoring the poorest. This means that socioeconomic disadvantage itself directly affects people's exposition to informal payments. The details of the decomposition (available on request) show that contribution of the LPI generally results from a negative elasticity estimated by the econometric model (the richer people are, the lower their probability to pay a bribe) multiplied by a positive concentration index (LPI unequally distributed in favor of the richest). Supply side factors also contribute to rising inequalities to the detriment of the poorest in a large majority of countries (negative sign of their contributions). In Madagascar for example, the contribution of supply side factors is −0.0545 and accounts for 40.0% of the total inequality (concentration index equals to −0.1364). The details of the decomposition reveal that these contributions generally result from positive elasticities (e.g. those who have faced the problem of lack of medicines are more likely to pay bribes) multiplied by negative concentration indices (e.g. lack of medicines is mainly reported by the poorest). Other demand side factors have lower contributions, with a negative sign in some countries and a positive sign in others. These factors are therefore not systematically associated with inequalities disfavoring the poorest. Finally, the inequalities measured by the concentration index are sensitive to the local context, since the contributions of regional dummies are associated with inequalities to the detriment of the poorest (negative sign) in most of the countries. Remarkably, the relative contribution of the different factors (e.g. contribution of supply side factors in percentage) vary across countries, indicating that poor/rich inequalities in bribe payment and the relative importance of the contributors are also sensitive to the national context.

Fig. 4 and Appendix 2 present a summary of the results of the decomposition of the poor/rich gap in bribe payment rates. Overall, these results highlight the same associations between inequalities in bribe payment and factors as with the decomposition of the concentration index. Supply side factors have positive contributions to the poor/rich gap in all countries except Lesotho, which means that poor/rich differences in the distribution of these variables are associated with increased inequalities disfavoring the poorest. In Cameroon for example, the poor/rich gap in bribe payment rates is 0.1330 and the contribution of supply side factors accounts for 0.0561, which is 42.2% of the total inequality. Regional disparities also appear to affect the inequalities in bribe payment (measured by the poor/rich gap). Their contribution is positive in about two thirds of countries. Finally, the contributions of other demand side factors are relatively low, with their sign changing from a country to another. With the alternative grouping strategy the contributions of the different factors have the same pattern than with the 50% cut-off point (see Appendix 3).

4. Discussion

The literature on informal payments for health care provides very little empirical evidence on the issue of vertical equity (Szende and Culyer, 2006). To our knowledge, this study is the first attempt to explore the question in the African context. Overall, our results show that the system of informal payments is highly regressive, meaning that proportionally, health workers ask for bribes from people with low living standards more frequently. In fact, from the concentration index, we find that demands for informal payments and the actual payment of bribes to access care in the local health facility are disproportionally concentrated among the poorest in almost all countries. This result is similar to what was observed in Hungary by Szende and Culyer (2006) and clearly refutes the

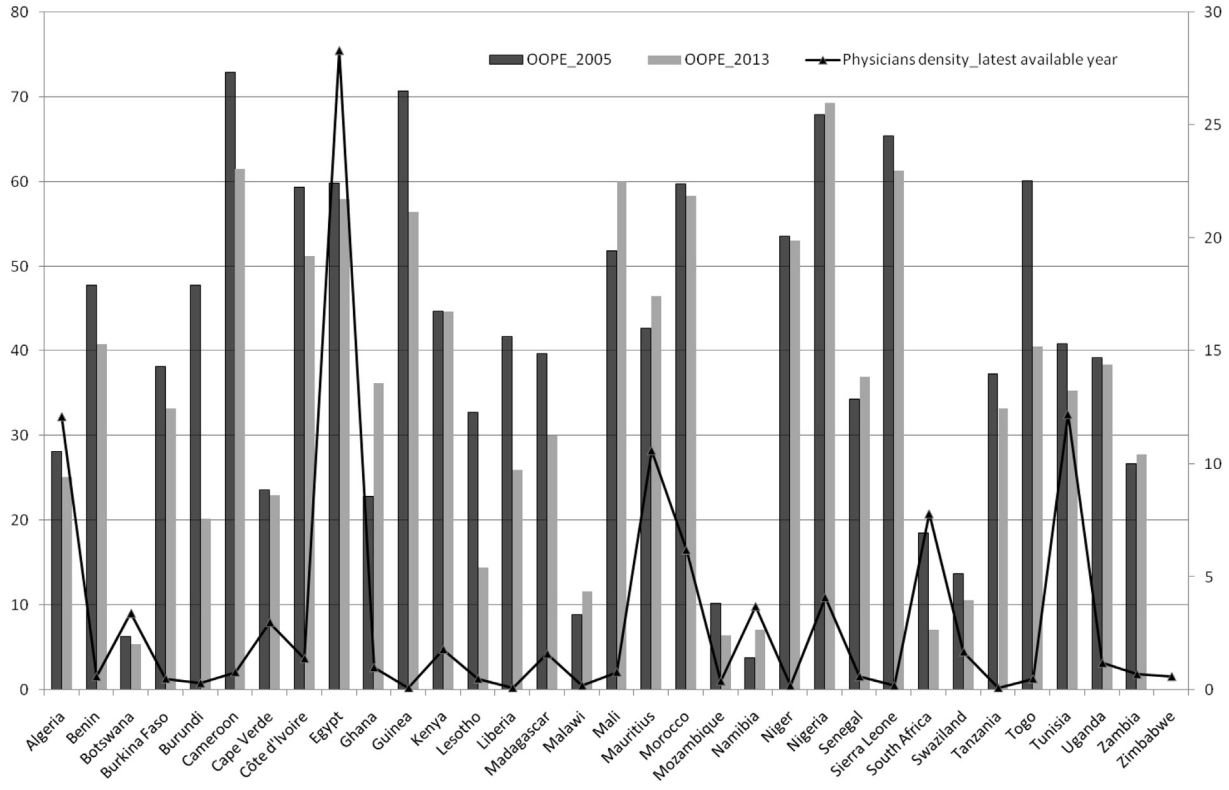

Fig. 1. Out-of-pocket expenditure (OOPE) as a percentage of total health expenditure (%) and density of physicians (per 10,000 populations). Source: WHO, 2015, 2013.

