The socio-economic capabilities of the Rwanda Community Based Health Insurance (CBHI) beneficiaries

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1. INTRODUCTION

Since its establishment in 2001, the Rwanda CBHI scheme has been associated with positive health outcomes including **reductions in infant and maternal mortality** [1]. Also, as observed in other social health insurance programmes [2][3], the CBHI has provided financial protection for a majority of the Rwanda informal sector against catastrophic health expenditure and improved general healthcare utilization. Thus, the CBHI remains the most popular health insurance scheme in the country. Between 2003 and 2022, the Scheme coverage increased exponentially from 7% to 87% [4][5].

Despite its successes, the CBHI has recently faced **challenges of increasing deficits, stagnated enrolments, and increasing number of members make only part payment of their household contributions** [7], all of which threaten its sustainability. To ensure that it continues to deliver on its mandate, the RSSB in its 2020-2025 Strategic Plan initiated steps to increase the CBHI's coverage rate to 99% by 2025 [8]. In 2020, **the government earmarked new financial sources for the CBHI including RWF 6 billion annual Government budget allocation, levies of RWF 20 per litre of fuel sold by each fuel trade company in Rwanda, one-tenth (10%) of road traffic fines, RWF 100 per hour from parking fee levied on vehicles (City of Kigali), half a per cent (0.5%) of the net salaries of employees paid by the employer, and ten per cent (10%) of tourism revenues [9].**

While these new revenues have improved the CBHI financials, the recent CBHI Sustainability Plan estimates that these funds will not be sufficient in the medium to long term. Thus, the need to explore additional channels of financing including increasing the CBHI contributions for the Ubudehe[1] category 2 and 3 members [6].

The CBHI member premium contributions have remained unchanged since 2011 when it was last revised. **Currently, members in Ubudehe category 1 pay RWF 3,000 (3 USD) per person per annum and this is fully subsidized by the central government. Ubudehe categories 2 and 3 members contribute RWF 3,000 per person per annum, while Ubudehe category 4 contributes RWF 7,000 per person per annum.** Apart from the Ubudehe category 1 members who are not subjected to additional payments, all the other categories also pay additional flat co-payment of RWF 200 at the health centre and health post level per visit and 10% coinsurance at the hospital level.

The **current contributions and copayments are not based on rigorous actuarial estimation** [6]. Consequently, there is an assumption that the current contributions are not commensurate to the comprehensive CBHI benefits package. The socio-economic capabilities study was therefore commissioned to estimate the maximum amount that the informal population especially the Ubudehe category 2, 3 and 4 members are willing and able to pay.

[1]*Ubudehe is the socio-economic classification of the Rwandan population whereby Ubudehe category 1 are the population in the lowest wealth quintile while category 4 members belong to the highest quintile*

2. OBJECTIVES

The CBHI socio-economic capabilities study had two main objectives, to (1) estimate the maximum amount each of the Ubudehe categories are willing and able to pay, and (2) establish the mains determinants of demand for the CBHI.

3. METHODS

Questionnaire survey was the primary data collection method with a few Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) conducted to provided context The data collection used KOBOTOOLBOX to gather responses for both closed-ended and open-ended survey questions. The sampling frame was built with districts as the main sampling units and calculated using the following formula [10]:

$$n = Deff^2 \frac{(1/P - 1)}{\alpha^2}$$

Where n= sample size, Deff=1.5 (design effect); P= 0.50 (recommended when prevalence is unknown); Z= 1.96 at 95% Confidence Interval; e= 0.05 margin of error, α=0.1.

The estimated minimum household sample size per district was **225** which was increased by 2% to account for contingencies, bringing the total sample size to **6,900 households** across the 30 districts.

Table 1: Summary table of Sample Size allocation

Province	All 4 Provinces and Kigali City
District	All 30 Districts
Sector	5 Sectors per District
Cell	3 Cells per Sector
Household level	15.3~16 Households per Cell

3.1 The Willingness and Ability to Pay (WTP/ATP) Approach

The WTP/ATP adopted the Contingent Valuation (CV) technique, specifically, the Double-Bounded Dichotomous Choice (DBDC) to elicit responses from the respondents. The choice of the DBDC approach is because it is relatively less exposed to biases and easier to analyse and deduce the WTP/ATP [11]. In this approach, 0 = No if a respondent was not willing to pay a proposed amount for the CBHI benefit package; and 1 = Yes if he was willing. The amounts were either adjusted upwards or downwards depending on the response obtained from the respondents. In this survey, depending on the household's Ubudehe category, respondents were asked if they were willing to pay **RWF 4,000 per member for non-category/category 2, RWF 5,000 per member for category 3 and RWF 9,000 per member for category 4.** If the respondent's answer was No, the respondent was asked to specify the exact amount he/she would be able willing to pay per household member per annum. However, if the answer was Yes, they were asked if they will be willing to pay a higher amount of **5,000 RWF per member for non-category/category 2, 6,000 RWF per member for Ubudehe category 3, and 10,000 RWF per person per annum for Ubudehe category 4**. If the answer was No, he/she was asked to specify the amount of money he/she was willing and able to pay per annum per member. The given amount was then recorded. If the response was Yes to the second proposed amount, then it is considered as their maximum and it ends the DBDC.

