



## Review article

# Economic valuation of setting up a social health enterprise in urban poor-resource setting in Kenya

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## ABSTRACT

The failure of the market and government to provide quality healthcare services have been the motivation to set up social health enterprise. However, the value for money associated with setting up a social health enterprise in sub-Saharan African countries has been relatively unexplored in the literature. The study presents the first empirical estimates of the mean willingness-to-pay (WTP) for setting up a social health enterprise that will simultaneously run a health center and provide health insurance scheme in an urban resource-poor setting and explores whether the benefits outweigh the costs. The contingent valuation method is used to estimate the mean WTP for the health insurance scheme proposed by the social health enterprise in Viwandani slum (Nairobi, Kenya). The survey was conducted between June and July 2018 on 300 households. We find that the feasibility of setting up a social health enterprise could be promising with 97 percent of respondents willing to pay about US \$ 2 per person per month for a scheme that would provide quality healthcare services. More importantly, setting up the social health enterprise will yield a positive net profit, and investors could expect US\$ 1.11 in benefits for each US\$ 1 of costs of investment in setting up the social health enterprise. We, therefore, conclude that this health policy in this urban resource-poor setting could be a viable solution to reach the neglected urban households in the Kenyan slums.

## 1. Introduction

Traditional neoclassical economists have long relied on the market to allocate resources. However, the invisible hand in a free-market system may fail to ensure the optimization of the social value due to information asymmetries thus failure for competition. In developing countries, the market seems ineffective in providing basic social needs such as healthcare to people at the bottom of the pyramid. Government interventions have also not been successful in providing the resources needed to fulfill the social need of people namely those living in the slums and rural areas. It has, therefore, been argued that social entrepreneurs who prioritize social impact over the creation of wealth could mitigate market failure (Phills, 2006; Pratono and Sutanti, 2016; Sepulveda, 2015), and also serve people at the bottom of the pyramid with quality healthcare services. The failure of the government in these countries to provide quality healthcare services has been the motivation for the setup of social health

enterprises.

In a broad sense, the social enterprise uses market-based solutions to address social problems (Cieslik, 2016; Haugh, 2007; Santos, 2012). It is considered as a new model to solve today's grand challenges (Dacin et al., 2011; Venot, 2016). In the area of health, the concept has shifted to social health enterprise with more emphasis on using a market-based approach to provide health services. (Farmer et al., 2016; Farmer and Kilpatrick, 2009; Gordon et al., 2018; Macaulay et al., 2018; Poveda et al., 2019; Roy et al., 2013, 2014). Despite spurred interest on social health enterprise as a response to healthcare provision to urban slum dwellers, there is a yawning gap of evidence around its feasibility and value for money in the urban resource-poor settings. The current study, therefore, contributes to the literature in three important ways.

First, the literature on the feasibility of setting up a social health enterprise is scarce in sub-Saharan African countries and inexistent in Kenya. Hence, the current study provides information and insights to

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social entrepreneurs who would like to invest in a social healthcare enterprise in an urban resource-poor setting to address sub-standard healthcare services. This type of social health enterprise will not only provide quality healthcare services via a health center but will also run a health insurance scheme in the urban resource-poor setting. Second, we explore the main determinants of the willingness-to-pay (WTP) for setting up this type of social health enterprise. This is relevant, as it will also provide clues to social entrepreneurs about the main drivers of demand, and whether the poorest of the poor and elderly are excluded from the health insurance scheme proposed by the social health enterprise. Third, we conduct a cost-benefit analysis of setting up the social health enterprise in an urban resource-poor setting. In our study, we attempt to shed light on the sustainability of the social health enterprise by conducting a fine-grained empirical analysis focusing on the value for money associated with the setting up of the social health enterprise in the slums of Nairobi. Given the fact that the economic profitability is necessary for the long-term viability of a business, we judge necessary to estimate the net profit of setting up the social health enterprise. This has been relatively unexplored in the literature. To the best of our knowledge, no studies have examined whether a social health enterprise in an urban resource-poor setting can yield monetary benefits that could outweigh the costs. This first empirical cost-benefit analysis will help in exploring the financial success and viability of the social health enterprise as well as the sustained health impact in the target community.

## 2. Background

Informal settlements house the vast majority of the world's urban population, in total, around a billion people live in urban resource-poor settings (UN-Habitat, 2015). Most households in these settings face difficulties in accessing quality care that is affordable (DESA, 2010). The situation is worse in sub-Saharan African countries where most urban resource-poor settings are characterized by poor housing quality, overcrowding, and lack of basic social amenities (Shami and Majid, 2014). Kenya is not an exception, the absence of public health infrastructure in urban resource-poor settings has resulted in the emergence of low-quality private clinics that fail to provide integrated care to the slum dwellers (Beguy et al., 2011).

In Kenya, the increasing focus on universal health coverage has brought renewed attention to the provision of quality affordable healthcare services especially in resource-poor settings (Okech and Lelegwe, 2016). However, efforts made by the government to ensure healthy lives and promote wellbeing for all at all ages have been hindered by the limited ability to mobilize revenue for quality and affordable healthcare provision (Barasa et al., 2018). Furthermore, approximately 83 percent of the total Kenyan population lacks financial protection from health care costs and about 1.5 million Kenyans are pushed into poverty each year as a result of high healthcare costs (Okungu et al., 2017). As such, the poor urban population resort to a largely unregulated private sector which is expensive with a large proportion of household expenditure being out-of-pocket on private health care providers (Chuma et al., 2007; Ziraba et al., 2009). Against this background, the attention has turned to social health enterprises that provide quality and affordable healthcare to improve financial protection, and reduce catastrophic health expenditures (Asfaw and von Braun, 2005; Basaza et al., 2008; Dong et al., 2004; Ndiaye et al., 2007). Some types of social health enterprises could emerge and include providing health insurance schemes for their potential members. Based on extensive collaboration with different stakeholders and researchers, the current study examines a type of social health enterprise that will enter the market to provide subsidized healthcare via a health insurance scheme to the low-income households in a Nairobi slum settlement. Under this type of social health insurance enterprise, a group of community members come together and voluntarily contribute small amounts of money to a common pool of funds. When an active member of the social health enterprise falls ill, they can receive treatment for their conditions for free at the point of use (Basaza

et al., 2008). The risk is pooled and shared across members. This type of social health enterprise thus operates on the principle of mutuality, voluntary and open membership, concern for the community, and member economic participation (Dong et al., 2004).