existence —at the country level-of a redistribution from the rich to the poor ('Robin Hood') through informal payments as suggested by Ensor and Savelyeva (1998). Following van Doorslaer et al. (1992), the informal payments system can therefore be considered as "unfair", in the countries included in this study, since the demands for these payments as well as the actual payment of bribes are not made according to individual's ability-to-pay.

The two decompositions implemented (on the concentration index and the poor/rich gap) show that, in a large majority of countries, supply side factors and regional disparities contribute to these inequalities in bribe payment disfavoring the poorest. The most deprived people encounter problems like the lack of medicines, the absence of doctors and long waiting times in their local health facilities more frequently than the richest and these failures are significantly associated with an increased risk of paying informally -as already found in other studies (Kankeu et al., 2014; Mokhtari and Ashtari, 2012). There is therefore a need to reduce the magnitude of these failures that were already identified in the literature as barriers to access for the poor (Lagarde et al., 2012; James et al., 2006). To the contrary, the contribution of demand side factors (excluding LPI) is very small and is not systematically associated with poor/rich inequalities (in some countries this contribution has the same sign as the concentration index or the poor/rich gap, while in others the signs are different). This means that these individual characteristics do not play an important role in the determination of inequalities in bribe payment. Meanwhile, the decomposition of the concentration index which includes the LPI as a regressor shows that it is a major contributor to inequalities disfavoring the poorest. This indicates that poor/rich differences in bribe payment also reflect directly the wealth gradient. For example, the richest may be more self-confident and more aware of what they are entitled to. This results in a higher bargaining power *vis-à-vis* health workers. Also, when facing demands for informal payments in their local public health facility, the richest may simply have more alternatives (e.g. going to the private sector or in another public facility rather than paying informally in their local one) than the poorer. This last possibility would be coherent with the theory of 'INXIT' proposed by Gaal and Mckee (2004).

The contribution of regional dummies, highlights the fact that the local context significantly affects poor/rich differences in bribe payment. This may indicate differences in health workers' rent-seeking behavior that are related to the geographic environment. For example, some authors have suggested that in certain rural areas, health workers are closer to patients and know them very well (closer ties within the community), which leads to fewer demands for informal payments (Belli et al., 2002; Thompson and Witter, 2000). As this may also reflect the effect of some relevant socio-cultural variables that are not included in our analysis, we have presented this contribution of regional dummies with the residual (unexplained) part of the decomposition.

Although the samples of the Afrobarometer surveys are nationally-representative and provided interesting data to carry out this multi-country study, some limitations should be acknowledged. First, the lack of data on the amounts of informal payments did not allow us to deepen the analysis on the financial burden from informal payments, especially for the poorest. Second, it would have been interesting to distinguish between primary and other health care services (e.g. hospital) in the analysis, as it is well known that the mechanisms related to the payment of bribes may differ according to the level of care (Vian et al., 2006; Gaal et al., 2006). Also, taking into account the number of visits at the health facility and the health status of interviewees (e.g. presence of chronic diseases) would have strengthen our analysis. The available datasets do not include these variables and their absence in our decompositions may partly explain the relatively high residual parts in certain countries. Thirdly, the data used relies on

Table 3
Occurrences of informal payments and normalized concentration indices.

Country	Round 5			Round 3					
	Had to pay a bribe at least once			Have faced at least one demand for informal payments			Had to pay a bribe at least once		
	%	CI	p-value	%	CI	p-value	%	CI	p-value
Algeria	6.1	−0.184	0.0047						
Benin	7.9	−0.141	0.0678	26.5	−0.237	<0.0001	11.9	−0.171	0.0014
Botswana	0.5	−0.350	0.0548	4.6	−0.204	0.0158	0.9	0.083	0.5035
Burkina Faso	7.7	−0.120	0.0558						
Burundi	9.2	−0.185	0.0020						
Cameroon	34.9	−0.179	<0.0001						
Cape Verde	3.8	−0.159	0.1051	19.8	−0.329	<0.0001	2.0	−0.213	0.1127
Côte d'Ivoire	23.7	−0.002	0.9617						
Egypt	53.2	−0.174	<0.0001						
Ghana	13.8	−0.032	0.4262	20.1	−0.207	<0.0001	16.1	−0.021	0.6834
Guinea	51.3	−0.195	<0.0001						
Kenya	32.2	−0.284	<0.0001	40.0	−0.229	<0.0001	30.9	−0.224	<0.0001
Lesotho	3.3	0.099	0.3400	2.9	0.002	0.9843	1.8	−0.032	0.8020
Liberia	40.3	−0.207	<0.0001						
Madagascar	19.1	−0.165	0.0008	19.5	−0.136	0.0026	15.5	−0.119	0.0131
Malawi	4.9	−0.191	0.0024	33.4	−0.111	0.0047	5.6	−0.039	0.6134
Mali	10.4	−0.135	0.0571	19.3	−0.224	<0.0001	14.0	−0.212	<0.0001
Mauritius	0.4	−0.356	0.0770						
Morocco	57.6	−0.087	0.0161						
Mozambique	24.7	−0.149	<0.0001	31.6	−0.153	0.0001	28.9	−0.184	<0.0001
Namibia	2.6	−0.087	0.4864	39.8	−0.217	<0.0001	25.0	0.007	0.8723
Niger	23.3	−0.194	<0.0001						
Nigeria	18.3	−0.256	<0.0001	45.3	−0.19	<0.0001	30.9	−0.165	<0.0001
Senegal	10.9	−0.226	0.0002	26.0	−0.088	0.0315	8.9	−0.277	<0.0001
Sierra Leone	50.7	−0.186	<0.0001						
South Africa	11.8	−0.127	0.0030	15.4	−0.145	0.0001	9.5	−0.116	0.0190
Swaziland	2.9	0.028	0.8262						
Tanzania	29.2	−0.213	<0.0001	32.5	−0.145	<0.0001	18.0	−0.128	0.0033
Togo	17.1	−0.080	0.1131						
Tunisia	9.7	−0.256	0.0003						
Uganda	36.3	−0.145	<0.0001	47.8	−0.139	<0.0001	33.3	−0.142	<0.0001
Zambia	7.9	−0.063	0.3783	31.4	−0.177	0.0001	12.1	−0.044	0.4044
Zimbabwe	14.8	−0.159	<0.0001	17.6	−0.074	0.1536	13.6	−0.029	0.5783

