Essays on health insurance for universal health coverage in low-and middle-income countries

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Abstract

This thesis contributes to the understanding of health insurance in low-and middle-income countries (LMIC) via four distinct essays. The focus is on the impact of health insurance on mental health and nutrition outcomes of social health insurance/national health insurance (SHI/NHI), equity and gender differences in community based health insurance (CBHI) payments and the willingness to pay for CBHI. Chapter 1 uses cross-section data from Ghana to explore whether health insurance affects psychological distress. Instrumental variables and propensity score matching methods are used in the analysis. The results suggest that health insurance improves psychological health. Chapter 2 uses longitudinal data from Indonesia to study the effect of health insurance for the poor on body mass index (BMI) and haemoglobin levels. A fixed-effects estimator with and without matching is employed. In general, the results show that health insurance has some negative effects on BMI but not on haemoglobin levels. Moving away from SHI/NHI, Chapters 3 and 4 focus on CBHI in Rwanda and Malawi, respectively. Chapter 3 analyses socioeconomic inequality in CBHI payments in Rwanda using repeated cross-section data. This chapter uses concentration indices, Kakwani indices, and unconditional quantile decomposition methods. The findings suggest that a flat-rate system of health insurance premium payment is more inequitable than the tiered system in which people pay based on community-defined socioeconomic status. Furthermore, female-headed households pay lower health insurance premiums. Chapter 4 uses primary data to examine the factors that affect willingness to pay for CBHI in rural Malawi. The chapter uses quantitative and qualitative data analysis methods. The results show that most people are willing to join and pay for CBHI using fiat money as opposed to commodity money. Furthermore, those who are enrolled in social cash transfer programmes are willing to spend less.

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Preface

The need to achieve universal health coverage (UHC) has required countries to adopt various forms of health financing and financial protection approaches (Qin et al., 2019). As defined by the World Health Organisation (WHO), UHC ensures that all people receive timely access to health services without suffering from financial hardship as a result of seeking health care (Moreno-Serra and Smith, 2012). UHC is an important target of Sustainable Development Goal 3 (SDG 3). Recently, several low-and middle-income countries (LMICs) have embarked on the journey towards UHC coverage by implementing new health insurance programmes and/or expanding their public health insurance provision, with the ultimate objective of improving the population's health in addition to other health system objectives (Spaan et al., 2012, Mitra et al., 2017).

Because achieving UHC is arduous, country-specific health insurance financing approaches are being encouraged (Chu et al., 2019). Community-based health insurance (CBHI), national health insurance (NHI), and social health insurance (SHI) are among the recommended prepaid health interventions being designed and implemented in different ways in many LMICs (Savadogo et al., 2013, Liu et al., 2019, Spaan et al., 2012). CBHI is not a new phenomenon; it very much resembles nineteenth-century health insurance systems in Britain, Germany, and Japan, which have evolved into the current SHI system. CBHIs cover a wide range of health financing instruments, and are heterogeneous in regulation, service coverage, management, and targeted objectives. As such, they are known by different names, such as "mutual health organisations"; "health insurance for the informal sector"; "mutual insurance schemes"; "community financing"; "microinsurance"; and "*mutuelles de santé*" (Hsiao, 2001, Jakab and Krishnan, 2004, Jütting, 2004). The main characteristic of CBHIs is that, they target people in the informal sector, there is community management in the scheme, enrolment/membership is voluntary, and they are not for profit (Wang and Pielemeier, 2012).

Development of CBHI towards SHI/NHI in the achievement of UHC is classified into three different stages (Wang and Pielemeier, 2012). These are called the basic model, the enhanced model, and the nation-wide model. There is a subtle difference between SHI and NHI. The main feature of SHI is that it is designed to cover people working in the formal sector (Wagstaff, 2010) and that membership is supposed to be mandatory. Members in the formal sector contribute to the insurance fund through employee and employer payroll tax contributions and the beneficiaries of the scheme are the members and usually their dependents. In most cases, NHI means that taxpayers would be the contributors but all the citizens are entitled to the benefits (McIntyre, 2010, Medicines, 2019). Countries that have successfully implemented large scale NHI include Ghana and Indonesia.

The various health insurance schemes that have been implemented have resulted in different impacts on the population due to the heterogeneity of the schemes and the populations they serve (Spaan et al., 2012). Despite the varying effects, the focus of health insurance studies in LMICs has largely been on the impact of health insurance on the improvement of physical health status, financial protection, and increased health care access. Recent systematic reviews indicate that still more, health insurance has received little attention in LMICs, and the existing evidence indicates some mixed results (Erlangga et al., 2019a, Erlangga et al., 2019b) – hence, requiring more studies. Furthermore, recent findings from systematic reviews demonstrate that health insurance improves financial protection and increases health care access (Spaan et al., 2012, Mitra et al., 2017, Erlangga et al., 2019b, Acharya et al., 2012). Nonetheless, questions remain regarding the effectiveness of the various schemes on mental health, nutritional status, the equity of insurance payments, and the level of demand in areas where they are not yet in operation.

It is also of interest to note that at the same time that health insurance availability has expanded in most LMICs (Barasa et al., 2018), there has also been an increase in underweight, obesity and cardiovascular diseases, among other non-communicable diseases (NCDs) (Allen et al., 2017). Statistics show that more than two-thirds of deaths worldwide are caused by NCDs, and people below the age of 60 years are the ones most affected. In addition to NCDs' effects on physical health, there is a growing burden of poor mental health in LMICs (Tampubolon and Hanandita, 2014, Lund et al., 2010, Patel et al., 2018). Although poor mental health accounts for an already considerable and growing burden of disease in many LMICs, policy action to confront the challenge has been limited at both the international and national levels.

Given the heterogeneity of outcomes, health insurance schemes and contexts, it is important to fully understand the issues that surround the existing health insurance schemes in LMICs if there is to be further positive progress towards the UHC goals and the SDGs. The present thesis contributes to the understanding of health insurance in LMICs via four distinct essays focusing on for the main health insurance schemes operating in LMICs. Specifically, the study focuses on SHI/NHI and CBHI , which have been designed and implemented to achieve UHC in LMICs (Fadlallah et al., 2018). The thesis further contributes through the application of recently developed econometric techniques, the use of mixed methods and primary data collection, and the multicountry nature of the thesis. It uses data from Ghana, Indonesia, Rwanda, and Malawi.

Chapter 1 assesses the impact of Ghana's implementation of a national health insurance scheme (NHIS) on psychological distress. Poor mental health is among the growing number of NCDs in LMICs. Mental health interventions typically have not been specifically covered in

publicly funded benefit packages, and this raises the question of whether the expansion of public health insurance may have directly or indirectly contributed to improved mental health, and if so, by how much. The study uses the first wave of the 2009–2010 Ghana Social Economic Panel survey, comprising 10,007 respondents. We employed instrumental variable and propensity score matching methods to estimate the causal impact of health insurance on psychological distress, measured by the Kessler Psychological Distress Scale (K10). Higher K10 values indicate greater psychological distress.

The results indicate that the median K10 score in Ghana is 16 ($p < 0.01$), with a minimum of 10 ($p < 0.01$) and a maximum of 45 ($p < 0.01$). The findings from the instrumental variable estimations, without matching, indicate that the K10 score of the insured is 11.8% lower ($p < 0.01$) than that of the uninsured. After running the instrumental variable regression on the matched sample, the K10 score of the insured is 10.6% ($p < 0.01$) lower than that of the uninsured. Similarly, the estimates based on propensity score matching indicate that the insured have a lower K10 score ($-0.023; p < 0.05$). Furthermore, the beneficial impact of health insurance on psychological distress is larger for wealthier insurance members than for poorer ones and varies across regions in Ghana. The findings are robust to the various estimation methods. This study suggests that having health insurance is associated with reduced psychological distress and hence improved mental health, although mental illness treatment or prevention were at best only partially covered by the NHIS in Ghana.

Chapter 2 uses three rounds of longitudinal data (2000, 2007, and 2014) to assess the impact of health insurance on body mass index (BMI) and haemoglobin levels in Indonesia. In 2005, the Indonesian government launched SHI for the poor, near poor and people in the informal sector. This was enacted in an attempt to increase access to health care and reduce household vulnerability to out-of-pocket (OOP) health expenditures, among other goals. Since then, Indonesia has also faced rising double burden of nutrition (underweight and overweight) and reductions in anaemia levels. The prevalence of other chronic diseases, such as cardiovascular diseases, has risen sharply over the same period. These health status transitions therefore prompted us to ask whether there is a link between health insurance and BMI and between health insurance and haemoglobin levels. Using the fixed effects (FE) estimator, as well as FE with matching, we find that insured people are likely to have a BMI that is 0.8% ($p < 0.01$) lower than that of uninsured people. However, the effect of health insurance is heterogeneous within wealth quintiles. Furthermore, we find no evidence that enrolment in insurance affects haemoglobin levels.

Moving away from SHI, chapters 3 and 4 focus on CBHI. Specifically, Chapter 3 investigates the inequality in contributions to CBHI in Rwanda. The availability of CBHI

appears to have mushroomed in many LMICs, partly as a policy response to calls for low-cost, pro-poor health financing solutions. In Africa, Rwanda has successfully implemented two types of CBHI systems since 2005. Existing CBHI evaluations have, however, tended to ignore the potential distributional aspects of household contributions (payments) made towards CBHI. We investigate the pattern of socioeconomic inequality in household CBHI premium contributions in Rwanda. We also assess gender differences in CBHI contributions.

Chapter 3 uses two rounds of national survey data for the periods 2010/11 and 2013/14. We quantify the magnitude of inequality in CBHI payments, decompose the concentration index of inequality, calculate Kakwani indices, and implement unconditional quantile regression decomposition to assess gender differences in CBHI expenditure. The key finding is that the categorisation of CBHI premiums into different payment groups may have led to the CBHI becoming less regressive than a flat-rate CBHI system, thereby reducing inequality in CBHI payments. In both the flat-rate and the wealth-based categorised system, inequality does exist; however, this inequality is much more pronounced in the flat-rate system. In terms of gender differences, female-headed households are likely to spend less on CBHI than male-headed households. The unconditional quantile decomposition analysis indicates that the difference in CBHI payments between female-headed households and male-headed households is due to group differences in the distribution of individual characteristics.

Whereas Chapter 3 focuses on equity in CBHI payments, Chapter 4 assesses willingness to pay (WTP) for CBHI in rural Malawi. In Malawi, few people have access to quality health care services, probably as a result of the OOP costs associated with health care utilisation. To increase health care access, one potential solution might be the establishment of CBHI, as opposed to SHI. CBHI may be preferable due to the existing large informal sector and limited tax collection capacities, which make it impossible to tax for SHI. As of 2018, neither CBHI nor SHI has been implemented in Malawi. To inform potential future CBHI implementation, this study investigates the willingness of Malawians to pay for CBHI and the factors that affect rural Malawians' WTP.

The primary data used in the study were collected in Malawi from September to October 2017 in five districts from three different regions. We collected both quantitative and qualitative data. The maximum WTP values were elicited using the bidding game approach. This was augmented by the WTP values obtained from focus group discussions (FGDs). Econometric analysis for the quantitative data was performed using a two-part generalised linear model (TPM -GLM), whereas the qualitative data were analysed using content analysis. The results show that the vast majority of respondents (95%) are willing to join CBHI by paying money as opposed to paying in kind using a commodity (33%). Furthermore, the variables age, income, knowledge of insurance, membership in government social cash support (Social Cash Transfer Programme

(SCTP)), and access to finance through village credit groups were entered as significant determinants of WTP. People enrolled in the SCTP were found to be willing to pay significantly less than non-SCTP enrolees.

A number of conclusions can be drawn from this chapter. First, the results suggest that there is high demand for CBHI in rural areas. Hence, health cost-sharing reforms are feasible. Second, people are far more likely to pay into CBHI by using money rather than in-kind transfers. Third, because access to finances is a significant predictor, policy makers may wish to consider linking CBHI to informal rural financial institutions to enrol as many participants as possible. Fourth, CBHI should not be based on a flat premium but rather may be made commensurate with increasing ability to pay.

The thesis concludes with Chapter 5, in which the key findings of the preceding chapters are summarised.

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Declaration

I declare that this thesis is a presentation of original work and I am the sole author of all the chapters. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References. Chapter 1 has been published with Marc Suhrcke and Rodrigo Morreno-serra, in the special issue of *Applied Health Economics and Health Policy* on "the economics of mental health," September 2019, pages 1-11. I also declare that Chapter 3 has been submitted to the journal of Health Policy and Planning whereas Chapter 4 has been submitted to the journal of Social Science and Medicine. The chapters have benefited from the following conferences.

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Chapter 1

The impact of Ghana's National Health Insurance on psychological distress

1.1 Introduction

The burden of poor mental health is concentrated in low-and middle-income countries (LMICs), where it is estimated that four out of five individuals suffer from mental health problems (Drew et al., 2012). Psychological distress has been shown to be associated with an increased risk of poverty, poor education outcomes (Callander and Schofield, 2018) and an increased risk of chronic diseases (McLachlan and Gale, 2018). Globally, the economic consequences of mental ill-health conditions are profound: between the years 2010 and 2030, almost USD16.0 trillion worth of economic output is estimated to be lost due to psychiatric disorders (Patel et al., 2018). Despite psychiatric disorders accounting for an already considerable, growing burden of disease in many LMICs, policy action to confront the challenge has been limited at both international and national levels (WHO, 2013).

Recently, several LMICs have embarked on the journey towards universal health coverage by expanding their public health insurance provision, with the ultimate objective of improving population health, in addition to other health system objectives (Spaan et al., 2012, Mitra et al., 2017). Without health insurance, people are exposed to more stressful conditions, which in turn may trigger psychological distress (Jacobs et al., 2014). Evidence from high-income countries shows that lack of health insurance is one of the key determinants of psychological distress (Kataoka et al., 2002, Jacobs et al., 2014).

Health insurance might affect psychological distress in several ways (McMorrow et al., 2017). This may include the psychological effect, for a given individual, of knowing that they would be protected against some of the adverse consequences of living with ill-health whilst being covered by health insurance. This effect may also be a result of direct coverage of psychiatric health treatment from health facilities (Jacobs et al., 2014). While there is growing interest in understanding the socioeconomic determinants of mental health in LMICs (Lund et al., 2018, Araya et al., 2003), the contribution of health insurance to psychological distress has not been fully examined in an LMIC context, except for one study in China that focused on

depression (Tian et al., 2012). Our paper is different from the Chinese study in terms of context, methods, and national representativeness in terms of sampling and uses a different measure of mental health.

The existing evaluations of public health insurance reforms in LMICs have focused on the impact on *physical* health (with mixed and sometimes counter-intuitive results) (Acharya et al., 2013, Giedion et al., 2013). In this paper, we seek to fill the evidence gap for LMICs by evaluating the impact of the public health insurance scheme in Ghana, one of the first countries in Africa to have introduced national health insurance scheme (NHIS) (Dake, 2018, Kotoh et al., 2017). Previous evaluations of the Ghana NHIS have focused on the effect of the NHIS on out-of-pocket payments (OOP), catastrophic health expenditure (CHE) (Aryeetey et al., 2016, Okoroh et al., 2018) and health care utilisation (van der Wielen et al., 2018), concluding that the NHIS has increased the latter and reduced OOP. Other studies have found that health insurance is associated with reduced neonatal mortality rates and improved maternal and child health outcomes (Lambon-Quayefio and Owoo, 2017, Brugiavini and Pace, 2016, Mensah et al., 2010, Temsah et al., 2017). One study from Ghana that is perhaps closest to our focus – but does remain very much at a descriptive level and is limited to a very small sample – has shown that having health insurance is associated with less anxiety in 89 male and 11 female prison inmates (Ibrahim et al., 2015). Of the 26.1 million people in Ghana, 650,000 are affected by severe mental disorders, and 2,166,000 suffer from moderate to mild mental disorders (WHO, 2019).

Ghana represents an interesting case study of the impact of health insurance on psychological distress in that the cost burden associated with mental healthcare utilisation has been shown to be high. According to Addo et al. (2013), households seeking mental health care incur costs of USD60.24 per month, out of a monthly household income of USD184.48. To the extent that health insurance reduces some of the private costs of such health care use, psychological health benefits may arise. However, the extent to which psychiatric health care services are included in the benefit package appears limited, as, for instance, psychotic medicines are only covered if prescribed in general practice (Eatona and Oheneb, 2015). This may suggest that if health insurance has a positive impact on psychological distress, then this may have to operate via channels other than increased mental health care utilisation.

This study contributes to the literature by, first, using more robust methodologies than existing studies – an instrumental variable (IV) technique and matching methods separately, as well as a combination of the two – to assess the effect of health insurance on psychological distress. Second, it provides evidence on the impact of health insurance on psychological distress in an African context. We examine psychological distress measured using the Kessler 10 (K10) instrument, which has been widely used by the WHO and other researchers in

previous mental health research (WHO, 2004, Uddin et al., 2018, Biddle et al., 2018, Sipsma et al., 2013).

The rest of the chapter is organised as follows. In section 1.2, we briefly describe NHIS in Ghana. Section 1.3 presents the methods, and we narrate the data and the econometric methods used. Section 1.4 explains the instruments used. Section 1.6 presents the results, consisting of the descriptive statistics and the econometric results. In Section 1.7, the results are discussed with reference to the previous literature and concludes the chapter

1.2 Ghana National Health Insurance

Ghana's health care system uses a 'cash and carry' approach, where people pay user fees at the point of use. User fees were introduced in the 1980s, as prescribed by the structural adjustment programs (SAP) of the IMF and World Bank (Adisah-Atta, 2017, Akazili et al., 2017). The reason for the introduction was to raise finance for health. After the implementation of user fee policy, the health care seeking costs were associated with large inequalities in health care access and excluded the poor from accessing health care services (Akazili et al., 2014). Eventually, many poor people resorted to other hardship coping mechanisms, such as reduction of consumption, borrowing and selling of essential asserts in order to finance health care utilisation (Akazili et al., 2017) The NHIS was established by the National Health Insurance Act of 2003 (Act 650), in the interest of improving equity in access to health care . The operation of the NHIS is regulated by the National Health Insurance Agency (NHIA) (NHIA, 2009).

The NHIS has decentralised operations where every district has its own insurance fund financed through central-level transfers and individual premiums (Rajkotia and Frick, 2011). Although membership in the NHIS is supposed to be mandatory, in essence, it is voluntary (Witter and Garshong, 2009). No penalties exist for those who do not have NHIS in Ghana (Bonfrer et al., 2016). Enrolment has been relatively low but favourably higher than that in most existing health insurance schemes in the West African region. Enrolment can be performed at the individual or household level (Rajkotia and Frick, 2011). Membership in the NHIS is valid for one year. Inequalities in enrolment have also been reported, where the richer are more likely to enrol than the poor (Jehu-Appiah et al., 2012, Jehu-Appiah et al., 2011). The enrolment problem has also been coupled with negative attitudes towards the pricing and financing of the NHIS (Jehu-Appiah et al., 2012). People under the age of 18, above 70, pensioners, pregnant women or those deemed to be indigent are exempted from premium payments.

In terms of financing, the NHIS has a hybrid financing mechanism. This includes taxes (2.5% value-added on goods and services, excluding the ones defined as goods and services consumed by the poor) (Jehu-Appiah et al., 2012, NHIA, 2009), payroll deduction from formal workers (2.5% of the Social Security and National Insurance Trust), annual allocation from the central government and premiums from the adults who work in the informal sector. At the time of the study, the districts were charging approximately USD8 per person, and people paid no deductibles or co-payment (Rajkotia and Frick, 2011). Currently, the premium varies within districts and is graduated based on income levels. The premium range is from 7.20 Ghanaian cedis (GH¢) (USD1.62) to GH¢48.00 (USD10.83) (Nsiah-Boateng and Aikins, 2018). Within the NHIS, there is a predefined benefit package that covers almost 95% of all health care services.

1.3 Methods

1.3.1 Data

This paper draws upon data from a study conducted by the Economic Growth Centre (EGC) at Yale University in the United States of America and the Institute of Statistical, Social, and Economic Research (ISSER) at the University of Ghana, Legon (Ernest et al., 2011). We use the first wave of the Ghana Socioeconomic Panel Survey of 2009-2010, which is the only data currently available for public use. The data can be downloaded from the World Bank website[1]. A two-stage stratified sample was used in the survey design during the data collection process. First, enumeration areas (EA) were selected, followed by a random selection of 15 households from each EA across the ten regions. In total, data were collected from 5009 households in the 334 EAs. The survey non-response rate is below one percent. Only individuals aged 12 years and older were included in the study (Ernest et al., 2011).

1.3.2 Dependent variable

The variable of interest is psychological distress and is measured using the K10, which is a tool developed by Kessler and Mroczeck (Kessler et al., 2003). The WHO has adopted the K10 for assessing mental health in various contexts (Slade et al., 2009, Furukawa Toshi et al., 2008, Uddin et al., 2018). In Ghana, the K10 has been used to measure psychological distress among prison inmates (Ibrahim et al., 2015) as well as in the general population (Sipsma et al., 2013). In the K10 questionnaire, respondents are asked 10 questions about the frequency with which they have experienced specific feelings in the previous four weeks. The answers are calibrated

[1] http://microdata.worldbank.org/index.php/catalog/2534/get_microdata

on a 5-point scale, ranging from a minimum of 1 to a maximum of 5 (where 1. None of the time, 2. A little of the time, 3. Some of the time, 4. Most of the time, and 5. All of the time). The K10 index is calculated as a sum of the 10 questions over the 5-point scale, and this gives a minimum of 10 to a maximum score of 50. Thus, higher scores denote higher psychological distress. Our analysis uses a continuous (log of) K10 score, which is more appropriate to reflect psychological distress than a categorical scale (Jacobs et al., 2014).

1.3.3 Explanatory variables

The choice of the independent variables is based on previous studies that have assessed socioeconomic determinants of psychological distress as well as predictors of health insurance uptake in Ghana and other countries (Callander and Schofield, 2018, Jacobs et al., 2014, Duku et al., 2016, Ibrahim et al., 2015, Addo et al., 2013, Sipsma et al., 2013). Among others, the variables include sex, age, self-reported health, geographical location, education, and income. All the variables we use are described in Table 1.1.

Table 1.1 - Description of variables

Variables	Description
K10-score	Kessler 10 Score
Health Insurance (NHIS)	1 if respondent has national health insurance and 0 otherwise
Household head	1 if respondent is a household head and 0 otherwise
Age of respondent	This is the age of the respondent at the time of the interview and is captured as continuous
Household size	Number of people who live in the household
Income (GH₵)	Total household per capita expenditure (Ghana Cedi)
Urban	Location of residence of respondent. 1 if urban, 0 if rural
Very healthy	Self-assessed health; 1 if healthy, 0 otherwise
Somewhat healthy	Self-assessed health; 1 if somewhat healthy, 0 otherwise
Somewhat unhealthy	Self-assessed health; 1 if somewhat unhealthy, 0 otherwise
Unhealthy	Self-assessed health; 1 if unhealthy, 0 otherwise
No qualification	Takes 1 if respondent has no education and 0 otherwise
MSLC/BECE/Vocational	Takes 1 if responded has MSLC/BECE/Vocational qualification and 0 otherwise
Secondary/SSS/SHS and higher	Takes value of 1 if respondent has secondary/SSS/SHS and higher qualification and 0 otherwise
Male	Captures gender of respondent and is 1 if male, 0 if female
Married	Marital status of the respondent; 1 if married and 0 otherwise
Western region	1 if Western region and 0 otherwise
Central region	1 if Central region and 0 otherwise
Greater Accra region	1 if Greater Accra region and 0 otherwise
Volta region	1 if Volta region and 0 otherwise
Eastern region	1 if Eastern region and 0 otherwise
Ashanti region	1 if Ashanti region and 0 otherwise
Brong Ahafo region	1 Brong Ahafo region and 0 otherwise
Northern region	1 if Northern region and 0 otherwise
Upper East region	1 if Upper East region and 0 otherwise
Upper West region	1 if Upper West region and 0 otherwise

Notes: BECE; basic education certificate examination, MSLC middle school leaving; certificate, *SHS* senior high school, SSS senior secondary school

1.3.4 Data analysis

The main analysis uses an IV approach to address endogeneity. Endogeneity occurs when a covariate is correlated with the unobserved error term of the regression. Our IV approach is motivated by concerns around selection into health insurance, which can potentially cause endogeneity. Previous studies report that the probability of enrolling in the NHIS in Ghana – which is in practice a voluntary individual decision – increases with health risk (Duku et al., 2016, Amponsah, 2013, Brugiavini and Pace, 2016, Chankova et al., 2010). Indeed, most insured individuals in our sample report poor self-assessed health, which suggests that the described sources of endogeneity may be an issue for our analyses.

Assuming that the relationship between health insurance and psychological distress is linear, the effect of the NHIS on psychological distress can be estimated as;

$$Y_i = \propto_0 + \theta NHIS_i + X_i'\beta + \varepsilon_i \quad (1.1)$$

where Y_i is log of K10, $NHIS_i$ health insurance for individual, X_i' is a vector of controls and ε_i is the error term. If endogeneity is a problem, it means that $E(\ NHIS_i|\varepsilon_i \neq 0)$. The implication of endogeneity is that the OLS coefficient (θ) is biased and inconsistent and can no longer be given a causal interpretation (Cameron and Trivedi, 2010); thus, there is a need to address endogeneity using an IV.

An IV is a variable (Z) that is correlated with having insurance but is not correlated with the error term (v_i) in equation (1.2). To be a suitable instrument, the variable must satisfy two important conditions, namely, being relevant (informative) and exogenous (valid) (Angrist and Pischke, 2008). Instrument relevance means that the instrument (Z) is highly correlated with the endogenous explanatory variable, i.e., $[Cov(Z_i, NHIS_i) \neq 0]$ (Angrist and Pischke, 2008). Instrument validity means that the instrument is not correlated with the error term, i.e., $[Cov(Z_i, \varepsilon_i|X_i) = 0]$. Having identified such an instrument, the effect of $NHIS_i$ on Y_i in equation (1.1) is estimated in two steps using two-stage least squares (2SLS). First, we regress health insurance uptake on the instrument and the regressors:

$$NHIS_i = \pi_0 + \pi_i Z_i + X_i'\emptyset + v_i \quad (1.2)$$

where Y_i is the log of K10, $NHIS_i$ is health insurance, Z_i is an instrument, X_i' is a vector of controls, $\emptyset$ is a vector of coefficients, π_0 is a constant, and v_i is an error term. To assess the strength of the instrument, we utilise the "rule of thumb" of whether the $F-$statistic in the

first stage (equation 1.2) is greater than 10 (Stock and Yogo, 2005). Exogeneity of the instrument is tested using the Hausman test (Wooldridge, 2010). This test assesses whether there are systematic differences between estimates obtained using ordinary least squares (OLS) and the IV estimator.

Second, from equation 1.2, we obtain the predicted values of the $NHIS$ variable used to run equation 1.3:

$$Y_i = \propto_0 + \tau \widehat{NHIS}_i + X_i'\beta + \varepsilon_i \quad (1.3)$$

where Y_i is the log of K10, $\widehat{NHIS}_i$ is the predicted value of health insurance, X_i' are controls with a vector of coefficients β, $\propto_0$ is a constant, and ε_i is an error term. The coefficient (τ) measures the effect of health insurance on psychological distress.

Because individuals vary in the characteristics, therefore, undertaking heterogeneity analysis by various socioeconomic characteristics is essential. The rationale for the different analyses of heterogeneity is based on empirical evidence, which suggests that the effect of health insurance may differ across socioeconomic characteristics (Escobar et al., 2010). The subgroup analysis undertaken is also critical because it helps to unmask the effects of health insurance beyond the aggregate level. Therefore, we test the hypothesis that the impact of health insurance may vary across socioeconomic categories. For Ghana, in this case, the analysis is important because previous studies have established heterogeneous effects of health insurance on other health outcomes (Bagnoli, 2019, Tirgil et al., 2019). Thus, we perform robustness checks by using different estimation samples (excluding those under age 18 and comparing rural-urban samples); changing the functional form (using naïve Poisson, naïve square root transformation, instrumented generalized method of moments (GMM) and control function); and imputing missing values by assigning the lowest and highest K10 scores to the 29 missing observations (0.29% of the data) on the dependent variable.

1.4 Instruments, relevance, and weak instruments

In any IV strategy, the challenge is to obtain a valid instrument (Angrist and Pischke, 2008). The most common instrument used in the related literature has been membership in microfinance or other social support organisations (Jowett et al., 2004). Variations in community- or state-level enrolment rates have also been used as instruments to proxy for insurance penetration (Strobl, 2017). Such instruments have been applied to estimate the effect of community-based health insurance on child health in Rwanda (Lu et al., 2012).

In addition to the above-mentioned studies, community enrolment as an instrument has also been extensively used in China (Cheung et al., 2016, Cheung and Padieu, 2015, Jung and Liu Streeter, 2015), Colombia (Trujillo et al., 2005), Mexico (Wirtz et al., 2012, Galárraga et al., 2010) and Ecuador (Waters, 1999). The suggested instrument has also been recently used in Ghana in the evaluation of the NHIS with respect to OOP, CHE and health care utilisation (Aryeetey et al., 2016). However, the difference with our own approach is that our instrument is constructed as an aggregate, excluding the household in which an individual is observed. This is based on the assumption that the higher the enrolment rate in the community is, the more attractive the insurance, thus increasing the odds of an individual enrolling. The instrument captures aggregated decisions for the other households to join the NHIS, and thus, it should not be directly correlated with the specific (excluded) household's mental health. The various public recruitment campaigns in communities (NHIA, 2009, NHIA, 2010) can be seen as one of the major contributors to higher community enrolment and are dependent on each NHIS district administrators' abilities to convince communities to join the NHIS. Given that the community decision to join a health insurance scheme also depends on aggregate decisions (Jowett, 2004, Chemin, 2018), then this should be exogenous to the decision at the household level.

1.5 Matching estimator

Following Cheung and Padieu (2015), Wirtz et al. (2012), and Trujillo et al. (2005), we also undertook propensity score matching (PSM). As a final check, we run our IV regressions using only the (propensity score) matched sample (Lu et al., 2012). The PSM estimator has been widely used in programme impact evaluation (Rosenbaum and Rubin, 1983, Angrist and Pischke, 2008, Dehejia and Wahba, 1999). The propensity score is the probability of being assigned to a treatment group (in this case, having NHIS), conditional on the observed covariates. Thus, PSM enables estimation of the treatment effect of having NHIS. In the model using PSM, let $NHIS_i = 1$ represent a person with health insurance and $NHIS_i = 0$ represent an individual with no health insurance. The effect of the treatment is then represented by TE_i for each individual as:

$$TE_i = Y_i(1) - Y_i(0) \tag{1.4}$$

where $Y_i(1)$ represents the log of the K10 score if a person has health insurance, and $Y_i(0)$ represents the log of the K10 score if a person does not have health insurance. The average treatment effect on the treated $(ATET)$ can be estimated as follows:

$$ATET = E(TE_i|NHIS_i = 1, X_i) = E(Y_i(1)|NHIS_i = 1, X_i) - E(Y_i(0)|NHIS_i = 1, X_i) \quad (1.5)$$

The propensity score is estimated using the same covariates used in the main regression (regions, household size, location, marital status, education, sex, income, and status of being household head or not). Other strategies, namely, nearest neighbour matching and regression adjustments (RA), were also utilised for sensitivity analysis of the choice of estimators. These are a form of doubly robust methods (combination of propensity score (exposure equation and outcome regression)) employed as part of a sensitivity analysis. All the approaches allow for robust standard errors (Funk et al., 2011). All the analyses were performed in Stata 15.1.

1.6 Results

1.6.1 Descriptive statistics

In Table 1.2, the median K10-score is 16, with a minimum of 10 and a maximum of 45. Approximately 34% of the respondents have health insurance, 49% are household heads, and 13% have secondary school or higher education qualifications. The mean age of respondents is approximately 39, most of the respondents are married, and 45% are male. The average household size is approximately 5, and 73% of the respondents report being in good health. The mean income per month is estimated at GH¢435 and ranges from GH¢60.00 to GH¢ 2668.00.

Table 1.2 - Social and demographic statistics

Variables	Mean	N	Med	Min	Max
K10-score	17.37	10007	16	10	45
Health Insurance (NHIS)	34%	3402	0	0	1
Household head	49%	4903	0	0	1
Age of respondent	39.13	10007	36	12	109
Household size	4.51	10007	4	1	20
Income (GH₵)	435.34	10007	314	60	2268
Urban	35%	3502	0	0	1
Very healthy	73%	7305	1	0	1
Somewhat healthy	18%	1801	0	0	1
Somewhat unhealthy	7%	700	0	0	1
Unhealthy	2%	200	0	0	1
No qualification	62%	6204	1	0	1
MSLC/BECE/Vocational	26%	2602	0	0	1
Secondary/SSS/SHS and higher	13%	1301	0	0	1
Male	45%	4503	0	0	1
Married	51%	5104	1	0	1
Western region	9%	901	0	0	1
Central region	7%	700	0	0	1
Greater Accra region	10%	1001	0	0	1
Volta region	10%	1001	0	0	1
Eastern region	12%	1201	0	0	1
Ashanti region	18%	1801	0	0	1
Brong Ahafo region	10%	1001	0	0	1
Northern region	14%	1401	0	0	1
Upper East region	6%	600	0	0	1
Upper West region	4%	400	0	0	1
N	10007				

1.6.2 Econometric results

Having presented the descriptive results, we move on to present the results from the main IV model. First, we interpret the first stage as shown in Appendix 1 Table A1.1. There seems to be a strong relationship between the instrument and NHIS uptake, which is significant at p <0.01. In terms of exogeneity, the post-estimation test indicates a Durbin-Wu-Hausman (DWH) statistic of 29.60 (p <0.01), thus leading to strong rejection of the exogeneity of health insurance. Regarding instrument relevance, the F-statistic (($F(1, 9954) = 1372.8$; p <0.01) is greater than 10, suggesting that the instrument is not weak (Stock and Yogo, 2005). The first-

stage test is attached in Appendix 1 Table A1.2.

In Table 1.3, the OLS results are in the top panel, and the IV model is in the bottom panel. In all estimations, we exclude and include different variables, as indicated in the table, to see whether the results are robust to change of controls. The main results are in column (5), where the self-assessed health variable is excluded because it may be correlated with mental health. The results are robust to excluding the self-assessed health indicator.

Table 1.3 - Results of the effect of health insurance on psychological distress (OLS & IV)

		(1)	(2)	(3)	(4)	(5)
	Variables	**Dependent variable is the log of K10**				
OLS	Health Insurance (NHIS)	-0.015**	-0.024***	-0.024***	-0.024***	-0.022***
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
IV	Health Insurance (NHIS)	-0.110***	-0.120***	-0.132***	-0.116***	-0.118***
		(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Controls	Household head	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Household size	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Urban	*Yes*	*Yes*	*No*	*Yes*	*Yes*
	Education	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Male	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Marital Status	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Log Income	*Yes*	*No*	*Yes*	*Yes*	*Yes*
	Province	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Age of respondent	*No*	*Yes*	*Yes*	*Yes*	*Yes*
	Self-assessed health	*No*	*No*	*No*	*Yes*	*No*
N		9978	9975	9975	9939	9975

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01. It is important to note that there were 68 missing observations in the analytic sample; for various variables, the reported sample sizes in the regression output may vary depending on the combination of the covariates used.

The results in Table 1.3 show that the health insurance coefficient for both OLS and IV is negative. For the OLS (-0.022; p <0.01), the results are robust to changes in the controls. In the IV model, given that the variable is in logarithm, the coefficient of -0.118 (p <0.01) may be interpreted as a semi elasticity. Exponentiation of the NHIS coefficient produces an estimate that implies that the K10 score is 11.8% lower for the insured, on average, than that of the uninsured. The estimated NIHS effects are statistically significant (p <0.01) across all IV models and consistently indicate that the K10 score for the insured is lower than that for the uninsured. The full results for OLS in Table 1.3 are in Appendix A1.3 and the IV are in Appendix A1.4.

Our results suggest that the IV estimation coefficient is higher than that of the (naïve) OLS analysis in Appendix A1.3. After checking for inclusion and exclusion of various variables in the specification, the K10 score ranges from 11.2% to 12.8% lower than the score for people without health insurance. After implementing matching and performing an IV on the matched sample, the results are similar to those in Table 1.3. We find that the health insurance coefficient is negative, suggesting that the K10 score for the insured is 10.6% lower than that of the uninsured. See Table 1.4 column 5. The full results are in Appendix A1.5 column 5.

Table 1.4 - Results of the effect of health insurance on psychological distress (IV on matched sample)

		(1)	(2)	(3)	(4)	(5)
Variables		**Dependent variable is the log of K10**				
	Health Insurance (NHIS)	-0.112***	-0.123***	-0.141***	-0.093***	-0.106***
		(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Controls	Household head	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Household size	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Urban	*Yes*	*Yes*	*No*	*Yes*	*Yes*
	Education	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Male	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Marital Status	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Log Income	*Yes*	*No*	*Yes*	*Yes*	*Yes*
	Province	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Age of respondent	*No*	*Yes*	*Yes*	*Yes*	*Yes*
	Self-assessed health	*No*	*No*	*No*	*Yes*	*No*
N		6764	6758	6758	6722	6758

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

In addition to the analyses discussed, we check for heterogeneity at different levels of income and across regions. The health insurance variable is interacted with income and regional variables. In Appendix 1A.6 and 1A.7 in the appendix, the marginal effects indicate that there is a heterogeneous impact of health insurance across income levels. We notice that the beneficial impact of health insurance on psychological distress increases with income (that is, after the interaction of the income and health insurance variables). We may also offer an interpretation regarding why health insurance seems to offer a greater beneficial effect for the rich. This is best interpreted based on the economic theory of expected utility, which basically suggests that people get insured to avoid loss of income/wealth when faced with unforeseen events, such as illness. Because wealth offers utility, then it may imply that that those with more wealth should have higher expected utility. Hence in our case, it can be argued that health insurance offer a psychological "peace of mind" effect (Haushofer et al., 2020) more on the

richer because it give them more assurance of avoid losing their wealth and/or incomes, than the poorer, in the event of sickness.

Across regions, we also find that there is heterogeneity and that the impact of health insurance varies by region. It is much lower in the capital city of Ghana Greater Accra and higher in the Ashanti regions. In Appendices 1A.8, 1A.9 and 1A.10, we did subgroup analysis, by gender, urban locations and also imputing the missing observations on the dependent variable. All results were qualitatively similar.