4. RESULTS

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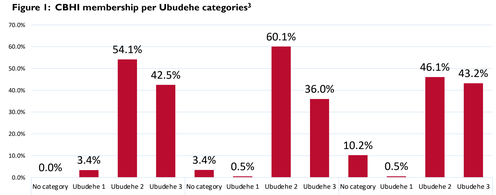
Table 2: Sample Distribution

Category of respondents	Total respondents	Percent
Current CBHI members	2,019	33.2%
Previous CBHI Members[2]	3,660	60.1%
Respondents who have never enrolled in the CBHI	407	6.7%
Total	6,086	100%

[2]*These are former CBHI members who as at the time of the survey (between January – April 2022) were not active members of the CBHI.*

Figure 1: CBHI membership per Ubudehe categories[3]



2 Although **99.3%** (n 6,044) of the respondents found the CBHI to be very useful mechanism for pay for medical bills, only **33.6%** (N=2043) indicated that it was unaffordable.

Table 3: Maximum willingness to pay by CBHI membership status

Category	Average of Maximum WTP (RWF)	Number of respondents (n)
CBHI member	**3572**	**1640**
Category 2	3460	914
Category 3	3756	724
No Category	3500	2
Never Enrolled in the CBHI	**3817**	**276**
Category 2	3518	112
Category 3	4648	122
No Category	3286	42
Previous CBHI Member	**3229**	**2732**
Category 2	3104	1616
Category 3	3355	995
No Category	3227	121
Overall	**3572**	**4648**

[3]*Only adult Rwandans with national ID card can be assigned an Ubudehe Category. Foreigners including those married to Rwandans are not currently eligible for an Ubudehe classification and without a category, they ineligible to enrol to the CBHI - this is the group we term here as 'No category' respondents. Unfortunately, the survey did not identify any Ubudehe category 4 household respondents.*

Logistic regression was used to investigate the relationship between the willingness to join, and the socio-economic and demographic characteristics of respondents.

Ordinary Least Squares (OLS) approach used to estimate the willingness and ability to pay.

The explanatory variables used to estimate demand included the price of insurance or premium. The price of insurance is hypothesized to have a negative effect on demand for insurance, such that the higher the premiums, the lower the demand for CBHI and vice versa. The analysis control for income variables proxied on households' monthly expenditure, participation in income generating activities, and saving behaviour of respondents. Additionally, household size as well as household socio-economic factors such as the level of education, marital status, and age of the head were examined. The other variables added were quality of health care, disability status of households, number of under-5 years children, number of 65+ years, awareness of CBHI terms and conditions, and usefulness of CBHI.

Both the normality of error terms and variance inflation factors (VIF) of independent variables were examined and the error terms were found to be normally distributed will all VIF of the independent variables less than 2.3 with no concern of multicollinearity. Wald chi2 tests was also used to measure the goodness of fit for both models and it shows high significance.

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Table 4: Logistic regression Model Estimation – Factors affecting the decision to enrol to CBHI

Variable	Coefficient	Z-Value	P-Value
Ubudehe 2	0.194	-1.6	0.110
Primary	0.176	1.09	0.275
Post-Primary	0.123	0.81	0.416
Civil status (married)	0.214	1.36	0.175
Children under 5 years in household	0.149	1.12	0.263
65+ years	0.444***	2.56	0.010
Age of household head	-0.008	-1.53	0.126
Size of household	-0.078***	-2.39	0.017
Disability	0.065	0.24	0.813
Out-off-Pocket	-1.44E-06	-0.22	0.829
Quality of health quality (Perception of good quality of service)	0.435***	4.11	0.000
Perception of knowledge and skills of medical staff	-0.107	-1.28	0.202
Employment status/working	0.0245	0.41	0.685
Monthly expenditure	3.57E-06	1.58	0.115
Participate in income generating activities (=1)	0.710***	4.39	0.000
Member of a formal or informal saving scheme	-0.133	-0.85	0.396
Saving in the Ejo Heza program?	-0.167	-1.21	0.227
Saving part of income (=1)	0.0393	0.25	0.802
Usefulness of CBHI membership	-0.2382	-0.26	0.793
Premium/Price of CBHI	-1.45***	-11.66	0.000
CBHI information/communication	0.41*	1.75	0.080
Healthcare utilization	0.832***	2.93	0.003
Constant	1.203	1.1	0.269
Number of observations			1,816
F(21, 1307)			256.51
Prob > chi2			0.0000
Adj R-squared			0.1271

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Table 5: Ordinary Least Squares (OLS) Model Estimations – Determinants of the WTP for CBH