CI: the normalized concentration index; P-value: computed on the crude concentration index.

individuals' declarations and one may wonder about the accuracy of responses. However, there is no reason to think that the interviewees systematically distorted their responses, since the environment of the surveys (not in health facilities) does not allow to envisage pressure from health staff from example (Stepurko et al., 2010). Finally, although the cross-subsidizing effect (depicted as a "Robin Hood" behavior by Szende and Culyer (2006)) appears to be irrelevant at the national level, it is not impossible that some doctors (especially in private practice) actually apply price discrimination by setting their fees according to the living standards of the patients as observed elsewhere (Belli et al., 2002; Kessel, 1958). To test this hypothesis at the level of doctors, we would need appropriate microdata.

In the context of sub-Saharan Africa where many other barriers can prevent the poorest to access health care, our findings reveal some important policy issues. The disproportionate burden of informal payments on the worse-off highlights the need to ensure a better financial risk protection to the poorest patients. Social health insurance and other pre-paid mechanisms targeting specific vulnerable groups (e.g. vouchers) are potential instruments that can be used to this end. Many studies have found these schemes significant in reducing financial barriers, at least the official part, and improving health care utilization (Ranson, 2002; Devadasan et al., 2007; Richard et al., 2010; Warren et al., 2011; Liang et al., 2012; Nguyen et al., 2012; Obare et al., 2013a,b; Bellows et al., 2013, Brody et al., 2013). Moreover, Mokhtari and Ashtari (2012) have shown that insured patients in Moldova were significantly less likely to leave informal payments and Özgen et al. (2010) found uninsured people to have the highest risk to make informal payments compared to those covered by an insurance scheme. Some qualitative studies based on face-to-face semi-structured interviews also show that for people, introducing health insurance can be an effective way to reduce informal payments. In Bulgaria for example, Balabanova and McKee (2002) have found that the introduction of health insurance (compulsory or voluntary) was one of the most suggested solutions to reduce informal payments. A similar result was obtained in Ukraine where the vast majority of respondents were found to believe that introducing social health insurance can solve the problem (Stepurko et al., 2013). It is obvious that even insured people can still pay informally as shown by Özgen et al. (2010), but the magnitude of the problem would certainly be reduced thanks to the following channels: (i) insurance empowers patients through increased awareness about their entitlements. They are therefore more informed and better know what they have to pay and what they do not have to pay (Mokhtari and Ashtari, 2012; Belli et al., 2004); (ii) insurance reduces the number and the amount of financial transactions between patients and health care providers. This reduces opportunities for health workers to ask for additional payments; (iii) insurance can contribute to strengthen the financial solvability of providers, therefore reducing incentives to charge patients informally. Funding shortages and the under-funding of health services are known to be important underlying factors explaining the existence of informal payments (Belli et al., 2004; Balabanova and McKee, 2002).