1.6.3 Results for matching

1.6.3.1 Matching quality

First, we checked for common support in the propensity scores. Figure 1.1 shows the common support (overlap) for the people with NHIS (treatment) and without NHIS (control). As can be seen, there is an overlap in the distribution of the propensity scores between the treatment and control groups. To estimate the treatment effects, the propensity score approach assumes the non-existence of differences between treated and non-treated individuals after matching is performed. Any indication of differences thus calls for balancing the treatment and control groups. Covariates are said to be balanced if the standardised differences in the matched data are close to zero and the variance ratios are close to one (Garrido et al., 2014, Austin, 2009). Figure A1.1 and Table A1.11 show that the treatment and control groups are successfully matched (provided in Appendix).

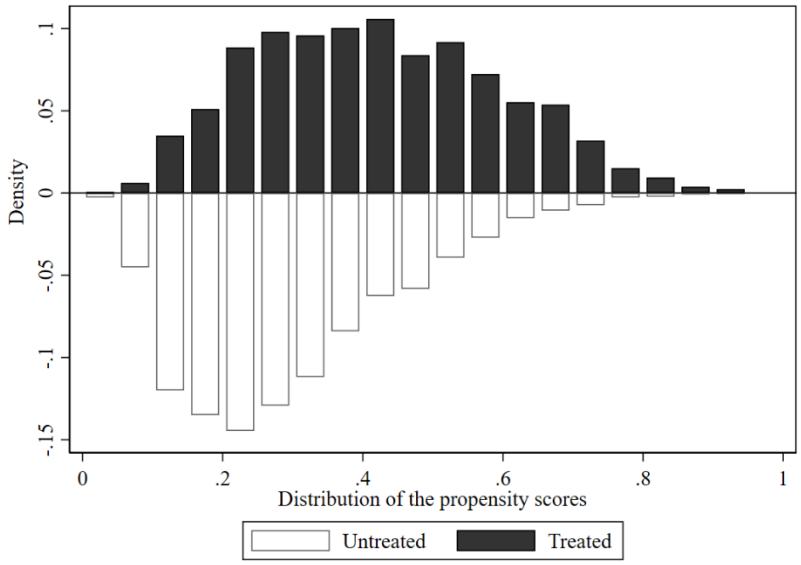

Figure 1.1 - Distribution of propensity scores across treatment and comparison groups

Table 1.5 shows the results for the various matching algorithms we employ (average treatment effect on the treated). The PSM results show that the K10 score for the insured is -0.023 ($p < 0.01$) lower than that for the uninsured. The result is consistent with the nearest neighbour matching (NN-match; see Caliendo and Kopeinig (2008)) and the regression adjustment (RA) estimates.

Table 1.5 - Results for matching estimators

	Propensity Score Matching	Nearest Neighbour-Match	Regression Adjustment
Average Treatment Effects on the Treated	-0.023**	-0.023**	-0.030***
	(0.009)	(0.008)	(0.007)

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

1.7 Discussion and conclusion

This paper adds to the existing literature that assesses the effect of health insurance on health outcomes by investigating the impact of having health insurance on psychological distress in Ghana. To the best of our knowledge, this is the first paper that assesses the relationship using nationally representative data from Ghana, a country where such evaluations do not exist, but the need for such research is high. Using the IV and propensity score matching techniques, we find that people with health insurance are less likely to have psychological distress. Our main results are estimated using an IV approach. The results are robust to a series of estimation methods we implemented.

We find that having health insurance is associated with a K10 score approximately 11.8% lower than that of the uninsured. In a related study of the impact of health insurance on mental health, Baicker et al. (2018) find that health insurance is associated with a reduction in undiagnosed depression by 50%. This is also in line with the conclusion in another study that indicates that health insurance is associated with a 30.5% reduction in depression (Baicker et al., 2013). Results from the IV-based estimates indicate a considerably higher positive impact of health insurance on psychological distress than the naïve models and the matching estimator results. This suggests that estimation without taking into account endogeneity biases the health insurance effect downwards.

The finding that having health insurance is associated with low psychological distress is consistent with Ibrahim et al. (2015), who find that prison inmates who have health insurance are less likely to have anxiety in Ghana. Furthermore, this is in line with what is reported in the context of the USA, showing that having public health insurance via Medicare is associated

with having a lower K10 score, compared to not having Medicare (McMorrow et al., 2017). Likewise, Finkelstein et al. (2012), in the Oregon health insurance experiment, report that people with health insurance are likely to have better mental health. This finding also confirms Tian et al. (2012) in China, who indicate that poor mental health is higher among people without health insurance. Nevertheless, the results contrast with Jacobs et al. (2014) in the USA, who find that public health insurance has no effect on psychological distress.

Having established that health insurance improves mental health, it is thus essential to discuss the possible mechanism through which health insurance has an impact on mental health in Ghana. These are the potential mechanisms through which health insurance can reduce psychological distress that may explain our results. First, health insurance may have enabled the insured access to treating physical health problems (van der Wielen et al., 2018). Improving physical health may in turn reduce stress, anxiety and depression, which may have appeared as comorbidities to the physical health problem (Ohrnberger et al., 2017, Jacobs et al., 2014). Evidence from Ghana shows that insured are likely to seek treatment as compared to those without health insurance (Blanchet et al., 2012). Second, the insured in Ghana are more likely to be protected from catastrophic health expenditures (Okoroh et al., 2018). Higher OOPs are likely to lead to CHE, which is likely to cause stress. Indeed in LMICs, OOPs are one of the main inducers of stress which may eventually have an effect on the mental health (Alam and Mahal, 2014). The likelihood that health insurance has reduced OOP may have broad household welfare effects on productivity and labour supply, which in turn may further reduce psychological distress through increasing household consumption and being protected from poverty. As previous researchers have shown in Ghana, the insured were likely to have higher consumption (Fiestas Navarrete et al., 2019)

In addition to the above, the result may be because mental health is at least partially covered via the NHIS in Ghana (Addo et al., 2013), hence facilitating access for patients when the services are required. Furthermore, the positive impact of health insurance may be due to the availability of community mental health workers (Agyapong et al., 2015), who are government employees, especially in rural areas where the health services are provided (they provide services to all people, but the non-insured are still required to pay for the medicine not covered by the NHIS). Last, we cannot rule out the "peace of mind effect" (Jacobs et al., 2014) as one potential explanation for the observed negative relationship between health insurance and psychological distress that we find here: those with health insurance may see their worries and stress levels reduced by the very existence of the insurance. Supporting this argument, McMorrow et al. (2017) in USA suggest that having health insurance provides mental health benefits that surpass actual care. This may be true in Ghana given that the provision of mental health care services as part of the NHIS has received less attention (Gilbert and Dako-Gyeke, 2018).

The results found in this paper can be generalisable to other countries with similar backgrounds to Ghana. The countries may be those with similar cultural practices, health systems and characteristics. Our results are not without limitations. First, the measure of psychological distress is self-reported, and as such, it may suffer from the similar problems that are associated with other self-reported health outcomes. However, because it is a validated, widely used measure, it is a very good proxy for the actual mental health that is available in the data. The results have important implications for further research. As a way forward, there is a need to conduct further research using clinically diagnosed measures of mental health to substantiate the relationship between health insurance and mental health. Furthermore, future research may consider incorporating the availability of mental health facilities vis-à-vis health insurance. It may also be important to go beyond looking at solely *public* health insurance by assessing the effect of having *private* health insurance or the combined effect of having both private health insurance and public health insurance. Our data do not allow for the consideration of such nuances.

Having discussed all the above, we may have some thoughts on the associated validity of our instrument. The instrument was based on the idea of aggregate demand. However, one may question the potential of other aspects, such as peer effects. In such an instrument. In order to deal with that, the use of cluster and regions is recommended. We aggregate penetration using clusters (each cluster had 15 households) and also controlled for regions. However, the extent to which this may take out aspects such as peer effects may still be an area for further research.

The conclusion that can be drawn from the results is that having health insurance improves psychological health in Ghana. This means that in addition to enabling people to have access to physical health care, health insurance may improve mental health. The results have important policy implications: since health insurance is associated with reduced psychological distress, providing health insurance may be one way to help improve mental health. Given that the impact is higher with increasing income levels, there may be a need to facilitate access to health insurance for people on lower incomes. Last, policymakers may consider increasing the benefit package to cover more psychiatric care.

Chapter 2

The impact of public health insurance on body mass index and haemoglobin in Indonesia

2.1 Introduction

The aim of this chapter is to contribute to a better understanding of the effect of health insurance on body mass index (BMI) and haemoglobin using panel data from Indonesia. A long-standing debate exists in the literature concerning the effect of health insurance on individual health status, and most of the studies on this topic are from developed countries. The predominant view suggests that health insurance is associated with an improvement in health status among the insured (Levy and Meltzer, 2008). However, there is a paucity of evidence that links health insurance to health status in low-and middle-income countries (LMICs) (Spaan et al., 2012, Erlangga et al., 2019b), where most of the health insurance schemes are in their infancy. Specifically, studies linking health insurance to nutritional status, BMI and haemoglobin, are scarce. In an attempt to improve the health status of the population, many LMICs have committed to the attainment of universal health coverage (UHC) through the implementation and expansion of various health insurance schemes (Mitra et al., 2017), Indonesia is one of these countries (Johar et al., 2018, Erlangga et al., 2019a).

There have been several landmark events with respect to the development of health insurance in Indonesia. These include the extension of health insurance provision to the poor in 2005 (Sparrow et al., 2013), the near poor in 2008, and the informal sector and, finally, the merging of various existing health insurance schemes into one national health insurance scheme, called *Jaminan Kesehatan Nasional* (JKN), in 2014 (Wiseman et al., 2018). The JKN scheme has been considered a success, given that enrolment in the programme increased from 86.4 million people in 2014 to 111.6 million in November 2017. However, despite various social health reforms in Indonesia, poor health status among individuals is still an issue of concern (Bou Dib et al., 2018).

In general, while the life expectancy increased by 8.0 years between 1990 and 2016 (Mboi et al., 2018) there has been a double burden of undernutrition and overnutrition during the same period (Hanandita and Tampubolon, 2015). Noncommunicable diseases (NCDs) (such as hypertension, diabetes and stroke) which are associated with a high BMI have increased

substantially over the period after 2005. Obesity (measured by BMI) as well, has been on the rise for more than a decade and has been considered an important health issue. For example, the prevalence of obesity was 23.0% as of 2010 (17% - Male ; 28.7% - female) (Rachmi et al., 2017). In addition to the aforementioned issues, low haemoglobin levels in the population is another issue of public concern. Recent evidence points to low levels of haemoglobin, despite the decline in anaemia prevalence in all age groups between 1997 and 2007 (Barkley et al., 2015). As the literature suggests, lower haemoglobin levels are linked to anaemia. In an adult population, anaemia may result in problems such as fatigue and weakness, which may lead to a decrease in labour productivity and earnings (Haas and Brownlie, 2001). Undernutrition reduces physical development, reduced economic productivity, and impairs cognition (Hanandita and Tampubolon, 2015) . Overnutrition may also reduce quality of life and inflate health care costs (Cawley and Meyerhoefer, 2012, Withrow and Alter, 2011). Hence, these health outcomes matter (BMI and haemoglobin) and economists should take an interest in how they link with having health insurance as well.

Health insurance is known to contribute to improved health outcomes by enabling proper and timely access to health care (Lépine et al., 2018), reducing out-of-pocket (OOP) costs, catastrophic health expenditures (CHEs) and impoverishment (Fiestas Navarrete, 2018). To better understand the relationship between health insurance and our outcome of interests, we make use of the concept of moral hazard (Nyman, 2004) and a theory of change due to health insurance (Acharya et al., 2011). The theory of change explains the pathways through which health insurance affects health outcomes, and suggests that when health insurance is made available to people, they may use it or not, and in the end, this may affect their health outcomes. The direction in which health insurance affect behaviour is a subject of debate. Moral hazard occurs when people change their economic behaviour as a result of having health insurance. Because health insurance represent monetary benefits that can encourage behaviour (Humphries et al., 2019) it may lead to either *ex ante* or *ex post* moral hazard. The predominant one has been the *ex-ante* moral hazard argument, which suggests that health insurance causes a reduction in self-protection (Zhao et al., 2018, Dave and Kaestner, 2009).

According to the aforementioned theories, there are two mechanisms through which health insurance may affect health outcomes – the direct and the indirect effect. The direct effect of health insurance on behavioural change is a popular view that emanated from the RAND experiment. It suggests that when people are insured they may no longer undertake preventive health behaviour, such as reducing smoking, drinking, and increasing physical exercise among others which may have a direct effect on health outcomes (Newhouse, 1993, Kenkel, 2000). This assertion of health insurance reducing preventive behaviour was also empirically confirmed by Lillard et al. (1986). Under this notion, health insurance coverage may imply that

individuals become less concerned about their future health (Stanciole, 2008). Thus, having health insurance may bring about changes in behaviour that may lead to having negative health outcomes, for example having higher BMI or low haemoglobin.

Another view suggests that there is an indirect transmission mechanism through which health insurance may affect health behaviour, hence changing BMI and haemoglobin outcomes. This relationship transmits through insurance-induced behaviour of greater contact with medical professionals (Dave and Kaestner, 2009), i.e increased health care access and more especially for preventive care (Lee, 2018). In this instance, health insurance may allow people to, for example make more visits to doctors, undertake general health check-up, just to mention a few. Greater contact with physicians and use of preventive health services may lead to improved health knowledge and information (such as changes in diets which may be recommended), regarding their conditions. Also, the medical experts may thus advise new health styles. Consequently, all these may result in health insurance being positively associated with health outcomes.

The understanding of how health insurance affects health status is important in Indonesia given that it is one of few LMICs to have implemented national health insurance where coverage is high. A growing interest in the literature surrounds health insurance in Indonesia. Of the existing studies, many have focused on assessing the effect of health insurance on health care utilisation (Johar et al., 2018, Sparrow et al., 2013, Erlangga et al., 2019a), OOP payments and impoverishment (Aji et al., 2013, Erlangga et al., 2019a). On the one hand, these studies indicate that having health insurance is associated with increased health care utilisation by the poor. Specifically, in the post-expansion period of JKN, healthcare utilisation has increased, ranging between 1.85% and 8.2%. Despite this observation, inequity in access to both outpatient and inpatient care remains an issue (Erlangga et al., 2019a).

On the other hand, the effect of health insurance on OOP costs remains mixed. Sparrow et al. (2013) report that OOP costs increased for the poor, whereas Aji et al. (2013) suggest that *Askeskin* health insurance decreased OOP expenditures by 34% and that *Askes* health insurance decreased OOP expenditures by 55%. Furthermore, Aizawa (2019) finds a significant effect of health insurance on OOP costs for maternal care delivery. Regarding financial protection, Aji et al. (2017) suggest that the poverty gap, normalised poverty gap and normalised mean poverty gap decreased between 2007 and 2014.

The current chapter adds to the existing literature by evaluating the effect of public health insurance for the poor, near poor and the informal sector using anthropometric measures that can also be used as biomarkers (Jones, 2009). This approach has not been attempted in the available literature that investigates the effect of health insurance on health status in LIMCs. The current paper fills the knowledge gap by using the most recent and updated longitudinal

dataset available, drawn from the 2000, 2007, and 2014 Indonesian Family and Life Survey (IFLS). This chapter comes closer to inferring causality compared to previous work given that we control for individual fixed effects (FE) (Wooldridge, 2010, Jones, 2009, Jones et al., 2013).

The rest of the chapter is organised as follows. In section 2.2, we briefly describe health insurance in Indonesia. Section 2.3 presents the methods, and we narrate the data and the econometric methods used. Section 2.4 presents the results, consisting of the descriptive statistics and the econometric results. In Section 2.5, the results are discussed with reference to the previous literature and concludes the chapter.

2.2 Health insurance in Indonesia

The Indonesian government offers a number of types of health insurance for different groups in the country (Sparrow et al., 2013). Apart from public health insurance, private providers also offer their own insurance packages. The public health insurance plans offered include *Askes (Asuransi Kesehatan), Jamsostek (Jaminan Sosial Tenaga Kerja)*, *Jamkesmas* (previously known as *Askesin*), *Jamskeda,* and *Asabri (Asurasi Sosial Angkatan Bersenjata Republik Indonesia)*. *Askes* was introduced in 1969 and was meant for civil servants. The police and military were covered via the *Asabri* insurance scheme. In 1994, *Jamsostek* was then introduced for formal private sector workers (Achadi et al., 2014). Because most poor people were still not covered, *Askesin* was introduced in 2005 and provided health insurance to the poor and was renamed *Jamkesmas* in 2008. In 2014, the Indonesian government introduced Indonesian national health insurance by merging *Askes, Jamsostek, Jamkesmas,* and *Asabri*. The current evidence shows that in July 2017, JKN covered 68% of the Indonesian population. Figure 2.1 presents the evolution of the health insurance schemes in Indonesia and the associated data that can be used to assess the relationship of interest in the paper.

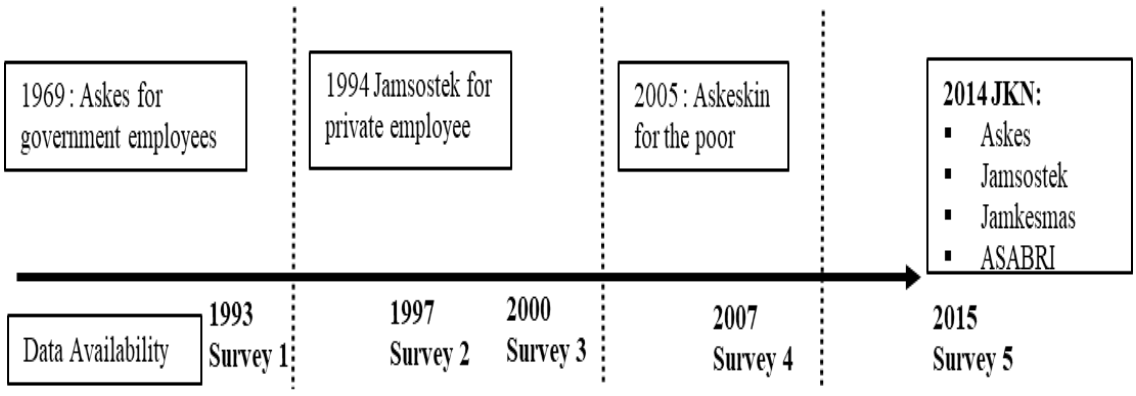

Figure 2.1 - Timeline of the insurance and available dataset

2.3 Methods

2.3.1 Data

This paper uses data from the IFLS, which is an ongoing longitudinal household survey that has multiple waves beginning in 1993 and spanning until 2014. The IFLS is a collaborative effort among the RAND Corporation in the USA, the centre for Population and Policy Studies (CPPS) of the University of Gadjah Mada and Survey METER in Indonesia. Data are collected using multistage sampling of households, individuals and communities by the RAND Corporation in conjunction with universities in Indonesia. The data are representative of almost 83% of the Indonesian population (Strauss et al., 2016). This analysis used the 2000, 2007 and 2014 waves (hereafter called IFLS3, IFLS4 and IFLS5, respectively). The data are publicly available on the RAND website http://www.rand.org/labor/FLS/IFLS.html. The analysis excludes people with private insurance, those with both public and private insurance, those with contributory insurance, and pregnant and lactating mothers.

2.3.2 Conceptual framework

To understand the framework within which health insurance affects BMI and haemoglobin, this paper uses the theory of change due to health insurance (Acharya et al., 2011), as shown in Figure 2.2. The first panel shows that the uptake of insurance is dependent on several factors to which economic agents react. Uptake essentially leads to health care utilisation, which is also affected by external factors. In the end, the utilisation of health insurance may lead to improved outcomes such as health status (in this case BMI and haemoglobin levels), increased labour productivity, reduction in OOP expenditure, etc.

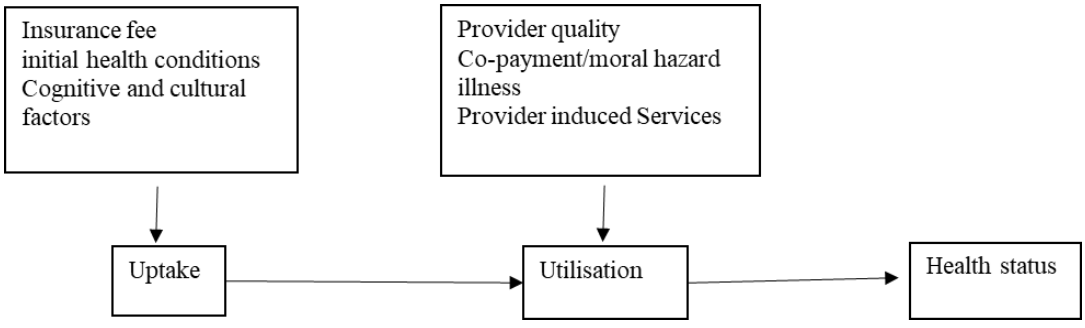

Figure 2.2 - A theory of change due to health insurance
Adapted from Acharya et al. (2011)

2.3.3 Empirical framework

This paper uses panel data methods to identify the causal effect of health insurance on BMI and haemoglobin. Suppose that the relationship between health insurance and the health outcomes (BMI/haemoglobin) of interest is linear; then, the impact of health insurance on the health outcome Y_{it} for individual i at time t depends on both observables and non-observables and on whether an individual has insurance or not. This relation can be expressed as follows:

$$Y_{it} = \beta Insu_{it} + \varphi X'_{it} + \epsilon_{it} , \qquad \forall\, i = 1, \dots, N\ , t = 2000, 2007, 2014 \tag{2.1}$$

where Y_{it} is either the log of BMI or the log of haemoglobin, $Insu_{it}$ stands for the insurance variable, and our parameter of interest is β. The control variables are captured by a 1 x K vector of regressors, namely, X'_{it} (these are time-varying), and ϵ_{it} is an error term assumed to be distributed as $N(0, \sigma_\epsilon^2)$. In equation (2.1), the effect of β may be biased due to reverse causality, omitted variable bias and measurement errors (Angrist and Pischke, 2008). In this case, the use of instrumental variables and matching may help resolve the bias that may arise. However, when no plausible instrument is available, FE regression is useful (Wooldridge, 2010, Baltagi, 2008) for unravelling the impact of public insurance on health. The FE regression applied here uses the individual as his or her own control. In order for the panel data to properly identify the treatment effect, it is assumed that an individual's unobserved heterogeneity is constant over time (Wooldridge, 2010, Cameron and Trivedi, 2010). In this chapter, the analysis follows the models of Yilma et al. (2015), Mebratie et al. (2019) and Nguyen (2016). From equation (2.1), the model can thus be further specified as follows:

$$Y_{it} = \beta Insu_{it} + \varphi X'_{it} + \delta T_t + \theta_i + \epsilon_{it} , \qquad \forall\, i = 1, \dots, N\ , t = 2000, 2007, 2014 \tag{2.2}$$

where $Insu_{it}$ stands for the insurance variable and our parameter of interest is β. The control variables are captured by vector X'_{it}. The individual FE are captured by the parameter θ_i, T_t are year dummies (these capture the influence of time trends), ϵ_{it} is the error term, and it is assumed that $E(\epsilon_{it}) = 0$. The specification in equation (2.2) is advantageous in that it can address endogeneity due to factors that are constant across time as well as those that are wave specific (Simeu and Mitra, 2019). All of the analyses were performed in Stata 15 (StataCorp, 2017).

In the FE model, the identifying assumption is that an individual's unobserved heterogeneity is constant over time. Since the FE model controls for all time-invariant

confounding factors, both measured and unmeasured (Gunasekara et al., 2013), the model offers an advantage over other models by using the individual as a control. However, this assumption may not hold over time. There are some possible limitations to the FE model. First, unobserved heterogeneity may render the results biased (Hill et al., 2019). Apart from the aforementioned, if there is not so much "within group variation", the FE model may not work well. Also, if the panel is short, (T is small), FE may not work well (Jones, 2007). Furthermore, aspects such as time-varying confounding factors, reverse causation, random measurement error, among others (Hill et al., 2019), may make the results biased (Simeu and Mitra, 2019). For example, biological change and changes in diets may not be properly accounted for by the FE estimator. Lastly, in the event of serial correlation among the explanatory variables, the results may also be biased. However, this does not mean there has to be zero correlation among the covariates (Wooldridge, 2010).

As indicated previously, health insurance is offered to people with various income levels and characteristics. It is thus essential to undertake heterogeneity analysis to unravel the effects of health insurance which may be masked by the aggregate analysis (Escobar et al., 2010). The heterogeneity analysis in this paper is supported by previous reviews from LIMCs which have shown that the impact of health insurance is indeed heterogeneous across socioeconomics characteristics, including income (Escobar et al., 2010). Thus, by undertaking this kind of analysis, we test the hypothesis that the impact of health insurance varies across socioeconomic categories.

2.3.4 Variables

Our dependent variables are anthropometric measures and may also play a role as biomarkers (Jones, 2009). These measures, collected by trained medical personnel, are BMI and haemoglobin. BMI is calculated as weight in kilograms divided by height in metres squared. All the variables are described in the Table 2.1. For our exposure variable, we use the definitions of Temsah et al. (2017) and Sparrow et al. (2013). An individual is considered treated if they have only public subsidised health insurance. We use the wealth index as a measure for socioeconomic status. This is derived from the household asset index using the method of Filmer and Pritchett (2001). The wealth index is a composite measure of cumulative living standards (Pirani, 2014) and is a suitable indicator of economic status, for which income data are difficult to collect. All the variables used in this study are defined in Table 2.1.

Table 2.1 - Definition of variables

Variable	Description	Measurement
Insurance	Respondent has subsidised insurance	1 = if one has subsidised insurance and 0 otherwise
Age	Age in years at the time of interview, captured as categories	Age <20 Age: 20-29 Age: 30-39 Age: 40-49 Age: 50+
Married	Marital status of respondent	1 = if married and 0 otherwise
Working		1 = if employed and 0 otherwise
Household Size	Number of people in the household	Continuous variable
Urban	Location of household	1= if urban and 0 otherwise
Quintile	Household wealth status in 5 quintiles	1 = if quintile 1 and 0 otherwise 1 = if quintile 2 and 0 otherwise 1 = if quintile 3 and 0 otherwise 1 = if quintile 4 and 0 otherwise 1 = if quintile 5 and 0 otherwise
Received Ruskin	Individual lives in a household that benefited from the Ruskin rice programme	1 = yes and 0 otherwise
Cash Transfer	Individual lives in a household that benefited from social cash transfer	1 = yes and 0 otherwise
Years of Education	Number of years spent in formal education	Continuous
Smokes	Individual smokes cigarettes or a pipe or chews tobacco	1 = yes and 0 otherwise
Meals per Day	Individual eats three times a day	1 = yes and 0 otherwise
Body Mass Index	The ratio of body mass to the square of height	continuous
Haemoglobin (Hgb)	Iron containing protein in red blood cells	continuous

2.4 Results

2.4.1 Descriptive results

Table 2.2 presents the summary statistics for the periods under study. The results show that no one within the sample had health insurance in the year 2000; however, there is an increase in the percentage of individuals with health insurance, from 21% in 2007 to 51% in 2014. The mean number of years of schooling in 2014 (8.21) is higher than that in the preceding years (6.29 in 2000 and 7.18 in 2007). With respect to smoking, the percentage of smokers declined from 36% in 2000, to 34% in 2007 and to 33% in 2014. More than half of the sample is married (67% in 2000, 70% in 2007 and 72% in 2014). BMI increased from 21.26 in 2000 to 23.09 in 2014, and haemoglobin levels generally increased from 13.14 in 2000 to 13.57 in 2007 but then declined in 2014 to 13.41.

Table 2.2 - Social and demographic characteristics

Explanatory variables	2000				2007				2014			
	Mean (%)	N	Min	Max	Mean (%)	N	Min	Max	Mean (%)	N	Min	Max
Insurance	0%	0	0	0	21%	4425	0	1	51%	12556	0	1
Age <20	16%	2844	0	1	12%	2529	0	1	12%	2954	0	1
Age: 20-29	26%	4622	0	1	28%	5900	0	1	22%	5416	0	1
Age: 30-39	21%	3733	0	1	23%	4846	0	1	26%	6401	0	1
Age: 40-49	15%	2667	0	1	16%	3371	0	1	18%	4431	0	1
Age: 50+	22%	3911	0	1	21%	4425	0	1	22%	5416	0	1
Female	53%	9422	0	1	52%	10957	0	1	53%	13048	0	1
Married	67%	11911	0	1	70%	14750	0	1	72%	17726	0	1
Working	59%	10489	0	1	61%	12853	0	1	57%	14033	0	1
Household Size	4.69	17778	1	16	5.18	21071	1	28	5.33	24619	1	24
Urban	42%	7467	0	1	46%	9693	0	1	55%	13540	0	1
Quintile 2	22%	3911	0	1	23%	4846	0	1	26%	6401	0	1
Quintile 3	22%	3911	0	1	23%	4846	0	1	19%	4678	0	1
Quintile 4	20%	3556	0	1	19%	4003	0	1	20%	4924	0	1
Quintile 5	14%	2489	0	1	13%	2739	0	1	16%	3939	0	1
Received Raskin	1%	178	0	1	55%	11589	0	1	55%	13540	0	1
Received cash transfer	0	0	0	1	29%	6111	0	1	20%	4924	0	1
Years of education	6.29	17778	0	18	7.18	21071	0	18	8.21	24619	0	21
Smokes	36%	6400	0	1	34%	7164	0	1	33%	8124	0	1
Body Mass Index	21.26	17778	7	109	22.37	21071	2	165	23.09	24619	11	69
Haemoglobin	13.14	17778	8	19	13.57	21071	8	19	13.44	24619	8	19
Eat 3 meals a day	73%	12978	0	1	74%	15593	0	1	68%	16741	0	1
Observations	17778				21071				24619			

The distribution of BMI and haemoglobin levels over the study period are shown in Figure 2.3.

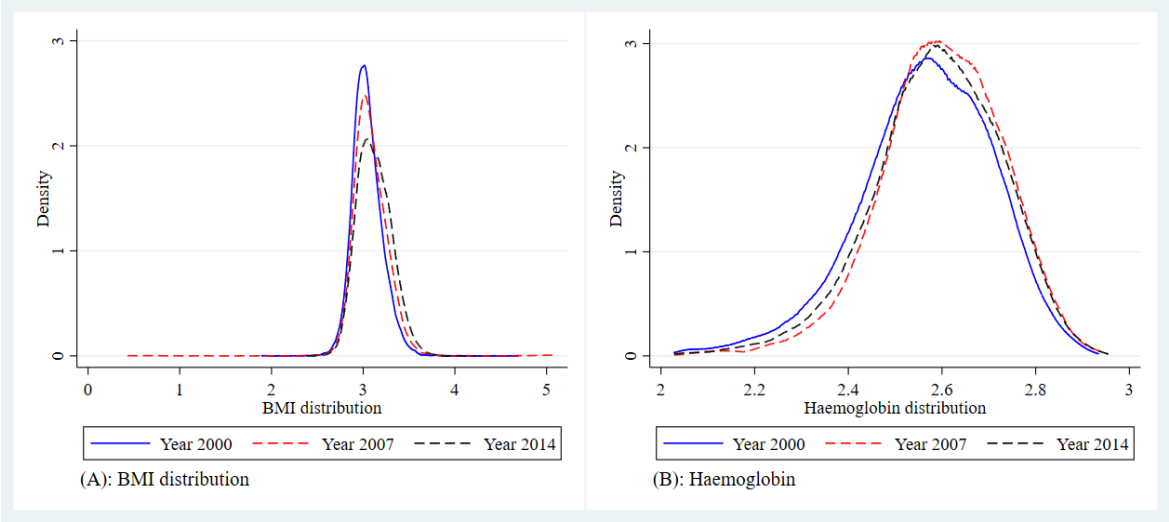

Figure 2.3 - Distribution of BMI and haemoglobin

Furthermore, both BMI and haemoglobin were assessed across wealth quintiles. As shown in Figures 2.4 and 2.5, both BMI and haemoglobin levels increase with wealth. Across all the years under consideration, the BMI and haemoglobin levels are higher for people in higher-income quintiles.

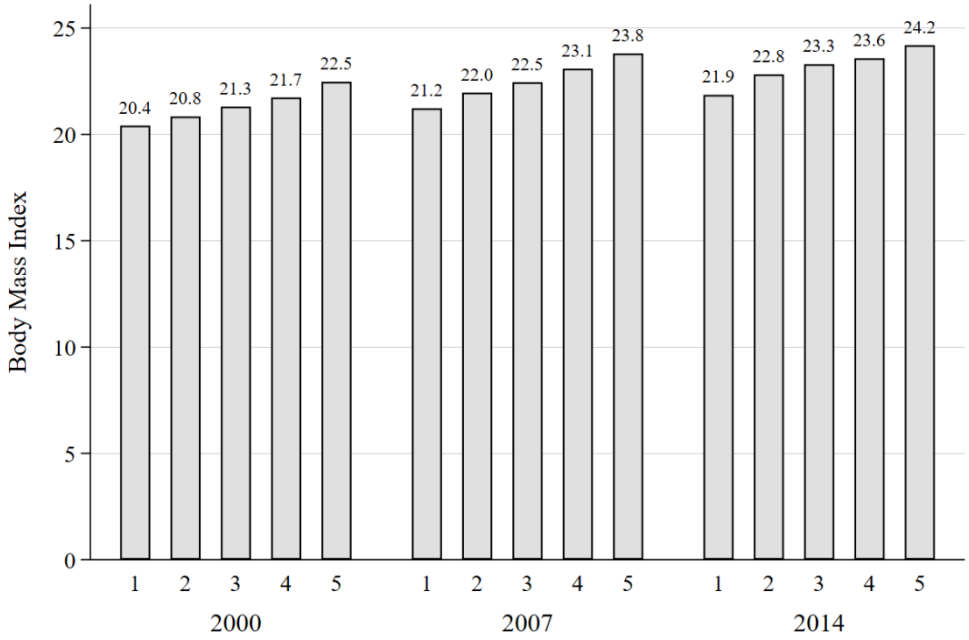

Figure 2.4 - BMI distribution by wealth quintile

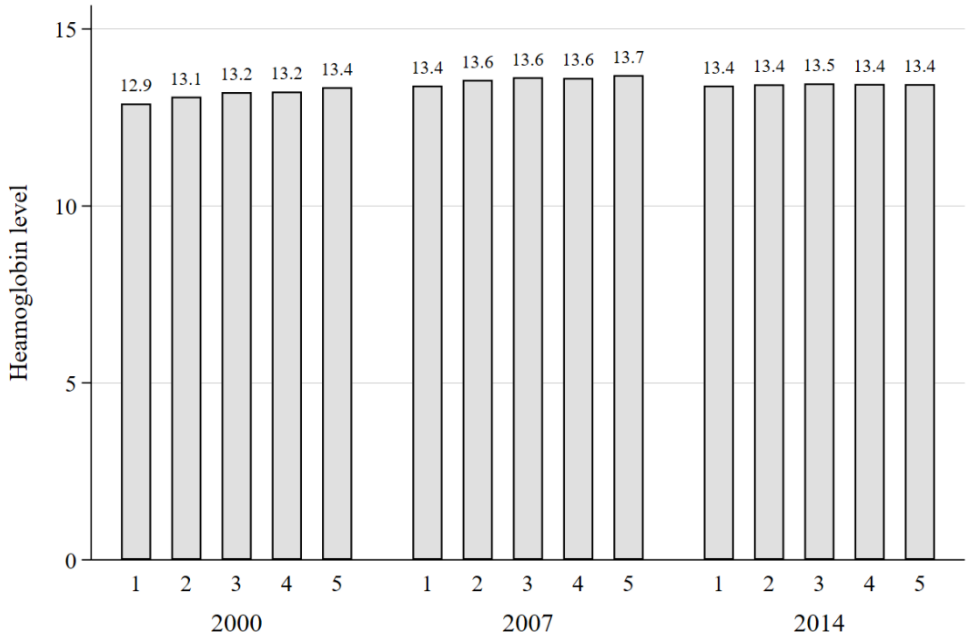

Figure 2.5 - Haemoglobin distribution by wealth quintiles

2.4.2 Econometric results

The results for both variables of interest are presented using the ordinary least squares (OLS) and FE estimators. First, we present the results for the OLS regression in Table 2.3. We exclude and include variables to investigate whether the results are robust to changes in the model specification.

Table 2.3 - Effect of health insurance on BMI in Indonesia (OLS)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Insurance	-0.005**	-0.005**	-0.005***	-0.006***	-0.005***	-0.014***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age 20 - 29	0.071***	0.071***		0.070***		
	(0.003)	(0.003)		(0.003)		
Age 30 - 39	0.122***	0.122***		0.125***		
	(0.003)	(0.003)		(0.003)		
Age 40 - 49	0.138***	0.139***		0.144***		
	(0.003)	(0.003)		(0.003)		
Age 50+	0.087***	0.088***		0.092***		
	(0.003)	(0.003)		(0.003)		
Married	0.041***	0.040***	0.085***	0.043***	0.085***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Working	-0.002	-0.003	0.016***	-0.002	0.016***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Household Size	0.000	0.000	0.000	0.001***	0.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Urban	0.020***	0.021***	0.024***	0.028***	0.024***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Quintile 2	0.022***	0.022***	0.025***		0.025***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 3	0.033***	0.033***	0.038***		0.038***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 4	0.047***	0.047***	0.053***		0.053***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 5	0.067***	0.067***	0.075***		0.075***	
	(0.003)	(0.003)	(0.003)		(0.003)	
Received Raskin	-0.012***	-0.012***	-0.012***	-0.016***	-0.012***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Cash Transfer	-0.008***	-0.008***	-0.007***	-0.016***	-0.007***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Years of Education	0.006***	0.006***	0.001**	0.008***	0.001**	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Years of Education Square	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Respondent Smokes	-0.066***	-0.065***	-0.064***	-0.069***	-0.064***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Eats 3 Meals per Day	-0.013***		-0.014***	-0.013***	-0.014***	
	(0.002)		(0.002)	(0.002)	(0.002)	
Year 2007	0.040***	0.040***	0.044***	0.041***	0.044***	0.041***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year 2014	0.070***	0.071***	0.078***	0.070***	0.078***	0.086***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	63468	63487	63468	63478	63468	63498
F	581.4	607.6	559.0	660.2	559.0	732.9
Adjusted R-squared	0.151	0.150	0.120	0.142	0.120	0.0281

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

The primary model is shown in column (1), where we control for all the available covariates. In row (1), the OLS models show strong evidence of a negative relationship between health insurance and log of BMI. The insured are likely to have lower BMI than the uninsured. The coefficient of insurance is almost consistent across all models, except at the point where we control only for time dummies. From column (1), the result implies that the log of BMI for the insured is 0.005 (p <0.01) lower than that for the uninsured.