In the context of under-resourced public sector provision of healthcare in the slums and the growing health burden and inequalities in these settings, social health enterprises may be able to provide innovative solutions as they tend to be more responsive to community needs in ways that the public sector entities are not providing quality healthcare at an affordable cost. The social enterprise landscape in Kenya is still growing but lacks support and recognition from the government, especially in low-resource and informal settings, with most emerging in the urban areas. Swasth Foundation is a good example of an entity that has set up several social enterprises dealing with healthcare provision in both urban and rural India to improve health among the low-income segments (Pegu and Kapila, 2015). Jacaranda Health is also a social health enterprise that has demonstrated the feasibility and sustainability of a social model for the provision of high-quality and affordable maternity healthcare to Nairobi's low-income women (Kearns et al., 2014). In Kenya, there is a growth of social health enterprises with a niche in micro-clinics and primary care, secondary and tertiary care, affordable specialist care (eyes), access to quality and safe drugs, and product innovation (Griffin-EL et al., 2014). However, the feasibility of setting up a social health enterprise that could at the same time provide health insurance scheme and run a health center to serve the urban-poor households in Kenya remains unexplored.

## 3. Methods

### 3.1. Study design and sampling

#### 3.1.1. Study design

Data for the study come from a cross-sectional survey. The survey was conducted between June and July 2018. The survey involved randomly selected households in the study area. This was a face-to-face survey conducted with the household head aged 18 years and above. The study was conducted in Viwandani, an informal settlement in Nairobi, Kenya, characterized by poor housing, lack of clean water, poor sanitation, high unemployment, poverty, and overcrowding. It is located very close to the city's industrial area and is home to predominantly labor migrants and those engaged in informal employment. Viwandani includes a proportionate mix of one-person and multi-person households. A one-person household comprises a person who makes provision for his or her food or other essentials for living without combining with any other person while a multi-person household comprises a group of two or more persons living together who make common provision for food and other essentials for a living (UN, 2017). A household is defined as a person or group of persons related or unrelated who sleep under the same roof, eat from a common pot, and the members acknowledge the authority of one person as head of household. Overall, in the sample of the current study, the average household size is three (Figure A1).

The African Population and Health Research Center (APHRC) has had a long-standing relationship with the Viwandani community. APHRC has been operating the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) since 2003 in two slums – Korogocho and Viwandani. In 2018, it was estimated from the NUHDSS that Viwandani slum has a population of approximately 56,837 individuals living in 22,739 households. The cost of healthcare in the public health sector is subsidized especially for pregnant women and children under five years of age by the government. However, these public health services are mostly inaccessible to the residents of Viwandani in terms of geographical location (distance) and time. The nearest public health facility is located at the periphery of the settlement area and operates between 8 a.m. and 5 p.m., and sometimes on Saturday when most residents are working. The near absence of the public health sector has led to the mushrooming of private health care providers of varied sizes who provide health care services. A handful of the private providers are credible with qualified health

practitioners but a majority are unqualified and not supervised by the Ministry of Health, therefore providing sub-standard care to the residents. Secondary healthcare services are mostly sought in facilities outside the slum.

### 3.1.2. Sampling

To estimate the sample size, we assumed that 25 percent of households in Viwandani would be willing to enroll in the health insurance scheme proposed by the social health enterprise during the first year. This was based on a study conducted in an urban slum in Nairobi, Kenya which found 27 percent uptake in health insurance (Wasike et al., 2017). However, during the process of sample size estimates, we assumed 25 percent due to budget constraints. We set the margin of error at 5 percent and used a 95 percent confidence interval for the standard normal distribution, and a non-response rate of 4 percent. Based on these parameters, we sampled 300 households in the study area. The respondents were randomly selected from the NUHDSS database managed by the APHRC.

## 3.2. Valuation scenario and oath script

### 3.2.1. Valuation scenario

The contingent valuation method (CVM) was used to estimate the demand for setting up a health insurance scheme proposed by the social health enterprise. The CVM is a stated-preference method that is used in economics to estimate the preferences of households for an environmental good or the setup of a health policy that may change the status-quo (Adamowicz et al., 1994; Bateman et al., 2002; Blumenschein et al., 2008; Champ and Bishop, 2006; Gustafsson-Wright et al., 2009). It can also be used to measure the value of an existing treatment or health policy, or to estimate the willingness-to-accept to compensate for the removal of a health care service/treatment. In the current study, a health insurance scheme aimed at improving the quality of healthcare services was proposed to respondents. The scheme was to be developed and managed by a social health enterprise so that households could access healthcare in their community. This type of social health enterprise will not only provide

with the aim to better serve the community. The full text of the script is found in Appendix 1.