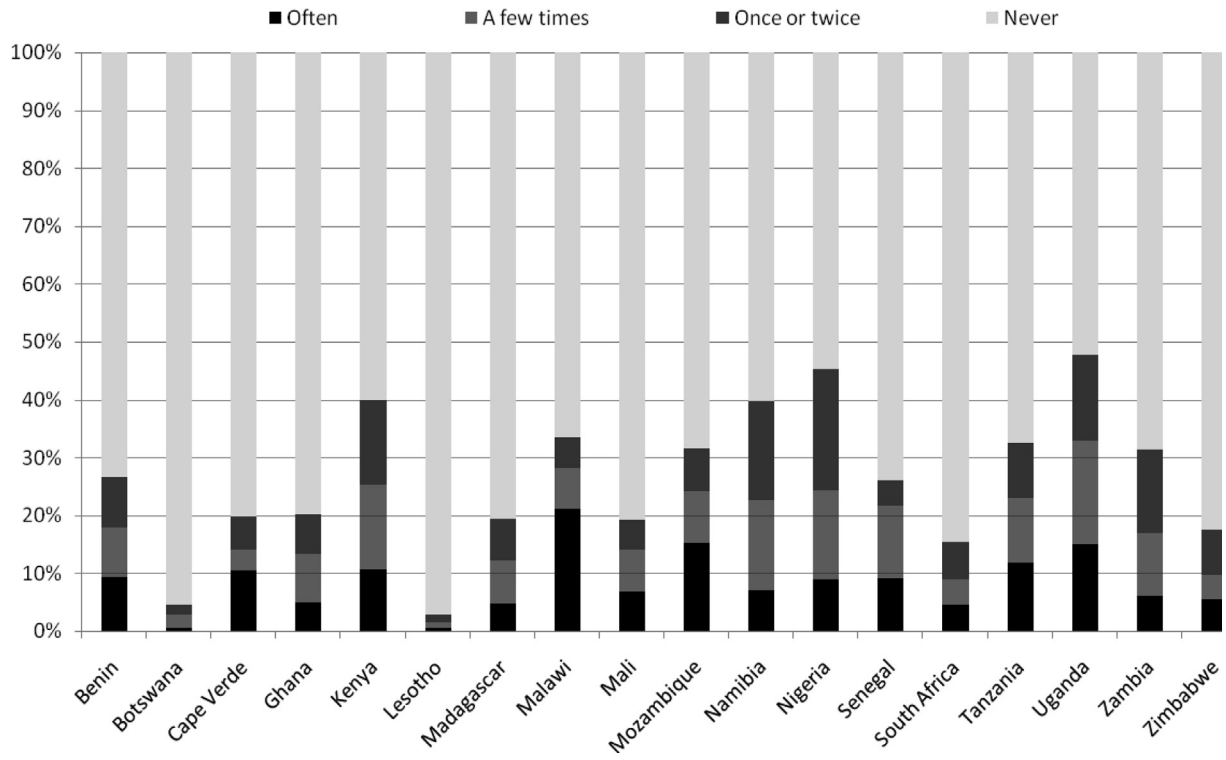

Fig. 2. Occurrences of demands for informal payments in public health facilities during the last 12 months (Round 3, 2005–2006).

Table 4
Poor/Rich differences in the occurrence of informal payments.

Proportion who had to pay a bribe at least once				
Country	Poorest 50%	Richest 50%	Gap	Adjusted odds ratio (95% CI)
Algeria	0.0593	0.0293	0.0300	1.72 (0.85–3.45)
Benin	0.0926	0.0699	0.0226	1.00 (0.58–1.72)
Botswana	0.0068	0.0010	0.0058	28.75 (–)
Burkina Faso	0.0905	0.0668	0.0237	0.92 (0.54–1.57)
Burundi	0.1034	0.0688	0.0345	1.41 (0.86–2.31)
Cameroon	0.4395	0.3065	0.1330	1.48 (0.94–2.33)
Cape Verde	0.0661	0.0287	0.0374	2.13 (0.78–5.84)
Côte d'Ivoire	0.2428	0.2607	−0.0179	0.85 (0.66–1.08)
Egypt	0.6320	0.5026	0.1294	1.20 (0.66–2.18)
Ghana	0.1278	0.1075	0.0203	1.16 (0.76–1.77)
Guinea	0.6038	0.4725	0.1313	1.38 (0.94–2.03)
Kenya	0.4483	0.2376	0.2108	1.93 (1.50–2.48)
Lesotho	0.0333	0.0474	−0.0141	0.87 (0.42–1.79)
Liberia	0.4728	0.3439	0.1289	1.40 (1.00–1.98)
Madagascar	0.2460	0.1699	0.0762	1.39 (0.86–2.27)
Malawi	0.0683	0.0256	0.0427	1.70 (0.93–3.08)
Mali	0.1196	0.0915	0.0281	2.02 (1.22–3.36)
Mauritius	0.0075	0.0016	0.0059	4.58 (0.47–45.04)
Morocco	0.6362	0.5745	0.0617	1.13 (0.72–1.78)
Mozambique	0.3031	0.2052	0.0979	1.66 (1.19–2.33)
Namibia	0.0282	0.0316	−0.0035	1.21 (0.48–3.05)
Niger	0.2641	0.1977	0.0664	1.17 (0.72–1.90)
Nigeria	0.2545	0.1388	0.1157	1.71 (1.08–2.70)
Senegal	0.1409	0.0921	0.0487	1.38 (0.86–2.22)
Sierra Leone	0.5810	0.4567	0.1243	1.55 (0.69–3.46)
South Africa	0.1426	0.1143	0.0283	1.17 (0.64–2.11)
Swaziland	0.0273	0.0289	−0.0015	0.64 (0.25–1.66)
Tanzania	0.3604	0.2236	0.1368	1.54 (1.03–2.32)
Togo	0.1896	0.1459	0.0437	1.54 (1.03–2.32)
Tunisia	0.1398	0.0649	0.0748	2.47 (1.20–5.08)
Uganda	0.4384	0.3175	0.1209	1.43 (1.01–2.01)
Zambia	0.0784	0.0698	0.0086	1.28 (0.63–2.62)
Zimbabwe	0.1951	0.1274	0.0677	1.23 (0.82–1.85)

