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Determinants of Demand for Health Insurance in Uganda: An Analysis of Utilisation and Willingness to Pay

Dablin Mpuuga,* Bruno L. Yawe§ & James Muwanga‡

Abstract

Health insurance is increasingly being recognized in Uganda as an effective way of protecting people against catastrophic health expenditures. However, only 5 percent of Ugandans hold health insurance, and only 42 percent would consider joining any health insurance scheme. It is in this regard that this study sought to examine the determinants of demand for health insurance in Uganda. After applying a logistic model on Uganda National Household Survey (UNHS) data of 2016/17, the results reveal that awareness is a very crucial factor in determining demand for health insurance, and that most Ugandans are not aware of health insurance as a mode of paying for medical care. The results further reveal that although most of the people suffering from non-communicable diseases are willing to pay for health insurance, very few have health insurance in this regard. Generally, willingness to pay does not translate into actual utilisation of health insurance. Thus, the study recommends the promotion of awareness about health insurance, increasing the literacy levels of Ugandans through education, promoting poverty reduction and income enhancing programs, as well as urgently implementing a National Health Insurance Scheme (NHIS).

Keywords: *demand, health insurance, logit*

JEL Codes: *A10, I11, I19*

1 Motivation

Uganda enjoyed one of the best equipped and well-staffed health care facilities in East Africa in the immediate aftermath of its independence in 1962. These facilities included referral hospitals, district hospitals, and a network of health units. However, the political turmoil and economic decline of the 1970s resulted in the deterioration of social services in general, and the national health care system in particular (Ssewanyana et al., 2004). Since then, health services in Uganda have been experiencing continuous budgetary cuts and deterioration in performance. According to the World Health Organisation (WHO), out of pocket payments (OOPs) are direct payments made by individuals to health care providers at the time of service. Out of pocket (OOP) expenditures on health continue to increase even after the abolition of user fees in 2001. This is reflected in Uganda's composition of health care financing as highlighted by Orem and Zikusooka (2010) in Table 1.

*Economist at the School of Economics, Makerere University: dablin.mpuuga@gmail.com
§Associate Professor of Economics at the School of Economics and Deputy Principal College of Business and Management Sciences, Makerere University.
‡Senior Lecturer of Economics at the School of Economics, Makerere University

Table 1: Health Care Financing by 2010

Health Care Financing Component	Percentage (%)
Household	49
Donors	35
Government	15
NGOs	1
Total	**100**

Source: Orem and Zikusooka (2010)

There is a growing national consensus on the importance of extending protection in the form of health insurance to the whole population to reduce the burden of catastrophic expenditures on health. According to the Uganda Bureau of Statistics (UBOS) (2018), a health insurance policy is an agreement between the insured and an insurance company where the insurance company agrees to cover the cost of certain listed medical benefits such as tests, drugs, and treatment services.

For the period 2012/13 to 2016/17, government expenditure on health remained low at an average of 7.9 percent, 1.9 points short of the health sector development plan 2015/16-2019/20 target of 9.8 percent; and much lower than the Abuja Declaration of 15 percent. Moreover, according to the Uganda Insurers Association (UIA) (2018), Uganda's OOP expenditures on health have kept on escalating, reaching a high of 53 percent compared to Rwanda, which stood at 18 percent. This renders health services expensive for households in Uganda.

The insurance market in Uganda is generally characterized by high potential demand and a rather low real demand. Whereas this could be attributed to a series of socio-economic reasons, it is still unclear as to why this high potential demand is not resulting into real demand (IRA, 2015).

Health insurance positively impacts on growth by reducing individuals' OOP expenditures on health (Kimani et al., 2012; Ibok, 2012; Ataguba and Goudge, 2012) which in turn increases their savings, and therefore promotes investment in an economy. The uninsured receive fewer preventive and diagnostic services, tend to be more severely ill when diagnosed, and receive less therapeutic care. Moreover, improving health status from fair or poor to very good or excellent increases both work effort and annual earnings by approximately 15 percent to 20 percent (Hadley, 2003). Despite the existence of a remarkably clear consensus about its importance, the demand for health insurance in Uganda has persistently remained low, with only 5 percent of the population being covered by health insurance. Awareness about health insurance services stands at a meagre 11 percent, and only 42 percent of those who are aware would consider joining any health insurance scheme (UBOS, 2018).