### 3.2.2. Oath script

Despite its wide applicability, researchers are still skeptical about the derived welfare estimates from the CVM. The main challenge with the CVM is that respondents might not be always truthful when eliciting their WTP (Aadland and Caplan, 2003; Blumenschein et al., 2001; Champ et al., 2009; Murphy et al., 2005a, 2005b). Hence, there could be a discrepancy between the *hypothesized* WTP and the *real* WTP, which is often referred to as hypothetical bias. In response to this concern, researchers had proposed to explicitly highlight the hypothetical problem in a script before respondents could make any decisions (cheap talk script) (Ami et al., 2011; Cummings and Taylor, 1999; Mahieu, 2010; Murphy et al., 2005b), remind the respondents that their decisions are consequential and could be used by policymakers about the provision of the public good or implementing the health policy (Bulte et al., 2005; Liu et al., 2010), give respondents time to think (Cook et al., 2011; Donfouet et al., 2015; Whittington et al., 1992), calibrating the respondents' answers using ex-post correction based on the certainty of respondents to the WTP questions (Blumenschein et al., 2008; Champ et al., 1997; Johannesson et al., 1999), and ask the respondents to make a commitment to tell the truth (oath script) (Jacquemet et al., 2013). In the current study, we explicitly used the oath script. Box 1 and 2

The oath script is grounded in the theory of commitment and social psychology where it is suggested that commitment and making a solemn promise to be honest is more binding and makes individuals to be more truthful. Furthermore, it has been suggested that using the oath script could mitigate the hypothetical bias (de-Magistris and Pascucci, 2014; Jacquemet et al., 2013; Stevens et al., 2013). After the pre-test of the valuation scenario and oath script, respondents were asked to make a promise to respond truthfully about their monthly contribution to the health insurance scheme. The pre-test of the oath script helped to contextualize the sentences to be included in the script. The oath script is found below:

## Box 1 Oath script

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Before you give me a response to your maximum monthly contribution, I would like to remind you that we conducted this similar study somewhere and we realized there is a difference between the maximum amount that people are willing to pay during the survey and what they are capable of paying. Please keeping in mind what we have discussed, I would like that you respond truthfully. Please can you promise to respond truthfully about your monthly contribution for the health insurance scheme?

1. Yes 2. No

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quality healthcare services via a health center but will also run a health insurance scheme in the urban resource-poor setting. There are two options here: the status quo ( $q^0$ ) and the proposed ( $q^1$ ) change that the social health enterprise would like to bring in the urban poor setting. The proposed change corresponds to an improvement ( $q^1 > q^0$ ) via a health insurance scheme that would be managed by the social health enterprise. The proposed scheme would cover basic healthcare services such as consultation fees, laboratory, pharmacy services, and maternity. Respondents were also informed that the healthcare services provided in the proposed enterprise would be better than what they were already receiving, available to them and their household members (up to four members aged below 18 years), and highly discounted. The participatory approach will be prioritized where the respondents will have more decision-making power in the management of the social health enterprise. All profits generated will be reinvested into the social health enterprise

### 3.3. Empirical model

The payment ladder was used as the elicitation format (Hanley et al., 2009; Mahieu et al., 2014; Soeteman et al., 2017; Voltaire et al., 2017; Whittington et al., 2008). It was noted that respondents could be uncertain about their WTP and therefore find it difficult to express it as a single value. Hence, the payment ladder was used since it allows researchers to investigate the uncertainty around the WTP by assuming that the actual WTP lies within an interval. In the payment ladder used, starting with the smallest bid amounts provided, respondents were asked to tick the amounts that they would definitely pay per month for the healthcare services. In the same vein, starting from the highest bid amounts, they were also asked to cross out the bid amounts that they would definitely not pay per month. Thus, the WTP is bounded between the lower bound and upper bound. The bid amounts were estimated after the pilot survey

using an open-ended question on the maximum amount that the respondents were willing to pay to access the healthcare services. The bid amounts ranged from Ksh 50 (US\$ 0.48) to Ksh 1000 (US\$ 9.5) a month (1 Ksh = US\$ 0.0095). The interval and ordinary least squares (OLS) regression methods were used to explore the factors associated with the demand for the health insurance scheme and mean WTP. The payment ladder used was inspired from Hanley et al. (2009)'s study. The full text is provided below:

## Box 2 Payment ladder

Now, we would like to know about the amount of money that you would be willing to pay per month for the health insurance scheme for your household members (up to four members aged below 18 years) and yourself in order to have accessed to healthcare services provided in the nearby health facility. As I earlier said, this health insurance scheme will be developed and managed by the social healthcare enterprise that will soon be settling in your community.

**Instructions to interviewers:**

"Ask the respondent if he/she would definitely pay Ksh 50 per month for the health insurance scheme. If **yes**, tick the first cell in column A, then ask if he/she would definitely pay Ksh 100. Keep going until the respondent says **no**.

Then ask if they are sure Ksh 1000 is too much for them. If **yes**, place a cross in the lowest cell of column B, and ask him/her if Ksh 600 is too much. Keep going up in column B until they say that they are not sure if Ksh X is too much."

At the end of this exercise, kindly record the lower bound and upper bound at the bottom of the next column".