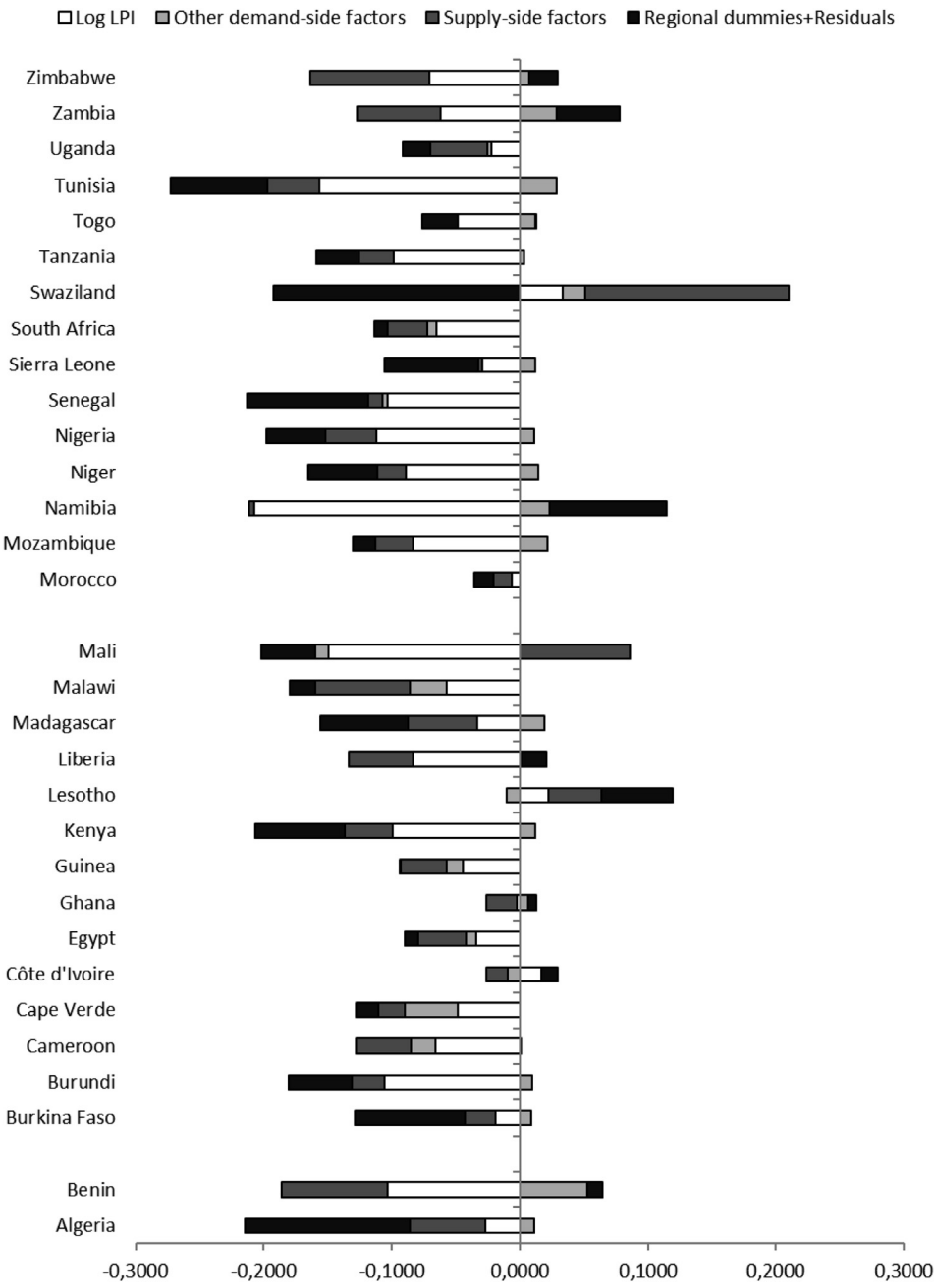

Fig. 3. Decomposition of the concentration index into contributions of factors.

Finally, we have found an important variability of bribe payment rates and of relative contributions of factors across countries, as well as significant contributions of regional dummies in many countries. This implies that the conception and implementation of policies aiming to reduce informal payments and the related inequities should take into account the context of the country as well as socio-cultural specificities of each region in the country.

5. Conclusions

This multi-country study is the first attempt to examine the social gradient in informal payments for health care in Africa as well as the potential contributors to the observed inequalities. Our results show that overall, the occurrence of informal payments exhibit a distribution that puts the poorest at a disadvantage, contrary to the hypothesis of a pro-poor cross-subsidization suggested by some authors. Furthermore, poor/rich differences in supply side factors such as lack of medicines, absence of doctors and long waiting times, as well as regional disparities and the socioeconomic disadvantage itself are found to be the main drivers of these inequalities. This highlights the need for African health systems to undergo substantial country-specific reforms in order to better protect the worse-off from financial risk when they seek care.

Although the study is representative of the 33 African countries included, there is still room for further research to better understand the socioeconomic inequalities in informal payments for health care. Particularly, future research should take into account