Turning to the FE estimations in Table 2.4, the results are qualitatively similar to the results presented in Table 2.3.

Table 2.4 - Effect of health insurance on BMI in Indonesia (FE)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Insurance	-0.008**	-0.007**	-0.006*	-0.010***	-0.006*	-0.021***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age 20 - 29	0.069***	0.069***	0.069***	0.068***	0.069***	
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Age 30 - 39	0.120***	0.120***	0.121***	0.122***	0.121***	
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Age 40 - 49	0.132***	0.133***	0.134***	0.137***	0.134***	
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Age 50+	0.082***	0.083***	0.085***	0.088***	0.085***	
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Married	0.040***	0.039***	0.038***	0.041***	0.038***	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Working	-0.004*	-0.005*	-0.005*	-0.004	-0.005*	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Household Size	-0.000	-0.000	-0.000	0.001**	-0.000	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Urban	0.018***	0.019***		0.026***		
	(0.002)	(0.002)		(0.002)		
Quintile 2	0.020***	0.020***	0.021***		0.021***	
	(0.004)	(0.004)	(0.004)		(0.004)	
Quintile 3	0.031***	0.031***	0.034***		0.034***	
	(0.004)	(0.004)	(0.004)		(0.004)	
Quintile 4	0.040***	0.040***	0.044***		0.044***	
	(0.004)	(0.004)	(0.004)		(0.004)	
Quintile 5	0.070***	0.070***	0.076***		0.076***	
	(0.005)	(0.005)	(0.005)		(0.005)	
Received Raskin	-0.010***	-0.011***	-0.012***	-0.015***	-0.012***	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Cash Transfer	-0.008**	-0.008*	-0.008*	-0.015***	-0.008*	
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Years of Education	0.006***	0.006***	0.007***	0.007***	0.007***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Years of Education Square	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Respondent Smokes	-0.068***	-0.067***	-0.068***	-0.071***	-0.068***	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Eats 3 Meals per Day	-0.011***		-0.012***	-0.011***	-0.012***	
	(0.003)		(0.003)	(0.003)	(0.003)	
Year 2007	0.043***	0.043***	0.044***	0.045***	0.044***	0.045***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Year 2014	0.079***	0.080***	0.081***	0.078***	0.081***	0.096***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
N	63468	63487	63468	63478	63468	63498
Rho	0.440	0.440	0.440	0.440	0.440	0.441
F	215.4	225.7	222.0	248.9	222.0	389.4
Adjusted R-squared	0.163	0.163	0.161	0.154	0.161	0.0441

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

We observe a rather strong negative effect of health insurance on BMI throughout all models presented in Table 2.4. After we control for different variables, the coefficient of the insurance variables ranges from -0.021 (p <0.01) to 0.006 (p <0.1). The coefficients in the FE (Table 2.4) estimation are not very different from those of the OLS estimations. However, there is now an increase in the standard errors. Based on the main FE model in column (1), the

estimate implies that the log of BMI for the insured is 0.008 (p <0.05) lower than that for the uninsured. For all models, the BMI for respondents in the higher wealth quantiles is higher than those in quintile 1, and the relationship is strong.

It is possible that the effect of health insurance was different overtime. To investigate this, we also look at the effect of interacting the insurance variable with the year dummies in Table 2.5. Column (1) shows that the interaction of the health insurance variable and the year dummy is not significant and that the treatment itself has a negative but nonsignificant sign. However, in column (2), the interaction effect is not statistically significant impact. However, the treatment variable still retains a negative sign. The full table is presented in Appendix 2A.1.

Table 2.5 - Effect of health insurance on BMI: the interaction of year and health insurance

Explanatory variables	(1)	(2)
Age	Yes	Yes
Marital Status	Yes	Yes
Employment	Yes	Yes
Household Size	Yes	Yes
Location	Yes	Yes
Wealth Quintile	Yes	Yes
Received Raskin	Yes	Yes
Cash Transfer	Yes	Yes
Years of Education	Yes	Yes
Years of Education Square	Yes	Yes
Respondent Smokes	Yes	Yes
Eats 3 Meals per Day	Yes	Yes
Insurance	-0.007	-0.009*
	(0.005)	(0.005)
Year 2007	0.043***	0.043***
	(0.003)	(0.003)
Insurance * Year 2007	-0.002	
	(0.007)	
Year 2014	0.078***	0.078***
	(0.004)	(0.004)
Insurance * Year 2014		0.002
		(0.007)
N	63468	63468
Rho	0.440	0.440
F	205.6	205.6
R-squared	0.163	0.163

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

Additionally, we perform further analysis to determine the effect of the relationship of health insurance and BMI within different wealth quintiles. We observe that in wealth quintiles 2, 3, and 4, there is no significant effect of the health insurance variable. However, the positive year effect is found to be consistent for all models. The results are presented in Appendix 2, Table 2A.2.

Turning now to the results on the effect of health insurance on haemoglobin, we show the OLS results in Table 2.6. The results indicate that except when we control for only the time trend, there is no significant relationship between health insurance and haemoglobin. The

results are consistent across all the models. Haemoglobin levels are higher for people in all higher-income quintiles than for those in wealth quintile 1.

Table 2.6 - Effect of health insurance on haemoglobin in Indonesia (OLS)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
Insurance	0.000	0.001	0.000	-0.000	0.000	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age 20 - 29	-0.009***		-0.009***	-0.009***	-0.009***	
	(0.002)		(0.002)	(0.002)	(0.002)	
Age 30 - 39	-0.011***		-0.011***	-0.010***	-0.011***	
	(0.002)		(0.002)	(0.002)	(0.002)	
Age 40 - 49	-0.019***		-0.019***	-0.017***	-0.019***	
	(0.002)		(0.002)	(0.002)	(0.002)	
Age 50+	-0.047***		-0.047***	-0.046***	-0.047***	
	(0.002)		(0.002)	(0.002)	(0.002)	
Married	-0.018***	-0.022***	-0.018***	-0.017***	-0.018***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Working	0.031***	0.029***	0.030***	0.031***	0.030***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Household Size	-0.000**	-0.000	-0.000**	-0.000	-0.000**	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Urban	0.000	-0.002		0.002**		
	(0.001)	(0.001)		(0.001)		
Quintile 2	0.007***	0.006***	0.007***		0.007***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 3	0.011***	0.009***	0.011***		0.011***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 4	0.011***	0.009***	0.011***		0.011***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Quintile 5	0.015***	0.012***	0.015***		0.015***	
	(0.002)	(0.002)	(0.002)		(0.002)	
Received Raskin	-0.004***	-0.004***	-0.004***	-0.005***	-0.004***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Cash Transfer	-0.004**	-0.004**	-0.004**	-0.005***	-0.004**	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Years of Education	0.005***	0.009***	0.005***	0.005***	0.005***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Years of Education Square	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Respondent Smokes	0.106***	0.105***	0.106***	0.106***	0.106***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Eats 3 Meals per Day	0.008***	0.009***	0.008***	0.008***	0.008***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Year 2007	0.036***	0.034***	0.036***	0.037***	0.036***	0.035***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year 2014	0.026***	0.022***	0.026***	0.026***	0.026***	0.025***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	62905	62905	62905	62913	62905	62932
F	873.7	999.6	916.9	1073.5	916.9	199.9
R-squared	0.205	0.195	0.205	0.204	0.205	0.00961

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

For the FE models, Table 2.7 shows that the results are qualitatively similar to the OLS results in Table 2.6. Health insurance has no significant effect on haemoglobin when controlling for all the variables. However, the impact of wealth status is still observed to be positive and meaningful at all quantiles compared to wealth quintile 1.

Table 2.7 - Effect of health insurance on haemoglobin in Indonesia (FE)

Explanatory variables	(1)	(2)	(3)	(4)	(5)	(7)
Insurance	-0.001	-0.001	-0.001	-0.001	-0.001	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Age 20 - 29	-0.012***		-0.012***	-0.012***	-0.012***	
	(0.003)		(0.003)	(0.003)	(0.003)	
Age 30 - 39	-0.013***		-0.013***	-0.013***	-0.013***	
	(0.003)		(0.003)	(0.003)	(0.003)	
Age 40 - 49	-0.022***		-0.022***	-0.021***	-0.022***	
	(0.004)		(0.004)	(0.004)	(0.004)	
Age 50+	-0.048***		-0.048***	-0.047***	-0.048***	
	(0.004)		(0.004)	(0.004)	(0.004)	
Married	-0.016***	-0.021***	-0.016***	-0.016***	-0.016***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Working	0.030***	0.028***	0.030***	0.030***	0.030***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Household Size	-0.001**	-0.000	-0.001**	-0.000	-0.001**	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Urban	-0.000	-0.002		0.002		
	(0.002)	(0.002)		(0.002)		
Quintile 2	0.008***	0.007***	0.008***		0.008***	
	(0.002)	(0.003)	(0.002)		(0.002)	
Quintile 3	0.014***	0.012***	0.014***		0.014***	
	(0.003)	(0.003)	(0.003)		(0.003)	
Quintile 4	0.012***	0.008***	0.012***		0.012***	
	(0.003)	(0.003)	(0.003)		(0.003)	
Quintile 5	0.015***	0.011***	0.015***		0.015***	
	(0.003)	(0.003)	(0.003)		(0.003)	
Received Raskin	-0.002	-0.002	-0.002	-0.002	-0.002	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Cash Transfer	-0.005**	-0.005**	-0.005**	-0.007***	-0.005**	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Years of Education	0.005***	0.009***	0.005***	0.005***	0.005***	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Years of Education Square	-0.000**	-0.000***	-0.000**	-0.000**	-0.000**	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Respondent Smokes	0.104***	0.102***	0.104***	0.103***	0.104***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Eats 3 Meals per Day	0.011***	0.013***	0.011***	0.011***	0.011***	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Year 2007	0.034***	0.032***	0.034***	0.035***	0.034***	0.035***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year 2014	0.024***	0.020***	0.024***	0.024***	0.024***	0.027***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	62905	62905	62905	62913	62905	62932
Rho	0.434	0.434	0.434	0.434	0.434	0.434
F	315.0	362.6	330.6	386.4	330.6	146.6
Adjusted R-squared	0.212	0.202	0.212	0.211	0.212	0.0190

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

Furthermore, we check for the effect of time and treatment interactions. Even after including an interaction as indicated in Table 2.8 (full results are presented in Appendix 2 Table 2A.3), health insurance and the interactions remain not significant.

Table 2.8 - Effect of health insurance on haemoglobin in Indonesia (FE-interactions-years)

Explanatory variables	(1)	(2)
Age	Yes	Yes
Marital Status	Yes	Yes
Employment	Yes	Yes
Household Size	Yes	Yes
Location	Yes	Yes
Wealth Quintile	Yes	Yes
Received Raskin	Yes	Yes
Cash Transfer	Yes	Yes
Years of Education	Yes	Yes
Years of Education Square	Yes	Yes
Respondent Smokes	Yes	Yes
Eats 3 Meals per Day	Yes	Yes
Household Size	-0.001**	-0.001**
Insurance	-0.002	0.001
	(0.003)	(0.003)
Year 2007	0.034***	0.034***
	(0.002)	(0.002)
Insurance* Year 2007	0.003	
	(0.005)	
Year 2014	0.025***	0.025***
	(0.003)	(0.003)
Insurance*Year 2014		-0.003
		(0.005)
N	62905	62905
Rho	0.434	0.434
F	300.7	300.7
R-squared	0.212	0.212

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

Next, we further assess the heterogeneity of health insurance across wealth quantiles. The effect is found only in income quantile 4; for all the other quantiles, there is no effect at all. However, across years, haemoglobin levels are higher in both 2007 and 2014 than in 2000. The full results are presented in the Appendix 2 in Table 2A.4.

To complement the previous analysis, we match the individuals on baseline characteristics and perform an FE regression on the sample on common support (Yilma et al., 2015).

Table 2.9 - Effect of health insurance on haemoglobin and BMI in Indonesia for males and females (FE) in the matched sample

Explanatory variables	BMI-Matched	Haemoglobin-Matched
Insurance	-0.007*	0.001
	(0.004)	(0.003)
Age 20 - 29	0.067***	-0.008**
	(0.005)	(0.003)
Age 30 - 39	0.118***	-0.009**
	(0.005)	(0.004)
Age 40 - 49	0.132***	-0.018***
	(0.006)	(0.004)
Age 50+	0.079***	-0.044***
	(0.005)	(0.004)
Married	0.039***	-0.016***
	(0.003)	(0.002)
Working	-0.004	0.029***
	(0.003)	(0.002)
Household Size	0.000	-0.001*
	(0.001)	(0.000)
Urban	0.020***	0.001
	(0.003)	(0.002)
Quintile 2	0.016***	0.007***
	(0.004)	(0.003)
Quintile 3	0.028***	0.013***
	(0.004)	(0.003)
Quintile 4	0.037***	0.012***
	(0.004)	(0.003)
Quintile 5	0.067***	0.017***
	(0.005)	(0.004)
Received Raskin	-0.011***	-0.000
	(0.004)	(0.003)
Cash Transfer	-0.009**	-0.006*
	(0.004)	(0.003)
Years of Education	0.006***	0.005***
	(0.001)	(0.001)
Years of Education Square	-0.000***	-0.000**
	(0.000)	(0.000)
Respondent Smokes	-0.067***	0.103***
	(0.003)	(0.002)
Eats 3 Meals per Day	-0.011***	0.011***
	(0.003)	(0.002)
Year 2007	0.044***	0.032***
	(0.003)	(0.002)
Year 2014	0.080***	0.024***
	(0.004)	(0.003)
N	37065	37115
Rho	0.330	0.366
F	190.3	265.1
R-Squared	0.171	0.209

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

The table shows that the coefficient for the health insurance variable on the BMI regression is -0.007 (p <0.1). Unlike in the unmatched sample, the standard errors are almost identical. The coefficient that we find here implies that the BMI of people with health insurance is likely to be 0.69% (exponentiated value of log BMI) lower than that of the uninsured. Regarding haemoglobin levels, the results are not different from those of the unmatched sample. There seems to be no significant association between health insurance and haemoglobin.

Since BMI is continuous, we also used indicator for obesity and overweight, normal and underwent. We find that the health insurance is not significantly associated with overweight and obesity, but with underweight.

2.5 Discussion and conclusion

Health insurance is an important topic that has taken centre stage in health system reforms in LMICs. This increased attention has been motivated by the WHO 2010 report that advocates for the introduction of prepaid health financing schemes as one way to achieve UHC. Indonesia has been very successful in the implementation of health insurance implementation and coverage. Although studies on the effect of health insurance on health outcomes are on the rise, rigorous evidence on the impact of health insurance on health outcomes, particularly nutritional status, remains scarce. To address this literature gap, this chapter uses panel data from the IFLS in Indonesia to examine the effect of health insurance on BMI and haemoglobin. Our findings are as follows.

Regarding BMI, the findings show that the insured have lower BMI than the uninsured. The results are robust to the exclusion and inclusion of different controls. The coefficient of the health insurance variable ranges from -0.005 (p<0.01) to -0.014 (p<0.01). It is, however, difficult to indicate whether the treatment effect found here is large or small since no benchmark for this relationship exists (Wagstaff and Pradhan, 2005). However, heterogeneity is observed within wealth quintiles. Furthermore, after matching the sample on the baseline characteristics, the results confirm the initial finding of a negative relationship between subsidised health insurance and BMI. This negative relationship is consistent with the findings of Wagstaff and Pradhan (2005) for the Republic of Vietnam.

Furthermore, the short-term effect is assessed by interacting the insurance variable with the treatment variable, which helps us to determine whether the health outcome of interest differs by year. However, the interaction term is found to be statistically insignificant. This finding may imply that in the short term, health insurance does not affect the health of the recipient compared to the health of the uninsured. Although we find a statistically significant

impact of insurance on BMI, the size of the effect (a reduction in BMI of 0.8%) remains a subject of debate in terms of policy relevance. Whilst significant, differences in the BMI of that magnitude may not have a major impact on future health of the insured and uninsured.

Regarding haemoglobin levels, the findings provide no evidence of a significant impact of health insurance on haemoglobin levels. However, the results are comparable to those of Hounton et al. (2012), who also did not find any difference in haemoglobin levels by membership in the CBHI scheme in Burkina Faso. Similarly, in the USA, Kominski et al. (2017) find that health insurance has no significant effect on haemoglobin levels. In both the matched and nonmatched samples, the results are qualitatively similar. Even after interacting the treatment effect with year-specific dummies, the relationship is still statistically insignificant.

This study has a number of limitations. Although the FE model can address the endogeneity of health insurance, it is also limited because it cannot control for factors that might be correlated with health insurance and health status, which change over time. With that said, because the chapter focused on one form of health insurance that was subsidised and given to the poor and near poor, the effect may be different from that of other insurance schemes provided to other people in Indonesia. With these limitations in mind, the results have important implications for further research. Future research should also focus on using other identification methods, such as employing instrumental variables. Furthermore, it is important to consider looking at the effect of the JKN expansion in 2014 and explore how this expansion affected the outcomes of interest in this chapter. This effect could not be analysed in this chapter since BMI is a long-term outcome, and the data available were collected in the same year the JKN expansion occurred.

In conclusion, this chapter assessed the effect of health insurance on health outcomes using anthropometric measures. The results show that health insurance affects BMI but has no significant impact on haemoglobin after controlling for covariates. Despite the limitations mentioned previously, the results bear important policy implications. The finding that health insurance is associated with lower BMI should be of interest to policymakers who are trying to halt the rise in obesity (Aizawa and Helble, 2017) and other problems that may arise from high BMI. Furthermore, since the short-term effects are not significant, the provision of health insurance should be seen as a long-term strategy.

Chapter 3

Socioeconomic inequality in community based health insurance premium contributions in Rwanda

3.1 Introduction

Having equity in health and protection from financial risk are some of the key health system objectives on the path to universal health coverage (UHC) (Moreno-Serra and Smith, 2012, Hogan et al., 2018, Moreno-Serra et al., 2011). UHC aims to ensure that people have access to health services without incurring catastrophic health expenditure (WHO and Word Bank, 2017). Payments toward health care are considered to be catastrophic if out-of-pocket payments for health services comprise a large share of household income (usually 5%-40%), which can lead to impoverishment (Xu et al., 2007). Nearly 800 million people globally (almost 12% of the world's population) face catastrophic health expenditure every year, and 100 million people are estimated to have been impoverished as a result (Wagstaff et al., 2018a, Wagstaff et al., 2018b).

In low-and middle-income countries, poor people, workers in the informal sector, as well as female-headed households are the ones most affected by catastrophic health expenditure (WHO, 2010a, WHO, 2010b, WHO, 2017). Thus, pro-poor health financing and gender equity in health financing have been recommended to protect such groups from the resulting adverse consequences (Witter et al., 2017). Community Based Health Insurance (CBHI) schemes have been – and are being – implemented as a broader response to those inequities in areas such as access, financing, and outcomes across many dimensions (Liu and Lu, 2018, Shafie and Hassali, 2013, Yilma et al., 2015). CBHI can be defined as any voluntary, non-profit prepayment plan operating at the community level, with members participating in the plan's management. These plans target people in the informal sector and the poor, and there is collective pooling of health risk (Dror and Firth, 2014, Wang and Pielemeier, 2012, Giedion et al., 2013, Preker et al., 2001). Despite the growth of CBHI in several countries, the equity implications of household CBHI contributions (household payments on CBHI) have hardly been assessed (Akazili et al., 2012).

To improve equity in health financing, the government of Rwanda introduced a nationwide government-supported CBHI model in 2005. In the period 2005-2011, premium contributions were based on a flat rate of 1000 Rwandan francs (RWF) per capita, per year (GoR, 2010, GoR,

2012). A new policy aimed at improving equity in payments took effect in 2011, grouping citizens into different contribution categories based on wealth status. Our paper seeks to assess and explain socioeconomic inequalities in premium contributions in CBHI in Rwanda.

The main research questions are twofold: Is there socioeconomic inequality in CBHI contribution in Rwanda? Is there gender differences in CBHI contribution in Rwanda? Thus, we add to the existing literature in at least four ways by answering the following specific questions: first, we investigate whether (and if so, how) inequality in premium contributions in CBHI changed between 2010 and 2014 (and, hence, between the two CBHI payment systems). Second, we decompose the socioeconomic inequality in CBHI household expenditure into its contributing factors. Third, we investigate the extent of the regressivity (or progressivity) of CBHI premium contributions. [1] Health related expenditures are regressive if wealthier individuals pay less on health (as a proportion of their total household expenditure) as their income increase (Wagstaff et al., 2008). Fourth, the paper critically analyses and describes the socioeconomic factors that explain the difference in premium contributions for male- and female-headed households (i.e. the gender gap) in each period of study. The gender analysis adopts a recently proposed distributional decomposition technique that addresses the limitations of the typically used mean-based decomposition method (Carrieri and Jones, 2017).

Previous, related evidence has focused on assessing the "equity impact" of CBHI in terms of reducing out-of-pocket payments and catastrophic health expenditure, revealing that CBHI can provide financial protection (Ekman, 2004, Spaan et al., 2012). Yilma et al. (2015) also report that in Ethiopia, CBHI reduces potentially harmful household coping strategies (e.g. borrowing). Using data from the pilot schemes during the introduction of CBHI in Rwanda, Schneider and Hanson (2006) find that CBHI contributed more positively to horizontal equity in health care access than user fees. Only Finnoff (2016) undertakes a gender-focused analysis, finding that female-headed households are less likely to enrol in CBHI in Rwanda. We build on the existing evidence to address the gap in the literature on equity in the distribution of actual CBHI payments and, therefore, the role of CBHI in promoting equitable health financing.

Undertaking this study is important for several reasons. Principally, inequitable contributions (e.g. in the form of regressive health payments) can result in dropout from CBHI enrolment, which in turn may render the CBHI scheme unsustainable (Odeyemi, 2014, Odeyemi and Nixon, 2013, Akazili et al., 2012). In addition, the case of Rwanda is interesting because it is considered to represent a CBHI scheme that has been successfully implemented at the national level, in that the CBHI expansion has been associated with a substantial decline in both out-of-pocket payments and catastrophic health expenditures (Chemouni, 2018, Soors et al., 2010, Olugbenga, 2017, Bonfrer et al., 2018). Furthermore, the CBHI implementation

periods have also been associated with improvements in maternal and child health (Saksena et al., 2010, Shimeles, 2010, Twahirwa 2008).

Gender differences are also an important issue in health care financing (Finnoff, 2016) and there is thus a rationale to undertake a gender gap analysis . First, female-headed households remain less likely to enrol in health insurance and more likely to be only partially covered by insurance (Ravindran, 2012, Dixon et al., 2014, WHO, 2010a, Adebayo et al., 2013, Uthman et al., 2015). Thus, it brings in some questions to assess what happens post –enrolment period. Second, empirical evidence suggests that there is a lack of the ability to pay for most female-headed households (Nanda, 2002, OXFAM, 2013, Witter et al., 2017). Third, since the 2010 policy changes in Rwanda, the new systems have also been designed for supporting vulnerable female-headed household through the *Ubudehe* programmes. Hence, it remains unclear as to whether, after enrolment, female-headed household-who are likely to be poor (Word Bank, 2015) are indeed contributing differently to male-headed households.

Using two rounds of national survey data for 2010/11 and 2013/14, we find that inequality in CBHI payments in Rwanda has been reduced. We also find that CBHI with stratified premiums is less regressive than CBHI with a flat rate premium system. Decomposition analysis indicates that income and CBHI stratification explain a large share of the inequality in CBHI payments. With respect to gender, female-headed households make lower contributions toward CBHI expenditure, compared to male-headed households.

The rest of the chapter is organised as follows. In section 3.2, we briefly describe CBHI in Rwanda. Section 3.3 presents the methods, and we narrate the data and the econometric methods used. Section 3.4 presents the results, consisting of the descriptive statistics and the econometric results. In Section 3.5, the results are discussed with reference to the previous literature. Section 3.6 concludes the study.

3.2 Community based health insurance in Rwanda

3.2.1 Evolution of community based health insurance in Rwanda

Soon after the 1994 Rwandan genocide, between 1994-96, with support from international organisations, user fees were abolished in order to increase the utilisation of health care for all (GoR, 2012, Kayonga, 2007). While well-intentioned, there were also negative repercussions on the health sector, due to the weak incentives for service providers to reach rural and poor populations. Apart from that, there was also insufficient resources for health as well as poor management (Kayonga, 2007, Habiyonizeye, 2013). As a result, in 1997 user fees were reintroduced, increasing the barriers for households to access health care. Eventually, CBHI was introduced as part of a pilot phase in the districts of Kabgayi, Kabuyare, and Byumba in

1999. Owing to the success of the pilot phase (GoR, 2012, GoR, 2010), strategic policy documents and policy frameworks for CBHI were developed in December 2004, with a view towards a roll-out of the CBHI scheme to all 30 districts, which started in 2005.

The main objective of the CBHI (also called *Mutuelles*) policy was to enable those in the informal sector and the poor to become part of a health insurance system (GoR, 2012, GoR, 2010). In addition, *Mutuelles* responded to two other national priorities: social cohesion, which has been a major priority of the government in promoting national reconciliation, and reconstruction of the country. As opposed to tax-based or other public financing approaches, *Mutuelles* also sought to promote the self-sufficiency of communities, calling on them to take a hands-on approach in their socioeconomic development in line with the principles of primary health care and the Bamako Initiative[2] (GoR, 2012, GoR, 2010, Habiyonizeye 2013). In the current CBHI (post 2011), people contribute using graduate premiums in classified groups called *Ubudehe.* An *Ubudehe* system ranks people according to wealth status, as defined by the context of their own community, using government defined criteria. Before the new policy was introduced, the contribution was 1000 RWF per person per year.

3.2.2 *Ubudehe* classifications

Ubudehe requires that a community defines the levels of poverty that exist in their village. It is a wealth ranking system used as a targeting method for various social protection programmes. Using a well-defined poverty criterion, *Ubudehe* allocates each household into one of the six ordinal income poverty-related categories (GoR, 2010, Nyinawankunsi et al., 2015). The contributions of the premium are based on the household's *Ubudehe* category, which is used as a proxy for the ability to pay (Nyinawankunsi et al., 2015, Nyandekwe et al., 2014), rather than on the standard measure of consumption of USD1.25 per day.[3] The process of allocating households to categories is done every two years,[4] and as of 2014, the classifications shown in Table 3.1 were used. The people in categories 1 and 2 are supported by the government and other development partners (GoR, 2010). A household subscription policy is used, where the whole household must be insured once the decision to enrol has been made, in order to avoid abuse of the system.

[2] Adopted in 1987, to ensure that entire populations would have access to good quality primary health care at affordable prices. The initiative is based upon the following principles: public participation in decision-making, contributions by users to finance health centres, state participation to ensure that the whole population has access to a minimum package of services. This was supported by WHO. See http://www.popline.org/node/271833

[3] http://www.worldbank.org/en/topic/measuringpoverty

[4] http://rwandapedia.rw/explore/ubudehe

Table 3.1 - Premium contribution according to wealth status classification

Ubudehe Category	CBHI Category	Premium per Member per Year	Proportion of people (% in *Ubudehe* group in the country
Ubudehe 1 & 2	Category 1	2000 (RWF) (USD3.34)	25%
Ubudehe 3 & 4	Category 2	3000 (RWF) (USD5.00)	65%
Ubudehe 5 & 6	Category 3	7000 (RWF) (USD11.69)	5%
Uncategorised	-	-	5%

Source: (GoR, 2012, GoR, 2010)

3.3 Methods

3.3.1 Data sources

This paper uses data from the third and fourth Rwandan 2010/2011 and 2013/2014 Integrated Household Living Conditions Surveys. These are population-based surveys that are designed and sponsored by the World Bank. The data was collected by the National Institute of Statistics Rwanda (NISR), using a stratified two-stage sampling (NISR, 2012, NISR, 2015). For both surveys the response rate was 99%. We focus only on the people who have CBHI, thus reducing our samples to 9212 and 9605 for the years 2010/11 and 2013/14, respectively. The data is publicly available for download free of charge from the NISR website (NISR, 2015).

3.3.2 Variables

The dependent variable of interest is CBHI expenditure and is captured in local currency (RWF) as the amount a household spent on CBHI. In the data, all respondents were asked if they have CBHI. For those respondents who indicated that they have CBHI, they were asked to indicate how much the household spent on CBHI, from premiums, registration and all associated cost of CBHI for the 12 months calendar months before the interview. Therefore, in this study, we define CBHI expenditure as all CBHI associated expenses.

Variable selection is guided by a standard Grossman model of factors potentially influencing expenditure on health insurance (Folland et al., 2010), as well as previous studies that mention the socioeconomic factors that affect enrolment in CBHI (Finnoff, 2016, Adebayo et al., 2013, Adebayo et al., 2015, Witter et al., 2017, Odeyemi, 2014). The variables are described in Table 3.2:

Table 3.2 - Definition of variables

Variables	Description	Measurement
Total household Expenditure	Annual household expenditure	Continuous (RWF)
Expenditure on CBHI	Annual CBHI expenditure	Continuous (RWF)
Age of household head	Age of household head at time of interview	Continuous
Number of under-five Children	Number of people below age 5 in the household	Continuous
Number of adults above five	Number of people above age 5 in the household	
Female-headed household	Sex of household head	1 if female, 0 if Male
Marital status	Marital status of household head	1 if married, 0 if not married
Residence (urban)	Place where the family is resident	1 if urban, 0 if rural
Number in retirement age	Number of people in the retirement age	Continuous
Number in paid Agriculture	Number of people in household engaged in paid Agricultural work	Continuous
Number in non-paid Agriculture	Number of people in household engaged in non-paid Agricultural work	Continuous
Education	Education level of household head	1 = No education 2 = Never complete primary 3 = Primary 4 = Post primary< secondary 5 = Secondary 6 = Higher
Ubudehe categories	Household wealth ranking based on community wealth ranking criteria. This is derived from proxy mean testing and is used in Rwanda to allocate households into CBHI premium category and other social safety nets	I *if Ubudehe category 1* 2 *if Ubudehe category 2* 3 *if Ubudehe category 3* 4 *if Unclassiffied Ubudehe*

3.3.3 Econometric analysis

Decomposing of concentration indices for CBHI payments

We make use of the concentration index to assess inequality in CBHI contributions (Wagstaff et al., 2008, O'Donnell et al., 2008). The index is defined as twice the area between the concentration curve and the line of perfect equality. It is calculated as the covariance between the health variable and its fractional rank in the living standard distribution (Wagstaff et al., 2008) expressed as:

$$C = 2Cov(y_i, r_i)/\mu \,, \tag{3.1}$$

where y_i is the weighted CBHI expenditure, μ is the mean CBHI expenditure, r_i is the ith household's rank in the income distribution. The concentration index ranges from -1 to 1. A negative value implies that inequality favours the poor and a positive value means inequality favours the rich (Wagstaff et al., 2008). Assuming a linear additive model, the concentration index can then be decomposed as:

$$C = \sum_k (\beta_k \bar{X}_k/\mu)\, C_k + \; GC_\varepsilon/\mu \tag{3.2}$$

where μ is the mean CBHI expenditure, C_K is the weighted concentration index for X_k (defined as analogous to (C)) and GC_ε is the generalised concentration index for the error term (ε). In this case, the concentration index is simply the weighted sum of concentration indices of k regressors, where the weight for X_k is the elasticity of $CBHI$ with respect to $X_k (e_k = \beta_k \bar{X}_k/\mu)$.

Assessing progressivity in premium contribution

Measurement of progressivity uses the Kakwani index (π_k). This assesses whether the poor (rich) pay more or less given their ability to pay, by comparing the distribution of income (using the Lorenz curve) with the distribution of health care payments (using concentration curves) (Kakwani et al., 1997). The Kakwani index is calculated as the difference between the concentration index and the Gini coefficient:

$$\pi_k = C_{prem} - \; G_{Inc} \tag{3.3}$$

where C_{prem} is the concentration index for CBHI, and G_{Inc} is the Gini coefficient for the measure of income. The value of the index (π_k) ranges from -2 to 1. If $\pi_k > 0$, it means progressivity, and when $\pi_k < 0$, it means regressivity. When the Kakwani index is negative, it implies that a lower proportion of income is paid out in the form of CBHI as income increases. The opposite applies for a positive value in the Kakwani indices.

Explaining the gender premium expenditure gap

In assessing the gender differences in CBHI expenditure, we adopt the Unconditional Quantile Regression (UQR) method (Firpo et al., 2009, Fortin et al., 2011). This is a form of a distribution-based regression method which captures the tails of the distribution and is useful for applications to health expenditure data, which is often skewed (Jones et al., 2015). UQR is part of the general method of the Recentered Influence Function (RIF) (Henceforth, UQR will be referred to as RIF). RIF estimates the marginal effects of covariates on the unconditional quantiles of an outcome variable. It is different from the traditional quantile regression (QR) in the sense that QR estimates the marginal effects on the conditional quantile (Firpo et al., 2009). RIF is estimated by first computing the sample quantile q_θ , and second the density at each quantile. Thus, the RIF is obtained by the equation:

$$RIF(y; q_\theta) = q_\theta + \frac{\theta - 1[y \leq q_\theta]}{f(q_\theta)} \quad (3.4)$$

where q_θ is the θth quantile of CBHI, and $f(q_\theta)$ is the unconditional density of CBHI at the θth quantile. Variable y is CBHI expenditure, $1[y \leq q_\theta]$ is an indicator function that shows whether the outcome of interest is equal to or smaller than the θth quantile. Assuming that the expectation of RIF is linear and the mean of the error term is zero, equation (3.4) can be expressed as:

$$E[RIF(y; q_\theta)|X] = X\beta^\theta \quad (3.5)$$

Equation (3.5) has the same connotation with OLS; the difference is that in the UQR, the RIF is used as the dependent variable (Firpo et al., 2009, Fortin and Lemieux, 2007, Fortin et al., 2011). For each quantile, the coefficients for the covariates can then be estimated as:

$$q_\theta = E_X\big[E[RIF(y; q_\theta)|X]\big] = E[X]\beta^\theta \quad (3.6)$$

Equation (3.6) can then be decomposed using the Oaxaca-Blinder decomposition. Let there be two groups, Female =A and B = Male, then the difference between the RIF for the two groups can be expressed as:

$$\Delta_y^\theta = q_{A|A}^\theta - q_{B|B}^\theta = \left[RIF(y_A; q_{A,\theta})|X\right] - \left[RIF(y_B; q_{B,\theta})|X\right] \quad (3.7)$$

$$\Delta_y^\theta = \underbrace{(\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta})\,\bar{X}_B}_{E} + \underbrace{(\bar{X}_A - \bar{X}_B)\hat{\beta}_{B,\theta}}_{C} + \underbrace{(\bar{X}_A - \bar{X}_B)\left(\hat{\beta}_{A,\theta} - \hat{\beta}_{B,\theta}\right)}_{I} \quad (3.8)$$

In equation (3.8), (E) amounts to the part of the differential that is due to group differences in the predictors, also known as the "endowments effect" in labour economics. The second component, (C) represents the contribution of differences in the coefficients (including differences in the Intercept). The last component (I), is the interaction term, accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups, but are difficult to interpret (Jann, 2008, O'Donnell and Wagstaff, 2008). To check the robustness of the results we also used the two-part model and the traditional Oaxaca-Blinder decomposition.

3.4 Results

To proxy for the ability to pay (income) for CBHI, we use household equivalised annual non-food expenditure as akin to permanent income (Deaton and Zaidi, 2002). We primarily adopt the equivalence scale used in Xu et al (2003), while an alternative equivalence scale, based on what is directly available in the Rwandan dataset, is used as a robustness check. We used equivalence scales because there is a tendency for households not to insure children (Word Bank, 2015). In some instances, there is partial payment for CBHI for the younger ones, as opposed to the relatively old adults. This suggests that there is some age preferences to insurance while also considering the size of the household. Thus, in this sense, the use of equivalence scales may be akin to using an actuarially fair premium, given the size of the household. However, there is no difference in the results when equivalence scales are used, or per capita income is used. The equivalence scales are in Table 3.3.

Table 3.3 - Equivalence scales used in the analysis

Rwanda EICV 3 and EICV4			Xu etal 2003
Age range	Gender		
	Male	Female	
Less than 1 year	0.41	0.41	
1 to 3 years	0.56	0.56	Alpha =0.56
4 to 6 years	0.76	0.76	
7 to 9 years	0.91	0.91	
10 to 12 years	0.97	1.08	
13 to 15 years	0.97	1.13	
16 to 19 years	1.02	1.05	
20 to 39 years	1	1	
40 to 49 years	0.95	0.95	
50 to 59 years	0.9	0.9	
60 to 69 years	0.8	0.8	
More than 70 years	0.7	0.7	

3.4.1 Demographic and social characteristics

The household is the unit of analysis used in this paper. Table 3.4 presents the descriptive statistics. There is a small decline in the number of female-headed households, from 28% in 2010/11 to 27% in 2013/14. We find no significant change in the mean age of the household head (still 46 years). A total of 86% of households are located in rural areas and 14% in urban areas. The mean income is higher in 2013/14 (RWF 39965.30) than in 2010/11 (RWF 33686.60). The mean CBHI expenditure in 2010/11 is RWF 1847.15 and is lower than in 2013/14, which is RWF 3583.59.