**Instructions to interviewers:**

"Read out column A from lowest to highest. Furthermore, kindly read out column B from highest to lowest"

Amounts in Ksh per month	A: I would definitely pay per month (tick)	B: I would definitely NOT pay per month (cross)
50		
100		
160		
200		
250		
300		
600		
1000		

a. Lower bound: Ksh \_\_\_\_\_

b. Upper bound: Ksh \_\_\_\_\_

In this study, the hurdle model, which is a two-part model was used (Mullahy, 1998; Pohlmeier and Ulrich, 1995). In the hurdle model, the two decisions (to join and pay) are independent. The first part of this model estimates the probability of joining the scheme while the second part which is the valuation equation uses the interval regression model or OLS. In the OLS, the midpoint of the interval bounded by the highest amount ticked and lowest amount crossed is calculated. Taking the midpoint will, however, contribute to losing a lot of variation that may exist in the payment ladder due to uncertainty around the WTP. Hence, the interval regression model seems the most suitable regression model. The model selection is also done using the Akaike's information criterion (AIC) (Akaike, 1998; Sawa, 1978) and Bayesian information criterion (BIC) (Raftery, 1995; Schwarz, 1978) which give better information on the process that generated the data. Furthermore, the study focused on the results from the second part of the hurdle model since a very small number of respondents (8 respondents out of 300 respondents) were not willing to join. More importantly, some covariates included in the first part of the empirical model had no variability within the less frequent event. The mean WTP derived from the interval regression is estimated following Cameron and Huppert (1989), Mahieu et al. (2012) by removing all covariates from the valuation function. The welfare estimates are computed on respondents who promised to be truthful. Most of the socio-demographic characteristics of the two groups (respondents who are truthful and those who are not) are similar except for the age. Thus, computing the welfare estimates only on respondents who are truthful during the valuation exercise will not bias the welfare estimates. This procedure was also followed by Carlsson et al. (2010).

Socio-demographic questions such as gender, education, distance to

the nearest facility, satisfaction with the healthcare services provided in the preferred primary health facility, self-rated health status, and assets were collected. Collecting the income of respondents was a challenge, and most often respondents are not always truthful in revealing their income even when income category is used in the survey. To overcome this issue, we use household assets and construct the wealth index (Filmer and Pritchett, 2001; Filmer and Scott, 2012; Howe et al., 2009). The wealth index is estimated using principal component analysis (PCA) on

type of dwelling, ownership of the dwelling, construction materials of the dwelling, source of cooking fuel, source of lighting fuel, household possessions, source of water for household consumption and type of sanitation facility. Respondents are then arranged on the asset ladder from the poorest to the wealthiest by a transformation into quintiles. Furthermore, concerning the satisfaction with the healthcare services which measures the quality of healthcare services, we examined whether respondents were satisfied with: (i) waiting time, (ii) friendliness and respect of the provider, (iii) privacy of consultation and treatment received, (iv) quality of advice and information, procedure of treatment, (v) cost of health services, and (vi) quality of services received at the preferred primary care facility they visited for routine care. These variables are coded as follows: 1-not satisfied at all, 2-slightly satisfied, 3-moderately satisfied, 4-very satisfied, and 5-extremely satisfied. This is further recoded into two groups: 1-satisfied (moderately satisfied, very satisfied, and extremely satisfied) and 0-not satisfied (slightly satisfied, not satisfied at all). The PCA was used to reduce the five groups of satisfaction variables to fewer common underlying dimensions. We choose a total number of two components which explained approximately 79% of the total variance (Fig. 1). The final satisfaction variable takes the value one with an above-median predicted score based on two separate principal component analyses, and zero otherwise. For education, we follow the demographic health survey (HEAT, 2018; Hosseinpoor et al., 2016) by defining education into three categories: one for no education, two for primary education, and three for secondary education or higher. However, there were very few respondents with no formal schooling/no education (n=4) and few respondents with tertiary education (n=20). Thus, we re-code education as a binary variable: one for secondary education or

higher, and zero for no education/primary education.

Table 1 provides the definition of variables used.

### 3.4. Cost-benefit analysis

The cost-benefit analysis (CBA) entails the aggregation of individuals' benefits in order to compare these with the total costs of a project or policy (Bateman et al., 2006). The CBA measures the costs and possible benefits from a policy by attaching monetary values to the possible costs and benefits. From the economic perspective, to measure the benefits of the proposed policy that could change the status quo is to ask the beneficiaries of the policy what is their WTP for it. Our estimates of the aggregate benefits of the proposed health policy using the CVM is grounded in the literature (Bateman et al., 2000; Khai and Yabe, 2014). It is standard practice in the literature to estimate the benefits of the program using the WTP method. For instance, Donfouet et al. (2015) conducted a CBA for air quality improvement in Douala city and they estimated the total benefits by multiplying the mean WTP by the total number of households in Douala city and also by the fraction of respondents who were "in the market". In the current study, the aggregate benefits are obtained by multiplying the target population by the sample mean WTP and also by the proportion of households willing to join the scheme. However, we carry out a sensitivity analysis by assuming a maximum market share of 27 percent (Wasike et al., 2017) and also accounting for the profits emanating from laboratory tests and drug sales in the aggregate benefits.

Furthermore, the costs are assessed by focusing on the resource that could be used and the unit costs of these resources. The cost to run the social health enterprise is divided into pre-opening costs, capital costs, administrative costs, staff costs, and activity costs. Pre-opening costs are costs incurred to launch the social health enterprise namely facility registration, pharmacy registration and accreditation, radiology registration and accreditation, community mobilization and sensitization. Capital items (items with more than one year of useful life) include stethoscopes, thermometers, sphygmomanometer, peak flow meter, digital BP machines, oxygen cylinder, sucker machine, blood glucose meters, X-ray machine, ECG machine, ultrasound machine, refrigerator, blood draw chair, microscope, otoscope, height measure children, childhood scale, adult scale, examination table, handheld tablets, desktop computer, drip stand, hospital beds, delivery beds, vehicle, mobile phones, ambulance stretcher, etc. Activity costs are costs related