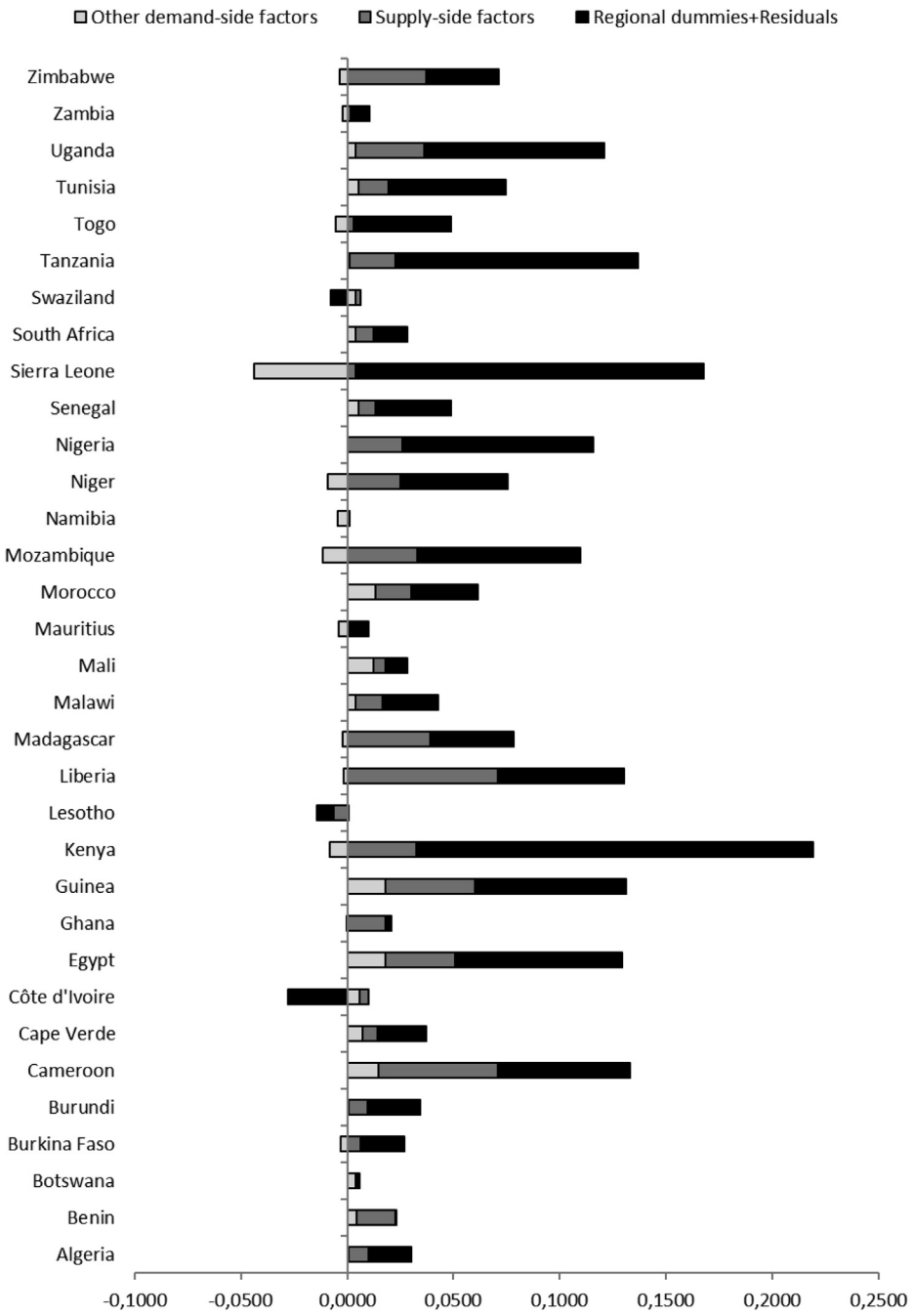

Fig. 4. Decomposition of the poor/rich gap into contributions of factors.

the level of care (e.g. primary vs. hospital), the number of visits, the amount of the informal payment (in addition to the occurrence) and an alternative measure of socioeconomic status. Indeed, it would be informative to study the social gradient in informal payments for health care using classical indicators of living standards (e.g. household expenditure, assets-based wealth index) rather than the Lived Poverty Index. Finally, as no geographical pattern is observed at the continent level and since within country regional disparities appear to play an important role, qualitative studies would be useful to better understand this complex phenomenon. This involves the collection of suitable microdata, which can be a great challenge in the context of low- and middle-income countries.

Acknowledgements

The authors would like to thank the Afrobarometer research projet, copyright holder of the data used in this paper and the "Emerging Voices for Global Health" training programme. We are also grateful to Maame Esi Woode, PhD, Jean-Benoît Falisse, PhD, and two anonymous reviewers for their helpful comments and suggestions on earlier versions of the paper.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2016.01.015.

References

Aarva, P., Ilchenko, I., Gorobets, P., Rogacheva, A., 2009. Formal and informal payments in health care facilities in two Russian cities, Tyumen and Lipetsk. Health Policy Plan. 24, 395–405. http://dx.doi.org/10.1093/heapol/czp029.

Afrobarometer, 2006. The Status of Democracy, 2005-2006: Findings from Afrobarometer Round 3 for 18 Countries. Briefing Paper No 40.

Afrobarometer data, 2005–2006, Round 3. URL: http://www.afrobarometer.org/.

Afrobarometer data, 2011–2013, Round 5. URL: http://www.afrobarometer.org/.

Balabanova, D., McKee, M., 2002. Understanding informal payments for health care: the example of Bulgaria. Health Policy 62, 243–273.

Balabanova, D., McKee, M., Pomerleau, J., Rose, R., Haerpfer, C., 2004. Health service utilization in the former soviet union: evidence from eight countries. Health Serv. Res. 39, 1927–1950. http://dx.doi.org/10.1111/j.1475-6773.2004.00326.x.

Belli, P., Shahriari, H., Group, C.M., 2002. Qualitative Study on Informal Payments for Health Services in Georgia. World Bank, Washington, DC.

Belli, P., Gotsadze, G., Shahriari, H., 2004. Out-of-pocket and informal payments in health sector: evidence from Georgia. Health Policy 70, 109–123. http://dx.doi.org/10.1016/j.healthpol.2004.03.007.

Bellows, B., Kyobutungi, C., Mutua, M.K., Warren, C., Ezeh, A., 2013. Increase in facility-based deliveries associated with a maternal health voucher programme in informal settlements in Nairobi, Kenya. Health Policy Plan. 28, 134–142. http://dx.doi.org/10.1093/heapol/czs030.

Brody, C.M., Bellows, N., Campbell, M., Potts, M., 2013. The impact of vouchers on the use and quality of health care in developing countries: a systematic review. Glob. Public Health 8, 363–388. http://dx.doi.org/10.1080/17441692.2012.759254.

Central and Eastern European Health Network, 2002. Formal and Informal Household Spending on Health: A Multicountry Study in Central and Eastern Europe. CEEHN report. http://www.hsph.harvard.edu/ihsg/publications/pdf/lac/MerckReportFINAL.pdf (accessed 10.09.14).