Variable	Coefficient	Z-Value	P-Value
Ubudehe 2	-0.035**	-1.91	0.0570
Primary	-0.030	-1.12	0.2620
Post-Primary	0.001	0.03	0.9720
Civil status (Married)	0.004	0.19	0.8490
Unde-5 years	0.003	0.18	0.8560
65+ years	-0.022	-0.93	0.3540
Age of household head	-0.011	-0.33	0.7430
Size of household	-0.087***	-3.67	0.0000
Disability	-0.017	-0.79	0.4280
Out-off-Pocket	-0.004	-0.61	0.5410
Quality of health quality (Perception of good quality of service)	-0.015	-1.1	0.3190
Perception of knowledge and skills of medical staff	0.015	1.44	0.1500
Employment status/working	-0.063***	-6.97	0.0000
Monthly expenditure	1.00E-06***	4.12	0.0000
Participate in income generating activities	0.060***	2.85	0.0040
Member of a formal or informal saving scheme	-0.038	-1.55	0.1210
Saving in the Ejo Heza program?	0.06***	2.89	0.0040
Saving part of income	0.065***	2.8	0.0050
Usefulness of CBHI membership	-0.247	-2.06	0.0390
Price of CBHI	-0.09***	-4.21	0.0000
CBHI information/communication	0.055*	1.85	0.0650
Healthcare utilization	0.058*	1.76	0.0780
Constant	8.76	42.3	0.0000
Number of observations			1,253
F(21, 1307)			15.43
Prob > chi2			0.0000
Adj R-squared			0.2023

*Note: *** and * = significant at 1%, and 10% level respectively. If P-Value < 0.05, means statistically significant*

5 The Logistic regression model shows that the **price of insurance is a significant determinant factor** to the CBHI enrolment with a coefficient of -1.45 and a P-Value < 0.05. This means that while holding the other factors constant, increasing premium by 1% would decrease the odds of enrolling by 1.4%. **Household size is negatively associated with WTP**, suggesting that for every new additional household member, the willingness to enrol of that household decreases by 0.078.

The coefficient for 'participation in **income generating activities**', which is one of the proxies of income, is **positive and significant** at the 1 percent level. In addition, households who p**erceive the quality of health care as high, and or have enough information of the CBHI, or have sought healthcare during the past 1 year, are more likely to enrol into the CBHI.**

4 The results from the OLS model show that the **price of insurance** is a significant determinant factor to households' ability to pay for the CBHI. Its coefficient is **negative and statistically significant at p-Value < 0.05**. This means that while holding all other factors constant, increasing premium by 1% would decrease the willingness to pay by 0.09%. Relatedly, **increasing the household size by 1 new member will decrease the willingness** to **pay by 0.087**%.

Households with **unemployed heads** are less likely to pay for an improved CBHI. The **other factors that positively** affects the households' ability to pay include their **participation in income generating activities** (increase WTP by 6%), and **participation in savings** (increase WTP by 6.5%). Households who are **well informed households about the CBH** have **better chance of paying** for the CBHI (increase WTP by 5.5%), Also, the **WTP for CBHI increases by 5.8% for households that have utilized healthcare in the last 1 year**.

5. DISCUSSION & CONCLUSION

While there **seems to be scope** for increasing the CBHI contributions for some Ubudehe categories particularly Category 2 and 3 members, these adjustments may have to be done in such a way that it doesn't significantly compromise the CBHI enrolment. **Some general improvements are required** including **addressing the challenges relating to quality of services, long waiting times and drugs stockout in facilities, as well as expanding the CBHI package to include private health care services.** This observation was emphasized during the FGDs, where the discussants repeatedly cautioned that before the CBHI increases the premiums, there is need to improve the service package, quality of the services provided, as well as create public awareness on the CBHI.

According to Grassi and Fontanelle (2008) the amount people say they are willing to pay may not necessarily reflect their ability to pay [18]. However, we postulate that the maximum amounts that the respondents are willing to pay for an improved CBHI are realistic and affordable to them. Firstly, **with an overall average maximum willingness to pay of RWF 3,572 (~USD3.6) per member per annum, it represents only 0.43% of Rwanda's Gross Domestic Product (GDP) per capita of USD 833.8 in 2021 which is far below the 12.6% in South Africa** and 9.0% average in OECD countries [19]. Secondly, **various studies have shown that the actual ability to pay is often higher than the amounts solicited** through the contingent valuation method [20]. We therefore recommended that the **CBHI considers increasing the premiums for Categories 2 and 3 members up to RWF 3,572** or start with the category 3 members and gradually scale up.

In terms of the determinants of demand, similar factors of statistical significance (with p-Values < 0.05) were observed to affect both the willingness to enrol and ability to pay for an improved CBHI including the **prices of insurance, size, economic activities participation, saving behaviour, income, expenditure, and healthcare utilisation experience of households, as well as the age, employment status of the household heads**. Also, **knowledge and understanding of the CBHI and perception of quality of the CBHI healthcare services** affect the willingness and ability to enroll.

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