**Table 1**  
Variable definition

Variable name	Variable definition
<b>Lower bound</b>	Lower bound of the payment ladder.
<b>Upper bound</b>	Upper bound of the payment ladder.
<b>Age</b>	Age of the respondent.
<b>Gender</b>	1 if male; 0 otherwise.
<b>Education</b>	1 if the respondent has secondary education or higher ; 0 otherwise.
<b>Log of distance</b>	Distance to the preferred primary health facility (km)
<b>Satisfaction with existing healthcare services<sup>(a)</sup></b>	1 if the respondent is satisfied-above the median; 0 otherwise.
<b>Perceived health status (Excellent/very good/good)</b>	1 if excellent/very good/good health state; 0 otherwise.
<b>Percent of the poorest (First wealth quintile)</b>	1if the respondent belongs to the first wealth quintile; 0 otherwise.
<b>Percent of the poor (Second wealth quintile)</b>	1if the respondent belongs to the second wealth quintile; 0 otherwise.
<b>Percent of the middle (Third wealth quintile)</b>	1if the respondent belongs to the third wealth quintile; 0 otherwise.
<b>Percent of the rich (Fourth wealth quintile)</b>	1if the respondent belongs to the fourth wealth quintile; 0 otherwise.
<b>Percent of the richest (Fifth wealth quintile)</b>	1if the respondent belongs to the fifth wealth quintile; 0 otherwise.

Notes: (a) Concerning the construction of this variable, you can refer to the notes in Figure 1.

to the purchasing of drugs based on the number of enrollees, drug handling, drug inventory, laboratory tests, disposable lab equipment, and cartridges, etc. The administrative costs include the rent of the office, internet access, air time voucher, electricity, water, stationery, maintenance and insurance fees, etc. Staff costs are the salaries of staff such as a medical doctor, clinical officer, nurses, midwives, laboratory technicians, community oral health officers, community health volunteers, community health assistants, cleaner, and security officers.

The base year for the costing is 2018 and the time horizon is one year. The calculation of the economic costs depends on the type of costs. Concerning the administrative costs, staff costs, and activities costs, the economic costs are estimated by multiplying the quantity of each resource that needs to be used by the unit costs of these resources. The pre-opening and capital costs are estimated by multiplying the quantity of each resource that needs to be used by the unit costs of these resources and then annualizing using a corresponding useful life year and three percent interest rate. An Excel costing tool was developed to estimate the benefit-cost ratio (BCR). All estimates for the cost-benefit analysis are provided in the supplement appendix in an Excel file.

The study was approved by the African Medical and Research Foundation (AMREF) Health Africa Ethics and Scientific Review Committee based in Nairobi (reference number: P482/2018). Written informed consent was sought from all respondents prior to participation in the study.

## 4. Results

### 4.1. Background characteristics of the respondents

In Table 2, results indicate that the mean of the lower and upper bounds are Ksh 184 (US\$ 1.75) and Ksh 245 (US\$ 2.33), respectively. On average, respondents are aged 35 years, predominantly males (52 percent), and had attained secondary school or higher (59 percent). Forty-one percent of the respondents are satisfied with the current healthcare services and their self-rated health status is rated as excellent/very good/good (79 percent). The average distance to the respondents' preferred primary health care facility is 1 km.

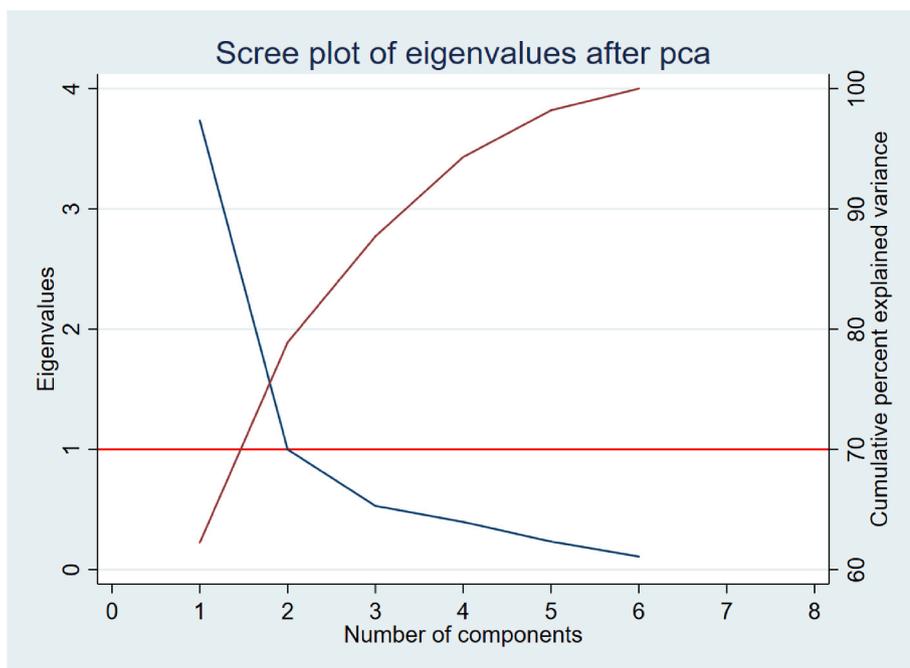
### 4.2. Demand curve for the health insurance scheme

Fig. 2 shows the percentage of respondents who reported that they would definitely pay for the health insurance scheme. For each bid amounts, we calculate the percentage of respondents who are willing to pay for the health insurance at the stated amount. The demand curve for the health insurance scheme clearly declines with price, implying an inverse relationship between the demand and the price. This indicates a downward sloping demand curve which is consistent with microeconomic theory. Undoubtedly, in Fig. 2, it is clear that all respondents report that at higher prices such as Ksh 1000 (US\$ 9.5) they would definitely not pay for the health insurance scheme. In fact, the percentage of respondents who said they would definitely pay is influenced by the price, decreasing from 97.26 percent at the lowest price (Ksh 50 or US\$ 0.48) to zero percent at the highest price (Ksh 1000 or US\$ 9.5).