Chen, Z., Roy, K., 2009. Calculating concentration index with repetitive values of indicators of economic welfare. J. Health Econ. 28, 169–175. http://dx.doi.org/10.1016/j.jhealeco.2008.09.004.

Chereches, R.M., Ungureanu, M.I., Sandu, P., Rus, I.A., 2013. Defining informal payments in healthcare: a systematic review. Health Policy 110, 105–114. http://dx.doi.org/10.1016/j.healthpol.2013.01.010.

Devadasan, N., Criel, B., Van Damme, W., Ranson, K., Van der Stuyft, P., 2007. Indian community health insurance schemes provide partial protection against catastrophic health expenditure. BMC Health Serv. Res. 7, 43. http://dx.doi.org/10.1186/1472-6963-7-43.

Dulani, B., Mattes, R., Logan, C., 2013. After a Decade of Growth in Africa, Little Change in Poverty at the Grassroots. Afrobarometer Policy Brief No 1.

Ensor, T., Savelyeva, L., 1998. Informal payments for health care in the Former Soviet Union: some evidence from Kazakstan. Health Policy Plan. 13, 41–49.

Fairlie, R.W., 1999. The absence of the African-American owned business: an analysis of the dynamics of self-employment. J. Labor Econ. 17, 80–108. http://dx.doi.org/10.1086/209914.

Fairlie, R.W., 2005. An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. J. Econ. Soc. Meas. 30, 305–316.

Gaal, P., Evetovits, T., McKee, M., 2006. Informal payment for health care: evidence from Hungary. Health Policy 77, 86–102. http://dx.doi.org/10.1016/j.healthpol.2005.07.024.

Gaal, P., McKee, M., 2004. Informal payment for health care and the theory of 'INXIT'. Int. J. Health Plann. Manage 19, 163–178.

Houweling, T.A., Ronsmans, C., Campbell, O.M., Kunst, A.E., 2007. Huge poor-rich inequalities in maternity care: an international comparative study of maternity and child care in developing countries. Bull. World Health Organ. 85, 745–754.

James, C.D., Hanson, K., McPake, B., Balabanova, D., Gwatkin, D., Hopwood, I., Kirunga, C., Knippenberg, R., Meessen, B., Morris, S.S., Preker, A., Souteyrand, Y., Tibouti, A., Villeneuve, P., Xu, K., 2006. To retain or remove user fees?: reflections on the current debate in low- and middle-income countries. Appl. Health Econ. Health Policy 5, 137–153.

Kakwani, N., Wagstaff, A., van Doorslaer, E., 1997. Socioeconomic inequalities in health: measurement, computation, and statistical inference. J. Econ. 77, 87–103. http://dx.doi.org/10.1016/S0304-4076(96)01807-6.

Kankeu, H.T., Boyer, S., Fodjo Toukam, R., Abu-Zaineh, M., 2014. How do supply side factors influence informal payments for healthcare? the case of HIV patients in Cameroon. Int. J. Health Plan. Manag. http://dx.doi.org/10.1002/hpm.2266.

Kessel, R.A., 1958. Price discrimination in medicine. J. Law Econ. 1, 20–53.

Lagarde, M., Barroy, H., Palmer, N., 2012. Assessing the effects of removing user fees in Zambia and Niger. J. Health Serv. Res. Policy 17, 30–36. http://dx.doi.org/10.1258/jhsrp.2011.010166.

Liang, X., Guo, H., Jin, C., Peng, X., Zhang, X., 2012. The effect of new cooperative medical scheme on health outcomes and alleviating catastrophic health expenditure in China: a systematic review. PLoS One 7, e40850. http://dx.doi.org/10.1371/journal.pone.0040850.

Mackenbach, J.P., Kunst, A.E., 1997. Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe. Soc. Sci. Med. 44, 757–771.

Mattes, R., Bratton, M., Yul, D.D., 2003. Poverty, Survival and Democracy in Southern Africa. Afrobarometer Working Paper No 23.

Mokhtari, M., Ashtari, M., 2012. Reducing informal payments in the health care system: evidence from a large patient satisfaction survey. J. Asian Econ. 23, 189–200.

Mæstad, O., Mwisongo, A., 2011. Informal payments and the quality of health care: mechanisms revealed by Tanzanian health workers. Health Policy 99, 107–115. http://dx.doi.org/10.1016/j.healthpol.2010.07.011.

Nguyen, H.T.H., Hatt, L., Islam, M., Sloan, N.L., Chowdhury, J., Schmidt, J.-O., Hossain, A., Wang, H., 2012. Encouraging maternal health service utilization: an evaluation of the Bangladesh voucher program. Soc. Sci. & Med. 74, 989–996. http://dx.doi.org/10.1016/j.socscimed.2011.11.030.

Obare, F., Warren, C., Abuya, T., Askew, I., Bellows, B., 2013a. Population-level impact of vouchers on access to health facility delivery for women in Kenya: a quasi-experimental study. Lancet 381, S100. http://dx.doi.org/10.1016/S0140-6736(13)61354-9.

Obare, F., Warren, C., Njuki, R., Abuya, T., Sunday, J., Askew, I., Bellows, B., 2013b. Community-level impact of the reproductive health vouchers programme on service utilization in Kenya. Health Policy Plan. 28, 165–175. http://dx.doi.org/10.1093/heapol/czs033.

Özgen, H., Sahin, B., Belli, P., Tatar, M., Berman, P., 2010. Predictors of informal health payments: the example from Turkey. J. Med. Syst. 34, 387–396.

Peiffer, C., Rose, R., 2014. Why Do Some Africans Pay Bribes while Other Africans Don't? Afrobarometer Working Paper No 148.