Table 3.4 - Demographic and social characteristics

	2010/11				2013/14			
Variables	Mean (%)	sd	Min	Max	Mean (%)	sd	Min	Max
Total household Expenditure	33686.59	57922.31	0	2043442	39965.32	93363.94	0	3626142
Expenditure on CBHI	1847.15	3057.21	0	194587	3583.59	3940.84	0	225875
Age of household head	45.58	15.88	17	98	45.61	16.26	14	102
number under-five Children	0.7	0.77	0	4	0.62	0.74	0	4
Number of adults above five	4.09	2.03	1	17	3.95	1.98	1	17
Female-headed household	28%	0.45	0	1	27%	0.44	0	1
Marital status	68%	0.46	0	1	69%	0.46	0	1
Residence (urban)	14%	0.34	0	1	14%	0.35	0	1
Number in retirement age	0.17	0.44	0	2	17%	0.44	0	3
Number in paid Agriculture	0.57	1.01	0	7	0.53	0.87	0	6
Number in non-paid Agriculture	0.9	1.14	0	7	0.8	0.92	0	8
No education	27%	0.45	0	1	25%	0.43	0	1
Never complete primary	3%	0.18	0	1	3%	0.17	0	1
Primary	60%	0.49	0	1	61%	0.49	0	1
Post primary< secondary	4%	0.2	0	1	4%	0.19	0	1
Secondary	5%	0.22	0	1	7%	0.25	0	1
Higher	1%	0.08	0	1	1%	0.11	0	1
Ubudehe category1					0.26	0.44	0	1
Ubudehe category2					0.60	0.49	0	1
Ubudehe category3					0.01	0.06	0	1
Unclassiffied Ubudehe					0.13	0.35	0	1
N	9212				9605			

Descriptive results also show a 167% increase in the difference in the male-female CBHI expenditure gap between 2010/11 and 2013/14, with female-headed households spending less in both periods. In 2013/14, in the stratified system of CBHI, the mean expenditure for male-headed households (RWF 4017.75) is almost double that of female-headed households (RWF 2381.13) (see Table 3.5).

Table 3.5 - Gender difference in CBHI expenditure

Year	Variable	Mean (Female-headed)	Mean (Male-headed)	Difference.	N
2010/2011	CBHI +	881.03	1145.27	264.23***	9212
	CBHI $	1408.21	2019.2	610.98***	9212
2013/2014	CBHI +	1564.88	2315.13	750.26***	9605
	CBHI $	2381.13	4017.75	1636.61***	9605

Notes: Standard error in parentheses, * p <0.1, ** p <0.05, *** p <0.01, sample weights applied ; + Uses Rwanda equivalence scales and $ uses equivalence scales from Xu (2003).

To complement the picture of the mean differences mentioned above, we also plot a graph of the distribution of the CBHI expenditure by gender. This is shown in Figures 3.1 and 3.2. In each of the Figures, panel (A) shows CBHI expenditure excluding zero expenditure on CBHI, whereas panel (B) includes zero expenditure. We show the two options of including and excluding zeros , so as to see the effect of including those who were potentially subsidsed, but not captured by the data. In both panels (A) and (B) of Figures 3.1 and 3.2, the distribution of the male-CBHI expenditure lies to the right of the female expenditure, showing that male-headed households spend more than female-headed ones.

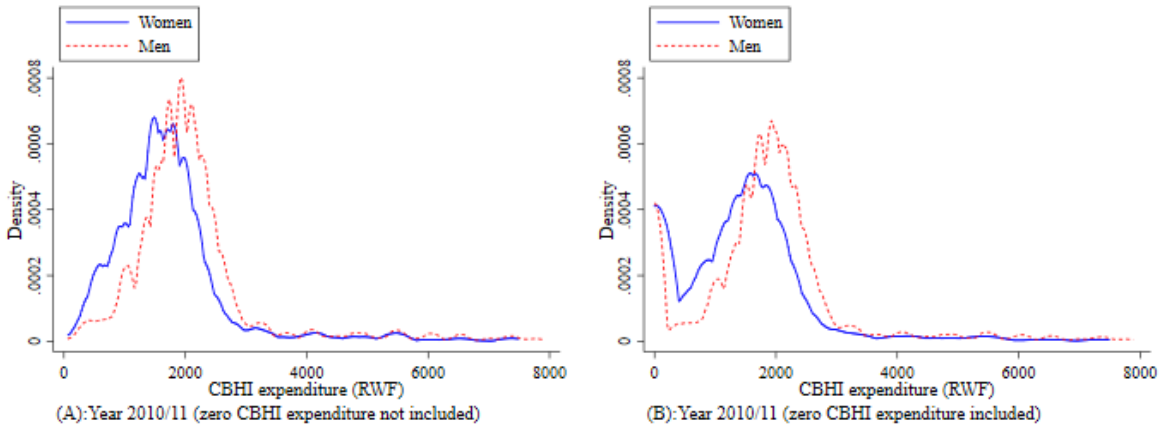

Figure 3.1 - Distribution of CBHI expenditure by gender 2010/11

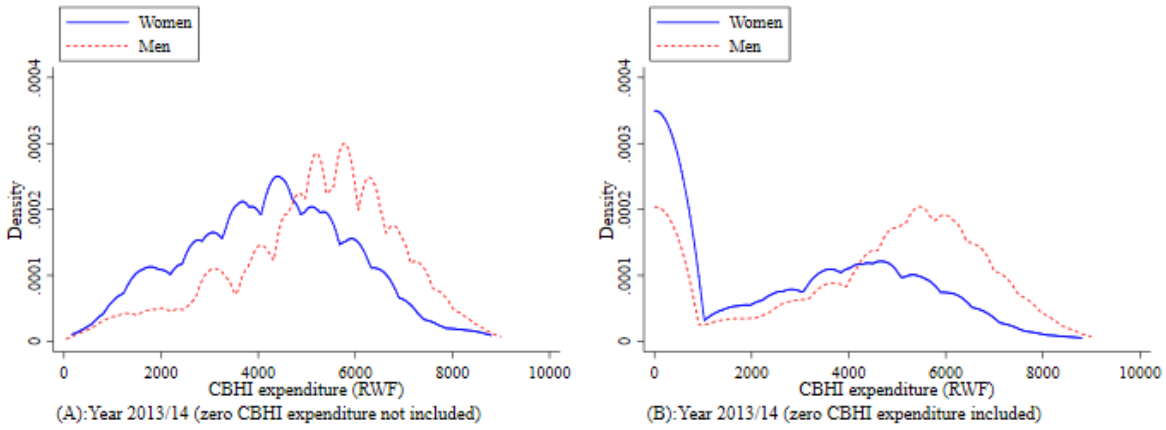

Figure 3.2 - Distribution of CBHI expenditure by gender 2013/14

3.4.2 CBHI inequality and progressivity in 2010/11 and 2013/14

We start by graphically assessing the extent of inequality in CBHI payments through the "direct method" (Wagstaff et al., 2008). This approach plots the share of CBHI expenditure in total income, across the income quintiles as shown in Figure 3.3. The graph is interpreted in the manner indicated by Wagstaff et al. (2011). In Figure 3.3(A), the distribution of CBHI payments decreases with increasing income, implying that in 2010/11 the CBHI payments are regressive. In Figure 3.3(B), in 2013/14, CBHI payments seem to be progressive when comparing the first two quintiles, but remain regressive in the third, fourth and fifth quintiles.

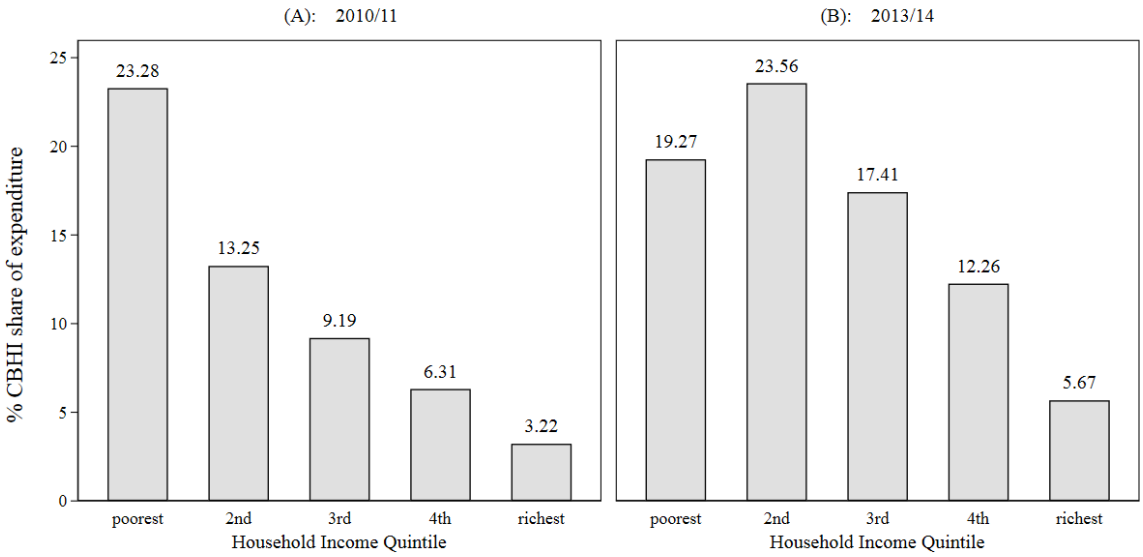

Figure 3.3 - CBHI progressivity in Rwanda, using the direct method

Figure 3.3 also shows that CBHI expenditure alone is not catastrophic, since the share of expenditure as a percentage of income is less than 40% of non-food expenditure (Xu et al., 2003). Between 2010/11 and 2013/14 there is a reduction in the share of CBHI expenditure in income for the poorest category, but an increase in all the others. A similar picture obtains when using total expenditure instead of non-food expenditure in the denominator. The concentration curves for CBHI expenditure are presented in Figure 3.4. Both curves indicate that CBHI is regressive, since the distribution of the concentration curve for CBHI payments lies between the line of equality and the Lorenz curve.

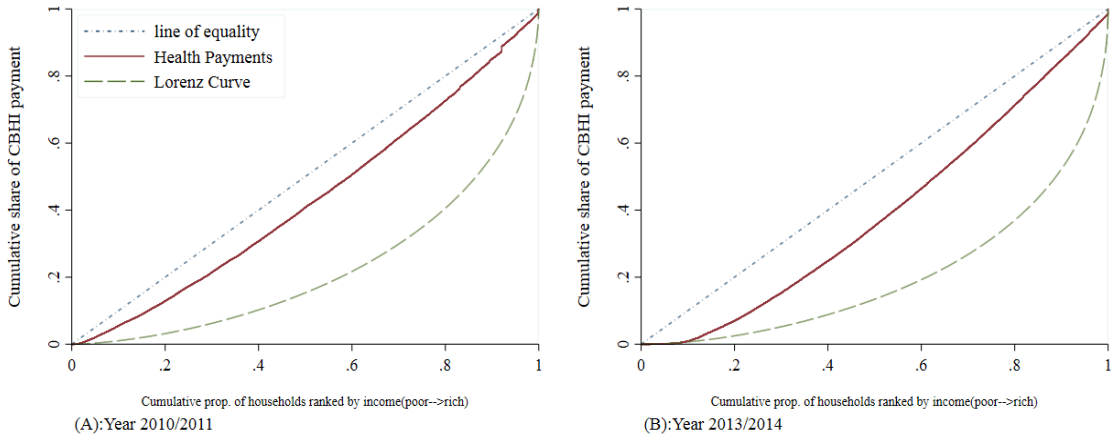

Figure 3.4 - Comparison of progressivity for CBHI in Rwanda 2010/11 and 2013/14

The visual analysis cannot precisely indicate the magnitude of inequality, or its evolution over time. For these purposes, we employ the Concentration and Kakwani indices (Wagstaff et al., 2008). Three different equivalent scales (A, B, C) and percapita income (D) are used here to test the robustness of the results. The Concentration and Kakwani indices for CBHI are presented in Table 3.6. These results are based on equations 3.1. All Concentration indices are positive and significantly different from zero. As indicated by Wagstaff et al. (2008) and Wagstaff et al. (2011), this can be interpreted as the better off contributing more than the poor in absolute terms. For the period 2013/14, using a Xu et al. (2003) equivalent scale, we calculate a concentration index of 0.222, compared to a 2010/11 value of 0.156, reflecting a 42% increase in the value of the concentration index.

Table 3.6 - Kakwani and concentration indices with different equivalent scales

2010/11	**A**	**B**	**C**	**D**
Concentration Indices	0.1410***	0.1560***	0.1310***	0.1460***
Gini Coefficients	0.5500***	0.5450***	0.5220***	0.5570***
Kakwani	-0.4090	-0.3890	-0.3910	-0.4110
2013/14				
Concentration Indices	0.2150***	0.2220***	0.1980***	0.2160***
Gini Coefficients	0.5900***	0.5810***	0.5730***	0.5960***
Kakwani	-0.3750	-0.3590	-0.3750	-0.3800

Notes : * p <0.1, ** p <0.05, *** p <0.01; (A) Rwanda equivalence scales; (B) uses Xu et al (2003); (C) uses O' Donnell et al (2008); (D) is percapita

As per the results in Table 3.6, all Kakwani Indices are negative (This is based on equation 3.3). The Kakwani Index for 2013/14 (-0.359) is less in magnitude than in 2010/11 (-0.389), suggesting that the move from a flat premium contribution to graduated premiums is associated with the improvement in the Kakwani index (the change is 7.7 %).

3.4.3 Decomposition of the concetration indices for inequality in CBHI expenditure

To explain the observed inequality pattern, the Concentration Index was decomposed into its contributing determinants, following Wagstaff et al. (2008) (See equation 3.2). Table 3.7 presents the results for CBHI inequality decomposition in 2010/11 and 2013/14. In both periods, the value of the absolute contribution for income quintiles 4 and 5 is positive, implying that they contribute positively to inequality in CBHI expenditure. For example, in 2013/14, income quintiles 4 and 5 explain 21% and 54% of the inequality in CBHI expenditure, respectively. However, the other income quintiles have negative values, implying that they reduce inequality in CBHI expenditure. With respect to age, being in the 25 to 35 age group increases inequality in CBHI expenditure compared to being in the age group below 25 years (reference category). However, being in the 55+ age group reduces inequality in CBHI expenditure, as compared to being in the age group below 25 years. As for education, only higher education produces an effect. For the *Ubudehe* categories, being in *Ubudehe* category 2 explains almost 18% of the inequality, whereas being in *Ubudehe* category 4 explains 6%.

Table 3.7 - Decomposition of the concentration index

Explanatory variable	2010/11			2013/14		
	CI	Absolute Contribution	Contribution (%)	CI	Absolute Contribution	Contribution (%)
Female-headed household	-0.137***	0.002	1.275	-0.171***	-0.004	-1.967
	(0.014)	(0.003)		(0.011)	(0.003)	
Income quintile 2	-0.400***	-0.019***	-12.445	-0.420***	-0.029***	-12.989
	(0.013)	(0.002)		(0.011)	(0.002)	
Income quintile 3	-0.003	-0.000	-0.113	-0.027***	-0.003***	-1.155
	(0.013)	(0.001)		(0.010)	(0.001)	
income quintile 4	0.389***	0.032***	20.397	0.370***	0.047***	21.256
	(0.013)	(0.002)		(0.011)	(0.002)	
Income quintile 5	0.792***	0.100***	64.364	0.785***	0.120***	53.985
	(0.011)	(0.009)		(0.009)	(0.005)	
25 < Age <35	0.076***	0.002***	1.336	0.084***	0.002***	1.125
	(0.011)	(0.001)		(0.012)	(0.001)	
35 < Age < 45	-0.007	-0.000	-0.215	0.021	0.001	0.229
	(0.016)	(0.001)		(0.017)	(0.000)	
45 < Age <55	0.017	0.000	0.137	-0.018	-0.000	-0.105
	(0.013)	(0.000)		(0.013)	(0.000)	
Age >55	-0.115***	-0.004**	-2.491	-0.127***	-0.005*	-2.043
	(0.012)	(0.002)		(0.011)	(0.002)	
# under five Children	-0.029***	-0.000	-0.262	0.005	0.000	0.166
	(0.008)	(0.001)		(0.007)	(0.001)	
# of adults above five	0.052***	0.013***	8.488	0.038***	0.008***	3.420
	(0.004)	(0.004)		(0.003)	(0.001)	
Marital status	0.046***	0.005	3.131	0.050***	0.006***	2.746
	(0.006)	(0.003)		(0.005)	(0.001)	
Residence(urban)	0.344***	-0.001	-0.774	0.369***	-0.007***	-3.105
	(0.027)	(0.002)		(0.023)	(0.002)	
# in retirement age	-0.206***	0.003***	1.981	-0.187***	0.002	0.859
	(0.017)	(0.001)		(0.015)	(0.001)	
# in paid Agriculture	-0.233***	-0.001	-0.341	-0.269***	0.002	0.993
	(0.012)	(0.001)		(0.011)	(0.002)	
# in non-paid Agriculture	0.210***	-0.000	-0.225	0.169***	0.003	1.165
	(0.011)	(0.003)		(0.007)	(0.004)	
Never complete primary	-0.243***	-0.000	-0.211	-0.233***	-0.000	-0.073
	(0.035)	(0.000)		(0.035)	(0.000)	
Primary	0.035***	-0.001	-0.426	0.020***	-0.000	-0.008
	(0.006)	(0.000)		(0.006)	(0.000)	
Post primary< secondary	0.321***	-0.001	-0.480	0.309***	-0.000	-0.106
	(0.026)	(0.001)		(0.034)	(0.001)	
Secondary	0.550***	-0.001	-0.339	0.420***	0.001	0.502
	(0.024)	(0.002)		(0.022)	(0.001)	
Higher	0.874***	0.019	12.454	0.656***	0.010*	4.380
	(0.034)	(0.013)		(0.044)	(0.006)	
Ubudehe category2				0.107***	0.039***	17.476
				(0.006)	(0.003)	
Ubudehe category3				0.573***	0.009	4.026
				(0.092)	(0.007)	
Ubudehe category4				0.192***	0.012***	5.601
				(0.018)	(0.002)	
Residual		0.007			0.008	
N	9212	9212	9212	9605	9605	9605

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

3.4.4 Explaining the gender gap in premium contribution

In Table 3.8 (detailed decomposition for 2013/14), the overall decomposition at various quantiles (Q30, Q50, Q75 and Q90) means that there is a gender difference in CBHI expenditure at the various quantiles. The analysis is based on equation 3.8. Results in Table 3.8 show that, for 2013/14, male-headed households have a higher CBHI expenditure than female-headed ones. But the gender-gap is declining as the quantile increases. Furthermore, the results also indicate that for the 30th and 50th quantiles, the difference in CBHI expenditure is due to the differences in covariates ('explained part'), rather than in the "unexplained part". Within the two quantiles, the gender-gap is significant at 1% level. This means that the characteristics of individuals have a direct effect on how much they spend on CBHI at the lower quantiles

To explore the robustness of the findings, the Oaxaca-Blinder decomposition was applied in addition to the two-part model with probit in the first part and RIF in the second part (the results are in Appendix 3A.3 to 3A.5. The results show that women pay less on CBHI, thus confirming the results in the descriptive at the very start and the RIF regression.

Table 3.8 - RIF Decomposition of the gender differential in CBHI expenditure-2013/14

Variables	Q30	Q50	Q75	Q90
Male-headed household	4897.222***	5641.823***	6500.816***	7335.217***
	(33.937)	(31.120)	(28.574)	(39.352)
Female –headed household	3429.727***	4727.095***	5732.404***	6613.708***
	(76.430)	(66.065)	(70.953)	(87.251)
Difference	1467.495***	914.728***	768.412***	721.508***
	(83.626)	(73.028)	(76.491)	(95.715)
Explained	1661.951***	895.579***	484.092***	193.813
	(124.884)	(97.120)	(88.177)	(125.900)
Unexplained	-194.456	19.149	284.320**	527.695***
	(140.951)	(112.448)	(104.301)	(146.780)

	Explained				Unexplained			
Variables	**Q30**	**Q50**	**Q75**	**Q90**	**Q30**	**Q50**	**Q75**	**Q90**
Quintile 2	-24.274	-13.376	-6.766	-3.054	-81.365	-85.039	-19.609	-15.043
	(12.774)	(7.300)	(3.928)	(2.486)	(61.402)	(50.266)	(38.813)	(37.004)
Quintile 3	17.054	10.016	5.487	3.583	-14.650	-2.074	20.524	53.362
	(16.338)	(9.647)	(5.329)	(3.604)	(64.881)	(53.699)	(42.416)	(43.901)
Quintile 4	41.803*	26.559*	15.921*	14.887*	-13.922	-66.417	-2.205	50.786
	(19.462)	(12.513)	(7.613)	(7.282)	(71.046)	(58.106)	(47.187)	(48.877)
Quintile 5	73.715**	48.271**	29.551**	33.262**	-76.943	-103.421	-134.685*	-113.395
	(23.121)	(15.474)	(9.786)	(11.126)	(80.180)	(67.075)	(63.522)	(71.092)
25 < Age <35	256.903***	263.616***	-24.270	-123.244***	99.708	87.286	-93.260**	-70.542
	(36.973)	(25.775)	(14.990)	(21.090)	(71.799)	(57.271)	(34.203)	(40.929)
35 < Age < 45	96.290***	117.022***	24.065**	-48.853***	101.889	134.383*	-98.101*	-67.957
	(17.404)	(16.966)	(7.718)	(11.537)	(74.950)	(61.569)	(41.998)	(54.528)
45 < Age <55	-94.276***	-98.021***	2.649	27.846*	151.985	192.263	-35.646	-10.448
	(19.763)	(17.732)	(8.508)	(13.102)	(132.700)	(107.722)	(69.448)	(97.635)
Age >55	-207.241***	-223.027***	103.439***	168.261***	446.536	419.152*	-99.026	-87.651
	(52.529)	(39.681)	(30.280)	(44.932)	(259.601)	(210.182)	(127.685)	(170.874)
# under five	165.399***	128.583***	139.071***	196.612***	131.157*	158.208***	52.326	32.916
	(20.585)	(17.750)	(16.695)	(24.558)	(56.408)	(47.520)	(51.778)	(65.370)
# of adults (>5)	148.563***	234.313***	386.194***	470.136***	-310.293	545.648***	64.314	-225.982
	(17.587)	(22.220)	(33.611)	(42.952)	(187.244)	(158.654)	(168.359)	(260.706)
Marital status	1114.520***	365.775***	-207.322*	-611.395***	206.210**	-50.268	-163.191*	-112.498
	(120.098)	(92.134)	(80.613)	(118.844)	(69.149)	(59.124)	(67.298)	(80.352)
Residence (Urban)	2.685	3.417	1.498	-0.027	32.240	54.927	68.309	15.054
	(2.535)	(2.637)	(1.761)	(2.200)	(42.590)	(37.776)	(37.721)	(49.075)
# Retirement age	33.115*	28.764*	18.702	15.885	7.155	-18.057	-72.748	-1.541
	(14.915)	(12.562)	(10.838)	(14.871)	(51.348)	(44.336)	(44.159)	(55.246)
# Paid Agriculture	1.942	1.419	-0.895	0.950	15.127	-12.455	-83.968*	-36.894
	(1.851)	(1.524)	(1.270)	(1.802)	(43.041)	(38.006)	(42.414)	(57.102)
# non-paid Agriculture	-42.707*	-8.336	-1.555	17.303	-28.665	-27.232	-51.885	59.927
	(17.134)	(15.485)	(15.705)	(24.758)	(47.945)	(43.862)	(50.253)	(74.498)
Never complete primary	0.934	0.069	-1.245	-0.576	-18.901	-17.079	-6.723	-1.366
	(1.687)	(1.344)	(1.591)	(1.703)	(13.482)	(11.403)	(12.727)	(15.198)
Primary	-3.100	-44.271*	-18.218	8.634	41.301	57.916	1.712	95.507
	(20.488)	(18.391)	(16.981)	(23.331)	(97.284)	(86.561)	(84.718)	(102.882)
Primary< secondary	-0.211	-1.275	-0.795	0.334	3.735	-6.355	3.274	14.901
	(0.739)	(1.863)	(1.229)	(0.976)	(15.381)	(13.910)	(13.584)	(19.561)
Secondary	-8.108	-7.962	-9.582*	-0.805	19.732	20.785	19.374	-6.694
	(4.798)	(4.248)	(4.073)	(4.912)	(25.216)	(22.106)	(21.999)	(32.020)
Higher	-0.734	0.042	0.929	2.676	-8.675	-4.656	-2.805	9.654
	(1.523)	(1.244)	(1.284)	(2.529)	(7.137)	(6.828)	(7.657)	(9.147)
Ubudehe category2	84.474***	60.309***	23.876**	15.188	-15.872	-105.005	-118.448	16.591
	(16.786)	(12.808)	(8.211)	(8.824)	(162.993)	(134.581)	(113.202)	(125.585)
Ubudehe category3	1.886	1.340	1.073	1.910	-0.781	-3.844	-7.772	-21.273
	(2.341)	(1.711)	(1.456)	(2.623)	(1.632)	(2.384)	(4.188)	(10.881)
Unclassiffied Ubudehe	3.318	2.332	2.281	4.300	-2.475	-63.231	7.042	47.939
	(3.678)	(2.670)	(2.497)	(4.471)	(52.118)	(42.982)	(37.520)	(45.966)

Notes: Robust standard errors are in parentheses, * p <0.10, ** p <0.05, *** p <0.01.

3.5 Discussion

This study represents – to the best of our knowledge – the first empirical evidence on the socioeconomic inequality in CBHI premium payments, drawing on rich repeated cross-sectional data from Rwanda. We also provide, for the first time, evidence on the distributional consequences of stratifying people into different CBHI premium categories. Finally, this study has added a new dimension by investigating and highlighting gender differences in CBHI payments.

Our results show that the concentration index for the CBHI payments has positively changed by 42% between 2010/11 to 2013/14, to the advantage of less wealthy households. This is indicated by the increase in the magnitude of the concentration index between the two survey rounds. The positive sign of both the indices and change in the indices means that more absolute payments on CBHI are being made by the richer households (Wagstaff et al., 2011, O'Donnell et al., 2008). CBHI payments have become less regressive in 2013/14 than in the preceding survey. This means that richer people spend proportionately less of their income on CBHI, but that the gap between the rich and poor has narrowed.

We also find that the change in the Kakwani index is between 7.7% and 8% when the mentioned equivalence scales are used. Because the major systematic difference in CBHI between the two survey years was the shift from the flat rate to stratified payment, this may suggest that the observed reduction in regressivity could be the result of this policy change. However, it is important to bear in mind that because CBHI premiums are only part of overall health spending, we cannot exclude the possibility that overall health expenditures have changed in a less pro-poor direction. Nevertheless, using a direct method which disaggregates the CBHI expenditure according to income quintiles suggests that there is a mixed pattern of regressivity. This might mean that CBHI may have been regressive across some socioeconomic groups, while being simultaneously progressive in others. Similarly, mixed patterns have also been reported in the context of social health insurance in Taiwan (O'Donnell et al., 2008).

There are a few possible reasons as to why CBHI continues to be regressive in the context of Rwanda. Firstly, O'Donnell et al. (2008) observed that where there is a lack of government subsidies for any group other than the poor, the effect of social health insurance remains regressive. A similar reasoning could apply to Rwanda, since around 25% of the population are in the subsidisation category, and there are no subsidies to other groups. Second, there are irregular payments and some people even drop out without renewing their subscription (GoR, 2010, GoR, 2012). Finally, contributions to the premiums are not paid as a proportion of income over time. Hence CBHI contributions do not change with a rise in earning capacity over the years.

On the decomposition of the factors explaining inequality (decomposition of the concentration index) in CBHI payments, the effects differ between covariates. Whilst the concentration index for women is negative, in both 2010/11 and 2013/14, its absolute contribution to total inequality is insignificant. However, the effect of income depends on the group and the *Ubudehe* categories. Being in higher *Ubudehe* categories increases inequality in absolute CBHI expenditure compared to category 1. This means that those in the higher categories made higher absolute payments than the ones in the lower *Ubudehe* categories. This is not so surprising given that the lower group (*Ubudehe* 1) is fully subsidised (Chemouni, 2018, GoR, 2012). The higher the income, the more the inequality increases for the wealthier and reduces for the poorer households. In other words, as income rises, so does the expenditure on CBHI in both time periods for the wealthier. Surprisingly, education seems to be an insignificant factor in explaining inequality. This could be due to the limited variation in educational attainment amongst the sample analysed, given that the majority of the sample come from rural areas with few educational opportunities.

This paper extends the results of Finnoff (2016), in which female-headed households are found to be less likely to enrol in CBHI in Rwanda; our paper finds that female-headed households also spend less on CBHI. For the various quantiles that we analyse, female-headed households paid less at all quantiles in both time periods. However, the gender difference is considerably higher in the tiered CBHI system. When the difference in expenditure is decomposed using the RIF methods, we find that differences in household characteristics are significant at all of the CBHI expenditure quantiles, but the non-explained component is also significant in the 75^{th} and 90^{th} quantiles. This implies that the difference in the endowments (the "explained part" in the RIF equation) is the main driver of differences in CBHI expenditure. Male-headed households pay more, and the difference in expenditure is largely explained by the difference in the distribution of their characteristics. Being a constituent of *Ubudehe 2* explains a major share of the difference in CBHI expenditure in 2013/14. For both periods, income quintiles 4 and 5 account for a great deal of the difference in expenditure on CBHI.

However, we must clarify that lower CBHI expenditure on the part of women is not necessarily a bad thing. This can mean that the system is really incorporating poorer female-headed households by allowing poorer women to pay less. There are two possible explanations of the potential cause of the gender difference in the gender-CBHI expenditure: First, this might be because most female-headed households are poor (NISR, 2012, NISR, 2015, GoR, 2010), and hence they simply could not afford or could only partially afford to pay for CBHI. Another potential explanation is that after a closer analysis of the data, we find that almost 46% of the female-headed households in the analysed data were in group 1 of *Ubudehe*. This means

that the low expenditure on CBHI is a result of receiving full subsidies in 2013/14. Despite this, we cannot rule out the potential existence of additional factors beyond the observed covariates which may explain the difference that becomes significant at higher quintiles.

The limitations of our study need to be acknowledged. The datasets that we have used are the only national-level data available on CBHI in Rwanda. Problems of the data include, for instance, the failure to include supporting payments made by churches and community members towards CBHI payments – a feature that has been shown in qualitative studies elsewhere (Akazili et al., 2012). In addition, the data does not indicate whether CBHI payments are taken from a government subsidy or not. In view of the results, the implication for future studies is that the research should also investigate the causal effects of belonging to a particular *Ubudehe* group on the payments toward CBHI. Furthermore, future studies may also investigate how changes in premium payment method might affect CBHI uptake and catastrophic health expenditure.

In light of the research questions, important results have been achieved that can serve as lessons for other countries who want to model their system on Rwanda. First, there is a reduction in inequality as measured both by the concentration index and the Kakwani index. Second, after decomposing the concentration index, income and *Ubudehe* classification are found to be significant contributors to inequality. Third, the tiered CBHI system seems to be less regressive. Hence the lesson learned is that a stratified CBHI is more pro-poor than a flat rate system. Finally, female-headed households spend less on CBHI and the gender differential in CBHI expenditure is explained mostly by the difference in the distribution of characteristics. Therefore, our overall results mean that CBHI in Rwanda may have had some (as intended) positive effect in terms of reducing inequality in payments.

3.6 Conclusion

In conclusion, in this paper, we investigate the pattern of socioeconomic inequality in CBHI household premium contributions in Rwanda in the years 2010 to 2014. We also assess gender differences in CBHI contributions. The chapter use the 2010/11 and 2013/14 rounds of national survey data, we quantify the magnitude of inequality in CBHI payments, decompose the concentration index of inequality, calculate Kakwani indices and implement unconditional quantile regression decomposition to assess gender differences in CBHI expenditure. We find that the CBHI with stratified premiums is less regressive than CBHI with a flat rate premium system. Decomposition analysis indicates that income and CBHI stratification explain a large share of the inequality in CBHI payments. With respect to gender, female-headed households make lower contributions toward CBHI expenditure, compared to male-headed households.

There are several potential policy implications that may be derived from the findings. First, policy makers may consider providing further subsidies for vulnerable female-headed households in the other *Ubudehe* groups, especially in group 2, in order to further reduce inequality. Second, as indicated by the Kakwani index, the authorities may wish to consider an increase in premium contributions for those in the higher wealth groups of *Ubudehe 3* and above. Third, since we also find that income is a big contributor to the differences, providing community programmes that increase individuals' income is another option. Such programmes might include community work for pay, or public works for insurance, whereby individuals would engage in community-based activities in exchange for coverage of their CBHI payment. Fourth, the proper implementation of the new 2015 CBHI laws, including fines for those who default on their CBHI payments, could force people to make equal contributions once they voluntarily join the CBHI (GoR, 2016). This has the potential to discourage people from only paying for CBHI at the time when they need to access health services. Finally, it is necessary to frequently review the *Ubudehe* categorisation criteria so as to capture the transitions in and out of poverty which people experience, which will essentially make it possible to align with the ability to pay.

As is known, attainment of UHC takes a long time: even in richer countries such as Germany, it took 127 years to achieve UHC through social health insurance (OXFAM, 2013), hence patience with the system is important. However, in the context of Rwanda, these results suggest a positive move in the right direction of UHC, since the system has been in progress for close to thirteen years. The results also mean that having a tiered system has the potential to check gender-related issues in financing.

Chapter 4

Willingness to pay for community based health insurance in rural Malawi

4.1 Introduction

Low-and middle-income countries (LMICs) face continuous health care financing problems (Dieleman et al., 2016a, Dieleman et al., 2016b), with financial risk attributable to widespread utilisation of health care (WHO, 2010b, WHO, 2016, Wagstaff et al., 2018a, Wagstaff et al., 2018b). Out-of-pocket (OOP) payments are a dominant means of financing health care and constitute a large proportion (10%-25%) of the household budget (Wagstaff et al., 2018b, Wagstaff et al., 2018a) in LMICs. OOP payments have been shown to constrain access to healthcare for the poor (Yates, 2009, Lagarde and Palmer, 2008); they also act as a driver of catastrophic health expenditure (Xu et al., 2007, Xu et al., 2003) and may lead to the impoverishment of households (Wagstaff, 2007, WHO, 2010b).

The poor, including those on government social protection programmes, and workers in the informal sector and rural areas, are particularly vulnerable to high OOP (Acharya et al., 2013). Therefore, some form of social protection or insurance to support the financing of health care access may be needed (WHO, 2010b, Kadidiatou et al., 2018). Some authors have recommended linking social cash transfers and health insurance (Owusu-Addo, 2016). Social health insurance (SHI) and community based health insurance (CBHI) have been suggested as possible pro-poor means of health financing to help achieve universal health coverage (UHC) (WHO, 2005, WHO, 2010b, WHO, 2016, Shafie and Hassali, 2013, Yilma et al., 2015, Chemouni, 2018).

The path to UHC for Malawi – one of the poorest countries in the world – remains arduous: currently, despite a large share of healthcare provision being free in most government facilities only, household health expenditure is still very high, especially among the poor in rural areas (Mussa, 2016, Mchenga et al., 2017). External funding support to the healthcare system has been declining in recent years, from 68.3% of total public health expenditure in 2012/13, to 53.5% in 2015 (MoH, 2016, GoM, 2017). Hence the urgency to identify and mobilise alternative health financing sources (GoM, 2018).

In order to achieve UHC, the Malawian government has embarked on introducing some forms of low-cost health insurance, as stated in the Government's new policy agenda for the period up to 2021 (MoH, 2016, GoM, 2017, GoM, 2018). At present, only health insurance provided by the private sector is available in Malawi, but neither CBHI nor SHI. The private health insurance scheme is unaffordable to many (MoH, 2016, Makoka et al., 2007) and its supply is limited to urban areas. Although introducing public health insurance (either in the form of CBHI or of SHI) is high on the current policy agenda (Gheorghe et al., 2019), it is not obvious whether people would be willing to join and pay for it. At present the scope for introducing SHI in Malawi is very limited, because tax collection as a way to fund SHI is very difficult in a mostly informal economy (about 89% of the working population is in the informal sector) (NSO, 2014, Chansa et al., 2018). In the short run, a more realistic alternative might be CBHI, not least because 80% of the population lives in rural areas, with limited access to relevant markets. In particular, there is limited access in rural areas to markets for maize, which is the most cultivated food crop in Malawi. The crop is used as a form of payment for trade (barter) and also it is sold for income by many rural dwellers (Chipeta, 2010).

In this chapter, we investigate the Malawian people's willingness to pay for CBHI, using money or agricultural commodities (maize crop). Involving people in this health insurance debate is important because the relative success of any health care reform policy depends to a large extent upon the degree to which it takes account of public preferences (Al-Hanawi et al., 2018). We pursue two main research questions: Are people willing to join CBHI and pay for CBHI (in cash or in kind)? What are the individual, community and household factors that affect the amount a household is willing to pay for CBHI in kind or in cash? The specific objectives are ; how much are people willing to pay in cash? How much are people willing to pay in kind? And does benefiting from existing government social protection affect the amount a household is willing to pay?

Answering these questions will provide critical input into policymakers' deliberations about the optimal design of health insurance in Malawi and in other LMICs in similar situations, taking into account the actual preferences of the population. Understanding the preferences of members of the social support programme (Social Cash Transfer programme (SCTP)) may be of particular interest, in that recent research has shown SCTP members to face increasing health care costs (Sara et al., 2016). The SCTP is unconditional, even though healthcare constitutes a large proportion of programme beneficiaries' household expenditure. SCTP members are given a monthly income, which can in principle be used for paying a CBHI premium. Furthermore, most SCTP members are already linked to rural financial savings groups (community banking) (Ksoll et al., 2016). These financial structures may form a conducive environment for CBHI and could be used to pool funds for CBHI.

Several studies point to a range of relevant socioeconomic determinants of willingness to pay for CBHI, including age, gender, income, wealth, location, religion, etc. However, the signs and magnitudes of the associations vary considerably across settings and within countries (Dong et al., 2004, Onwujekwe et al., 2010, Shafie and Hassali, 2013). For Malawi specifically, there is a dearth of evidence on the determinants of willingness to pay for any type of health insurance. Abiiro et al. (2016) find that people have heterogeneous preferences for health insurance products. Their results suggest that people aged 55 years and over, as well as wealthier households, preferred health insurance packages with better coverage compared to a basic package. In a related study, Phiri and Masanjala (2012) assess willingness to pay for micro health insurance, by focussing mainly on people affiliated with private micro-lending institutions in three districts of the southern region of Malawi. They find a WTP of 97%, with income being the most significant determinant.