### 4.3. Determinants of willingness-to-pay and welfare estimates

We find that most of the respondents (97.33 percent) are willing to join the proposed social health enterprise. Thus, the setup of the social enterprise could be feasible in Viwandani. Furthermore, while using the oath script to mitigate hypothetical bias, we find that most of the respondents (97.33 percent) promised to tell the truth when asked about their WTP. This result is similar to what Carlsson et al. (2010) and Jacquemet et al. (2013) found when using the oath script. Most of the respondents promised to be truthful during the valuation exercise.

In Table 3, our findings suggest that most of the variables in OLS and interval regression have similar signs and level of significance. The coefficient on age is negative and highly significant implying that older



**Fig. 1.** Construction of the satisfaction variable using principal component analysis: Number of components and percent explained variance.

Notes: (a) Satisfaction with healthcare services measures whether respondents were satisfied with: (i) waiting time, (ii) friendliness and respect of the provider, (iii) privacy of consultation and treatment received, (iv) quality of advice and information, procedure of treatment, (v) cost of health services, and (vi) quality of services received at the preferred primary care facility they visited for routine care. These variables are coded as 1-not satisfied at all, 2-slightly satisfied, 3-moderately satisfied, 4-very satisfied, 5-extremely satisfied. This is further recorded into two groups: 1-satisfied (moderately satisfied, very satisfied, extremely satisfied) and 0-not satisfied (slightly satisfied, not satisfied at all). Since these variables are binary outcomes, we use the polychoric principal component analysis (PCA). We choose a total number of two components which explained approximately 79% of the total variance.

respondents are less willing to pay for the proposed health insurance scheme. This result is consistent with findings from [Bärnighausen et al. \(2007\)](#) and [Donfouet et al. \(2011\)](#) in other studies involving community-based health insurance.

The distance to the preferred primary health facility is not a deterrence to pay for the health insurance scheme. The positive and significant effect of distance suggest that respondents living far from their preferred primary health facility are willing to pay more than those living nearby. A plausible explanation from our results could be due to the fact that within the slum, transport cost is marginal. Current literature provides mixed results on the effect of distance to primary healthcare facility on the WTP. In some studies, the effect is positive and

insignificant ([Dror et al., 2007](#)), while other studies found that the shorter the distance to the contracted community-based insurance health facility, the more respondents were willing to drop out from the health insurance scheme ([Dong et al., 2009](#)).

Consistent with our expectation, the coefficient for satisfaction is positive and significant, implying that a higher level of satisfaction with the healthcare services positively influences the demand for joining the health insurance scheme. Other studies also found that satisfaction with the quality of services could be a key determinant of the WTP for national health insurance scheme ([Al-Hanawi et al., 2018](#)). However, results also suggest that the poorest households within the community are less willing to pay than rich households.

In [Table 4](#), the monthly mean WTP per person is Ksh 214 (US\$ 2.03), and Ksh 210 (US\$ 1.99) for the OLS and interval regression, respectively. The preferred model is the interval regression model with the monthly mean WTP of approximately US\$ 2 per person because it is a more conservative welfare estimate and the interval regression accounts for the uncertainty around the WTP. Furthermore, at the bottom of [Table 3](#) the AIC and BIC confirm that the interval regression model (AIC = 2231.14, BIC = 2275.27) has the lowest value of AIC and BIC as compared to the OLS model (AIC = 3651.09, BIC = 3691.54), implying that the interval regression model seems to fit the data without over-fitting it.

#### 4.4. Cost-benefit analysis for setting up the social health enterprise

We conduct the cost-benefit analysis of setting up this social health enterprise by investigating whether the benefit outweighs the cost. Based on the information provided by the NUHDSS database, the size of the Viwandani population is 56,837 individuals and the number of existing primary healthcare centers in the NUHDSS catchment area is six. From the survey of the household expenditure on healthcare using a three-month recall period, we estimate that the costs of essential package of medicines and laboratory tests per person per year would be US\$ 16.50, and US\$ 15.40, respectively. We also posit a markup of 33 percent on the drug price and laboratory tests. This percentage markup on medicines is similar to the recommended percentage markup by the Kenyan authority. Furthermore, we estimate the benefits for setting up the social health enterprise as streams of revenues coming from the monthly premiums (mean WTP derived from the interval regression which is US\$ 1.99 or US \$ 2 per person per month). This is further translated into annual mean

**Table 2**  
Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Lower bound of the payment ladder	292	183.77	125.94	50	1000
Upper bound of the payment ladder	292	244.66	147.43	50	1000
Age	292	34.56	10.9	19	73
Gender (Male=1, proportion)	292	0.52	0.5	0	1
Education (Secondary education or higher=1, proportion) <sup>a</sup>	292	0.59	0.49	0	1
Log of distance to the nearby preferred health facility (km)	292	0.02	1.56	-4.61	4.09
Satisfaction with existing healthcare services (Satisfied=1, proportion)	292	0.41	0.49	0	1
Perceived health status (Excellent/very good/good=1, proportion)	292	0.79	0.4	0	1
Percent of the poorest (First wealth quintile, proportion)	292	0.20	0.40	0	1
Percent of the poor (Second wealth quintile, proportion)	292	0.19	0.40	0	1
Percent of the middle (Third wealth quintile, proportion)	292	0.20	0.40	0	1
Percent of the rich (Fourth wealth quintile, proportion)	292	0.19	0.39	0	1
Percent of the richest (Fifth wealth quintile, proportion)	292	0.19	0.39	0	1

Notes: <sup>a</sup> They are very few respondents with no education (n=4) and few respondents with tertiary education (n=20). Thus, we re-code education into two categories: (0=No education/Primary education,1=Secondary education or higher).