Therefore, we sought to examine the determinants of demand for health insurance, and specifically to examine the impact of: (i) non-communicable diseases and other factors on the demand for health insurance in Uganda; and (ii) awareness and other

factors on the demand for health insurance in Uganda. Actual utilisation and willingness to pay for health insurance are the two measures of demand for this study.

The rest of the study presents the theoretical and methodological underpinnings, followed by empirical analysis and discussions, and finally concluding by suggesting the way forward.

2 Related Literature

2.1 Theories of Demand for Health Insurance

Nyman (2005) suggests that health insurance is purchased to obtain an income transfer when ill. The consumer purchases insurance when the expected utility gain that is generated by the income transfer when ill exceeds the expected utility lost from paying the premium when healthy. Therefore, Nyman argues that to understand the relationship between health insurance and demand for medical care, it is important to recognize that private health insurance is primarily a transfer of income from those who remain healthy to those who become ill.

The conventional theory of health insurance holds that becoming insured acts like a reduction in the price of health care, just as if the price reduction had occurred exogenously in the market. According to this theory, the mechanism by which insurance is financed can be ignored because the effect of premiums on the demand for medical care, an income effect, is empirically negligible (Nyman, 2001).

Zweifel (2007) presented a two-goods model of insurance demand, with wealth in the no-loss state and wealth in the loss state constituting the two goods. He applied a simpler alternative of the Von Neumann-Morgenstern (VNM) function, and concluded that risk-averse individuals derive benefit at least on expectations from health insurance, provided the premium does not contain an excessive loading for administrative expense and profit; in other words, so long as the premium is actuarially fair.

2.2 Empirical Literature

Different methods and techniques have been applied to analyse demand for health insurance, using both primary and secondary data. For example, Ramesh and Nishant (2006) applied the Heckman two-stage estimation procedure, using both probit and ordinary least squares to analyse, first, factors that affect insurance purchase decision; and second level studying factors that affect the amount of insurance purchase in a micro health insurance scheme in the Anand district of Gujarat, India.

The probit and logit models are widely used especially when outcome variables are dichotomous in nature (Cameron & Trivedi, 2005). However, the logit model is more preferred in health-related studies simply because of its comparative mathematical simplicity, and the fact that it provides odds ratios that clearly show the magnitude. Ataguba and Goudge (2012) used propensity score matching to investigate the impact of private insurance in South-Africa, via membership of a

medical scheme, on health-care utilisation and out-of-pocket payments. On their part, Cardon and Hendel (2001) applied a structural model of health insurance and health care choices on individual data from the National Medical Expenditure Survey (NMES).

In the case of Uganda, Ssempala (2018) applied the probit model on Uganda Demographic Health Survey (UDHS) data of 2011 to examine factors influencing demand for health insurance in the country. Orem and Zikusooka (2010) just assessed the impact of the proposed National Health Insurance Scheme (NHIS) on overall equity in financing in Uganda, using both the Kutzin and fair financing frameworks. They assessed the proposed NHIS for Uganda from an equity perspective, exploring the extent to which this NHIS would improve the existing disparities in the health sector (ibid.). They argue that the NHIS is proposed mainly to obtain additional funding for the health sector and promote financial risk protection. They further highlight that a gradual implementation of the NHIS will result in low coverage initially, which might pose a challenge for effective management of the scheme. Moreover, they argue that it is not clear how the NHIS would fit into, and integrate within, the existing financing mechanisms (ibid.). On the other hand, Ssempala (2018) only investigated factors influencing demand for health insurance in Uganda, and concluded that wealth, level of education, access to information, and area of residence are significant determinants of demand for health insurance. However, age, marital status, and health status (which was proxied by smoking) were found to be insignificant.