Our study adds to this literature in several ways. First, previous literature on the demand for CBHI has not specifically considered the role of pre-existing social protection arrangements. Internationally, SCTPs have grown in popularity (Owusu-Addo et al., 2018, Kilburn et al., 2018) and they have also at times been linked to health insurance uptake (Owusu-Addo, 2016). Social cash transfers increase household income and have been reported to enable households to purchase health insurance in Tanzania (Evans et al., 2014), USA (Courtin et al., 2018) as well as Mexico (Biosca and Brown, 2015). Hence, our work on Malawi may be useful to understand the feasibility of expanding social protection in the health context for countries with a similar set-up. Second, this is the first study in the international literature to examine willingness to pay for CBHI using a crop that is a staple food of this country (i.e. 'in kind' WTP). Introducing this possibility is important for two main reasons: (1) In Malawi, as in many other developing countries, food/maize producers have limited access to markets and therefore face important transaction costs to sell their crops that may make their income unpredictable. (2) Because the discount factor varies with the type of goods and household characteristics (Ubfal, 2016), people attach different value to spending in cash compared to paying in kind.

Third, from a methodological perspective, this is the first study in the literature on willingness to pay for CBHI that uses a two-part model. This is important as the two-part-model (TPM) is more efficient than ordinary least squares, and it allows controlling for bias due to selection (Belotti et al., 2015, Fonta et al., 2010). Finally**,** unlike previous studies, we enrich our quantitative methods with qualitative information from structured focus group discussions (FGDs) (Lessard et al., 2009, Macha et al., 2014). Complementing contingent valuation with qualitative data is currently gaining ground and highly recommended in economic evaluations (Coast et al., 2012, Coast and De Allegri, 2018).

The rest of the chapter is organised as follows. In section 4.2, we briefly describe the profile of Malawi in terms of health financing. Section 4.3 presents the methods: we narrate the study design, target population, the survey sampling technique used, how willingness to pay elicitation was achieved, and finally the econometric methods. Section 4.5 presents the results, consisting of the descriptive statistics and the econometric results. In Section 4.6, the results are discussed with reference to the previous literature. Section 4.7 concludes, while noting some limitations of the study.

4.2 Brief country profile: Economy, health service provision and health financing

Geographically, Malawi is a landlocked country located in southern central Africa, along the western part of the Great African Rift Valley. It covers a total area of 118,484 square kilometres (km^2), 900 km in length, and 90 to 161 km in width. The country is divided into three zones known as regions (North, Central, and South) and further subdivided into 28 districts. In each district, the highest local administrative authority is called the Traditional Authority. Each Traditional Authority has chiefs who have various villages under their administration.

The country is classified as a low-income country, with 50% of the population below the poverty line (NSO and WB, 2018). As of 2015, Malawi's Gross Domestic Product (GDP) per capita was estimated at USD381.40. On average, the active population earns USD37 per month, with a median of USD114. The economy is primarily agro-based, with 84% of the population living in rural areas. At the national level, 89% are employed in the informal sector whereas 11% are within the formal sector (NSO, 2014). Life expectancy at birth is estimated at 63.9 years (MoH, 2017). Since 1990, there has been a steady decline in infant and child mortality, eventually achieving the MDG goal number 4 (Kanyuka et al., 2016).

Regarding service provision, health services are provided by public, private for profit, and private not for profit sectors. Public provision accounts for 60% of health service provision where most of the health services are free at the point of use. However, there are private wings in some public facilities, which charge user fees. The remaining 40% is essentially covered by other sectors such as non-governmental organisations (NGOs), private providers, Christian Health Associations (CHAM), which charge user fees at point of use (MoH, 2017) .

With respect to health financing, the health sectors have been donor-driven for a long period. However, recent trends have shown that funding from donors is decreasing and as of 2015 it was around 53% of total health financing. At the same time, there has been an increase in private health financing and public financing. This has been deemed to be unsustainable at present and alternative sources such as health insurance have been called for (MoH, 2017, GoM, 2017).

4.3 Methods

4.3.1 Analysis framework

There are several factors that can affect an individual's willingness to pay for CBHI, some of the determinants are summarised in Figure 4.1. This has been modified based on various willingness-to-pay studies for CBHI studies (Mladovsky and Mossialos, 2008, Ataguba et al., 2008, Schneider, 2004, Adebayo et al., 2015, Onwujekwe et al., 2010). The factors include, sex, household headship, current health status, income, employment, wealth, and education, just to mention a few. The factors may operate at the individual level and at community level.

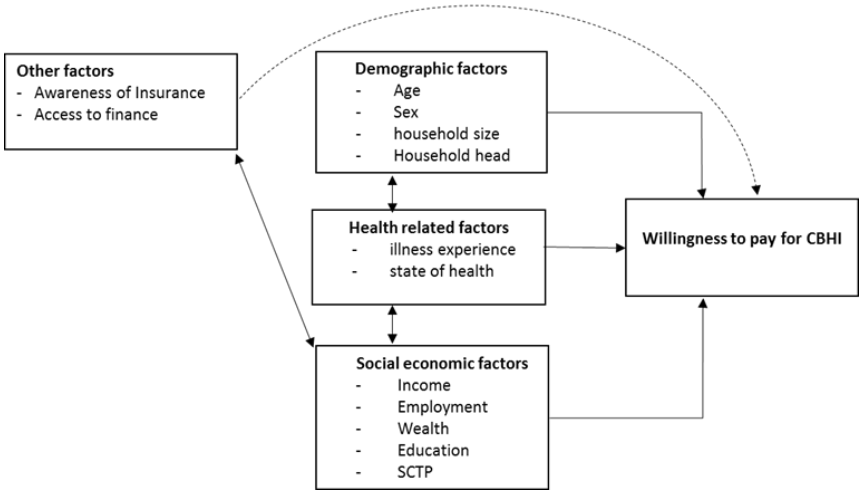

Figure 4.1 - Analysis framework

4.3.2 Methods for quantitative analysis

4.3.2.1 Data

Data was collected in five districts: one of the six districts in the northern region, one district in the central region, and three of the thirteen districts in the southern region. The districts were selected purposely because people in those areas have considerable experience of implementing the SCTP, and they have access to both private and public health facilities within 20 kilometres. Selecting in this way enabled us to avoid biases that would have resulted from concentrating only on places with either exclusively government facilities or private ones. In each of the districts visited, we conducted interviews in at least two Traditional Authorities (TAs), except in the northern district (Nkhatabay). TAs are the supreme rulers of a clan, who oversees the chiefs in any district and their area form administrative geographical zones. The

TAs are under the administrative authority of the district commissioner at the local government. Data entry was done in CsPro[5], and analysed in Stata 15 (StataCorp, 2017).

4.3.2.2 Study design and sampling

This was a cross-sectional study. Only household heads (or their spouses) aged 18 and above were interviewed, because they are the decision-makers at household level in rural areas. A systematic random sampling design was used to select individuals. We interviewed one respondent from every fifth household. Before conducting the interviews, local leaders were informed two days in advance. Entry clearance was obtained from regional police offices, as well as from local district commissioners to ensure security. SCTP respondents were identified using government records, which are available on the village registers. The SCTP members were also selected from every fifth SCTP household. The first household was selected from a random draw of the names on the village register. In total, 453 non-SCTP and 456 SCTP members were interviewed.

The Fisher's formula was used to calculate the sample size (Cochran, 1963, Kish, 1965, Lwanga et al., 1991). This calculates the minimum sample size from 'unknown large population', and is a toolbox for sample size calculation in surveys. "Unknown population" refers to a scenario in which the researcher does not have any prior information regarding population size, or any other statistical properties of the population. The formula is expressed as:

$$n = Z^2_{1-\frac{\alpha}{2}} p(1-p)/d^2, \tag{4.1}$$

where n is the sample size, d is the level of accuracy (sampling error), and Z is the standard normal deviation (1.96% Confidence interval). As a rule of thumb, assuming the target population is not known, and the population proportion is not known, it is advisable to use p = 0.5, Z = 1.96, $\alpha = 5\%$, CI = 95% and d = 0.05. Using the above parameters the minimum of 384 is obtained (Cochran, 1963, Lwanga et al., 1991). To allow for possible incomplete and/or damaged questionnaires, we increased the sample for each group to 452 non-SCTP and 455 SCTP. The total interviewed respondents were 909, and the response rate was 100%. However, two questionnaires were thrown out due to damage. The very high response rate is also in line with the national household surveys (Integrated household surveys, Malawi Demographic and Health Surveys, Multiple Indicator Surveys, among others), which have always obtained a survey response of 95% or above.

[5] https://www.census.gov/population/international/software/cspro/index.html

4.3.2.3 Elicitation of willingness to pay

Several methods have been used for eliciting WTP for CBHI in LMICs. However, there is no theoretical justification in favour of one method over the other (Kangethe et al., 2016), as each method appears to have strengths and weaknesses (Cookson, 2003). Commonly used methods include Dichotomous Choice, Direct Open-ended, Bidding Game, Payment Card, as well as Binary With a Follow-Up (Ryan and Watson, 2009, Dong et al., 2004, Fonta et al., 2010, Dong et al., 2003). This study used the Bidding Game method, because it has been used widely in other studies eliciting WTP for CBHI in Africa, Latin America, and Asia (Dror et al., 2007, Bonan et al., 2014, Adams et al., 2015, Ahmed et al., 2016). In addition, the Bidding Game approach has been tested to be appropriate and efficient in several countries (Onwujekwe, 2001, Onwujekwe, 2004, Kangethe et al., 2016, Onwujekwe et al., 2010). The Bidding Game method can be described as follows. First, the respondent must agree or disagree upon the first bid. If the first bid is agreed upon, the interviewer increases the bid until the respondent says "no". The value of WTP is the amount before the respondent says "no". If the interviewee says "no" to the first bid, the interviewer lowers the bid until a "yes" is expressed.

Starting point bias is an important concern in WTP studies. In this study, this bias was dealt with by using random starting points (Gustafsson-Wright et al., 2009, Bonan et al., 2014). In addition, we used the premium levels that the private health insurance companies were offering at market price, and also the premiums they were willing to offer to the poorest in the process of expanding private health insurance. Before bidding, the respondent was informed of the attributes as well as the concept of CBHI. Opportunities to ask questions were given when the respondent did not understand, and throughout the survey process. The proposed CBHI structure was as expressed in Figure 4.2:

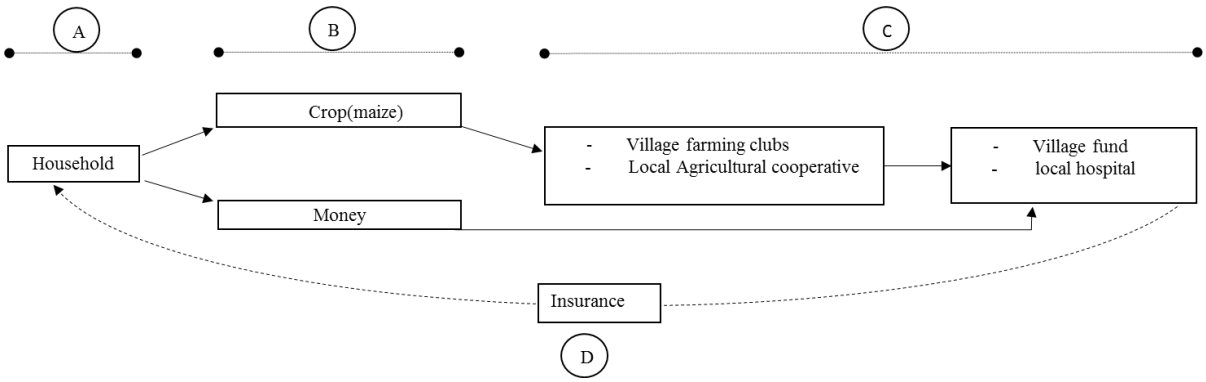

Figure 4.2 - The proposed CBHI

In Figure 4.2, (A) is the source of payment, (B) the payment method, (C) is the pooling of payments and (D) is the insurance benefit package. It is envisaged that households can pay

either in money and/or using maize. If payment is by money, this will go straight into the pooled fund. However, if a household pays using maize, this will be channelled to local agricultural cooperatives, which can sell this to obtain the money equivalent to then pay the insurance subscription for the household in the community fund.

4.3.3 Econometric analysis of quantitative data

During the survey, all respondents were asked the following two questions (1) "Are you willing to join 'CBHI' and pay using money?" and (2) "Are you willing to join 'CBHI' and pay using maize produce?" The questions simultaneously asked for the willingness to join and the willingness to pay using money or payment in kind. The WTP (in cash or in kind) was elicited only for individuals who were willing to join CBHI. As a consequence, we jointly model the willingness to join CBHI and the WTP for CBHI. We use a two-part model that explicitly accounts for the selection into the subsample of individuals who provided values for the WTP.

The first part of the model is the selection equation or equivalently the willingness to join CHHI, and the second part of the model is the valuation equation or equivalently, conditional on the willingness to join, what is the WTP. In the two-part model setting, we use a probit model for the selection equation and a GLM model for the valuation equation. The TPM model is designed to deal with limited dependent variables (Buntin and Zaslavsky, 2004, Deb et al., 2017, Jones, 2000, Belotti et al., 2015). The selection equation can be specified as in Belotti et al. (2015), as follows:

$$\emptyset(y > 0) = prob(y > 0|X) = F(X\delta) \tag{4.2}$$

where X is a vector of explanatory variables, δ is the corresponding vector of parameters to be estimated, and F is the cumulative distribution function of an independent identically distributed error term, chosen from a probit . For the positive values (second part), the model is then expressed as a conditional mean:

$$\emptyset(y|y > 0, X) = f(X\gamma) \tag{4.3}$$

where X is a vector of explanatory variables, γ is its vector of parameters, and f is an appropriate density function for $y|y > 0$. The overall mean WTP can be estimated as the probability from the first part multiplied by the expected value from equation (4.3), that is:

$$E(y|X) = prob(y > 0|X_i) * E(y|y > 0, X) \quad (4.4)$$

The second part of the TPM uses the GLM because WTP data is usually skewed, and this is the case with WTP data which has outliers' problems (Lofgren et al., 2008). The GLM displays more flexibility and allows for multiple forms of the error term (Wooldridge, 2010, Greene, 2012). Based on the test conducted, a log link function is chosen, as well as a Gamma distribution for the error term.

GLM is mainly a two-step process, first involving identifying a link function, and second, a specification of the family of error terms. First, the index function is specified, which indicates the relationship of the covariates and outcomes, $X'\beta$. This is linear in parameters, β, but can be nonlinear in covariates X'. Second, the link function, g, which relates the mean of , y , to the linear index:

$$X'\beta = g\{E(y|y > 0, X)\} \quad (4.5)$$

The inverse of g maps the index, $X'\beta$, into the mean value, μ, conditional on the observed characteristics of the outcome, y:

$$\mu = E(y|y > 0, X) = g^{-1}\ (X'\beta) \quad (4.6)$$

Since the data is continuous, a possible assumption has to be made and appropriate distribution to be estimated. This can either be Gaussian, Poisson, gamma or Inverse Gaussian (Jones et al., 2013, Deb et al., 2017).

Covariates used in the analysis are based on the framework specified in Figure 4.1 as well as studies estimating willingness to pay for CBHI (Onwujekwe et al., 2010, Dong et al., 2005, Shafie and Hassali, 2013, Bonan et al., 2014, Phiri and Masanjala, 2012, Donfouet et al., 2011, Ahmed et al., 2016). The Pregbon Link test (Deb et al., 2017, Jones et al., 2013, Cameron and Trivedi, 2010) was done to test for model specification error.

For each of the variables used, we tested the overall effect of the inclusion and exclusion variable, on the functional form of the model. The specification that passed the tests is the one we report in the results. Not only that, in the OLS we controlled for heteroscedasticity by using White-robust standard errors (Gujarati, 2009). Since we are using the two-part GLM, and no encompassing specification test (Deb et al., 2017), testing was done on each single equation of the two parts . Thus, the GLM specification of the family distribution was done using the Modified Park test. The Gamma distribution was thus used, since all the values of the Park

test were close to two (Jones et al., 2013, Deb et al., 2017). We also conducted the link test and the log was preferred. All the variables used are defined in Table 4.1.

Table 4.1 - Definition of variables

Variables	Description	Measurement
Region	Region where respondent resides	1 = if south
		2 = if central
		3 = if north
Head	Status of the respondent in the household	1 = if head of household
		0 = not the household head
Household size	The number of people who live in the house	A continuous quantitative measure
Age of respondent	Respondent's age in years	1 = if age ≤ 27
		2 = if age 28-37
		3 = if age 38-47
		4 = if age 48-57
		5 = if age 58-67
		6 = if age ≥68
Sex	Sex of respondent	0 = if female
		1 = if male
Education	Whether an individual attended some formal education	0 = if no education
		1 = if primary
		2 = if secondary or higher
Household expenditure per capita (Income)	Amount that household spent on household needs one month prior to interview	Income in 5 quintiles
SCTP	Whether a respondent is a member of SCTP programme	1 = if SCTP
		0 = if not SCTP
Religion	Religion of respondent	1= Orthodox Christian
		2= Muslim
		3= Pentecostal Christian
		4= No religion
Finance	Whether respondent has access to formal or informal financial institutions	1=if yes
		0= if no
Employed	Whether an individual is employed or not	1= if yes
		0 = if no
Insurance Awareness	Whether an individual is aware of any existing insurance	1= if yes
		0= if no
Chronic	Whether the household has a member with any chronic disease	1 = if yes
		0 = if no
Sickness in the past three months	Whether a member of household was sick in the past three months	1 = if yes
		0 = if no

4.3.4 Qualitative data analysis

The quantitative data was then complemented with the qualitative data, which was collected through focus group discussions (FGDs). Community members were interviewed from sampled villages in which the survey took place. Two FGDs were carried out in each of the districts, with an average of 12 participants per FGD. The qualitative data was analysed using the content analysis approach, whereby patterns of text are coded, themes analysed, and meaning systematically derived from the data (Weber, 1990, Neuendorf, 2016). Data matrices containing themes from the qualitative responses were developed with Microsoft Excel software. The interviews were recorded in the local language and later transcribed into English.

4.4 Ethical clearance

Ethical approval was obtained twice, both in the United Kingdom (UK) and in Malawi. In the UK, the University of York ethics committee for Social Sciences granted ethical clearance, while in Malawi, the National Commission for Research in Health and Social Sciences (NCRSH) approved the research (https://www.ncst.mw/?page_id=366). The clearance approval certificate is in Appendix 4A1

4.5 Results

4.5.1 Demographic and social characteristics

Table 4.2 presents the descriptive statistics of the variables used in the analysis. Panel (A) is for non-members of SCTP, panel (B) is for SCTP members, and panel (C) holds the pooled descriptive statistics for the total sample. Panel (C) shows that many people are willing to join CBHI and pay using money (95%), as opposed to payment using commodity (33%). Among the respondents, 29% have some knowledge of health insurance. Using money as a payment method, the mean WTP per capita is 291.03 Malawi Kwacha (MK) (0.40USD),[6] which is 2.1% of the total household expenditure.

[6] 1 USD = MK 725.62 see https://www.rbm.mw/Statistics/MajorRates

Table 4.2 - Social and demographic characteristics

	non SCTP (A)				SCTP (B)			Total			
Variable	**n**	**Mean (%)**	**Min**	**Max**	**n**	**Mean**	**Min**	**Max**	**n**	**Mean**	**Min**	**Max**
Willingness to join CBHI using cash	434	96%	0	1	432	95%	0	1	862	95%	0	1
Willingness to join CBHI using commodity	181	40%	0	1	114	25%	0	1	299	33%	0	1
WTP per capita (cash)	452	332.18	0	4000.00	455	250.15	0	1003	907	291.03	0	4000
WTP per capita (commodity)	452	379.00	0	6450.00	455	206.16	0	4320	907	292.3	0	6450
Household expenditure	452	15929.42	0	260000.00	455	11987.25	300	80000	907	13951.82	0	260000
Age<=27	99	22%	0	1	23	5%	0	1	118	13%	0	1
Age 28-37	127	28%	0	1	77	17%	0	1	200	22%	0	1
Age 38-47	72	16%	0	1	77	17%	0	1	154	17%	0	1
Age 48-57	59	13%	0	1	46	10%	0	1	109	12%	0	1
Age 58-67	59	13%	0	1	91	20%	0	1	145	16%	0	1
Age 68+	41	9%	0	1	141	31%	0	1	181	20%	0	1
Sex of respondent	86	19%	0	1	100	22%	0	1	181	20%	0	1
Household head	285	63%	0	1	400	88%	0	1	680	75%	0	1
Health insurance awareness	145	32%	0	1	114	25%	0	1	263	29%	0	1
Household size	452	5	1	17	455	5	1	14	907	5	1	17
No education	77	17%	0	1	182	40%	0	1	254	28%	0	1
Primary education	303	67%	0	1	246	54%	0	1	544	60%	0	1
Secondary education+	72	16%	0	1	27	6%	0	1	100	11%	0	1
Any chronic disease	185	41%	0	1	246	54%	0	1	435	48%	0	1
Income quintile 1	113	25%	0	1	68	15%	0	1	181	20%	0	1
Income quintile 2	90	20%	0	1	100	22%	0	1	190	21%	0	1
Income quintile 3	77	17%	0	1	132	29%	0	1	209	23%	0	1
Income quintile 4	63	14%	0	1	82	18%	0	1	145	16%	0	1
Income quintile 5	108	24%	0	1	73	16%	0	1	181	20%	0	1
Sick past three months	312	69%	0	1	332	73%	0	1	644	71%	0	1
Employed	402	89%	0	1	373	82%	0	1	780	86%	0	1
Married	312	69%	0	1	164	36%	0	1	481	53%	0	1
Access to finance	226	50%	0	1	196	43%	0	1	417	46%	0	1
South	294	65%	0	1	309	68%	0	1	599	66%	0	1
Central	99	22%	0	1	100	22%	0	1	200	22%	0	1
North	59	13%	0	1	46	10%	0	1	109	12%	0	1
Orthodox Christians	181	40%	0	1	155	34%	0	1	336	37%	0	1
Pentecostal Christians	127	28%	0	1	132	29%	0	1	254	28%	0	1
Moslems	77	17%	0	1	91	20%	0	1	163	18%	0	1
No religion	68	15%	0	1	77	17%	0	1	145	16%	0	1
Observations	452				455				907			

As for health status, 71% (73% for SCTP and 69% for non-SCTP) of the respondents report having a household member who has been sick in the three months preceding our survey. A total of 54% of SCTP members (41% non-SCTP members) have an individual with a chronic disease in their households. Overall, 48% of the respondents have a household member with some form of chronic disease. The diseases mainly include HIV and AIDS, tuberculosis, epilepsy, and chronic malaria. Most of the respondents are married (53%) and are household heads (75%). For both WTP in cash and kind), the mean WTP increases with household total expenditure (Figure 4.3). However, WTP as a share of total household expenditure decreases with increasing total household expenditure.

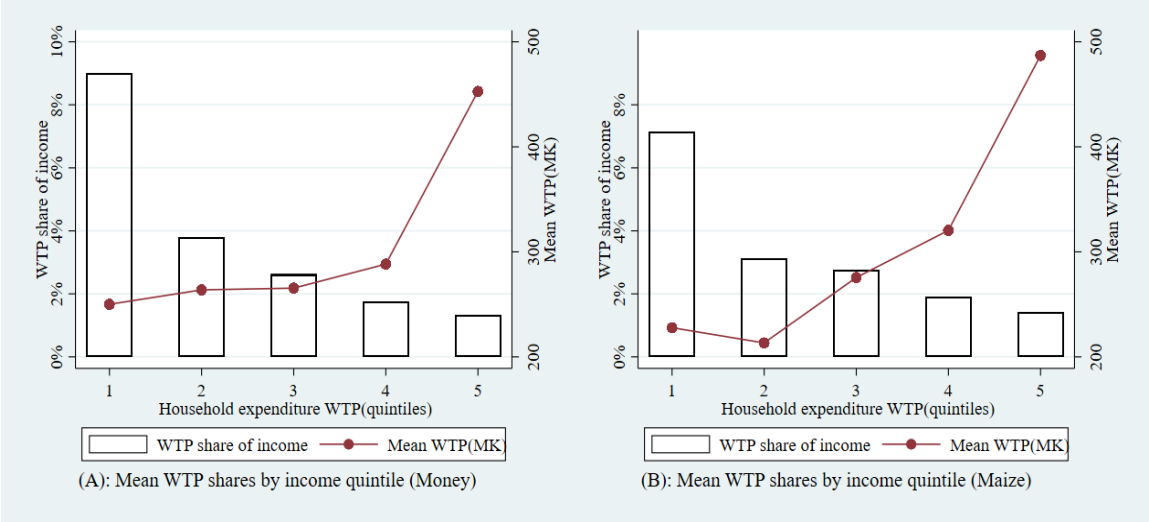

Figure 4.3 - Mean WTP as % of income by income quintiles

The overall distribution of willingness to pay for CBHI using money and commodity is shown in Figure 4.4:

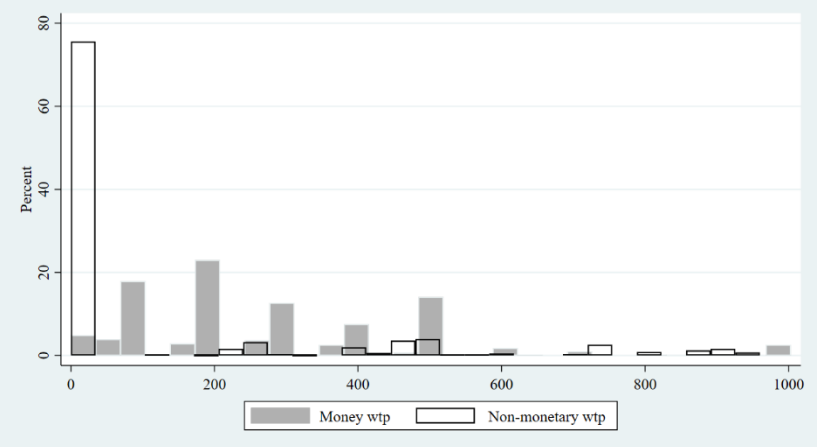

Figure 4.4 - Distribution of WTP using money versus WTP using commodity

As Figure 4.4 shows, willingness to pay using a commodity is concentrated at zero, as opposed to the willingness to pay using money. The median for willingness to pay using money is MK200.00 (0.28 USD). For the willingness to pay using a commodity, the median is zero.

4.5.2 Differences in willingness to pay by socioeconomic characteristics

We use t-tests (see Table 4.3) to supplement the previous descriptive analysis. Among those who indicate a willingness to pay using money, the difference in the mean WTP value between those aged under 28 (Yes=1) and those aged over 28 (No=0) is MK 67.33 (p =0.026). The difference is MK32.20 (p =0.492) between those age groups among those who indicate WTP using a commodity (see Table 4.4). Non-SCTP members are willing to pay more using both money and a commodity. Using money, the non-SCTP members are willing to pay MK 332.18 (USD 0.46), as compared to MK 250.15 (USD 0.35) for the SCTP members. The difference (MK 82.03) (USD 0.11) is statistically significantly different from zero at the 1% level. The difference in the willingness to pay for the two groups is shown by the kernel densities in Appendix 4 Figure 4A.1 - which shows that the non-SCTP groups are willing to pay more than the SCTP groups.

Table 4.3 - Differences in mean willingness to pay using cash across categories, for the people who indicated "yes" on willingness to pay using cash

	No		Yes			
Variable	**n**	**Mean (MK)**	**n**	**Mean (MK)**	**Difference**	**p-value**
Age <=27	788	282.20	119	349.53	-67.33	0.026
Age 28-37	703	287.29	204	303.94	-16.65	0.374
Age 38-47	755	287.90	152	306.58	-18.68	0.410
Age 48-57	802	287.79	105	315.81	-28.02	0.498
Age 58-67	761	299.79	146	245.38	54.41	0.012
Age 68+	726	301.90	181	247.42	54.48	0.004
Sex of respondent	724	281.81	183	327.53	-45.72	0.075
Household head	223	332.51	684	277.51	55.00	0.025
Health insurance awareness	647	270.96	260	340.98	-70.02	0.002
No education	649	313.39	258	234.79	78.60	0.000
Primary education	360	270.01	547	304.86	-34.85	0.047
Secondary education+	805	282.40	102	359.12	-76.71	0.015
Any chronic disease	475	293.77	432	288.02	5.76	0.745
Income quintile 1	725	305.73	182	232.47	73.26	0.000
Income quintile 2	714	296.42	193	271.11	25.31	0.187
Income quintile 3	698	302.28	209	253.47	48.81	0.006
Income quintile 4	764	282.83	143	334.85	-52.02	0.115
Income quintile 5	727	268.90	180	380.41	-111.50	0.000
Sick past 3 months	264	325.90	643	276.72	49.18	0.045
Employed	130	217.31	777	303.37	-86.06	0.000
Married	430	269.65	477	310.31	-40.66	0.021
Access to finance	489	243.31	418	346.86	-103.55	0.000
South	304	321.42	603	275.71	45.72	0.032
Central	709	284.91	198	312.94	-28.03	0.144
North	801	284.91	106	337.26	-52.35	0.264
Orthodox Christians	571	288.64	336	295.09	-6.45	0.712
Pentecostal Christian	740	280.39	167	338.17	-57.77	0.080
Moslems	649	305.09	258	255.68	49.41	0.004
No religion	761	291.18	146	290.25	0.94	0.967
SCTP member	452	332.18	455	250.15	82.03	0.000

Significance; * p <0.1, ** p <0.05, *** p <0.01, robust standard errors in parentheses

Table 4.4 - Differences in mean willingness to pay using maize across categories, for the people who indicated "yes" on willingness to pay using commodity

	No		Yes			
Explanatory variables	**n**	**Mean (MK)**	**n**	**Mean (MK)**	**Difference**	**p-value**
Age <=27	788	296.52	119	264.33	32.20	0.492
Age 28-37	703	284.72	204	318.43	-33.72	0.477
Age 38-47	755	296.46	152	271.65	24.81	0.580
Age 48-57	802	273.59	105	435.19	-161.60	0.080
Age 58-67	761	289.23	146	308.29	-19.06	0.710
Age 68+	726	314.61	181	202.79	111.82	0.010
Sex of respondent	724	276.17	183	356.09	-79.92	0.109
Household head	223	419.17	684	250.94	168.24	0.002
Health insurance awareness	647	242.94	260	415.14	-172.20	0.001
No education	649	326.45	258	206.40	120.05	0.007
Primary education	360	263.63	547	311.17	-47.55	0.244
Secondary education+	805	277.59	102	408.38	-130.79	0.052
Any chronic disease	475	277.64	432	308.41	-30.77	0.437
Income quintile 1	725	300.69	182	258.87	41.82	0.419
Income quintile 2	714	309.08	193	230.23	78.84	0.056
Income quintile 3	698	304.53	209	251.46	53.07	0.253
Income quintile 4	764	289.60	143	306.71	-17.11	0.742
Income quintile 5	727	258.55	180	428.61	-170.06	0.001
Sick past 3 months	264	290.55	643	293.02	-2.47	0.957
Employed	130	145.04	777	316.94	-171.90	0.000
Married	430	229.98	477	348.48	-118.50	0.002
Access to finance	489	249.02	418	342.93	-93.91	0.018
South	304	261.22	603	307.97	-46.75	0.222
Central	709	311.64	198	223.03	88.61	0.024
North	801	286.97	106	332.55	-45.58	0.450
Orthodox Christians	571	264.64	336	339.30	-74.66	0.072
Pentecostal Christian	740	301.50	167	251.53	49.97	0.355
Moslems	649	293.88	258	288.31	5.57	0.894
No religion	761	302.75	146	237.81	64.95	0.157
SCTP member	452	379.00	455	206.17	172.84	0.000

Notes: * p <0.1, ** p<0.05, *** p <0.01, robust standard errors in parentheses

4.5.3 Willingness to join CBHI[7] using money or in kind

Table 4.5 shows willingness to join CBHI and pay using money and in kind. The marginal effects (dy/dx) are also shown. We find that age has no statistically significant effect on willingness to join CBHI and to pay using money or in kind. Furthermore, males are more likely to join CBHI and pay using a commodity than females. Insurance awareness is a significant predictor of willingness to join CBHI and to pay using either method.

The likelihood of joining CBHI and paying using money varies with income quintile. Individuals within income quintile 2 ($\beta = 0.603$; $p < 0.01$), quintile 4 ($\beta = 0.422$; $p < 0.01$) and quintile 5 ($\beta = 0.861$; $p < 0.01$) are more likely to join CBHI than those in quintile 1. However, there are no significant differences in the first three income quintiles in terms of likelihood to join CBHI, when payment in maize-equivalent is suggested. Respondents who have access to finance are more likely to join CBHI than those without any access. We also

estimated the regressions using the multivariate probit (Appendix 4, Table 4A.1) (collapses to bivariate when there two categories) (Cappellari and Jenkins, 2003) and we find same results as probit models.

Table 4.5 - Willingness to join CBHI

	Cash		In kind	
Explanatory Variables	β	(dy/dx)	β	(dy/dx)
Age 28-37	-0.100	-0.008	0.064	0.021
	(0.322)	(0.027)	(0.164)	(0.053)
Age 38-47	-0.254	-0.022	0.048	0.016
	(0.345)	(0.029)	(0.179)	(0.058)
Age 48-57	-0.160	-0.014	0.119	0.039
	(0.371)	(0.032)	(0.200)	(0.065)
Age 58-67	-0.461	-0.039	0.274	0.089
	(0.326)	(0.028)	(0.189)	(0.061)
Age 68+	-0.118	-0.010	-0.074	-0.024
	(0.325)	(0.028)	(0.197)	(0.064)
Sex of respondent	-0.316	-0.027	0.516***	0.168***
	(0.241)	(0.021)	(0.145)	(0.046)
Household head	-0.233	-0.020	-0.479***	-0.156***
	(0.289)	(0.025)	(0.145)	(0.046)
Health insurance awareness	0.524***	0.045***	0.271***	0.089***
	(0.202)	(0.017)	(0.101)	(0.033)
Household size	0.058	0.005	0.032	0.010
	(0.042)	(0.004)	(0.021)	(0.007)
Primary education	0.477***	0.041**	0.200*	0.065*
	(0.183)	(0.016)	(0.116)	(0.038)
Secondary education+	0.123	0.010	0.186	0.061
	(0.280)	(0.024)	(0.185)	(0.060)
Any chronic disease	0.329**	0.028**	0.062	0.020
	(0.161)	(0.014)	(0.095)	(0.031)
Income quintile 2	0.603***	0.051**	0.087	0.028
	(0.229)	(0.020)	(0.148)	(0.048)
Income quintile 3	0.155	0.013	0.043	0.014
	(0.215)	(0.018)	(0.147)	(0.048)
Income quintile 4	0.422*	0.036*	0.302*	0.098*
	(0.250)	(0.022)	(0.156)	(0.051)
Income quintile 5	0.861***	0.073***	0.512***	0.167***
	(0.278)	(0.025)	(0.154)	(0.049)
Sick past 3 months	-0.443**	-0.038**	0.122	0.040
	(0.190)	(0.016)	(0.106)	(0.035)
Employed	0.596***	0.051***	0.262*	0.086*
	(0.178)	(0.015)	(0.145)	(0.047)
Married	0.015	0.001	-0.261**	-0.085**
	(0.198)	(0.017)	(0.132)	(0.043)
Access to finance	0.385**	0.033**	0.265***	0.086***
	(0.184)	(0.016)	(0.094)	(0.030)
South	0.106	0.009	0.128	0.042
	(0.229)	(0.020)	(0.126)	(0.041)
North	-0.082	-0.007	0.100	0.033
	(0.328)	(0.028)	(0.180)	(0.059)
Orthodox Christians	0.165	0.014	0.132	0.043
	(0.207)	(0.018)	(0.126)	(0.041)
Moslems	0.224	0.019	-0.039	-0.013
	(0.268)	(0.023)	(0.145)	(0.047)
No religion	0.612**	0.052**	0.145	0.047
	(0.292)	(0.025)	(0.153)	(0.050)
SCTP member	0.091	0.008	-0.286***	-0.093***
	(0.182)	(0.016)	(0.105)	(0.034)
N	907	907	907	907
Log lik.	-145.1		-520.6	
Pseudo R2	0.190		0.0934	

Notes: * p <0.1, ** p <0.05, *** p <0.01, robust standard errors in parentheses

Regarding whether being an SCTP member affects the willingness to join and pay for CBHI using the mediums of interests, we find different results for joining using cash and that of using in kind. There is no significant association between SCTP members' willingness to join CBHI and pay using currency. However, SCTP members are less likely to join CBHI and pay using a commodity, as compared to non-SCTP members.

Moving away from the quantitative findings, we now present the findings from qualitative excerpts, on willingness to join and pay using in kind and or cash. The quantitative findings are largely supported by the qualitative analysis and similar results emanate from the verbal excerpts. Respondents are willing to join CBHI and pay using money and/or in kind. Unlike the quantitative analysis, which shows that female respondents are more likely to join (in kind), the themes from the qualitative excerpts show that in most cases, there is unanimous agreement on willingness to join using either cash or in kind, across gender, and regardless of SCTP status. This is illustrated by the quotes from FGD participants, below:

"*Everyone would love to join… who doesn't want…" (FGD1, Zomba, FGD members narrating in the background)*

"This health insurance is a good idea because when you are in a group things are simple, your group members will help you solve the problem as opposed to being self-financing" (FGD1, Balaka Mkaya)

Despite the higher willingness to join CBHI, it is evident that many prefer to join CBHI and pay using cash and not in kind. This finding was similar to what the results from the quantitative analysis indicated. Nevertheless, some still think that it is fine to use either method to pay for CBHI. Some respondents expressed their opinions on the matter as follows:

"*We would prefer that people should be given a choice on what to pay for the CBHI, either maize or money. This is so because people have different capabilities to earn a living from multiple sources (FGD2, Balaka, respondent)*

"The problem with payment-in kind is that it depends on the rainfall patterns within a particular year. One cannot predict how the rainfall pattern will be like. Hence, it is somehow a risky thing to depend on a thing that has the potential to do better in one year than another. This has the potential to make an individual fail to contribute to CBHI at some point…" (FGD2, Balaka, respondent)

"In this place, the available land we use for farming is damboland [a term for a wetland in swampy areas]. This is unlike the other side [respondents' points to the higher ground]. Because of that, maize does not do well in watery places, and not all of us own land on the other side. Therefore, if someone tells you that he or she can pay in kind using maize that will be a total lie (FGD1, Machinga respondent)

"Maize is "golide" [gold], no one would be interested in giving away maize when they have already managed to harvest enough. It is better to use money because one can get money from various sources, but that is difficult with maize (FGD1, Zomba, respondent).

4.5.4 Determinants of the willingness to pay using money

Table 4.6 shows the results for levels of willingness to pay using money. There are differences in the effects of age on WTP. Our reference category is the age group 18-27, because our respondent recruitment criteria had age 18 as the minimum age cut-off. Each age group covers a 10-year age difference.