Ranson, M.K., 2002. Reduction of catastrophic health care expenditures by a community-based health insurance scheme in Gujarat, India: current experiences and challenges. Bull. World Health Organ. 80, 613–621.

Richard, F., Witter, S., de Brouwere, V., 2010. Innovative approaches to reducing financial barriers to obstetric care in low-income countries. Am. J. Public Health 100, 1845–1852. http://dx.doi.org/10.2105/AJPH.2009.179689.

Salmond, C., King, P., Crampton, P., Waldegrave, C., 2005. A New Zealand Index of Socioeconomic Deprivation for Individuals. http://www.otago.ac.nz/wellington/otago020233.pdf (accessed 10.09.15).

Spinakis, A., Anastasiou, G., Panousis, V., Spiliopoulos, K., Palaiologou, S., Yfantopoulos, J., 2011. Expert Review and Proposals for Measurement of Health Inequalities in the European Union.. http://ec.europa.eu/health/social_determinants/docs/full_quantos_en.pdf (accessed 24 April 2015).

Stepurko, T., Pavlova, M., Gryga, I., Groot, W., 2010. Empirical studies on informal patient payments for health care services: a systematic and critical review of research methods and instruments. BMC Health Serv. Res. 10, 273. http://dx.doi.org/10.1186/1472-6963-10-273.

Stepurko, T., Pavlova, M., Levenets, O., Gryga, I., Groot, W., 2013. Informal patient payments in maternity hospitals in Kiev, Ukaine. Int. J. Health Plan. Manag. 28, e169–e187. http://dx.doi.org/10.1002/hpm.2155.

Stringhini, S., Thomas, S., Bidwell, P., Mtui, T., Mwisongo, A., 2009. Understanding informal payments in health care: motivation of health workers in Tanzania. Hum. Resour. Health 7, 53. http://dx.doi.org/10.1186/1478-4491-7-53.

Szende, A., Culyer, A.J., 2006. The inequity of informal payments for health care: the case of Hungary. Health Policy 75, 262–271. http://dx.doi.org/10.1016/j.healthpol.2005.04.001.

Tatar, M., Ozgen, H., Sahin, B., Belli, P., Berman, P., 2007. Informal payments in the health sector: a case study from Turkey. Health Aff. (Millwood) 26, 1029–1039. http://dx.doi.org/10.1377/hlthaff.26.4.1029.

Thompson, R., Witter, S., 2000. Informal payments in transitional economies: implications for health sector reform. Int. J. Health Plan. Manag. 15, 169–187. http://dx.doi.org/10.1002/1099-1751(200007/09)15, 3<169::AID-HPM589>3.0.CO;2–2.

Tomini, S., Maarse, H., 2011. How do patient characteristics influence informal payments for inpatient and outpatient health care in Albania: results of logit and OLS models using Albanian LSMS 2005. BMC Public Health 11, 375. http://dx.doi.org/10.1186/1471-2458-11-375.

Transparency International, 2014. Corruption Perceptions Index 2014. Transparency International, Berlin. http://www.transparency.org/cpi2014/.

Urbanos-Garrido, R.M., 2012. Social inequalities in health: measuring the contribution of housing deprivation and social interactions for Spain. Int. J. Equity Health 11, 77. http://dx.doi.org/10.1186/1475-9276-11-77.

van Doorslaer, E., Wagstaff, A., Rutten, F., 1992. Equity in the Finance and Delivery of Health Care: An International Perspective (OUP Catalogue). Oxford University Press.

van Doorslaer, E., Koolman, X., Jones, A.M., 2004. Explaining income-related inequalities in doctor utilisation in Europe. Health Econ. 13, 629–647. http://dx.doi.org/10.1002/hec.919.

Vian, T., Gryboski, K., Grybosk, K., Sinoimeri, Z., Hall, R., 2006. Informal payments in government health facilities in Albania: results of a qualitative study. Soc. Sci. & Med. 62, 877–887. http://dx.doi.org/10.1016/j.socscimed.2005.07.005.

Wagstaff, A., 2005. The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. Health Econ. 14, 429–432. http://dx.doi.org/10.1002/hec.953.

Wagstaff, A., 2009. Correcting the concentration index: a comment. J. Health Econ 28, 516–520 author reply 521-524 doi:http://dx.doi.org/10.1016/j.jhealeco.2008.12.003.

Wagstaff, A., Van Doorslaer, E., Watanabe, N., 2003. On decomposing the causes of health sector inequalities, with an application to malnutrition inequalities in Vietnam. J. Econ. 112, 207–223. http://dx.doi.org/10.1016/S0304-4076(02)00161-6.

Warren, C., Abuya, T., Obare, F., Sunday, J., Njue, R., Askew, I., Bellows, B., 2011. Evaluation of the impact of the voucher and accreditation approach on improving reproductive health behaviors and status in Kenya. BMC Public Health 11, 177. http://dx.doi.org/10.1186/1471-2458-11-177.

World Bank, 2015. Country and Lending Groups. http://data.worldbank.org/about/country-and-lending-groups (accessed 07.04.15).

World Health Organization. The 2013 update, Global Health Workforce Statistics. World Health Organization, Geneva. http://www.who.int/hrh/statistics/hwfstats/ (accessed 20.04.15).

World Health Organization, 2015. Global Health Expenditure Database. http://apps.who.int/nha/database/ViewData/Indicators/en (accessed 20.04.15).

Yiengprugsawan, V., Lim, L.L., Carmichael, G.A., Dear, K.B., Sleigh, A.C., 2010. Decomposing socioeconomic inequality for binary health outcomes: an improved estimation that does not vary by choice of reference group. BMC Res. Notes 3, 57. http://dx.doi.org/10.1186/1756-0500-3-57.