The most critical barrier to enrolment in the Kenyan National Hospital Insurance Fund (NHIF) is the lack of knowledge of informal sector workers about the NHIF, its enrolment options and procedures for informal sector workers (Mathauer et al., 2008). Also, even though most people are often interested and willing to pay for health insurance, they cannot afford it (ibid,). Kimani et al. (2012) confirmed the magnitude of the affordability constraints by concluding that only 10 percent of Kenyans in urban slums were participating in the NHIF program, while less than 1 percent (0.8 percent) had private insurance coverage. They further confirmed that people working in the formal employment sector were more likely to be enrolled under any health insurance program compared to those in the informal sector. This is similar to what Umeh and Feeley (2017) also argue: that the rich are more willing to pay for health insurance compared to the poor. This means that actual enrolment in a community-based health insurance scheme is directly associated with one's socioeconomic status.

Other factors such as age, sex, marital status, education level, family size (Ibok, 2012), geo-political zone (Aregbeshola & Khan, 2018), and religion (Jutting, 2003) have been found to be significant determinants of demand for health insurance. According to Ramesh and Nishant (2006), income and healthcare expenditure are significant determinants of health insurance purchase; with age, coverage of illness, number of children in a family, and knowledge about insurance all having a significant but non-linear relationship with health insurance purchase.

Cardon and Hendel (2001) argue that riskier individuals buy more coverage and on average end-up using more care, and this is partly in agreement with Zweifel (2007) two-goods model of health insurance demand. The uninsured have a higher relative risk of death than the privately insured, although there is greater uncertainty about the exact magnitude of the difference. Both the extra years of life and presumably more healthy years of life would add to individuals' and families' health which increases annual earnings by 15 percent to 20 percent (Hadley, 2003).

Reliance on out-of-pocket (OOP) payment for healthcare may lead poor households to undertake catastrophic health expenditure. Risk-pooling mechanisms have been recommended to mitigate such burdens for households in Bangladesh (Ahmed et al., 2016). Ataguba and Goudge (2012) also recommend health insurance as an alternative to direct OOP financing, which aims at improving access to care and reduce OOP payments. They call for a need to design health insurance in the form that ensures not only adequate utilization of health services, but also provides financial protection to the insured.

As concerns willingness to pay for health insurance, Ahmed et al. (2016) confirms that it increases by 0.196 percent with each increase in income. This is in line with Wang et al. (2005) who confirmed that income is a very important factor in influencing farmers' decision to join a community-based insurance (CBI).

Based on the reviewed literature, age, gender, health status, marital status, household size, residence, income, education level, and awareness about health insurance are some of the factors that have been found to impact on the demand for health insurance. However, there are mixed findings with regards to the impact of different variables due to variations in environment and the data utilised.

3 Methodology

3.1 Theoretical Framework

To investigate the determinants of demand for health insurance in Uganda, we adopted the expected utility theory as put forward by Zweifel (2007) in his two-goods model. In this model which is based on the Von Neumann-Morgenstern (VNM) function, there are two levels of wealth, W_L in the loss state and W_N in the no-loss state. The associated utilities are $U[W_L]$ and $U[W_N]$, where $U[W_L] < U[W_N]$.

The expected utility is given by;

$$EU = \pi\, U[W_L] + (1-\pi)\, U[W_N] \qquad (1)$$

Where,

$W_L = W_0 - L - P(I) + I$, and $W_N = W_0 - P(I)$; with π denoting probability of loss ($0 < \pi < 1$), P the premium, and I the amount paid by insurance in the event of loss. The demand for insurance, case of $\pi = 1/2$ is illustrated in Appendix C. The expected utility EU is associated with the expected value of wealth EW, and there is a linear combination of utilities $U[W_L]$ and $U[W_N]$.

Considering an individual who has the possibility of being insured, in which a high value and a low value of wealth may be realized with a certain probability. Given that the alternative providing certainty would be financially equivalent ($W = EW$), a risk-averse decision maker would opt for insurance. This means that $U[EW] > EU[W]$.