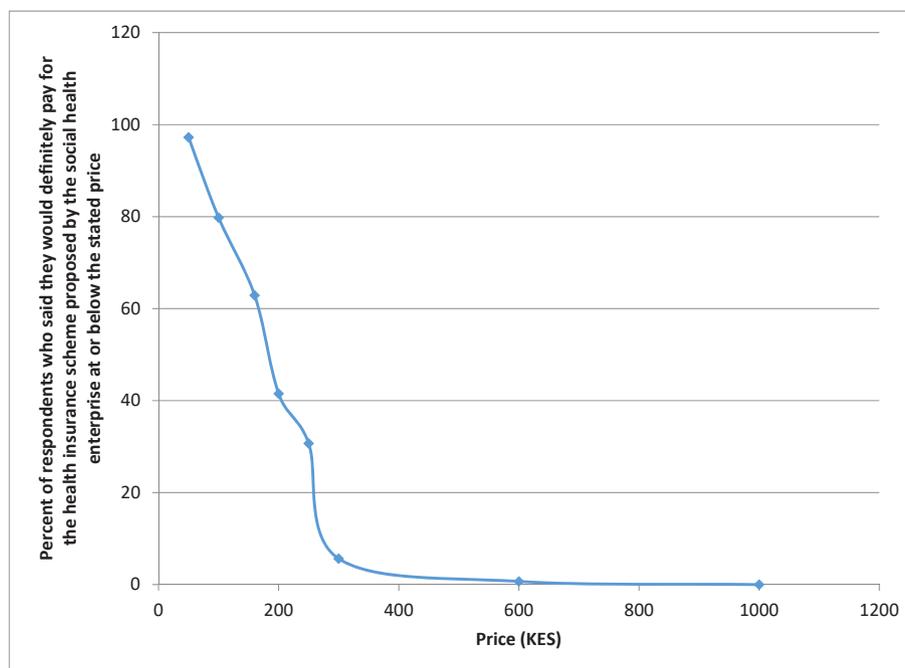


Fig. 2. Demand curve for respondents who would definitely pay for the health insurance scheme proposed by the social health enterprise.

WTP per person also using the maximum number of members who are willing to join ( $55,319.45 = 56,837 \times 97.33\%$ ).

Results in Table 5 from the main analysis suggest that the setting up of the social health enterprise will yield sufficient benefits to cover the

Table 3  
Determinant of willingness-to-pay for social enterprise

Variables	Reference category	OLS	Interval Regression
Age		-2.06*** (0.64)	-1.81*** (0.58)
Gender (Male=1)	Female	22.36 (17.95)	14.84 (16.87)
Education (Secondary education or higher=1)	No education/primary education	6.82 (15.19)	8.09 (14.22)
Log of distance to the nearby preferred health facility		14.19*** (4.08)	12.44*** (3.89)
Satisfaction with existing healthcare services (Satisfied=1)	Not satisfied	39.63** (15.60)	33.48** (15.14)
Perceived health status (Excellent/very good/good=1)	Fair/poor health status	-2.13 (18.15)	-0.38 (16.14)
Poor (Second wealth quintile) <sup>(a)</sup>	First wealth quintile (poorest)	25.66 (23.34)	29.10 (22.46)
Middle (Third wealth quintile)	First wealth quintile (poorest)	-14.26 (22.26)	-7.79 (21.33)
Rich (Fourth wealth quintile)	First wealth quintile (poorest)	50.48** (25.63)	49.18** (23.40)
Richest (Fifth wealth quintile)	First wealth quintile (poorest)	-11.55 (18.95)	-2.44 (17.42)
Intercept		245.24*** (33.61)	232.85*** (31.68)
Obs.		292	292
AIC		3651.09	2231.14
BIC		3691.54	2275.27

Notes: Standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . (a) means that the reference group for the wealth quintile is the poorest wealth quintile. AIC, BIC, are Akaike's information criterion and Bayesian information criterion, respectively.

Table 4  
Mean WTP (US\$)

Models	Mean WTP
OLS	214.21 (7.50)
Interval regression	209.66 (0.04)

entire total costs during the first year. The results indicate that the benefit-cost ratio (BCR) is 1.11, value greater than one implying that this policy could be financially attractive to investors. This means that the investors could expect US\$ 1.11 in benefits for each US\$ 1 of costs of investment in setting up the social health enterprise that will simultaneously run a health center and provide health insurance scheme to urban poor-resource setting in Kenya.

We carry out a sensitivity analysis of the cost-benefit analysis. First, we account for the profits emanating from laboratory tests and drug sales in the aggregate benefits. This implicitly assumes that the drugs and laboratory tests may not be covered by the social health enterprise. This will yield a BCR of 1.37. Similarly, we also explore the sensitivity of the findings of the BCR by assuming a maximum market share of 27 percent (Wasike et al., 2017), implying a size of the population served about 15,345.99 individuals, the profits emanating from laboratory tests and drug sales in the aggregate benefits, and a markup of 60 percent. In this scenario, the BCR is 1.05, implying that the total benefits still outweigh the total costs.