As column 2 shows for the two-part GLM results, respondents in the age group 58-67 are likely to spend MK81.08 less than respondents in the age group 18-27. In addition, people in the age group 68+ are likely to spend MK55.89 less than those in the 18-27 age group. Males are willing to pay MK53.78 more than females. No significant difference is observed in terms of the maximum amount of WTP with regard to being the head of the family, household size, or education level. As for disease burden, those with a family member having any chronic conditions are willing to pay MK 29.09 more than respondents who have a family member without any chronic condition.

All respondents in higher income quintiles are willing to pay more than those in income quintile 1. For example, the respondents in income quintile 2 are likely to spend MK76.64 more than those in income quintile 1. Those in income quintile 5 are willing to pay MK148.51 more than group 1. Access to finance is also a major predictor of WTP: those with access to structures such as Village Savings and Loans (VSL) clubs or other local credit clubs, are willing to pay MK94.58 more than those without access to these financial structures. Awareness of health insurance is also an important predictor of maximum WTP. We find that respondents who are aware of health insurance are willing to pay MK 71.34 more than respondents who are unaware. SCTP membership is significantly negatively related to maximum WTP values. The results in Table 4.6 show that SCTP members are willing to pay 44.94 less than non-SCTP members.

Table 4.6 - Determinants of willingness to pay using cash

Explanatory variables	$E(y\|y>0,X)$	$E(y\|X) = prob(y>0\|X_i) * E(y\|y>0,X)$
Age 28-37	-0.136	-41.76
	(0.087)	(26.362)
Age 38-47	-0.112	-37.82
	(0.096)	(28.801)
Age 48-57	-0.161	-50.28
	(0.106)	(31.955)
Age 58-67	-0.245**	-81.08***
	(0.101)	(30.358)
Age 68+	-0.184*	-55.89*
	(0.101)	(30.233)
Sex of respondent	0.208**	53.78**
	(0.083)	(24.841)
Household head	-0.116	-38.51
	(0.081)	(24.434)
Health insurance awareness	0.207***	71.37***
	(0.056)	(17.047)
Household size	0.007	3.41
	(0.012)	(3.544)
Primary education	0.063	28.25
	(0.063)	(18.786)
Secondary education+	0.067	22.01
	(0.103)	(30.763)
Any chronic disease	0.076	29.09*
	(0.051)	(15.387)
Income quintile 2	0.220***	76.64***
	(0.078)	(23.446)
Income quintile 3	0.200**	61.59***
	(0.079)	(23.523)
Income quintile 4	0.383***	120.29***
	(0.085)	(25.990)
Income quintile 5	0.448***	148.51***
	(0.084)	(25.947)
Sick past 3 months	-0.143**	-50.90***
	(0.057)	(17.086)
Employed	0.098	40.97*
	(0.074)	(21.771)
Married	-0.144*	-41.44*
	(0.073)	(22.014)
Access to finance	0.299***	94.98***
	(0.051)	(15.817)
South	-0.079	-20.72
	(0.067)	(20.087)
North	-0.022	-8.03
	(0.099)	(29.522)
Orthodox Christians	0.071	24.19
	(0.067)	(20.062)
Moslems	0.193**	60.85**
	(0.079)	(23.752)
No religions	0.080	36.07
	(0.081)	(24.463)
SCTP member	-0.161***	-44.94***
	(0.057)	(17.139)
N	862	907

Notes: * p <0.1, ** p <0.05, *** p <0.01, robust standard errors in parentheses

4.5.5 Determinants of the willingness to pay using a commodity

In order to allow for comparability with the direct money contribution method, the amount that respondents are willing to pay using a commodity is converted into a monetary equivalent, using the prevailing market prices at the time of the survey (see Appendix 4, Table 4A.4). As shown in Table 4.7, only a small share of respondents are willing to pay using a commodity. As for age, the only difference in WTP levels is among respondents in the age groups 48-57 and 58-67. These are willing to pay MK148.41 and MK175.67, respectively, more than the respondents in age group 18-27. Contrary to the previous analysis relating to monetary payment, the older age group is willing to pay more than the younger age group in the 18-27 age category.

Gender does not appear to play a significant role, in contrast to the findings of Ataguba et al. (2008), which indicate that males are likely to pay more for CBHI. The possible explanation is that in rural Malawi, farming is a joint family activity. Hence, no huge difference should be expected across gender. However, relative knowledge of health insurance is a significant predictor: those with some insurance awareness are willing to pay MK131.94 more than those without. Income and access to finance are also significant in predicting WTP. As can be seen in Table 5.7, those with access to any form of finance are willing to pay MK82.10 more than those without any access. As for income, only the higher quintile is more significant than the lowest income category.

Table 4.7 - Determinants of willingness to pay using in kind (Maize)

Variables	$E(y\|y>0,X)$	$E(y\|X) = prob(y>0\|X_i) * E(y\|y>0,X)$
Age 28-37	0.127	55.25
	(0.162)	(65.746)
Age 38-47	-0.002	13.14
	(0.175)	(71.351)
Age 48-57	0.392**	148.41*
	(0.188)	(78.406)
Age 58-67	0.335*	175.67**
	(0.183)	(76.222)
Age 68+	0.400*	95.98
	(0.205)	(81.691)
Sex of respondent	-0.214	83.67
	(0.145)	(57.720)
Household head	-0.099	-164.63***
	(0.148)	(59.519)
Health insurance awareness	0.189*	131.94***
	(0.098)	(41.347)
Household size	0.021	15.13*
	(0.023)	(9.003)
Primary education	-0.073	35.19
	(0.123)	(48.723)
Secondary education+	0.186	106.95
	(0.182)	(74.843)
Any chronic disease	-0.021	11.47
	(0.090)	(37.305)
Income quintile 2	0.018	29.68
	(0.152)	(60.612)
Income quintile 3	0.165	60.40
	(0.151)	(61.004)
Income quintile 4	0.101	114.86*
	(0.159)	(64.787)
Income quintile 5	0.184	199.08***
	(0.151)	(62.427)
Sick past 3 months	-0.138	-5.87
	(0.105)	(42.770)
Employed	0.157	120.14*
	(0.164)	(63.187)
Married	0.032	-64.61
	(0.135)	(54.400)
Access to finance	0.024	82.10**
	(0.093)	(37.908)
South	0.317**	128.80**
	(0.125)	(52.248)
North	0.245	99.93
	(0.175)	(72.627)
Orthodox Christians	0.016	42.05
	(0.122)	(50.039)
Moslems	-0.144	-53.26
	(0.151)	(61.265)
No religions	-0.186	-13.20
	(0.147)	(60.783)
SCTP member	-0.123	-116.73***
	(0.101)	(42.102)
N	298	907

Notes: * p <0.1, ** p <0.05, *** p <0.01, robust standard errors in parentheses

With reference to SCTP status, we also find different results for the WTP in cash and in kind. Being a SCTP member is negatively related to WTP in commodity. Members of SCTP are willing to pay MK116.73 less than non-members. However, there is no difference in terms of willingness to pay value in cash.

Just as the case with the WTP for cash narrated above, the results from the quantitative component for the WTP using maize are complemented by the qualitative findings obtained from the FGDs. From the FGDs, we find that willingness to pay values mentioned a range from MK20.00 to MK 1500.00 per person per month using currency. Furthermore, the WTP using in kind ranges from MK20 to a maximum of MK7000.00, in Dedza and Balaka districts. Nevertheless, for all the other districts, the WTP values are within the same WTP interval as in Dedza and Balaka, as the excerpts below indicate.

"We think the that the appropriate range to pay may be MK 200.00, …, MK300. 00,… , MK 500.00,…, MK1000.00. However, let us be honest, all of us here, we can pay MK500, that we can manage" (FGD2, Balaka, Mkaya)

"For me, I can even manage to pay MK2000.00 per person per month if it's using money because I manage to feed my family. If we use Maize, I can manage to pay one bag of 50 Kilograms (equivalent to MK 7000.00 at the time in the area). That's not a problem to me …" (FDG2 respondent, Zomba).

In support of the previous relation between incomes, SCTP status, many were of the view that at an individual level they could manage to pay. However, they also suggest that the wealthier members of the respective communities could pay a higher reservation price. Some also thought that those who are on SCTP could pay less than the rest. The following quotes illustrate these opinions:

"In this village, there are rich people despite living in the village. These should pay more for CBHI than everyone…" (FGD2, Balaka respondent)

"Even though we receive money in the form of SCTP, it is fine to contribute to CBHI because it will help us save some money for use in the future. The problems of health are never-ending in this area as such in the current state, we can keep on paying now and again for various costs and lose even the SCTP money. Therefore, health insurance, in my opinion, can help us" (FGD2, Nkhatabay, respondent)

For all the quantitative results presented, we also used the Heckman selection model to check appropriate model. The mills ratio in the Heckman were turned out to be insignificant, hence the use of the tow part model is justified (See Appendix 4 Tables 4A.1 and 4A.2).

4.6 Discussion

This chapter, provides new evidence from rural Malawi on the willingness to pay for CBHI, whether in money or commodity – the factors affecting the willingness to join CBHI. To undertake the analysis, we collected primary data using a household survey that was conducted from September to October 2017. The major findings are as follows:

First, a significant majority of people appear to be willing to join CBHI, and prefer to pay using money (95%), rather than a commodity (33%). A general result of high willingness to join CBHI (97%) has previously been reported by Phiri and Masanjala (2012) for Malawi, Bangladesh (86.7%) (Ahmed et al., 2016), Cameroun (93.98%) (Donfouet et al., 2011) and Sierra Leone (93%) (Jofre-Bonet and Kamara, 2018). The high willingness to join CBHI may be due to the perceived need for health insurance, reflected in the high disease burden as well as the high costs associated with health care utilisation. Responses gathered from the FGDs indicate that people report experiencing higher health care costs of up to a maximum of MK 70,000. This is aggravated by the fact that in most cases, people are given prescriptions at public facilities but are asked to purchase the treatment drugs at a private pharmacy (Khuluza and Haefele-Abah, 2019).

However, the result of a much-reduced willingness to join CBHI using commodity does differ from the previous literature in Nigeria, which had shown that people are willing to join CBHI and pay more for CBHI using commodities such as yams, rice, beans and cassava (Ataguba et al., 2008). A potential explanation may be that in Malawi, some respondents feel that they might lose their health insurance whenever they do not harvest enough maize in a particular year (e.g. as a result of adverse weather conditions). Another reason might be the difference in the type of commodity (Yams, rice, and cassava) used in Nigeria to elicit the WTP and the intrinsic value of the commodities used. Upon further probing in our qualitative research, some respondents indicated that the crop has much more value to them because it is a staple food, unlike any other crop. Hence, people may prefer to keep the commodity and pay off the CBHI using money, even if it means sourcing financial means from elsewhere.

Our finding that there is a strong positive relationship between income and willingness to join CBHI, as well as the maximum amount respondents are willing to pay, echoes previous results from Namibia, Malaysia, and Burkina Faso (Shafie and Hassali, 2013, Dong et al., 2004). It also conforms with economic theory, which suggests that WTP for health insurance increases

with income (Folland et al., 2010). The finding also accords with a previous study in Malawi by Phiri and Masanjala (2012). As Shafie and Hassali (2013) assert, a positive relationship between WTP and income is a clear signal for uptake, because it points toward affordability. At the same time, it may mean that the non-poor might benefit from CBHI uptake in the community, while the poor are excluded because they cannot afford the terms of membership (Onwujekwe et al., 2010). Our finding that access to finance is highly significant supports the supposition that there is a positive relationship between income and willingness to pay. This is important, given the growth of village loans and savings schemes, village banks, and mobile banking – all structures that facilitate community banking in the absence of formal banks (Steinert et al., 2018), thereby potentially enabling the pooling of funds for CBHI.

We also find that respondents with no formal education are less likely to join CBHI. However, we find no statistically significant effect of education on respondents' WTP for CBHI, either in currency or in kind. This is understandable because in rural areas in Malawi there is minimal variation in educational attainment among the population, as most people do not progress beyond primary education (NSO, 2005, NSO, 2012, NSO, 2014, NSO, 2017). Awareness of health insurance acts as another principal determinant of WTP. We find a strong positive effect on both enrolment and maximum WTP for CBHI. This result vindicates the findings of Donfouet et al. (2011) for Cameroun. This might be the result of private health insurance companies intensifying massive campaigns for their health insurance products, with prominent advertising via radio stations and leaflets. Since there have been improvements in rural communication, the theoretical benefits of insurance have also been reaching rural areas through various communication channels.

Our results also show that people who are not already receiving government transfers (i.e. the non-SCTP members) are willing to pay considerably more than SCTP members, be it financially or in the form of a commodity. This could be because SCTP members are facing tighter budgetary constraints than non-members. As such, even though the SCTP might increase members' incomes and wealth status (Kilburn et al., 2018), they might still be expecting the government to provide health insurance on top of the SCTP support. It is also conceivable that most SCTP members are already using the SCTP money to pay for healthcare (Sara et al., 2016) and may hence be unwilling or unable to spend additional money for health insurance. This may mean that those who are in the SCTP might find it hard to join if the proposed premium is above their WTP, thus requiring further subsidies.

We also establish that males are willing to pay more than females – a finding that is consistent with Gustafsson-Wright et al. (2009) in Namibia, and similar to Dong et al. (2003) for Burkina Faso. Yet, this is in contrast to the Phiri and Masanjala (2012) results for Malawi, which found no significant gender differences. This might be due to the notion that in Malawi,

men have a higher ability to earn income in rural areas, as opposed to women, whose work is often restricted to domestic chores. Likewise, in Cameroun, it has been reported that males are the sole breadwinners, and as such, their WTP was higher (Shafie and Hassali, 2013).

In addition to the factors affecting WTP that we have already discussed, we also find that the presence of a household member with chronic illness has a significant positive effect on the willingness to join CBHI and on the maximum WTP. The result may be a pointer towards potential adverse selection in the intended CBHI. However, this finding is likely a reflection of the need to mitigate higher costs associated with chronic conditions in Malawi (Wang et al., 2016). Most households that include an individual with chronic illness also spend more time on informal care, thereby crowding out the time they could use to work in agricultural fields, to generate livelihood. Thus, health insurance would help them to mitigate the indirect costs associated with chronic illness.

Finally, it is also important to give some hypotheses for why possible differences might arise when comparing the WTP of individuals in cash versus using maize. First, there are differences in the way the maize crop is valued across the various regions in the country. The northern region is predominantly a less maize consuming society as compared to the south. Hence the value attached to maize should be lower than the value on cash. Second, the seasonal price fluctuations of the maize crop are high, whilst the cash is relatively stable over time. As such, the difference in the region prices may also potentially help to explain the difference in the value of the WTP in maize as compared to cash.

4.7 Conclusions

In this chapter we investigate the willingness to join and pay using cash or in kind. Furthermore, we looked at the socioeconomic determinants of the willingness to pay, and if belonging to the SCTP affect WTP. Findings show that many are willing to join and pay for CBHI, but there is variation in the socioeconomic characteristics. Overall, the results of this study suggest that health financing reforms are acceptable and hence feasible, thereby allowing for households to bear some of the cost via pre-payment. The results we have discussed so far bear several important implications. First, the high WTP using money means that when embarking on CBHI, the Ministry of Health may consider the promotion of insurance schemes that use money rather than commodities. Second, the positive relationship between income and WTP might make it possible for CBHI to be designed in a way that would enable individuals to pay according to their ability to pay, as opposed to a flat rate payment, which would likely be regressive. This could enable even the poorer members of communities to enrol. It also means that there is a need to develop health insurance targeting criteria, similar to those used for SCTP

targeting, or a more robust proxy means test.[8] Third, improving the financial access through village savings and loans and mobile banking could enable people to have improved access to financial sources, which will in turn allow people to pay for CBHI. This suggests that CBHI could potentially be linked to these financial institutions in rural areas. Participants could then be organised in groups that would provide easy access to liquidity through group finance pooling.

Fourth, since insurance awareness has a strong positive effect on willingness to join and WTP, when setting up insurance schemes, promoters (e.g. the Ministry of Health and local governments) might want to consider embarking on mass awareness campaigns, to be continued even after enrolment periods to avoid ex-post-dropout. This can be done through various platforms, including short message services (SMS) texting, as is being done for the current health promotion messages by the Ministry of Health, in collaboration with cell phone service providers. At the village level, information may also be spread via village health committees, village development committees, and health surveillance assistants. Continuous awareness after enrolment is important for continuity and understanding. Hence, the more people are well informed about the programme, the more they will be willing to pay (Onwujekwe et al., 2010).

Finally, the finding that people who are already on SCTP are less willing to pay for CBHI means that the insurance groups could in principle be split according to SCTP status, with additional subsidies offered to the SCTP members. For example, in Ghana, the livelihood programme subsidises people on SCTP to enrol into health insurance, which has proven to be an effective strategy (Owusu-Addo et al., 2016). The subsidy can be in the form of an addition to the SCTP monthly cash transfers, or it could be set up as a condition for continued SCTP eligibility. Moreover, policymakers may also consider the use of Local Development Funds (LDFs) to subsidise the SCTP members.[9] The government allocates the LDFs in the budget annually to cater for various development-related aspects, thus providing established channels that can be used. Hence, this would call for government-sponsored, as opposed to traditional voluntary, CBHI.

Finally, there are some possible limitations to the study. First, the limited sample that we have used in the study may be true for the represented regions. Second, the study does not take into account the seasonality of the maize crop. Because the maize crop varies with season, it is

[8] The current SCTP targeting is a two-step process, where at the first stage the community chose who should benefit according to the community criteria and arrange for the names of beneficiaries to be sent to the government offices. In the second phase, the government selects the final beneficiaries from the names, based on an undisclosed method. However, by the time we were finishing the survey, the government had started developing some mapping for proxy means tests to use for health insurance beneficiaries and other safety net programmes.

[9] http://www.ldf.gov.mw/contact-us/faqs/

also the results for WTP using maize may be different between, planting season and harvesting periods.

Chapter 5

Conclusion of the thesis

This thesis has presented empirical evidence on several topics in the literature concerning health insurance to provide universal health coverage (UHC) in low-and middle-income countries (LMICs). The topics that have been explored include the impact of health insurance on psychological distress (a measure of undiagnosed poor mental health), body mass index (BMI) and haemoglobin levels; equity and gender differences in community based health insurance (CBHI) payments; and the demand for CBHI in a rural context. To achieve the aims of each respective chapter, a wide variety of econometric tools have been employed, including the instrumental variable technique, matching estimators, panel data fixed-effects estimation, RIF regressions and the two-part GLM. Apart from the econometric methods, the thesis also employed qualitative methods using the focus group discussions (FGDs). The findings of each respective chapter are significant and can assist policymakers in making informed decisions regarding the current operating SHI/NHI and CBHI in LMICs to ensure that countries are on track to provide UHC.

Chapters 1 and 2 focus on national health insurance (NHI) / social health insurance (SHI) in Ghana and Indonesia, respectively. Chapter 1 uses cross-section data from Ghana to assess the impact of Ghana's national health insurance scheme (NHIS) on psychological distress. The chapter applies quasi-experimental methods to answer the questions of interest. Specifically, instrumental variables and propensity score matching methods are used in the analysis. The results of the analysis show that having health insurance improves psychological health. It is observed that the impact of health insurance on mental health is more beneficial for wealthier insurance recipients than for poorer ones. Furthermore, the impact of health insurance on mental health varies by region within Ghana. The overall results obtained have some important policy implications in terms of reducing the burden that is currently caused by increasing mental health problems.

Whilst Chapter 1 focuses on mental health, Chapter 2 examines BMI and haemoglobin levels. The context is Indonesia, where a large national health insurance programme is currently in operation. The aim of the chapter is to assess the effect of health insurance for the poor on BMI and haemoglobin levels. Despite the increase in health insurance studies in Indonesia, there is a dearth of literature linking health insurance to these health outcomes. A fixed-effects

estimator, with and without matching, was employed to assess the impact of health insurance on BMI and haemoglobin levels. In general, the results show that health insurance has some negative effect on BMI, but not on haemoglobin levels. One limitation of this research is the lack of a comparative study within the region that could be used to assess the size of the impact.

Moving away from SHI/NHI, the third and fourth chapters focus on CBHI in Rwanda and Malawi, respectively. Chapter 3 analyses socioeconomic inequality in CBHI payments in Rwanda using repeated cross-sectional data. This chapter uses concentration indices, Kakwani indices and the recently developed unconditional quantile decomposition methods. The findings suggest that a flat-rate system of health insurance premium payments is more inequitable than a tiered system in which people pay based on community-defined socioeconomic status. Additionally, female-headed households pay lower health insurance premiums. Furthermore, the decomposition method shows that inequalities in CBHI payments were largely explained by income and *Ubudehe* (community wealth ranking) group in 2013/14.

Finally, Chapter 4 uses primary data to examine the factors that affect willingness to pay for CBHI in rural Malawi. This investigation takes place against the background of the need for health sector reforms and the Malawi government's intention to implement various health insurance schemes as a means of promoting equity in health care access and financial risk protection. In this chapter, the two-part GLM econometric technique is used for the quantitative analysis. The content analysis method is also used to analyse data from FGDs to augment the quantitative findings. By combining the quantitative and qualitative data, this approach goes beyond previous contingent valuation studies in the CBHI literature.

The results show that most people are willing to participate in and pay for CBHI using fiat money as opposed to commodity money. Income, education and knowledge about health insurance are the primary predictors of willingness to participate in and pay for the proposed health insurance. Furthermore, those who are on social cash transfer programmes are willing to spend less. The results suggest that there is a demand for CBHI and that cost sharing among the people and government may be possible. In terms of policy, because access to finances is a significant predictor of WTP, policymakers may consider linking CBHI to informal rural financial institutions (which facilitate micro-saving and micro-insurance) to facilitate access to the scheme. Instead of a flat CBHI premium, premiums should be linked to the ability to pay to mitigate potentially regressive effects.

Although the strengths of the thesis are highlighted in each chapter, it is also important to acknowledge the limitations of the thesis in general and offer directions for further research. First, the available data on health insurance in most African countries are scarce. This stems primarily from the fact that most of the insurance schemes are still within their infancy. Because most of the national data rely on the World Banks's living standard survey and the

Demographic Health Surveys, short-term changes in insurance adoption may be missed because surveys are conducted at five-year intervals. Second, there is no information on the source of financing for health insurance payments, such as in the context of Rwanda, which would have been very useful for the analysis. Third, the thesis does not take into account changes in the structure of the economies under study; consequently, it is essential to take into account other factors such as occurrences of natural disasters and changes in political regimes that may have influenced the behaviours of respondents. For example, in Ghana and Indonesia, changes in political regimes strongly influenced decisions concerning the adoption of health insurance (Ayisi et al., 2017, Pisani et al., 2017).

More than 60% of the world's population are employed in the informal sector (ILO, 2018), of which a large share is in LMICs. The provision of a single form of health insurance scheme may leave out the informal sector. Specifically, this includes poor and vulnerable households, particularly female-headed households and those in predominantly rural areas. Recent evidence has shown that even SHI leaves out the poor, especially those who are either unemployed or working in the most informal sector (Witter et al., 2017). These people may live in highly remote areas, and they may not understand the benefits of participating in such a system. This is among the reasons countries should combine insurance for the formal sectors with informal ones. It is also the reason most SHI schemes in developing countries have incorporated the informal sector, enabling people to register with the programme through cross-subsidisation, which results in hybrid forms of NHI.

Appendices

Appendix 1

Table 1A.1 - Table for first stage output for the main models

	(1)	(2)	(3)	(4)	(5)
Explanatory Variables	**Dependent variable is health insurance uptake**				
Instrument	0.788***	0.790***	0.757***	0.776***	0.775***
	(0.021)	(0.021)	(0.020)	(0.021)	(0.021)
Household head	0.001	-0.028**	-0.023*	-0.023*	-0.022*
	(0.010)	(0.012)	(0.012)	(0.012)	(0.012)
Household size	-0.011***	-0.003*	-0.007***	-0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Urban	-0.035***	0.000		-0.031***	-0.033***
	(0.012)	(0.011)		(0.011)	(0.011)
MSLC/BECE/Vocational	0.034***	0.075***	0.064***	0.067***	0.066***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Secondary/SSS/SHS and higher	0.110***	0.158***	0.138***	0.144***	0.142***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Male	-0.089***	-0.086***	-0.085***	-0.085***	-0.087***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Marital Status	0.056***	0.072***	0.069***	0.070***	0.068***
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)
Log Income	0.064***		0.059***	0.064***	0.065***
	(0.007)		(0.007)	(0.007)	(0.007)
Western	0.020	0.012	0.035*	0.018	0.020
	(0.021)	(0.021)	(0.020)	(0.021)	(0.020)
Central region	0.014	0.002	0.020	0.006	0.010
	(0.020)	(0.020)	(0.019)	(0.020)	(0.020)
Volta region	0.056***	0.023	0.061***	0.044**	0.049**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Eastern region	0.067***	0.050**	0.072***	0.057***	0.059***
	(0.020)	(0.020)	(0.019)	(0.020)	(0.020)
Ashanti region	0.061***	0.048***	0.071***	0.058***	0.059***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Brong Ahafo region	0.092***	0.060***	0.105***	0.088***	0.091***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Northern region	0.038**	0.020	0.051***	0.034*	0.039**
	(0.020)	(0.019)	(0.019)	(0.019)	(0.019)
Upper East region	0.092***	0.064***	0.104***	0.078***	0.083***
	(0.024)	(0.024)	(0.023)	(0.024)	(0.024)
Upper west region	0.036	-0.008	0.044*	0.021	0.029
	(0.026)	(0.026)	(0.025)	(0.026)	(0.026)
Age of respondent		-0.009***	-0.009***	-0.009***	-0.009***
		(0.001)	(0.001)	(0.001)	(0.001)
Age square		0.000***	0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Somewhat healthy				0.017	
				(0.012)	
Somewhat Unhealthy				0.035*	
				(0.018)	
Unhealthy				0.019	
				(0.036)	
N	10007	10004	10004	9968	10004
F	192.17	191.23	197.99	166.69	190.60
Adjusted R-squared	0.21	0.22	0.23	0.23	0.23

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.2 - Results for the IV first stage test

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(1,9954)	DWH
NHIS	0.229	0.228	0.117	1372.8***	29.6***

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.3 - Effect of NHIS on psychological distress (Naïve OLS models)

	(1)	(2)	(3)	(4)	(5)
Explanatory variables	**Dependent variable is the log of K10**				
Health Insurance (NHIS)	-0.015**	-0.024***	-0.024***	-0.024***	-0.022***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Household head	0.117***	0.047***	0.045***	0.044***	0.046***
	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)
Household size	-0.003*	-0.004***	-0.002	-0.001	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban	-0.031***	-0.034***		-0.024***	-0.027***
	(0.008)	(0.007)		(0.007)	(0.008)
MSLC/BECE/Vocational	-0.057***	-0.054***	-0.056***	-0.048***	-0.053***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Secondary/SSS/SHS and higher	-0.085***	-0.077***	-0.078***	-0.067***	-0.073***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Male	-0.096***	-0.065***	-0.063***	-0.058***	-0.065***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Marital Status	0.051***	0.006	0.007	0.010	0.006
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Log Income	-0.015***		-0.020***	-0.017***	-0.014***
	(0.005)		(0.005)	(0.005)	(0.005)
Western	0.005	0.014	0.023*	-0.000	0.012
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Central region	0.008	0.016	0.023	-0.006	0.014
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Volta region	-0.012	-0.007	-0.003	-0.030**	-0.012
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Eastern region	0.152***	0.155***	0.162***	0.142***	0.153***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Ashanti region	-0.050***	-0.045***	-0.039***	-0.054***	-0.047***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Brong Ahafo region	0.110***	0.122***	0.122***	0.105***	0.115***
	(0.013)	(0.012)	(0.012)	(0.013)	(0.013)
Northern region	0.242***	0.252***	0.257***	0.237***	0.248***
	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)
Upper East region	0.125***	0.134***	0.144***	0.111***	0.130***
	(0.015)	(0.015)	(0.014)	(0.015)	(0.015)
Upper west region	0.068***	0.079***	0.082***	0.035**	0.071***
	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Age of respondent		0.007***	0.007***	0.008***	0.007***
		(0.001)	(0.001)	(0.001)	(0.001)
Age square		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Somewhat healthy				0.056***	
				(0.008)	
Somewhat Unhealthy				0.155***	
				(0.012)	
Unhealthy				0.185***	
				(0.026)	
N	9978	9975	9975	9939	9975
Adjusted R-squared	0.17	0.19	0.19	0.20	0.19

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.4 - Effect of NHIS on psychological distress (IV models)

	(1)	(2)	(3)	(4)	(5)
Explanatory variables	**Dependent variable is the log of K10**				
Health Insurance (NHIS)	-0.110***	-0.120***	-0.132***	-0.116***	-0.118***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Household head	0.117***	0.044***	0.043***	0.041***	0.044***
	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)
Household size	-0.004***	-0.004***	-0.003**	-0.002*	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban	-0.024***	-0.023***		-0.017**	-0.019**
	(0.008)	(0.008)		(0.008)	(0.008)
MSLC/BECE/Vocational	-0.049***	-0.042***	-0.042***	-0.038***	-0.042***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Secondary/SSS/SHS and higher	-0.067***	-0.054***	-0.053***	-0.047***	-0.052***
	(0.010)	(0.011)	(0.011)	(0.010)	(0.010)
Male	-0.106***	-0.075***	-0.075***	-0.067***	-0.075***
	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)
Marital Status	0.055***	0.012	0.013*	0.015**	0.012
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Log Income	-0.007		-0.009*	-0.009*	-0.006
	(0.005)		(0.005)	(0.005)	(0.005)
Western	0.017	0.025*	0.033**	0.011	0.024*
	(0.014)	(0.013)	(0.013)	(0.013)	(0.014)
Central region	0.010	0.017	0.022	-0.005	0.016
	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)
Volta region	0.000	0.002	0.007	-0.019	-0.001
	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
Eastern region	0.175***	0.176***	0.184***	0.162***	0.175***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Ashanti region	-0.030**	-0.026**	-0.020	-0.036***	-0.028**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Brong Ahafo region	0.146***	0.154***	0.160***	0.139***	0.151***
	(0.015)	(0.014)	(0.014)	(0.015)	(0.015)
Northern region	0.256***	0.264***	0.271***	0.250***	0.262***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Upper East region	0.157***	0.163***	0.175***	0.140***	0.161***
	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)
Upper west region	0.087***	0.093***	0.099***	0.052***	0.090***
	(0.017)	(0.016)	(0.016)	(0.017)	(0.017)
Age of respondent		0.006***	0.006***	0.007***	0.006***
		(0.001)	(0.001)	(0.001)	(0.001)
Age square		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Somewhat healthy				0.056***	
				(0.008)	
Somewhat Unhealthy				0.157***	
				(0.012)	
Unhealthy				0.187***	
				(0.026)	
N	9978	9975	9975	9939	9975
Adjusted R-squared	0.15	0.17	0.16	0.19	0.17

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.5 - Results of the effect of health insurance on psychological distress (IV on matched sample)

	(1)	(2)	(3)	(4)	(5)
Explanatory variables	**Dependent variable is the log of K10**				
Health Insurance (NHI)	-0.112***	-0.123***	-0.141***	-0.093***	-0.106***
	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)
Household head	0.089***	0.055***	0.043***	0.033***	0.032***
	(0.009)	(0.011)	(0.011)	(0.010)	(0.011)
Household size	-0.000	-0.001	-0.002	-0.002	-0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Urban	-0.042***	-0.050***		-0.051***	-0.045***
	(0.009)	(0.008)		(0.009)	(0.009)
MSLC/BECE/Vocational	-0.058***	-0.047***	-0.052***	-0.036***	-0.048***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Secondary/SSS/SHS and higher	-0.099***	-0.072***	-0.072***	-0.065***	-0.048***
	(0.010)	(0.011)	(0.011)	(0.010)	(0.011)
Male	-0.088***	-0.079***	-0.079***	-0.065***	-0.069***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Marital Status	0.045***	-0.011	0.016*	-0.001	0.015
	(0.007)	(0.009)	(0.009)	(0.009)	(0.009)
Log Income	-0.016***		-0.009	-0.005	-0.014**
	(0.006)		(0.006)	(0.006)	(0.006)
Western	-0.054***	-0.035**	-0.016	-0.036**	-0.035**
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Central region	-0.040*	-0.025	0.001	-0.001	0.020
	(0.024)	(0.023)	(0.023)	(0.023)	(0.024)
Volta region	-0.050***	-0.027	-0.019	-0.050***	-0.037**
	(0.017)	(0.017)	(0.018)	(0.018)	(0.017)
Eastern region	0.115***	0.126***	0.141***	0.122***	0.123***
	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)
Ashanti region	-0.101***	-0.085***	-0.096***	-0.087***	-0.081***
	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)
Brong Ahafo region	0.071***	0.107***	0.104***	0.080***	0.100***
	(0.015)	(0.014)	(0.014)	(0.015)	(0.014)
Northern region	0.192***	0.214***	0.223***	0.208***	0.217***
	(0.017)	(0.016)	(0.016)	(0.017)	(0.017)
Upper East region	0.084***	0.110***	0.106***	0.065***	0.113***
	(0.018)	(0.017)	(0.018)	(0.018)	(0.018)
Upper west region	0.030	0.093***	0.109***	0.041*	0.062***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Age of respondent		0.006***	0.005***	0.007***	0.005***
		(0.001)	(0.001)	(0.001)	(0.001)
Age square		-0.000**	-0.000**	-0.000***	-0.000*
		(0.000)	(0.000)	(0.000)	(0.000)
Somewhat healthy				0.033***	
				(0.010)	
Somewhat Unhealthy				0.144***	
				(0.014)	
Unhealthy				0.227***	
				(0.024)	
N	6764	6758	6758	6722	6758
Adjusted R-squared	0.14	0.18	0.15	0.20	0.17

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.6 - Heterogeneity of the impact of health insurance by income

Income		dy/dx	Std. Err.	z	P>|z|	[95% Conf. Interval]	
	1	-0.091	0.025	-3.620	0.000	-0.140	-0.042
	2	-0.098	0.022	-4.360	0.000	-0.142	-0.054
	3	-0.106	0.021	-5.150	0.000	-0.146	-0.065
	4	-0.113	0.019	-5.860	0.000	-0.151	-0.075
	5	-0.121	0.019	-6.330	0.000	-0.158	-0.083
	6	-0.128	0.020	-6.480	0.000	-0.167	-0.089
	7	-0.136	0.021	-6.340	0.000	-0.178	-0.094
	8	-0.143	0.024	-6.040	0.000	-0.189	-0.097
	9	-0.151	0.026	-5.680	0.000	-0.202	-0.099

Table 1A.7 - Heterogeneity of the impact of health insurance by region

Region	dy/dx	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Western Region	-0.135	0.029	-4.570	0.000	-0.192	-0.077
Central Region	-0.123	0.037	-3.320	0.001	-0.195	-0.050
Greater Accra Region	-0.031	0.026	-1.180	0.236	-0.082	0.020
Volta Region	-0.086	0.029	-2.980	0.003	-0.142	-0.029
Eastern Region	-0.145	0.026	-5.690	0.000	-0.195	-0.095
Ashanti Region	-0.152	0.024	-6.250	0.000	-0.200	-0.105
Brong Ahafo Region	-0.079	0.025	-3.210	0.001	-0.127	-0.031
Northern Region	-0.119	0.024	-4.870	0.000	-0.167	-0.071
Upper East Region	-0.133	0.027	-4.970	0.000	-0.185	-0.080
Upper West Region	-0.076	0.032	-2.370	0.018	-0.139	-0.013

Table 1A.8 - Results for poison, square root- transformed models, control function and GMM with IV

	Poison	Square root	Control funciton	GMM
Explanatory Variables	Dependent variable is the log of k10 score			
Health Insurance (NHI)	-0.023***	-0.048***	-0.110***	-0.108***
	(0.007)	(0.013)	(0.019)	(0.020)
Household head	0.048***	0.091***	0.044***	0.046***
	(0.009)	(0.018)	(0.009)	(0.009)
Age of respondent	0.006***	0.013***	0.005***	0.005***
	(0.001)	(0.002)	(0.001)	(0.001)
Age square	-0.000***	-0.000***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Household size	-0.002*	-0.005*	-0.004***	-0.003**
	(0.001)	(0.003)	(0.001)	(0.001)
Urban	-0.028***	-0.059***	-0.024***	-0.021***
	(0.008)	(0.015)	(0.008)	(0.008)
MSLC/BECE/Vocational	-0.058***	-0.115***	-0.047***	-0.048***
	(0.008)	(0.015)	(0.008)	(0.008)
Secondary/SSS/SHS and higher	-0.079***	-0.155***	-0.058***	-0.061***
	(0.010)	(0.019)	(0.011)	(0.011)
Male	-0.066***	-0.131***	-0.074***	-0.075***
	(0.007)	(0.014)	(0.008)	(0.008)
Marital Status	0.004	0.007	0.009	0.009
	(0.008)	(0.015)	(0.007)	(0.008)
Log Income	-0.008	-0.020**	-0.001	-0.001
	(0.005)	(0.010)	(0.005)	(0.005)
Western	0.031**	0.043*	0.039***	0.042***
	(0.013)	(0.026)	(0.014)	(0.014)
Central region	0.040**	0.054*	0.039**	0.041***
	(0.016)	(0.031)	(0.016)	(0.016)
Volta region	0.009	0.000	0.015	0.020
	(0.013)	(0.026)	(0.014)	(0.014)
Eastern region	0.165***	0.322***	0.184***	0.185***
	(0.013)	(0.025)	(0.013)	(0.013)
Ashanti region	-0.012	-0.046**	0.003	0.005
	(0.012)	(0.022)	(0.012)	(0.012)
Brong Ahafo region	0.121***	0.238***	0.152***	0.153***
	(0.013)	(0.026)	(0.015)	(0.015)
Northern region	0.254***	0.526***	0.267***	0.267***
	(0.013)	(0.026)	(0.013)	(0.013)
Upper East region	0.138***	0.269***	0.160***	0.165***
	(0.015)	(0.031)	(0.017)	(0.016)
Upper west region	0.078***	0.147***	0.089***	0.095***
	(0.016)	(0.032)	(0.017)	(0.017)
DW-test			0.100***	
			(0.021)	
N	9975	9975	9975	9975