Introducing health status H in the risk-utility function, and if the premium is actuarially fair, then:

$$P(I) = \pi I \qquad (2)$$

Substituting equation (2) into (1) modified to comprise $U_h(W)$ for the healthy state and $U_s(W)$ for the sick state, and taking the first order derivative with respect to insurance coverage I, we get:

$$\frac{dEU}{dI} = \pi U_s'[W_l](-\pi + 1) + (1 - \pi)U_h'[W_n](-\pi) = 0 \qquad (3)$$

Dividing throughout by $\pi(1 - \pi)$ implies that,

$$U_s'[W_l] = U_h'[W_n] \qquad (4)$$

Therefore, given actuarially fair premiums, the optimum for a potential buyer of health insurance is the equality of the two marginal utilities of wealth. The theory of insurance demand predicts that risk-averse individuals derive benefits at least on expectations from health insurance, provided the premium does not contain an excessive loading for administrative expense and profit (Zweifel, 2007).

The two variables of wealth and health status as suggested by Zweifel (2007) were adopted for this study; whereas age, gender, awareness about health insurance, residence, household size, education level, as well as marital status of the individual were adopted basing on the empirical literature. We also introduced non-communicable disease (NCD) as a new variable since it is an emerging issue.

3.2 Estimation Procedure

The econometric model for the study was specified as follows;

$$y_i = \beta' x_i + \varepsilon_i \qquad (5)$$

Where, β is a vector of parameters to be estimated, y_i is the dependent variable; with $\beta' = (\beta_0\ \beta_1 \ldots\ldots\ldots\ldots\ldots \beta_{13})$, and $x_i' = Age\ Age^2\ Gen\ Wea\ Hstatus\ Res\ Hhs\ Mstatus\ Edn\ Awareness\ NCD\ Region\ lnPrice$)[1]

Since the dependent variable is dichotomous in nature, this study adopted the logit model. The linear probability model (LPM) could not be applied because it is always

[1]Health status and NCD did not appear in the same model together due to collinearity issues. They were rather run in different models. *Gen* stands for gender or sex of an individual, *Wea* stands for wealth of an individual, *Res* stands for residence, *Hhs* is the Household size, *Mstatus* is the Marital status, *Edn* is the education level, and *lnPrice* is the log of the health care expenditure by an individual.

heteroskedastic, and its simplistic assumption of linearity that cannot apply to a dichotomous variable of health insurance demand. The fact that it is possible for predicted probabilities to lie outside the [0 1] interval makes the LPM inappropriate. The logit and probit models give qualitatively similar results, although the logit model was adopted over the probit due to its comparative mathematical simplicity, and its provision of the odds ratios (Gujarati & Porter, 2009).

From the econometric model, $y_i = \beta' x_i + \varepsilon_i$

$$y = \begin{cases} 1 & if\ insured \\ 0 & if\ not\ insured \end{cases}$$

Let y_1 and y_0 be the net benefit or utility derived from being insured and not being insured respectively. Where,

$$y_1 = \beta' x_1 + \varepsilon_1 \text{ and } y_0 = \gamma' x_0 + \varepsilon_0$$

We do not observe y_1 and y_0, but we do observe y, where,

$$y = 1 \text{ if } y_1 > y_0 \text{ and } y = 0 \text{ if } y_1 \leq y_0$$

In other words, if the utility gained from being insured is greater than the utility gained from not being insured, that is, $y_1 > y_0$, then $y = 1$. Likewise, $y = 0$ if utility gained from being insured is less or equal to that gained from not being insured, that is, $y_1 \leq y_0$.

The probability of observing being insured is therefore; $(y = 1) = F(\beta' x)$, because the expected value of y given x is just a probability.