Table 5  
Cost-benefit analysis (US\$) of setting up a social health enterprise

Items	Estimates	% of Total
Benefits		
<b>Total benefits</b>	1,327,666.85	100%
<b>Costs</b>		
<b>Pre-opening costs</b>	5,931.15	0.50%
<b>Capital costs</b>	27,859.70	2.33%
<b>Administration costs</b>	41,850	3.49%
<b>Staff costs</b>	181,596	15.16%
<b>Activity costs</b>	940,812	78.53%
<b>Total costs</b>	1,198,048.86	100%
<b>Net profit</b>	129,617.99	
<b>Benefit-cost ratio (BCR)</b>	1.11	

## 5. Conclusions

In sub-Saharan African countries, low-income households face difficulties in accessing quality care and affordable healthcare services. The situation is worse in urban resource-poor settings where there is a near absence in the delivery of public healthcare services. To overcome this issue and achieve universal health coverage, a social health enterprise that will simultaneously run a health center and provide health insurance scheme could be an effective means to provide good quality affordable care and improved financial protection. Nevertheless, the WTP for setting up a social health enterprise is scarce, and the assessment of the costs of setting up the social health enterprise against its benefits are not usually documented. In this study, we use the CVM to estimate the mean WTP for the health insurance scheme proposed by the social health enterprise and investigate the main determinants of WTP in Viwandani slum (Nairobi, Kenya). This type of social health enterprise will not only provide quality healthcare services via a health center but will also run a health insurance scheme in the urban resource-poor setting.

Results of the study suggest that the feasibility of setting up a social health enterprise is promising in an urban resource-poor setting with about 97 percent of respondents willing to pay US\$ 2 per person per month for a scheme that would provide quality healthcare services. More importantly, setting up the social health enterprise will yield a positive net profit, and investors could expect US\$ 1.11 in benefits for each US\$ 1 of costs of investment in setting up the social health enterprise. Given the gaps in the delivery of healthcare services in such communities, the setting up of a social health enterprise in this urban resource-poor setting is a viable solution to reach the neglected urban households in the Kenyan slums. However, the health insurance package needs to be designed with an equity lens so that the most vulnerable groups within the community can have access.

Though the results of the study could be useful for policy recommendation, the present study has some limitations, including the possibility of mid-point/centering bias, a lack of open-ended follow-up questions on the maximum WTP. The standard payment ladder is far from perfect. It could yield to a mid-point/centering bias (Neumann and Johannesson, 1994). This occurs when respondents choose WTP responses located in the middle of the card (Ryan et al., 2004). Generally, the best way to test for any bias in the payment ladder is to use different payment ladder versions of different amounts and lengths presented to split samples (Rowe et al., 1996). However, the current survey design does not allow us to test for the mid-point/centering bias and we acknowledge this limitation. This bias could be mitigated using the classic and interval payment card (CIPC) format (Voltaire et al., 2017).

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2020.113294>.

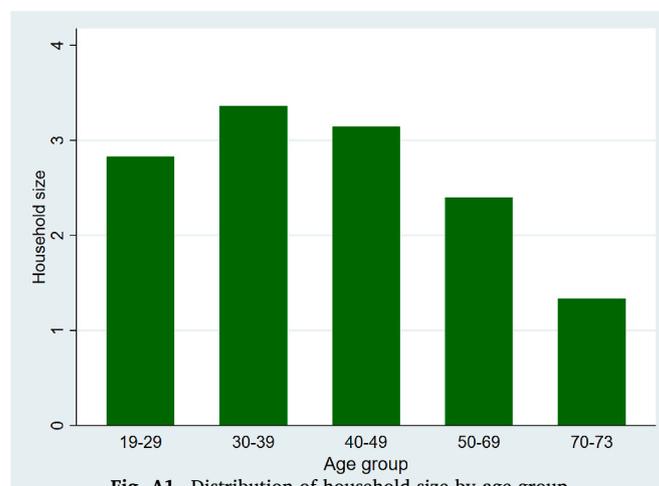


Fig. A1. Distribution of household size by age group.

The CIPC still addresses the uncertainty in CVM but integrates two options: Option A and Option B that are presented simultaneously to respondents. Option A consists of a single sequence of bid amounts horizontally arranged and exposed all together on one sheet. Option B consists of two separate and similar sequences of bid amounts also horizontally arranged. The respondents then elicit their WTP by first choosing the preferred option. Furthermore, we did not include an open-ended follow-up question on the maximum WTP. This could have helped to do further analysis and also test for starting point bias.

If social entrepreneurs would like to implement this type of social health enterprise in this urban resource-poor setting, there is a need for more involvement of the governments, and philanthropy donors/multilateral agencies. A recent report from the Overseas Development Institute (Griffin-EL et al., 2014) found that the Kenyan government is not promoting social enterprises. The government could create a good enabling environment for social health enterprises by promoting social dialogue, enacting laws that recognize the role of social health enterprises and their contribution in achieving universal health coverage, using fiscal incentives (tax relief to social entrepreneurs who will invest in social health enterprise in hard-to-reach areas such as urban resource-poor setting and fragile counties), and facilitating access to finance (credit guarantees to social health enterprises which lack tangible collateral). Philanthropy donors/multilateral agencies also have a role to play. They could use innovative financing mechanisms namely the development impact bonds. Hence, they could pay social entrepreneurs who will invest in social health enterprise interventions and tie the funding to specific and measurable outcomes that will be achieved namely in the area of universal health coverage. Another instrument is the concessional loans and grants meant for social health enterprises.

For future research, it could be more relevant to investigate the causal impact of this type of social health enterprise in urban-poor resource setting in Kenya on health outcomes and financial catastrophe. This could be examined using a cluster randomized controlled trial. This could shed some light on how this type of social health enterprise contributes to universal health coverage in Kenya.

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