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.9 - Results for replacing the missing 0.29% of the missing values with extreme values of K10 score

Explanatory Variable	replaced missing K10score with the lowest score (10)	replaced missing K10score with the highest score (50)
Health Insurance (NHIS)	-0.121***	-0.101***
	(0.018)	(0.019)
Household head	0.041***	0.041***
	(0.008)	(0.009)
Age of respondent	0.006***	0.006***
	(0.001)	(0.001)
Age square	-0.000***	-0.000***
	(0.000)	(0.000)
Household size	-0.004***	-0.004***
	(0.001)	(0.001)
Urban	-0.022***	-0.024***
	(0.007)	(0.008)
MSLC/BECE/Vocational	-0.043***	-0.041***
	(0.008)	(0.008)
Secondary/SSS/SHS and higher	-0.056***	-0.050***
	(0.010)	(0.010)
Male	-0.074***	-0.068***
	(0.007)	(0.007)
Marital Status	0.011	0.009
	(0.007)	(0.007)
Log Income	-0.003	-0.004
	(0.005)	(0.005)
Western	0.025*	0.023*
	(0.013)	(0.013)
Central region	0.016	0.024
	(0.015)	(0.015)
Volta region	0.005	0.005
	(0.013)	(0.013)
Eastern region	0.166***	0.176***
	(0.013)	(0.013)
Ashanti region	-0.014	-0.014
	(0.011)	(0.012)
Brong Ahafo region	0.149***	0.145***
	(0.014)	(0.014)
Northern region	0.257***	0.261***
	(0.013)	(0.013)
Upper East region	0.156***	0.152***
	(0.016)	(0.016)
Upper west region	0.083***	0.097***
	(0.016)	(0.017)
N	10004	10004
Adjacent R-squared	0.16	0.17

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 1A.10 - Results for urban, rural, male, and female samples

	Urban	Rural	Male	Female
Explanatory Variables	**Dependent variable is the log of k10 score**			
Health Insurance (NHIS)	-0.077*	-0.111***	-0.107***	-0.128***
	(0.040)	(0.022)	(0.032)	(0.024)
Household head	0.028*	0.054***	0.064***	0.053***
	(0.014)	(0.011)	(0.019)	(0.012)
Age of respondent	0.006***	0.006***	0.004**	0.007***
	(0.002)	(0.001)	(0.002)	(0.001)
Age square	-0.000**	-0.000***	-0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Household size	-0.003	-0.004**	-0.003	-0.004*
	(0.003)	(0.002)	(0.002)	(0.002)
MSLC/BECE/Vocational	-0.029**	-0.051***	-0.051***	-0.032***
	(0.013)	(0.010)	(0.012)	(0.011)
Secondary/SSS/SHS and higher	-0.055***	-0.038**	-0.067***	-0.030*
	(0.015)	(0.015)	(0.015)	(0.016)
Male	-0.069***	-0.078***		
	(0.011)	(0.010)		
Marital Status	-0.012	0.026***	0.006	0.021*
	(0.012)	(0.009)	(0.013)	(0.011)
Log Income	-0.014*	-0.004	-0.012	-0.000
	(0.008)	(0.007)	(0.008)	(0.007)
Western	-0.044**	0.180***	0.018	0.032*
	(0.021)	(0.022)	(0.019)	(0.019)
Central region	0.097***	0.100***	0.003	0.028
	(0.026)	(0.023)	(0.023)	(0.021)
Volta region	-0.004	0.132***	-0.015	0.014
	(0.021)	(0.022)	(0.019)	(0.019)
Eastern region	0.113***	0.328***	0.162***	0.188***
	(0.019)	(0.022)	(0.019)	(0.018)
Ashanti region	-0.134***	0.162***	-0.032*	-0.023
	(0.015)	(0.022)	(0.017)	(0.017)
Brong Ahafo region	0.124***	0.279***	0.122***	0.177***
	(0.024)	(0.023)	(0.022)	(0.020)
Northern region	0.230***	0.401***	0.241***	0.281***
	(0.023)	(0.021)	(0.019)	(0.018)
Upper East region	0.060	0.302***	0.141***	0.180***
	(0.052)	(0.023)	(0.022)	(0.023)
Upper west region	0.046	0.231***	0.044*	0.134***
	(0.042)	(0.024)	(0.024)	(0.023)
Urban			-0.024**	-0.016
			(0.011)	(0.010)
N	3454	6521	4468	5507
R-Squared	0.18	0.17	0.18	0.15

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Figure 1A.1 - Covariate balance for matching

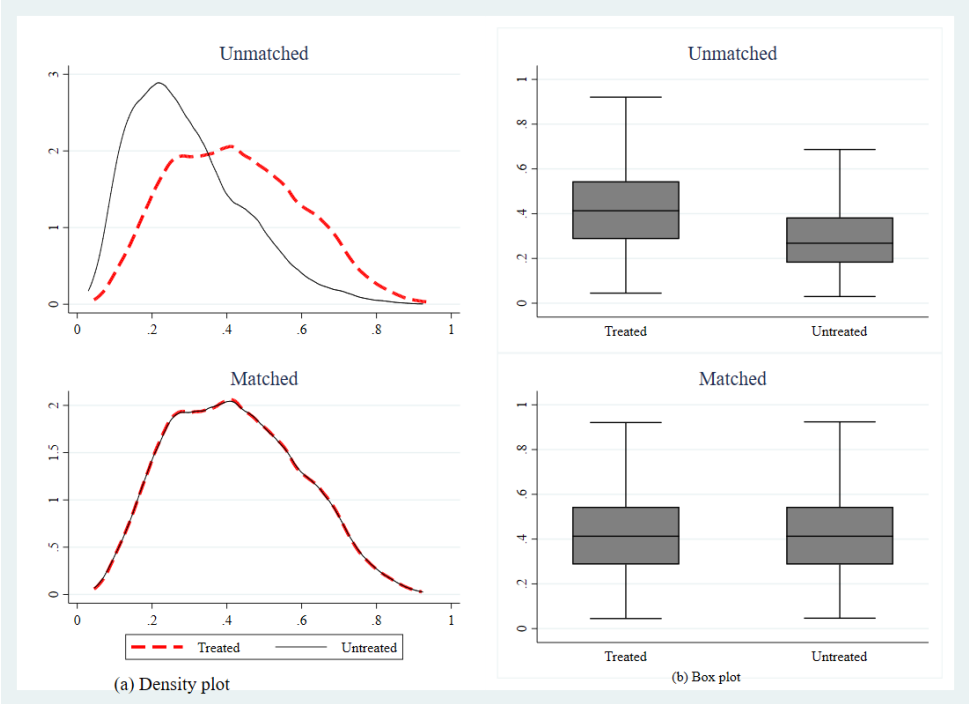

Table 1A.11 - Table of covariate balance for matching

	Standardised differences		Variance ratios	
Variables	**Raw data(A)**	**Matched data(B)**	**Raw data(C)**	**Matched data(D)**
Household head	-0.04	0.03	1.00	1.00
Age of respondent	0.19	0.06	1.31	0.99
Age squared	0.22	0.05	1.47	0.95
Household size	-0.14	-0.02	0.79	1.00
Urban	0.30	-0.05	1.18	0.99
Somewhat healthy	0.05	0.04	1.08	1.07
Somewhat Unhealthy	0.08	0.04	1.29	1.13
Unhealthy	0.07	-0.06	1.57	0.70
MSLC/BECE/Vocational	0.13	-0.02	1.14	0.98
Secondary/SSS/SHS and higher	0.27	0.01	1.77	1.01
Male	-0.19	0.00	0.95	1.00
Married	0.04	0.03	1.00	1.00
Log income	0.31	-0.03	1.02	0.89
Western region	-0.06	-0.00	0.85	0.99
Central region	-0.20	0.00	0.46	1.02
Volta region	-0.09	0.01	0.76	1.03
Eastern region	0.12	-0.04	1.32	0.92
Ashanti region	0.10	0.03	1.18	1.05
Brong Ahafo region	0.26	-0.00	1.95	1.00
Northern region	-0.17	-0.01	0.69	0.99
Upper East region	0.11	0.02	1.49	1.06
Upper west region	-0.07	0.02	0.72	1.09

Appendix 2

Table 2A.1 - Effect of insurance on BMI- interacting year with treatment

Explanatory variables	(1)	(2)
Age 20 - 29	0.069***	0.069***
	(0.004)	(0.004)
Age 30 - 39	0.120***	0.120***
	(0.005)	(0.005)
Age 40 - 49	0.132***	0.132***
	(0.005)	(0.005)
Age 50+	0.082***	0.082***
	(0.005)	(0.005)
Married	0.040***	0.040***
	(0.003)	(0.003)
Working	-0.004*	-0.004*
	(0.003)	(0.003)
Household Size	-0.000	-0.000
	(0.001)	(0.001)
Urban	0.018***	0.018***
	(0.002)	(0.002)
Quintile 2	0.020***	0.020***
	(0.004)	(0.004)
Quintile 3	0.031***	0.031***
	(0.004)	(0.004)
Quintile 4	0.040***	0.040***
	(0.004)	(0.004)
Quintile 5	0.070***	0.070***
	(0.005)	(0.005)
Received Raskin	-0.010***	-0.010***
	(0.003)	(0.003)
Cash transfer	-0.008**	-0.008**
	(0.004)	(0.004)
Years of education	0.006***	0.006***
	(0.001)	(0.001)
Years of education square	-0.000***	-0.000***
	(0.000)	(0.000)
Respondent smokes	-0.068***	-0.068***
	(0.003)	(0.003)
Eat 3 meals a day	-0.011***	-0.011***
	(0.003)	(0.003)
Insurance	-0.007	-0.009*
	(0.005)	(0.005)
Year 2007	0.043***	0.043***
	(0.003)	(0.003)
Insurance X Year 2007	-0.002	
	(0.007)	
Year 2014	0.078***	0.078***
	(0.004)	(0.004)
Insurance X Year 2014		0.002
		(0.007)
N	63468	63468
Rho	0.440	0.440
F	205.6	205.6
R-squared	0.163	0.163

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 2A.2 - Effect of health insurance on BMI in Indonesia (FE-Within quintiles of wealth)

Explanatory Variable	Wealth quintile 1	Wealth quintile 2	Wealth quintile 3	Wealth quintile 4	Wealth quintile 5
Insurance	-0.027**	0.002	-0.038***	-0.028	-0.007
	(0.013)	(0.013)	(0.014)	(0.017)	(0.027)
Age 20 - 29	0.064***	0.073***	0.089***	0.065***	0.075**
	(0.017)	(0.016)	(0.019)	(0.019)	(0.032)
Age 30 - 39	0.100***	0.118***	0.136***	0.127***	0.113***
	(0.020)	(0.021)	(0.020)	(0.023)	(0.034)
Age 40 - 49	0.104***	0.109***	0.143***	0.136***	0.089***
	(0.020)	(0.020)	(0.023)	(0.024)	(0.034)
Age 50+	0.040**	0.079***	0.088***	0.088***	0.106***
	(0.020)	(0.018)	(0.021)	(0.023)	(0.035)
Married	0.023*	0.036***	0.037***	0.022	0.052**
	(0.012)	(0.012)	(0.013)	(0.016)	(0.025)
Working	0.003	-0.003	-0.004	0.001	0.017
	(0.010)	(0.010)	(0.011)	(0.012)	(0.018)
Household Size	0.000	-0.001	0.004	-0.004	-0.001
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Urban	0.019*	0.031***	0.012	0.018	0.053**
	(0.010)	(0.009)	(0.010)	(0.011)	(0.024)
Received Raskin	0.015	-0.008	-0.006	-0.014	0.054*
	(0.013)	(0.012)	(0.014)	(0.013)	(0.029)
Cash transfer	-0.013	-0.005	-0.016	-0.030	-0.150***
	(0.013)	(0.014)	(0.017)	(0.022)	(0.050)
Years of education	0.001	0.005	0.013***	0.005	-0.003
	(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Years of education square	-0.000	-0.000	-0.001***	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Respondent smokes	-0.072***	-0.073***	-0.064***	-0.064***	-0.061***
	(0.010)	(0.009)	(0.011)	(0.012)	(0.015)
Eat 3 meals a day	-0.004	-0.017*	-0.005	-0.017	-0.009
	(0.010)	(0.010)	(0.012)	(0.012)	(0.021)
Year 2007	0.026**	0.030**	0.039***	0.059***	0.049***
	(0.012)	(0.011)	(0.013)	(0.012)	(0.016)
Year 2014	0.081***	0.062***	0.100***	0.090***	0.055*
	(0.013)	(0.013)	(0.015)	(0.015)	(0.029)
N	13318	15158	13517	12373	9102
Rho	0.525	0.520	0.508	0.503	0.495
F	12.97	15.35	15.04	12.94	9.153
R-Squared	0.131	0.134	0.158	0.140	0.179

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 2A.3 - Effect of health insurance on Hemoglobin in Indonesia (FE-interactions-Years)

Explanatory variables	**(1)**	**(2)**
Age 20 - 29	-0.012***	-0.012***
	(0.003)	(0.003)
Age 30 - 39	-0.013***	-0.013***
	(0.003)	(0.003)
Age 40 - 49	-0.022***	-0.022***
	(0.004)	(0.004)
Age 50+	-0.048***	-0.048***
	(0.004)	(0.004)
Married	-0.016***	-0.016***
	(0.002)	(0.002)
Working	0.030***	0.030***
	(0.002)	(0.002)
Household Size	-0.001**	-0.001**
	(0.000)	(0.000)
Urban	-0.000	-0.000
	(0.002)	(0.002)
Quintile 2	0.008***	0.008***
	(0.002)	(0.002)
Quintile 3	0.014***	0.014***
	(0.003)	(0.003)
Quintile 4	0.012***	0.012***
	(0.003)	(0.003)
Quintile 5	0.015***	0.015***
	(0.003)	(0.003)
Received Raskin	-0.002	-0.002
	(0.002)	(0.002)
Cash transfer	-0.005**	-0.005**
	(0.003)	(0.003)
Years of education	0.005***	0.005***
	(0.001)	(0.001)
Years of education square	-0.000**	-0.000**
	(0.000)	(0.000)
Respondent smokes	0.104***	0.104***
	(0.002)	(0.002)
Eat 3 meals a day	0.011***	0.011***
	(0.002)	(0.002)
Insurance	-0.002	0.001
	(0.003)	(0.003)
2007	0.034***	0.034***
	(0.002)	(0.002)
Insurance* year 2007	0.003	
	(0.005)	
Year 2014	0.025***	0.025***
	(0.003)	(0.003)
Insurance*tear 2014		-0.003
		(0.005)
N	62905	62905
rho	0.434	0.434
F	300.7	300.7
R-Squared	0.212	0.212

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 2A.4 - Effect of health insurance on haemoglobin within income quintiles

Explanatory variables	Wealth quintile 1	Wealth quintile 2	Wealth quintile 3	Wealth quintile 4	Wealth quintile 5
Insurance	-0.007	-0.009	-0.002	-0.019*	0.016
	(0.010)	(0.009)	(0.010)	(0.011)	(0.018)
Age 20 - 29	-0.006	-0.027**	-0.027**	-0.027*	-0.024
	(0.013)	(0.012)	(0.013)	(0.014)	(0.020)
Age 30 - 39	-0.027*	-0.028**	-0.040***	-0.013	-0.016
	(0.015)	(0.013)	(0.014)	(0.016)	(0.023)
Age 40 - 49	-0.024	-0.024*	-0.028*	-0.022	-0.004
	(0.017)	(0.014)	(0.015)	(0.017)	(0.025)
Age 50+	-0.061***	-0.061***	-0.060***	-0.041**	-0.022
	(0.015)	(0.013)	(0.015)	(0.017)	(0.025)
Married	-0.021**	-0.019**	-0.009	-0.004	-0.024
	(0.009)	(0.008)	(0.009)	(0.009)	(0.015)
Working	0.040***	0.011	0.031***	0.020**	0.033***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.011)
Household Size	0.000	-0.003**	0.001	0.003*	-0.002
	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Urban	-0.001	0.005	0.006	-0.008	-0.020
	(0.008)	(0.007)	(0.007)	(0.008)	(0.013)
Received Raskin	0.010	-0.003	-0.001	0.003	-0.016
	(0.011)	(0.009)	(0.009)	(0.009)	(0.015)
Cash transfer	-0.003	0.017*	-0.008	-0.011	0.007
	(0.011)	(0.009)	(0.011)	(0.015)	(0.026)
Years of education	0.004	0.003	0.007**	0.002	0.012**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)
Years of education square	0.000	-0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Respondent smokes	0.089***	0.116***	0.107***	0.116***	0.106***
	(0.008)	(0.007)	(0.007)	(0.008)	(0.012)
Eat 3 meals a day	0.010	0.010	0.024***	0.008	0.001
	(0.008)	(0.007)	(0.008)	(0.008)	(0.012)
Year 2007	0.031***	0.037***	0.033***	0.040***	0.032***
	(0.010)	(0.009)	(0.009)	(0.008)	(0.010)
Year 2014	0.038***	0.027***	0.028**	0.026**	0.010
	(0.011)	(0.010)	(0.011)	(0.010)	(0.016)
N	13185	15043	13411	12272	8994
Rho	0.484	0.493	0.498	0.501	0.502
F	23.82	27.10	25.62	22.81	10.18
R-squared	0.240	0.220	0.237	0.235	0.228

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Appendix 3

Table 3A.1- Male-female differences in CBHI expenditure

Year	Variable	Mean (Female-headed)	Mean (Male-headed)	Difference.	Std. Error	Obs.
	CBHI+	881.03	1145.27	264.23***	30.24	9212
2010/11	CBH$	1408.21	2019.20	610.98***	51.23	9212
	CBHI£	800.51	1021.54	221.03***	28.59	9212
	CBHI#	1238.52	1659.03	420.50***	45.21	9212
2013/14	CBHI+	1564.88	2315.13	750.26***	82.07	9605
	CBH$	2381.13	4017.75	1636.61***	109.96	9605
	CBHI£	1418.87	2067.04	648.17***	74.08	9605
	CBHI#	2012.65	3264.36	1251.71***	64.70	9605

Figure 3A.1 - Concentration curve comparison sensitivity

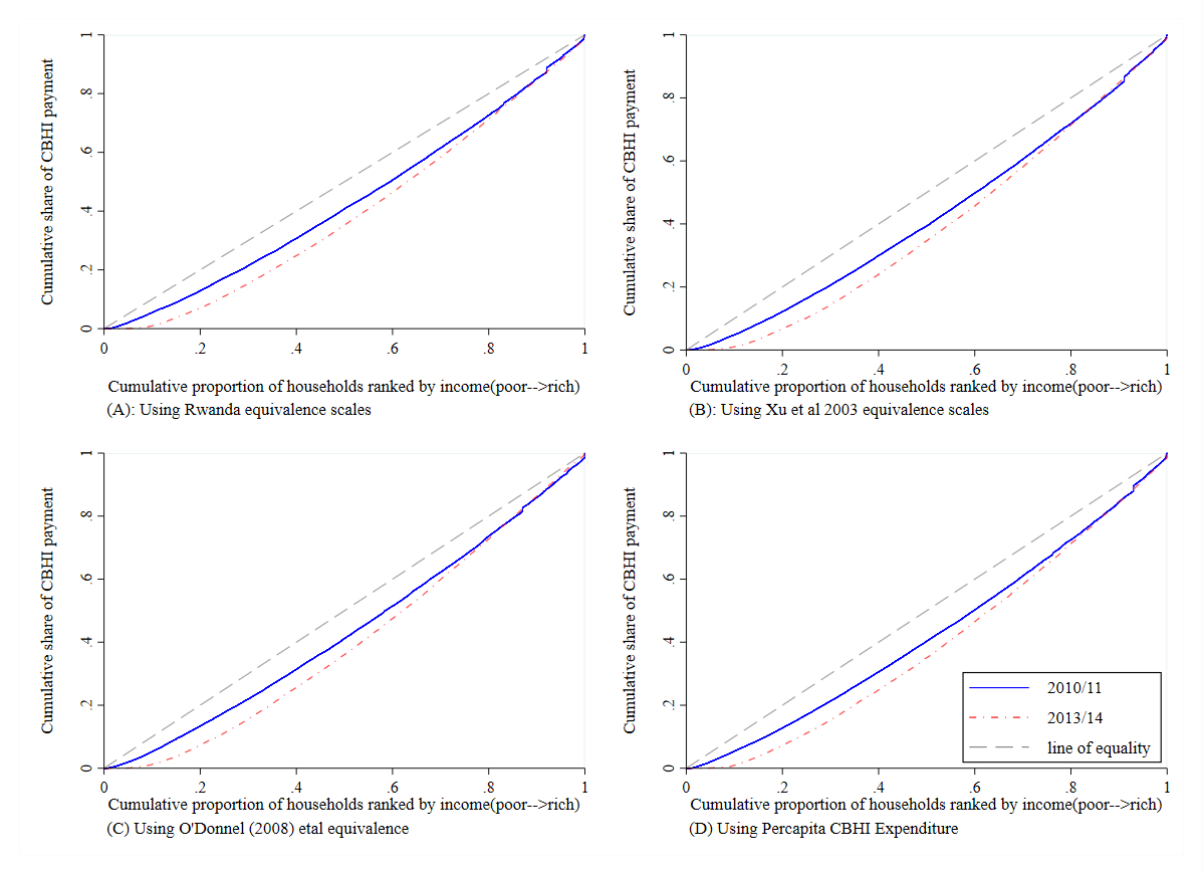

Figure 3A.2 - CBHI regressivity using the direct method

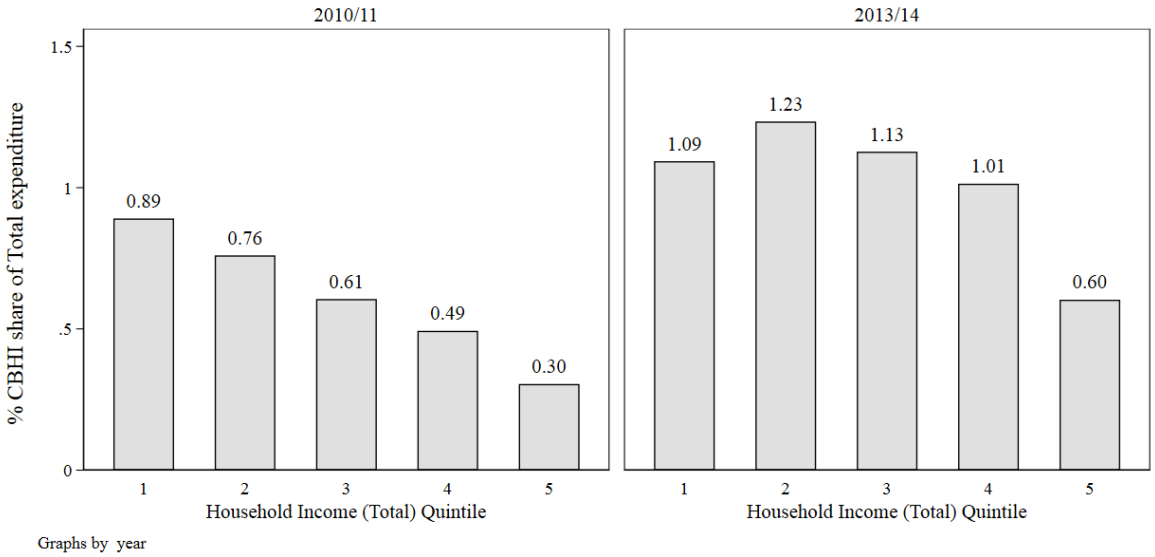

Table 3A.2 - 2010/11 OLS and RIF regression for CBHI expenditure (Two-Part)

		OLS	RIF			
Explanatory variables	**Probit**	**Log(CBHI)**	**Q(30)**	**Q(50)**	**Q(75)**	**Q(90)**
Female-headed household	-0.010	-0.036	0.050	-0.092***	-1.520***	-1.693
	(0.073)	(0.026)	(0.034)	(0.032)	(0.555)	(1.280)
Income quintile 2	0.476***	0.145***	0.172***	0.122***	1.640***	2.937***
	(0.048)	(0.019)	(0.024)	(0.024)	(0.365)	(0.643)
income quintile 3	0.634***	0.204***	0.219***	0.176***	2.600***	4.817***
	(0.051)	(0.019)	(0.023)	(0.024)	(0.379)	(0.712)
Income quintile 4	0.719***	0.248***	0.237***	0.209***	3.392***	8.289***
	(0.053)	(0.019)	(0.023)	(0.024)	(0.396)	(0.820)
income quintile 5	0.844***	0.327***	0.261***	0.266***	5.252***	12.183***
	(0.061)	(0.020)	(0.024)	(0.025)	(0.442)	(0.944)
25 < Age <35	0.038	0.104***	0.206***	0.280***	-0.102	2.378**
	(0.078)	(0.024)	(0.032)	(0.029)	(0.449)	(1.063)
35 < Age < 45	-0.181*	0.134***	0.206***	0.321***	1.753***	2.768**
	(0.082)	(0.026)	(0.034)	(0.032)	(0.527)	(1.205)
45 < Age <55	-0.172*	0.078**	0.172***	0.241***	1.261**	1.376
	(0.085)	(0.027)	(0.035)	(0.033)	(0.552)	(1.250)
Age > 55	-0.109	0.087**	0.151***	0.236***	-0.115	2.602**
	(0.088)	(0.029)	(0.037)	(0.035)	(0.571)	(1.304)
# under five Children	0.056*	0.047***	0.110***	0.135***	1.532***	0.092
	(0.026)	(0.008)	(0.010)	(0.011)	(0.197)	(0.424)
# of adults above five	0.022*	0.062***	0.071***	0.122***	2.571***	1.100***
	(0.010)	(0.003)	(0.004)	(0.004)	(0.082)	(0.197)
Marital status	0.221**	0.115***	0.239***	0.064**	-0.398	-0.160
	(0.074)	(0.026)	(0.034)	(0.032)	(0.541)	(1.272)
Residence (Urban)	-0.076	-0.069***	-0.032	-0.074***	-1.807***	-2.906***
	(0.053)	(0.018)	(0.021)	(0.022)	(0.383)	(0.863)
# in retirement age	-0.065	-0.054**	-0.056***	-0.061***	-0.383	-2.061***
	(0.048)	(0.017)	(0.022)	(0.022)	(0.357)	(0.708)
# in paid Agriculture	-0.025	0.012*	0.035***	0.015**	-0.023	-0.049
	(0.017)	(0.006)	(0.006)	(0.007)	(0.131)	(0.278)
# in non-paid Agriculture	-0.010	0.007	0.004	-0.006	0.328**	0.056
	(0.017)	(0.005)	(0.006)	(0.007)	(0.130)	(0.309)
Never complete primary	0.112	0.011	-0.010	0.020	1.198	1.069
	(0.097)	(0.033)	(0.039)	(0.040)	(0.741)	(1.651)
Primary	-0.014	-0.011	0.022	-0.009	-0.299	-1.126
	(0.041)	(0.014)	(0.017)	(0.018)	(0.326)	(0.722)
Post primary< secondary	-0.144	0.016	0.008	0.033	-0.238	0.619
	(0.091)	(0.030)	(0.035)	(0.037)	(0.745)	(1.770)
Secondary	0.042	-0.004	-0.008	0.002	-0.076	0.075
	(0.098)	(0.029)	(0.033)	(0.035)	(0.698)	(1.642)
Higher	0.173	0.261***	-0.036	-0.041	0.419	8.941*
	(0.286)	(0.073)	(0.082)	(0.091)	(1.753)	(5.217)
N	9212	7871	7871	7871	7871	7871
Adjusted R-squared	-	0.167	0.178	0.240	0.242	0.042
Pseudo R-squared	0.071	-	-	-	-	-

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 3A.3 - OLS and RIF regression for CBHI expenditure for 2013/ 2014 (Two-part)

		OLS	RIF			
Explanatory variables	**Probit**	**Log (CBHI)**	**Q(30)**	**Q(50)**	**Q(75)**	**Q(90)**
Female-headed household	0.009	0.045	0.270***	-1.211	-0.065**	-0.198***
	(0.067)	(0.027)	(0.059)	(0.788)	(0.030)	(0.050)
Income quintile 2	0.761***	0.232***	0.387***	3.495***	0.138***	0.047
	(0.046)	(0.023)	(0.050)	(0.727)	(0.025)	(0.035)
income quintile 3	0.987***	0.289***	0.477***	5.216***	0.185***	0.140***
	(0.048)	(0.023)	(0.049)	(0.720)	(0.025)	(0.038)
Income quintile 4	1.246***	0.354***	0.571***	6.066***	0.224***	0.251***
	(0.052)	(0.023)	(0.048)	(0.714)	(0.025)	(0.039)
income quintile 5	1.418***	0.390***	0.642***	6.696***	0.266***	0.271***
	(0.058)	(0.024)	(0.049)	(0.750)	(0.027)	(0.043)
25 < Age <35	0.163*	0.063**	0.179***	7.688***	0.094***	-0.186***
	(0.068)	(0.023)	(0.048)	(0.616)	(0.020)	(0.030)
35 < Age < 45	0.062	0.094***	0.190***	10.243***	0.255***	-0.059
	(0.075)	(0.026)	(0.052)	(0.724)	(0.028)	(0.046)
45 < Age <55	-0.016	0.058*	0.165***	7.047***	0.142***	0.015
	(0.077)	(0.028)	(0.056)	(0.804)	(0.031)	(0.054)
Age >55	0.042	-0.013	0.017	5.094***	0.025	-0.184***
	(0.079)	(0.029)	(0.058)	(0.820)	(0.031)	(0.053)
Number under-five Children	0.104***	0.060***	0.039**	3.271***	0.103***	0.200***
	(0.025)	(0.009)	(0.015)	(0.286)	(0.012)	(0.022)
Number of adults above five	-0.038***	0.053***	0.031***	3.328***	0.165***	0.296***
	(0.010)	(0.004)	(0.006)	(0.121)	(0.005)	(0.010)
Marital status	0.230***	0.146***	0.544***	2.644***	0.013	-0.211***
	(0.066)	(0.026)	(0.056)	(0.750)	(0.028)	(0.047)
Residence (Urban)	-0.193***	-0.038*	-0.086**	-1.401**	-0.051**	-0.080**
	(0.052)	(0.018)	(0.034)	(0.556)	(0.022)	(0.040)
Number in retirement age	-0.005	-0.018	-0.023	-1.482***	-0.036	-0.055
	(0.044)	(0.017)	(0.034)	(0.559)	(0.022)	(0.036)
Number in paid Agriculture	-0.048*	-0.010	0.004	0.211	-0.007	-0.030
	(0.019)	(0.007)	(0.014)	(0.251)	(0.010)	(0.019)
Number in non-paid Agriculture	-0.006	-0.016*	-0.022*	-0.235	-0.012	0.006
	(0.019)	(0.007)	(0.012)	(0.219)	(0.010)	(0.019)
Never complete primary	0.022	-0.015	-0.035	0.049	-0.003	-0.015
	(0.093)	(0.037)	(0.072)	(1.098)	(0.046)	(0.078)
Primary	0.020	-0.015	-0.029	-0.233	-0.032	-0.039
	(0.040)	(0.016)	(0.030)	(0.501)	(0.021)	(0.037)
Post primary< secondary	0.007	-0.018	-0.033	-1.327	-0.119***	-0.049
	(0.094)	(0.032)	(0.056)	(0.978)	(0.040)	(0.081)
Secondary	0.173*	-0.029	-0.079*	-0.979	-0.045	-0.089
	(0.081)	(0.026)	(0.047)	(0.812)	(0.034)	(0.059)
Higher	0.065	0.071	0.022	0.804	0.095	0.159
	(0.170)	(0.052)	(0.098)	(1.588)	(0.066)	(0.125)
Ubudehe category2	1.217***	0.250***	0.343***	3.985***	0.089***	0.060*
	(0.037)	(0.019)	(0.040)	(0.598)	(0.023)	(0.035)
Ubudehe category3	1.498***	0.605***	0.564***	6.758***	0.257**	0.716**
	(0.359)	(0.090)	(0.094)	(2.442)	(0.121)	(0.280)
Unclassiffied *Ubudehe*	0.947***	0.172***	0.199***	0.920	0.033	0.111**
	(0.054)	(0.023)	(0.048)	(0.725)	(0.027)	(0.043)
N	9605	6727	6727	6727	6727	6727
Adjusted R-squared	-	0.1952	0.1309	0.3065	0.3128	0.2727
Pseudo R-Squared	0.3036	-	-	-	-	-

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 3A.4 - RIF Decomposition for difference in CBHI expenditure 2010/11

Overall	**Q30**	**Q50**	**Q75**	**Q90**				
Male	1478.706***	1931.010***	2310.663***	2866.615***				
	(14.223)	(11.328)	(13.146)	(40.107)				
Female	820.001***	1523.597***	1985.209***	2398.944***				
	(42.669)	(24.761)	(22.415)	(37.118)				
Difference	658.705***	407.413***	325.454***	467.671***				
	(44.977)	(27.229)	(25.985)	(54.647)				
Explained	660.447***	322.054***	214.487***	261.449*				
	(56.228)	(36.836)	(37.317)	(128.021)				
Unexplained	-1.742	85.360*	110.967**	206.222				
	(68.265)	(43.160)	(40.963)	(135.971)				
		Explained			**Unexplained**			
	Q30	**Q50**	**Q75**	**Q90**	**Q30**	**Q50**	**Q75**	**Q90**
Income quintile 2	-15.231*	-8.714*	-4.731*	-8.177*	-86.038**	-37.213*	-0.276	36.136
	(6.167)	(3.543)	(2.013)	(3.578)	(27.391)	(15.845)	(12.786)	(22.347)
Income quintile 3	25.026***	14.752***	9.803***	17.705**	-123.813***	-57.761***	-20.392	43.042
	(7.122)	(4.217)	(2.902)	(5.457)	(25.837)	(15.214)	(13.664)	(26.471)
Income quintile 4	27.219***	16.763***	13.602***	31.887***	-99.838***	-48.012***	-27.227*	82.221**
	(7.062)	(4.353)	(3.576)	(8.486)	(24.498)	(14.285)	(12.574)	(25.500)
Income quintile 5	57.654***	37.140***	37.823***	102.266***	-106.225***	-48.125**	-28.104	118.898**
	(9.258)	(5.966)	(6.064)	(16.833)	(26.534)	(16.300)	(15.676)	(37.952)
25 < Age <35	63.698***	70.996***	-6.543	37.898	63.989*	2.362	-26.918*	40.805
	(14.362)	(9.810)	(9.398)	(29.996)	(31.285)	(19.511)	(13.729)	(27.721)
35 < Age < 45	12.101**	15.993***	2.591	9.297	136.890**	53.265	-9.861	30.803
	(4.270)	(3.966)	(2.402)	(7.548)	(47.499)	(29.882)	(21.246)	(45.099)
45 < Age <55	-19.796**	-21.230***	-3.040	-1.920	124.931*	30.216	-12.743	40.856
	(6.246)	(4.752)	(3.621)	(10.930)	(60.028)	(38.666)	(26.752)	(58.118)
Age >55	-74.617***	-68.972***	6.381	-7.852	198.362*	66.834	-69.303	12.643
	(20.670)	(13.313)	(12.683)	(39.597)	(100.045)	(63.988)	(44.359)	(100.118)
# under five Children	77.679***	66.005***	64.634***	38.753	67.875*	60.389**	-10.918	-51.114
	(10.828)	(7.534)	(7.872)	(23.441)	(33.351)	(19.799)	(18.486)	(40.004)
# of adults above five	58.776***	85.609***	143.524***	130.741***	81.299	162.843**	95.354	-71.365
	(7.703)	(7.242)	(10.825)	(19.626)	(97.321)	(58.905)	(60.231)	(154.661)
Marital status	446.794***	119.052***	-60.977	-71.718	-48.127	-47.877	-66.523*	-150.215*
	(56.341)	(36.055)	(34.939)	(130.634)	(48.731)	(31.282)	(29.160)	(74.571)
Residence (Urban)	-0.009	-0.009	-0.020	-0.067	-30.684	-21.415*	-14.711	-74.243***
	(0.538)	(0.525)	(1.178)	(3.961)	(17.089)	(10.252)	(9.254)	(21.527)
# in retirement age	18.647**	10.708**	4.714	4.893	26.974	8.607	-20.900	-48.375
	(6.407)	(4.091)	(3.560)	(10.477)	(29.293)	(16.988)	(14.427)	(32.741)
# in paid Agriculture	0.009	0.006	0.002	0.004	22.329	-12.557	-18.592	-11.622
	(0.574)	(0.403)	(0.116)	(0.249)	(26.507)	(16.080)	(15.635)	(34.687)
# in non-paid Agriculture	1.569	-7.204	14.031*	-2.446	28.209	20.955	19.317	16.336
	(8.483)	(6.112)	(6.865)	(23.613)	(25.572)	(15.972)	(14.911)	(35.313)
Never complete primary	0.032	-0.015	-0.161	-0.303	-2.568	1.958	1.809	-4.905
	(0.248)	(0.150)	(0.299)	(0.641)	(8.045)	(4.382)	(3.768)	(8.950)
Primary	-14.210	-8.104	-6.787	-28.280	45.084	-5.238	-16.338	-120.417
	(10.348)	(6.672)	(6.340)	(17.083)	(50.255)	(30.376)	(26.978)	(62.290)
Post primary< secondary	-0.925	0.088	-0.332	-0.989	2.759	-2.375	-4.967	-5.156
	(1.001)	(0.637)	(0.712)	(2.146)	(7.981)	(4.927)	(4.945)	(11.363)
Secondary	-3.377	-0.588	-0.992	2.238	12.945	6.813	4.750	12.487
	(2.672)	(1.666)	(1.758)	(6.104)	(12.491)	(6.929)	(6.348)	(11.508)
Higher	-0.591	-0.225	0.962	7.520	-0.762	-0.681	-0.495	5.019
	(0.893)	(0.644)	(0.816)	(5.282)	(1.018)	(0.702)	(0.929)	(3.371)

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 3A.5 - Oaxaca-Blinder decomposition of gender difference in CBHI expenditure