Where,

$$(\beta' x) = \Lambda(\beta' x) = \frac{e^{\beta' x}}{1 + e^{\beta' x}}$$

3.2.1 Odds Ratios

The odds ratio represents the constant effect of a predictor x, on the likelihood that one outcome will occur. The odds ratio is given by, $P(y = 1)/P(y = 0) = e^{\beta' x_i}$, and it gives the number of times an individual is likely to demand for health insurance compared to not demanding (Cameron & Trivedi, 2005; Green, 2012; Johnston & Dinardo, 1996; Jones, 2005; Maddala, 1992; Wooldridge, 2016).

3.3 Data

We used secondary data from the Uganda National Household Survey (UNHS) 2016/17, which is the 6th in a series of consumption surveys conducted by the Uganda Bureau of Statistics (UBOS). The survey covered all 112 districts of Uganda for a period of 12 months, which is from end of June 2016 to June 2017, where a total of 17,450 households were scientifically selected countrywide. For health insurance, the survey considered persons aged 15 years and above. The data was used because of its easy accessibility, availability, and for being the most recent household survey.

Table 2: Definition of Variables

Variable	Definition	Coding	Variable Type	E-sign
Utilisation (y_i)	Whether the respondent is covered by any health insurance scheme	1-Yes 0-No	Binary	Outcome variable
Willingness (y_i)	Whether the respondent would be willing to join any health insurance scheme	1-Yes 0-No	Binary	Outcome variable
Age	Age of the respondent in completed years	Continuous	Continuous	+
Age Squared	Age x Age of the respondent in completed years	Continuous	Continuous	-
Awareness	Whether the individual is aware about health insurance	0-Not aware **(Ref)** 1-Aware	Binary	+
Gender	Sex of the individual i.e. Male or Female	1-Male **(Ref)** 2-Female	Binary	+
Marital status	The marital status of the respondent	1-Married Monogamous **(Ref)** 2-Married polygamous 3-Divorced/separated 4-Widow/widower 5-Never married	Nominal	 - - - -
Health status	Whether the respondent fell ill, 6 months before collection of data	0-No illness **(Ref)** 1-Illness	Binary	-
Education	Whether the respondent could read and write	1-Unable to read and write **(Ref)** 2-Able to read only 3-Able to read and write	Nominal	+ +
Residence	Whether the respondent stays in a rural or urban area	0-Rural **(Ref)** 1-Urban	Binary	+
Household size	The number of members in a household	Continuous	Continuous	-
Wealth	The wealth status of the household	1-Poor **(Ref)** 2-Neither poor nor rich 3-Rich	Nominal	+ +
Region	The region where the respondent resides	1-Central **(Ref)** 2-Eastern 3-Northern 4-Western	Nominal	- - -
Price (lnPrice)	Expenditure on medical care (opportunity cost of health insurance)	Continuous	Continuous	-
NCD	Whether the respondent is suffering from any of the non-communicable diseases or not i.e. Diabetes, High blood pressure and Heart diseases.	0-No NCD **(Ref)** 1-Has NCD	Binary	+

Note: E-sign – Expected sign

4. Empirical Results

To be confident with the estimates, diagnostic tests were performed to check and correct for any abnormalities in the data, model, or even the variables that were adopted for the study. In the presence of high multicollinearity, t-statistics tend to be too small and with very wide confidence intervals of coefficients. Some variables were dropped as a remedy to the multicollinearity problem. The variance inflation factor (VIF), as well as the pair-wise correlation, were used to detect the problem of multicollinearity (Gujarati & Porter, 2009) (see Appendix A). All the variables passed the test, except for Age and Age squared, whose VIFs shot high above the threshold of 10. However, this was expected since Age squared was generated from Age to investigate the possibility of a non-linear relationship between Age and health insurance demand. The average VIF is 5.385, 5.369 and 5.378 for models 1, 2 and 3, respectively.

Age squared was normalized by dividing it by 100. The Price (total expenditure on health and medical care), which is the opportunity cost of health insurance, was normalized by taking its logarithm (see table 3). Since the health status of an individual and possession of a non-communicable disease can be highly correlated, health status and NCD were run interchangeably.