Overall Decomposition	**2013/2014**		**2010/2011**	
Male	8.4800***		7.5705***	
	(0.007)		(0.007)	
Female	8.2666***		7.3303***	
	(0.015)		(0.014)	
Difference	0.2134***		0.2402***	
	(0.017)		(0.016)	
Explained	0.2695***		0.1904***	
	(0.028)		(0.024)	
Unexplained	-0.0561*		0.0498*	
	(0.031)		(0.027)	
Variable	**Explained**	**Unexplained**	**Explained**	**Unexplained**
Income Quintile 2	0.0005	-0.0068	0.0014**	0.0092
	(0.000)	(0.006)	(0.001)	(0.006)
Income quintile 3	0.0005	0.0093	0.0004	-0.0081
	(0.000)	(0.006)	(0.000)	(0.006)
Income quintile 4	0.0028**	0.0090	0.0019**	0.0005
	(0.001)	(0.007)	(0.001)	(0.005)
Income quintile 5	0.0064***	-0.0125*	0.0102***	-0.0105
	(0.002)	(0.007)	(0.002)	(0.007)
Income quintile 1 (Base)	0.0162***	-0.0000	0.0166***	0.0105*
	(0.003)	(0.006)	(0.002)	(0.006)
25 < Age <35	0.0054*	0.0072	0.0032	-0.0063
	(0.003)	(0.006)	(0.003)	(0.005)
35 < Age < 45	0.0045***	0.0013	0.0033***	0.0126**
	(0.001)	(0.005)	(0.001)	(0.006)
45 < Age <55	-0.0016	-0.0022	-0.0004	0.0111
	(0.001)	(0.008)	(0.001)	(0.007)
Age >55	0.0147***	-0.0011	-0.0043	0.0054
	(0.005)	(0.015)	(0.004)	(0.012)
Age up to 25(base)	-0.0026***	-0.0010	-0.0058***	-0.0028
	(0.001)	(0.002)	(0.001)	(0.002)
Number under-five Children	0.0251***	0.0218*	0.0263***	0.0146
	(0.004)	(0.012)	(0.005)	(0.011)
Number of adults above five	0.0377***	0.0086	0.0393***	-0.0189
	(0.004)	(0.035)	(0.004)	(0.039)
Marital status	0.1414***	0.0241	0.0897***	0.0221
	(0.026)	(0.015)	(0.023)	(0.018)
Residence	0.0007	0.0099	0.0002	-0.0174***
	(0.001)	(0.008)	(0.001)	(0.006)
Number in retirement age	0.0031	0.0055	0.0076***	-0.0025
	(0.003)	(0.010)	(0.002)	(0.010)
Number in paid Agriculture	-0.0002	-0.0036	0.0000	-0.0032
	(0.000)	(0.010)	(0.000)	(0.009)
Number in non-paid Agriculture	-0.0067*	-0.0033	0.0040	0.0138
	(0.004)	(0.011)	(0.003)	(0.009)
Never complete primary	0.0001	-0.0003	0.0001	-0.0010
	(0.000)	(0.002)	(0.000)	(0.003)
Primary	-0.0050	0.0307	-0.0120*	-0.0488**
	(0.004)	(0.019)	(0.007)	(0.020)
Post primary< secondary	-0.0001	0.0017	-0.0003	-0.0049*
	(0.000)	(0.002)	(0.000)	(0.003)
Secondary	-0.0011	0.0054	-0.0018	0.0051
	(0.001)	(0.004)	(0.001)	(0.004)
Higher	0.0005	-0.0027	0.0011	0.0006
	(0.000)	(0.002)	(0.001)	(0.000)
None	-0.0001	0.0199	0.0094	-0.0393**
	(0.006)	(0.016)	(0.008)	(0.020)
Ubudehe category2	-0.0030	0.2974**		
	(0.006)	(0.139)		
Ubudehe category3	0.0006	-0.0042		
	(0.001)	(0.003)		
Unclassiffied Ubudehe	-0.0013	0.0742**		
	(0.001)	(0.035)		
Ubudehe category1(base)	0.0310***	0.0811**		
	(0.008)	(0.040)		
N	6727	6727	7871	7871

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Appendix 4

Figure 4A.1 - Distribution of WTP for the non-SCTP and SCTP members

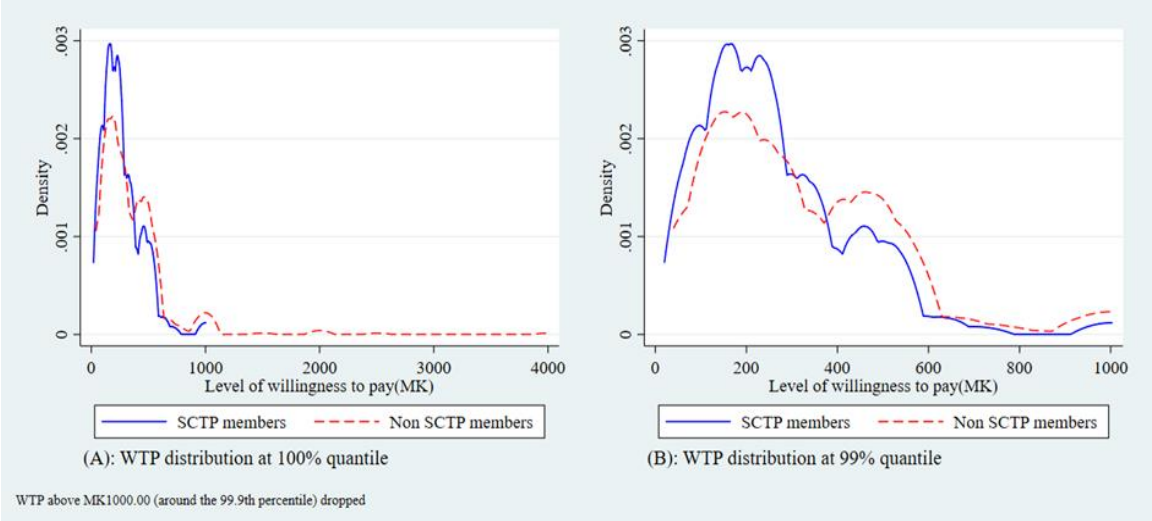

Table 4A.1 - Multivariate probit of willingness to participate in CBHI

	Cash		In-kind	
Variable	β	se	β	se
Age 28-37	-0.100	-0.008	0.064	0.021
	(0.322)	(0.027)	(0.164)	(0.053)
Age 38-47	-0.254	-0.022	0.048	0.016
	(0.345)	(0.029)	(0.179)	(0.058)
Age 48-57	-0.160	-0.014	0.119	0.039
	(0.371)	(0.032)	(0.200)	(0.065)
Age 58-67	-0.461	-0.039	0.274	0.089
	(0.326)	(0.028)	(0.189)	(0.061)
Age 68+	-0.118	-0.010	-0.074	-0.024
	(0.325)	(0.028)	(0.197)	(0.064)
Sex of respondent	-0.316	-0.027	0.516***	0.168***
	(0.241)	(0.021)	(0.145)	(0.046)
Household head	-0.233	-0.020	-0.479***	-0.156***
	(0.289)	(0.025)	(0.145)	(0.046)
Health insurance awareness	0.524***	0.045***	0.271***	0.089***
	(0.202)	(0.017)	(0.101)	(0.033)
Household size	0.058	0.005	0.032	0.010
	(0.042)	(0.004)	(0.021)	(0.007)
Primary education	0.477***	0.041**	0.200*	0.065*
	(0.183)	(0.016)	(0.116)	(0.038)
Secondary education+	0.123	0.010	0.186	0.061
	(0.280)	(0.024)	(0.185)	(0.060)
Any chronic disease	0.329**	0.028**	0.062	0.020
	(0.161)	(0.014)	(0.095)	(0.031)
Income quintile 2	0.603***	0.051**	0.087	0.028
	(0.229)	(0.020)	(0.148)	(0.048)
Income quintile 3	0.155	0.013	0.043	0.014
	(0.215)	(0.018)	(0.147)	(0.048)
Income quintile 4	0.422*	0.036*	0.302*	0.098*
	(0.250)	(0.022)	(0.156)	(0.051)
Income quintile 5	0.861***	0.073***	0.512***	0.167***
	(0.278)	(0.025)	(0.154)	(0.049)
Sick past 3 months	-0.443**	-0.038**	0.122	0.040
	(0.190)	(0.016)	(0.106)	(0.035)
Employed	0.596***	0.051***	0.262*	0.086*
	(0.178)	(0.015)	(0.145)	(0.047)
Married	0.015	0.001	-0.261**	-0.085**
	(0.198)	(0.017)	(0.132)	(0.043)
Access to finance	0.385**	0.033**	0.265***	0.086***
	(0.184)	(0.016)	(0.094)	(0.030)
South	0.106	0.009	0.128	0.042
	(0.229)	(0.020)	(0.126)	(0.041)
North	-0.082	-0.007	0.100	0.033
	(0.328)	(0.028)	(0.180)	(0.059)
Orthodox Christians	0.165	0.014	0.132	0.043
	(0.207)	(0.018)	(0.126)	(0.041)
Moslems	0.224	0.019	-0.039	-0.013
	(0.268)	(0.023)	(0.145)	(0.047)
No religion	0.612**	0.052**	0.145	0.047
	(0.292)	(0.025)	(0.153)	(0.050)
SCTP member	0.091	0.008	-0.286***	-0.093***
	(0.182)	(0.016)	(0.105)	(0.034)
N	907	907	907	907
ll	-145.1		-520.6	
Rho 2,1	.0788274			

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 4A.2 - Determinants of WTP for CBHI using Heckman model (Valuation equations)

Explanatory variable	Money (no restriction) β	Money (with restriction) β	Commodity (no restriction) β	Commodity (with restriction) β
Age 28-37	-0.134	-0.130	0.102	0.112
	(0.082)	(0.085)	(0.158)	(0.163)
Age 38-47	-0.120	-0.112	0.075	0.083
	(0.091)	(0.094)	(0.163)	(0.171)
Age 48-57	-0.180*	-0.175*	0.389*	0.408*
	(0.099)	(0.103)	(0.212)	(0.218)
Age 58-67	-0.253**	-0.233**	0.333	0.375
	(0.101)	(0.105)	(0.332)	(0.331)
Age 68+	-0.221**	-0.217**	0.386*	0.374*
	(0.096)	(0.099)	(0.199)	(0.205)
Sex of respondent	0.181**	0.193**	-0.120	-0.039
	(0.077)	(0.080)	(0.579)	(0.569)
Household head	-0.055	-0.048	-0.166	-0.242
	(0.074)	(0.077)	(0.543)	(0.535)
Health insurance awareness	0.152**	0.132**	0.227	0.268
	(0.062)	(0.064)	(0.298)	(0.293)
Household size	0.004	0.002	0.009	0.013
	(0.011)	(0.012)	(0.039)	(0.039)
Primary education	0.022	-0.002	0.029	0.062
	(0.071)	(0.073)	(0.254)	(0.252)
Secondary education+	0.073	0.063	0.295	0.325
	(0.096)	(0.100)	(0.268)	(0.269)
Any chronic disease	0.062	0.048	-0.067	-0.057
	(0.053)	(0.055)	(0.105)	(0.108)
Income quintile 2	0.212**	0.185**	-0.008	0.005
	(0.085)	(0.087)	(0.157)	(0.163)
Income quintile 3	0.182**	0.177**	0.089	0.095
	(0.074)	(0.076)	(0.139)	(0.146)
Income quintile 4	0.366***	0.349***	0.079	0.126
	(0.086)	(0.088)	(0.353)	(0.352)
Income quintile 5	0.420***	0.388***	0.256	0.333
	(0.095)	(0.098)	(0.554)	(0.546)
Sick past 3 months	-0.053	-0.036	-0.107	-0.087
	(0.060)	(0.062)	(0.166)	(0.167)
Employed	0.020	-0.015	0.149	0.193
	(0.093)	(0.094)	(0.351)	(0.343)
Married	-0.101	-0.100	0.012	-0.030
	(0.066)	(0.068)	(0.311)	(0.310)
Access to finance	0.287***	0.271***	0.067	0.109
	(0.054)	(0.056)	(0.306)	(0.302)
South	-0.096	-0.099	0.288	0.308*
	(0.063)	(0.066)	(0.183)	(0.183)
North	-0.063	-0.056	0.161	0.177
	(0.092)	(0.095)	(0.195)	(0.199)
Orthodox Christians	0.085	0.078	-0.009	0.011
	(0.064)	(0.066)	(0.180)	(0.181)
Moslems	0.158**	0.148*	-0.161	-0.167
	(0.076)	(0.078)	(0.145)	(0.151)
No religion	0.068	0.045	-0.207	-0.185
	(0.087)	(0.089)	(0.204)	(0.206)
SCTP member	-0.132**	-0.138**	-0.136	-0.181
	(0.055)	(0.056)	(0.329)	(0.322)
Selected N=	**862**	**862**	**298**	**298**
Not selected N=	**45**	**45**	**609**	**609**
mills	-0.325	-0.621	0.295	0.522
	(0.499)	(0.495)	(1.592)	(1.553)
N	907	907	907	907
lambda	-0.325	-0.621	0.295	0.522

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 4A.3 - Selection equations for the Heckman model

	Money (no restriction)	Money (with restriction)	Commodity (no restriction	Commodity (with restriction
Explanatory variables	β	β	β	β
Age 28-37	-0.100	-0.102	0.064	0.065
	(0.330)	(0.331)	(0.160)	(0.160)
Age 38-47	-0.254	-0.256	0.048	0.049
	(0.349)	(0.349)	(0.176)	(0.176)
Age 48-57	-0.160	-0.165	0.119	0.120
	(0.389)	(0.389)	(0.192)	(0.192)
Age 58-67	-0.461	-0.474	0.274	0.277
	(0.336)	(0.338)	(0.186)	(0.187)
Age 68+	-0.118	-0.120	-0.074	-0.073
	(0.346)	(0.346)	(0.193)	(0.193)
Sex of respondent	-0.316	-0.333	0.516***	0.517***
	(0.251)	(0.253)	(0.145)	(0.145)
Household head	-0.233	-0.226	-0.479***	-0.478***
	(0.287)	(0.288)	(0.146)	(0.146)
Health insurance awareness	0.524**	0.520**	0.271***	0.269***
	(0.222)	(0.222)	(0.102)	(0.102)
Household size	0.058	0.058	0.032	0.032
	(0.040)	(0.040)	(0.021)	(0.021)
Primary education	0.477**	0.471**	0.200*	0.197*
	(0.191)	(0.192)	(0.117)	(0.118)
Secondary education+	0.123	0.102	0.186	0.184
	(0.338)	(0.339)	(0.184)	(0.184)
Any chronic disease	0.329*	0.332*	0.062	0.061
	(0.171)	(0.171)	(0.094)	(0.094)
Income quintile 2	0.603**	0.604**	0.087	0.084
	(0.264)	(0.264)	(0.145)	(0.146)
Income quintile 3	0.155	0.154	0.043	0.042
	(0.229)	(0.229)	(0.147)	(0.147)
Income quintile 4	0.422	0.419	0.302*	0.300*
	(0.287)	(0.287)	(0.158)	(0.158)
Income quintile 5	0.861***	0.855***	0.512***	0.509***
	(0.331)	(0.332)	(0.154)	(0.155)
Sick past 3 months	-0.443**	-0.448**	0.122	0.124
	(0.201)	(0.202)	(0.105)	(0.105)
Employed	0.596***	0.590***	0.262*	0.259*
	(0.193)	(0.193)	(0.143)	(0.144)
Married	0.015	0.019	-0.261*	-0.260*
	(0.234)	(0.234)	(0.133)	(0.133)
Access to finance	0.385**	0.379**	0.265***	0.263***
	(0.180)	(0.181)	(0.094)	(0.095)
South	0.106	0.100	0.128	0.129
	(0.229)	(0.230)	(0.126)	(0.126)
North	-0.082	-0.090	0.100	0.101
	(0.330)	(0.331)	(0.180)	(0.180)
Orthodox Christians	0.165	0.162	0.132	0.131
	(0.215)	(0.215)	(0.125)	(0.125)
Moslems	0.224	0.229	-0.039	-0.040
	(0.258)	(0.259)	(0.148)	(0.148)
No religion	0.612**	0.609**	0.145	0.142
	(0.304)	(0.304)	(0.152)	(0.152)
SCTP member	0.091	0.100	-0.286***	-0.287***
	(0.186)	(0.187)	(0.104)	(0.104)
WTP commodity		0.104		
		(0.197)		
WTP cash				0.053
				(0.231)

Notes: Robust standard errors in parentheses, * p <0.10, ** p <0.05, *** p <0.01

Table 4A.4 - Maize price per basin

Traditional Authority	Price (MK) (per basin)
Kachere	250
Kaphuka	230
Kasumbu	300
Malemia	455
Mkula	500
Mposa	470
Mulumbe	430
Mwambo	400
Nkaya	250
Nsanama	480
Sitola	385
Timbiri	250
Toleza	270

4A 1- Ethics approval certificate

NATIONAL COMMISSION FOR SCIENCE AND TECHNOLOGY

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'A nation with scientifically and technologically led sustainable growth and development'

Ref No: NCST/RTT/2/6 **28th July, 2017**

Gowokani Chirwa
Univesity of Malawi
P.O Box 280
Zomba

Dear Gowokani Chirwa,

RESEARCH ETHICS APPROVAL OF PROTOCOL P07/17/199: WILLINGNESS TO PAY FOR COMMUNITY BASED HEALTH INSURANCE AMONG SOCIAL CASH TRANSFER BENEFICIARIES AND NON-BENEFICIARIES IN MALAWI

Having satisfied all the ethical, scientific and regulatory requirements, procedures and guidelines for the conduct of research in the social sciences sector in Malawi, I am pleased to inform you that the above referred research study has officially been approved. You may now proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this letter. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the National Committee on Research in the Social Sciences and Humanities in a format that is available at the secretariat. Once the study is finished, you are required to furnish the Committee and the Commission with a final report of the study.

Wishing you a successful implementation of your study.

Yours Sincerely

Martina Chimzimu
NCRSH ADMINISTRATOR AND RESEARCH OFFICER
HEALTH, SOCIAL SCIENCES AND HUMANITIES
For: CHAIRMAN OF NCRSH

4A 2 - Survey instruments

Principal Investigator: Mr Gowokani Chirwa

Background

The country is facing dire health financing crisis. Currently, there is a debate to re-introduce user fees in some of the public facilities in the country in order to raise finance to purchase medicines and other health items. In fact, in central hospitals (tertiary hospitals) a bypass fee has been effected and is already in place, in addition to the private wings which already existed. Despite that, studies in the country indicate that people already face heavy costs through out of pocket expenditure such as transport, purchase of drugs at open markets, pharmacies and private health centres, among others. One possible way to deal with this it to have a community based health insurance, which can protect people from such effects. This kind of insurance has helped in reducing financial burden in other countries such as Rwanda, Kenya, just to mention a few. As of now, the government is in the process of introducing a national insurance scheme given that private health insurance is not affordable to many. The national scheme can be best complimented by CBHI, given that a lot of people are poor.

Purpose of this study component

As part of the study we are interested to know the willingness of people to join a CBHI. The research team is headed by a member of staff from the University of Malawi- Chancellor College based at Zomba, and now studying at the University of York in the United Kingdom (UK). The principal investigator will use the data for his studies of PhD in Economics and other academic purpose, only. The data collected here might be used for further research work.

What it will mean if you take part in this study

If you agree to take part in this study, you will participate in an interview of about 30 minutes during which we will ask you about your willingness join CBHI and, willingness to pay for CBHI.

Confidentiality

Your identity will be protected at all times. Your name will not be displayed on any of the responses you provide us to the questions. All information obtained during the course of the study will be held securely, and stored on paper in locked cabinets and in computers on password protected files.

Costs and benefits and risks

Taking part in the study will not cost you anything. However, you will receive MKW 200 to compensate you for your time. There will is no risk associated with collecting information in this study.

Voluntary participation and withdrawal

Your participation is voluntary. You may withdraw from the study at any time during the interview process without giving a reason and without any penalty.

Who have approved the study?

This study has been approved by the National Committee on Research in the Social Sciences and Humanities (NCRSH)), Lilongwe, Malawi and the University of York (ELMPS), York, United Kingdom.

Questions

If you have any questions concerning participation in this study, please feel free to ask me. Alternatively, you can contact:

Name	**Telephone/email**
Mr Gowokani .C. Chirwa	0999209444/088175050
	gowokani@gmail.com
Chancellor College Research Coordinator	+2651524222
	economics@cc.ac.mw
Chair of NCRSH	(T) +2651771 550/ (F) +2651772 431
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Prof Marc Suhrcke (PhD supervisor,York)	marc.suhrcke@york.ac.uk
Prof Tony Royle (Chair ELMPS, York)	+44 (0) 1904 325061
	tony.royle@york.ac.uk

Consent Form

This form is for you to state whether or not you agree to take part in the study. Please read and answer every question. If there is anything you do not understand, or if you want more information, please ask the researcher.

1. Have you read and understood the information leaflet about the study?

   Yes ❒ No ❒

2. Have you had an opportunity to ask questions about the study?

   Yes ❒ No ❒

3. Do you understand that the information you provide will be held in confidence by the research team?

   Yes ❒ No ❒

4. Do you understand that you may withdraw from the study for any reason, without affecting any services you receive?

   Yes ❒ No ❒

5. Do you understand that the information you provide may be used in future research?

   Yes ❒ No ❒

6. Do you agree to **voluntarily** take part in the study?

   Yes ❒ No ❒

7. If yes, do you agree to your interviews being recorded on questionnaires?
   (You may take part in the study without agreeing to this).

   Yes ❒ No ❒

Respondent _____ **Interviewer** _____

_____ _____

Signature Signature

_____ _____

Date Date

Witness_____ Signature_____

(Name in BLOCK CAPITALS) Date_____

WIILINGNESS TO PAY QUESTIONNAIRE

Questionnaire number: …… (All questionnaires will be recorded for data entry)

SECTION A

A.1: FIELD CONTROL INFORMATION

A01: Interviewer's name: _____ A03: Supervisor's name: _____
A02: Interviewer Code

1. Vitumbiko
2. Bessy
3. Grey
4. Davie
5. Lisuwa
6. Kudzai
7. Ben
8. Yamikani
9. Tadala
10. Maggie

Interviewer Sign. _____Date _____ Time _____

A.2: IDENTIFIERS

A05: Traditional Authority.....

A06: District……..

A07: Village……..

A08: SCTP membership Yes =1 No=0

SECTION B1 : RESPONDENT INFORMATION				
B01	**B02**	**B03**	**B04**	**B05**
Main occupation of the respondent ? Farmer…….1 Trader……2 Fisherman/woman....3 Government……...4 NGO……..5 Does nothing..……..6	**What is the sex of the respondent?** Male…….1 Female……..0	**Relationship to head of household?** Head……...1 Spouse……2 ***Do not ask B10-B-13 if answer here is head.*** ***(Note that there can be household heads who can be below 18)***	**What is the Age of the respondent?**	**What is the marital status of respondent?** Married……1 Separated…….2 Divorced……..3 Widow(er).....4 Single…..…….5
Enter code	**Enter code**	**Enter code**		**Enter code**
			Year born …… **Age :**	

B06	B07	B08	B09
Does anyone in the household suffer from a? ***(circle all that apply)*** Blind……1 Deaf……2 Speech impairment.....3 Deformed limb(s)…..4 Mentally disabled…..5 None……..6 Other (specify)…..7	**Does anyone in the household suffer from any chronic illness?** Chronic malaria……1 TB…….....2 HIV/AIDS……..3 Asthma…….....4 Arthritis……5 Epilepsy……6 Other (specify)….....7 None……8	**Highest education achieved?** Nursery……..……...1 Pre-school.. …..…….2 Primary……..…….…3 Secondary…….……...4 Training college…..5 University…….....6 None…….....7	**What is the religion of member?** Catholic……...1 SDA…….....2 Moslem…….....3 CCAP ……..4 Pentecostal……5 No religion……6 Other……..7
Enter code	**Enter code**	**Enter code**	**Enter code**

SECTION B2 : RESPONDENT

Also ask the information below if the respondent is not the household heads

B10	B11	B12
What is the sex of the household head? Male…….1 Female….0	**What is the Age of household head?**	**Highest education achieved** Nursery……..…….1 Pre-school.. …..….2 Primary……..…….3 Secondary…..…….4 Training college….5 University…….....6 None…….....7
	Year Born :	**Enter code**
	Age	

B13	B14	Put values here	
What is the religion of Household head? Catholic……..1 SDA.....2 Moslem…….....3 CCAP …….4 Pentecostal……..5 No religion……..6 Other…….7	**What is the size of the family of the household according to the Ages listed?**	**0-5**	
		6-18	
		19-65	
		>65	
Enter code			

SECTION C: AVAILABILITY OF HEALTH CARE PROVIDERS

Q No.	Questions and filters	Coding categories and codes	Skip to
C01: Primary Care			
C01.1	How far away is the *closest* facility for primary care (allopathic or traditional medicine)? ***[convert to km if distance mentioned in other units]***	|___|___| km _____ (Other unit)	
C01.2	How far away is the facility for primary care you normally use?	|___|___| km Never used primary care.....888	→ **E02**
CO1.3	What is the transport you normally use?	1. Walking 2. Hired bysclcle 3. Personal bicycle 4. Mini bus 5. Hired vehicle 6. Home vehicle 7. *Oxcart* 8. *Other*	
C01.4	How much time does it take to get to the facility you normally use, using the common transport mentioned?	|___|___| hours |___|___| minutes	
C01.5	Is the primary health facility you normally use a	Private 1 Public 2	

	private, public or charitable health care provider?	Charitable 3	
C01.6	Why has your household decided to use this facility? You may give more than 1 answer. Do you use it because it is … ***[Read out the first four options and code appropriate]***	**Yes** **No** Free ……..1 0 Closest 1 0 Cheapest 1 0 Best quality 1 0 Best effort of staff 1 0 Obliged to do so by the health insurance scheme 1 0 Other (specify) 1 0 _____	
C01.7	How long is the average waiting time when seeing a general doctor (General Practitioner)?	|___|___| hours |___|___| minutes	***Specify units***
C01.8	How long is the average waiting time before seeing a doctor in hospital?	|___|___| hours |___|___| minutes	
C01.9	How would you rate the health status of your family?	1.Very poor 2. Poor 3. Medium 4. Good 5. Very good	
C01.10	Did any one at your household fall sick in the past 3 months?	Yes =1 No=0 ***If "No" go to D01***	
C01.11	What was the type of illness?	1. Malaria 2. Diarrhoea 3. General body pain (fevers) 4. Inflammation of a body organ 5. Others (ulcers, kidney problems, abscess, etc.)	
C0.12	Did you seek any care?	Yes =1 No=0	
C0.13	Where did you seek care?	1.Self-treatment 2. Local drug vender 3. Private Heath Facility 4. Public hospital 6. Traditional healer 7. Other (specify)_____	
C0.14	How much did you spend?	1. Transport …… (*put zero if walked)* 2. Paying for lab, drugs, xray, consultation …….	

SECTION D. WILLINGNESS TO PAY

Q No.	Questions and filters	Coding categories and codes	Skip to
D01	How easily have you been able to pay for medical bills in times of sickness of yourself or your household members?	Very easy.....1 Easy.....2 Neither easy nor difficult.....3 Difficult.....4 Very difficult.....5	
D02	Are you aware of the existence of health insurance schemes / Have you ever heard of health insurance?	Yes.....1 No.....0	
D03	Do you have Health insurance	Yes.....1 No.....0	

[Read out] Health insurance is where you make regular payments towards the future cost of medical care (treatment, hospitalization, drugs, and so on). In case of sickness of an insured person, the health insurance scheme pays a major proportion of total medical bills. You pay your contribution and many others do the same. It saves you the financial burden of personally bearing all the medical bills in times of a sickness crisis as the pay-out can be more than you could pay in premium in years. Insured persons, who do not have any illness costs do not get the premiums back at the end of the insurance period; instead, the premiums are kept by the insurance provider in order to pay for the medical bills of other insured persons or for expenditures in future years. Suppose this insurance scheme is to be managed by members of your community, and covers transport costs, cost of hospitalisation, drug purchase at pharmacy if referred. I will now ask your willingness to join and pay.

D04	Are you willing to join such a scheme and pay using money?	Yes.....1 No……...0	→ **D07**
D05	How much are you willing to pay for such a scheme? **[Do not ask if DO4 is No]**	**D05.1** The price of a monthly insurance premium (contribution) per person is 300 Kwacha; are you willing to pay? 1 = Yes (**D05.2**); 0 = No (**D05.3**) Do not know (**D05.4**) **D05.2.** What if the premium is 350 Kwacha, will you be willing to pay? *(increase in multiples of K50)* 1 = Yes (D05.4) ; 0 = No (D05.4) [……..…] **D05.3**. What if the premium is 250 Kwacha, will you be willing to pay?	**Always start with random higher prices,**

		1 = Yes (**D05.4**); 0 = No (**D05.4**) [……..] *Use price lower than first where they said No* **D05.4.** What really is the maximum amount you are willing to pay for CBHI? […….] **D05.5 Price where bidding started […….]** **D.05.6 Price where second bid […….]** **D.05.7 Price where third bid started […….]**	
D06	What is your preferred frequency for payment for health insurance premium despite the monthly suggestion above [**Read out options**]	Every week 1 Every month 2 Every quarter (4 months) 3 Every 6 months 4 Every 12 months 5	
Sometimes there can be option of people contributing maize to the group, and then these can be sold for example to ADMARC, which in turn can be used as your money contribution to the group. I will then ask you if you could be willing to pay the scheme using maize product.			
D07	Are you willing to join such a scheme and pay using maize produce?	Yes..... 1 No..... 0	→ **E01**
D08. A	How much are you willing to pay for such a scheme?	**D08.1** The price of an insurance premium (contribution) per person is **3 basins of Maize,** of maize; are you willing to pay? [*remember to vary this start price]* 1 = Yes (**D08.2**); 0 = No (**D08.3**) Do not know (**D08.4**) **D08.2**. What if the premium is **4 basins**, will you be willing to pay? 1 = Yes (D08.4) ; 0 = No (D08.4) **[……..……..]** **D08.3.** What if the premium is 2 Bags(50Kg), will you be willing to pay? 1 = Yes (**D08.4**) ; 0 = No (**D08.4**) **[……]** **D08.4.** What really is the maximum amount of maize you are willing to pay for CBHI? **[…… .]** [these to be done by enumerator, don't ask again]	

		D08.5 Price where bidding started […….] **D.08.6 Price where second bid […….]** **D.08.7 Price where third bid started […….]**	
D08.B	Supposes an alternative payment is using the following	1. Chickens …… 2. Firewood …… 3. Goat …… 4. Mat …… 5. Groundnuts …… 6. Other Goods …… 7. Nothing ……	
D09	What is your preferred frequency for payment for health insurance premium	Every week 1 Every month 2 Every quarter (4 months) 3 Every 6 months 4 Every 12 months 5	
[Please take out the cards and read out] A Health insurance package consists of several parts which are hospitalization, primary care, consultations for traditional healers, pharmaceuticals, transportation, lab tests and loss of income when ill. Here, you see nine cards. Each card represents a typical health insurance service.			
D10	Which of these services, you would not be willing to pay anything for in a health insurance product? Please put aside the cards, whose service you would not wish to be insured for.	***[please code all services/cards that were put aside by the respondent as "0" in the RANK table below]***	
[Read out] For all the other cards, please order them on the table/on the ground in terms of importance for you to be insured for. ***[please code the most important card as 1, the second important card as 2 and so on for the other cards as well.]*** **RANK:** **RANK:**			
D10.1	Hospitalizations (no maternity care and no deliveries)	|___|___|	
D10.2	Primary care/ General Physician (allopathic)	|___|___|	
D10.3	Consultations for traditional healer	|___|___|	
D10.4	Pharmaceuticals/Drugs on prescription	|___|___|	
D10.5	Maternity care (prenatal, deliveries, postnatal)	|___|___|	
D10.6	Transportation of patient (decided by gatekeeper, e.g. health worker, General Physician, midwife)	|___|___|	
D10.7	*Lab tests*	|___|___|	
D10.8	X-Ray and Imaging Services (X-Ray	|___|___|	
D10.9	Compensation for loss of income when ill	|___|___|	
D10.11	Part funeral cover and coffin	|___|___|	

SECTION E: HOUSEHOLD INCOME & SOURCES			
We have almost finished this interview, just a few short questions on your household.			
Q No.	**Questions and filters**	***Coding categories and codes***	**Skip to**
E01	What is the main source of household income?	Sale of farm/forest products……1 Sale of livestock……2 Sale of handcrafts……3 Salaries……4 Daily wages……5 Cash transfers (SCTP)……6 Remittances……7 Credit/Borrowing……8 Sale of other products……9 _____	
E02	What is the total household income per month, from all sources?	_____ MWK	
E03	How much income is obtained from these sources?	_____ MWK [**SCTP**] **E02 :A** _____MWK **E02 :B** [***Non SCTP sources***]	
E04	How much do you spend per month at you household?	_____MWK	
SECTION F: HOUSEHOLD CHARACTERISTICS			
F01	How many rooms in your household are used for sleeping?	|___|___|	
F02	What is the main source of drinking water for members of your household during the current time of year?	Piped water ..... 1 Private well..... 2 Public well..... 3 Spring ..... 4 River/stream..... 5 Pond/lake/dam..... 6 Rainwater ..... 7 Other (specify) 8	

F03	Kindly tell me the major household assets that you own? [only those working condition]	Cell Phone 1 0 Television 1 0 Mattress 1 0 Refrigerator 1 0 Electric or gas cooker 1 0 Radio 1 0 Car 1 0 Bicycle 1 0 Motorcycle 1 0 Other(specify)	
F04	Does your household have…? If so, how many? *(Indicate 0 if you have none)*	Cattle..... |___|___| Goats ..... |___|___| Pigs..... |___|___| Chicken..... |___|___| Sheep ..... |___|___| Guinea fowls… |___|___| Ducks |___|___|	

Thank You for attending

Focus Group Discussion Guide

A) Common Health care paying problems and needs

1) As members of this community what are your main problems in paying for your health care needs (*Ngati amodzi a mdela lino, ndi mavuto anji amene mumakumana nawo polipira chithandizo chaku chipatala)*. Probes:
   i. Cost associated with paying for health care
   (*ndalama yomwe amalipira chithandizo chaku chipatala)*
   ii. Availability of health care [Competition, distance]
   (kapezekedwe ka chithandizo chaku chipatala)

B) Community awareness, understanding and experience with health insurance

1) Have you ever heard about health insurance?
   (*munamvapo za inshuransi ya za umoyo?)*
2) What do you think about health insurance?
   (*mukuganiza kuti inshuransi ya za umoyo ndi chiyani?)*
3) Are you members of any health insurance scheme? (probe for names of any health insurance)
   (*kodi ena/nonse mwa inu alipo amene ali pa inshuransi ya za umoyo)*

DEFINE HEALTH INSURANCE!!!

C) Willingness to pay for health insurance

1) Do you now understand health insurance?
   (*Pano mwamvetsetsano tikamati inshuransi ya za umoyo ndi chiyani?)*
2) Would you like such a scheme to be introduced now into your community? Why?
   (*mungakonde kuti ndondomeko ya inshuransi ya za umoyo itakhazikitsidwa mu dera lanu lino? Chifukwa?) -**probe***
3) Would you be willing to contribute towards such a scheme? Why? -**probe**
   (*mungasangalatsidwe mutamasonkha nawo mu gululi? Chifukwa?)*

D) Methods of Payment

1) How would you like to contribute? Probe
   (*Kodi mungakonde mutamapereka motani?)*
   i. In cash, or in kind?
   (*ndalama kapeza zinthu zina?)*
   ii. How much?
   (*ndalama zingati/zinthu zochuluka bwanji, kapena mlingo wanji?)*

- ***probe***

E) Management of the scheme

1) How would you like the scheme to be managed?
   (*kodi mungakonde kuti gulu limeneli lidziyendetsedwa bwanji?)*
2) Who will be managing the scheme(if not mentioned ,probe for):
   (*ndi ndani amene adzisamalira zopereka zanu/ndondomeko imeneyi?)*
   i. Community elected representatives?
   (*anthu amene mwasankha kuti adziyimilira bungweli?)*

ii. An NGO
(*bungwe limene lisali la Boma?)*
iii. Healthcare provider?
(*a zaumoyo?)*
iv. Village groups/village bank?
(*magulu a m'mudzi/ma Banki a m'mudzi?)*

3) How would you like the contributions to be collected from you? Probes: means of collecting
(*kodi mungakonde atamatolera zoperekazi munjira yanji)*
i. Paying through community agents,
(*kupereka kupyolera mwa munthu/anthu osankhidwa?)*
ii. Paying directly to management staff of the fund,
(*kupereka kwa anthu ogwira ntchito ku bungweli?)*
iii. Deduction from salary etc.
(*kuchotsera ku malipiro etc*)

Thank you very much for your time

IMPORTANT NOTE: At the end of the interview, probe the people in the various mini meetings that may arise. Some people might have not talked initially, but the post meetings makes good points

List of Abbreviations

2SLS	:	Two-Stage Least Squares
AIDS	:	Acquired Immuno Deficiency Syndrome
ATET	:	Average Treatment Effect on the Treated
BMI	:	Body Mass Index
CBHI	:	Community Based Health Insurance
CHE	:	Catastrophic Health Expenditure
EA	:	Enumeration Area
EGC	:	Economic Growth Centre
FE	:	Fixed Effects
FGD	:	Focus Group Discussion
GLM	:	Generalised Linear Methods
GMM	:	Generalized Method of Moments
GoM	:	Government of Malawi
HIV	:	Human Immunodeficiency Virus
IFLS	:	Indonesian Family and Life Survey
IMF	:	International Monetary Fund
ISSER	:	Institute of Statistical, Social, and Economic Research
IV	:	Instrumental Variable
JKN	:	Jaminan Kesehatan Nasional
LMIC	:	Low and Middle-Income Countries
MK	:	Malawi Kwacha
MoH	:	Ministry of Health Malawi
NCD	:	Non-Communicable Disease
NCRSH	:	National Commission for Research in Health and Social Sciences
NHIA	:	National Health Insurance Agency
NHIS	:	National Health Insurance Scheme
NSO	:	National Statistical Office
OLS	:	Ordinary Least Squares
OOP	:	Out -of-Pocket
PHI	:	Private Health Insurance
PSM	:	Propensity Score Matching
SCTP	:	Social Cash Transfer Programme
SHI	:	Social Health Insurance

UK	:	United Kingdom
UHC	:	Universal Health Coverage
USD	:	United States of America Dollar
VSL	:	Village Savings and Loans
WB	:	World Bank
WHO	:	World Health Organisation
WTP	:	Willingness to Pay

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