The mean value of 0.05801 for utilisation of health insurance compared to 0.4025 for willingness to pay for health insurance clearly show that Ugandans are more willing to pay for health insurance than they actually enrol for this health insurance. This can be partly attributed to the low awareness levels, combined with affordability constraints prevailing in the country.

Table 3: Summary of Descriptive Statistics

Variable	Mean[2]	Sd	Min	Max	N
Utilisation	0.05801	0.23378	0	1	10360
Willingness	0.4025	0.49043	0	1	9759
Awareness	0.10855	0.31107	0	1	38426
Age[3]	20.5532	17.9752	0	115	74237
Gender	1.51838	0.49967	1	2	76571
Marital status	3.82559	1.71116	1	5	74237
Health status	0.63749	0.48073	0	1	74237
Education	2.14853	0.97641	1	3	67056
Residence	0.29426	0.45571	0	1	76463
Household size	5.87241	2.67879	1	23	76463
Wealth	2.19219	0.73744	1	4	76565
Region	2.52799	1.0804	1	4	76463
NCD	0.05427	0.22654	0	1	49332
Agesq2[4]	7.45536	12.1919	0	132.25	74237
lnPrice	9.06303	0.84335	4.60517	15.6073	76397

[2] The mean of categorical variables and dummies does not make much economic sense but it is reported for consistency and uniformity.
[3] Age was measured in completed years, therefore babies who were months old take on a value of zero.
[4] Agesq2 was normalized by dividing it by 100.

The Hausman test was run to ascertain the model to run, the test results indicated that the logit model is consistent under both the null (H_0) and alternative (H_a) hypotheses. The null hypothesis states that, the difference in coefficients of the logit and probit models is not systematic. However, the probit model was inconsistent under the alternative hypothesis, but efficient under the null hypothesis. This confirmed the running of a logit model instead of a probit model.

After all the necessary diagnostic tests, three logit regressions were performed to generate odds ratios. All regressions were run on the estimation sample not only to report consistent estimates, but also to make policy recommendations at the national level (Skinner & Mason, 2012). The weighted regressions show the population size of 31,327,409 for model 1, and 29,932,709 for both models 2 and 3 (see Appendix B).

Table 4 presents the logit regression results of demand for health insurance. The odds ratios show the probability of an individual demanding for health insurance relative to the probability that they do not (Haipern and Visintainer, 2003). For Model 1 [M(1)], utilisation of health insurance was run as the outcome variable whereas in model 2 [M(2)] and model 3 [M(3)] willingness to pay was run as the outcome variable. Health status in models 1 and 2 was replaced with NCD in model 3 to avoid multicollinearity.

Table 4: Logistic Estimates (Odds Ratios) of Demand for Health Insurance in Uganda

Variables	M (1)	M (2)	M (3)
Awareness: Not Aware **(Ref)**			
Aware	3.632***	3.200***	3.243***
	(0.498)	(0.488)	(0.506)
Age:	1.141***	0.998	0.995
	(0.0432)	(0.0119)	(0.0120)
Agesq2:	0.858***	1.001	1.004
	(0.0404)	(0.0133)	(0.0134)
Gender: Male **(Ref)**			
Female	1.087	1.135	1.152
	(0.164)	(0.100)	(0.103)
Mstatus: Married Monogamous **(Ref)**			
Married Polygamous	0.663*	0.934	0.935
	(0.139)	(0.121)	(0.116)
Divorced/Separated	0.534*	0.745	0.733*
	(0.196)	(0.139)	(0.135)
Widow/Widower	1.565	0.990	1.004
	(0.527)	(0.267)	(0.292)
Never Married	0.845	0.892	0.862
	(0.195)	(0.104)	(0.103)
Hstatus: Healthy **(Ref)**			
Unhealthy	1.026	1.603***	
	(0.162)	(0.105)	
Education: Unable to Read & Write (**Ref**)			
Able to Read only	2.553	3.140***	3.233***
	(1.479)	(1.028)	(1.048)

Able to Read & Write	1.030	1.663***	1.676***
	(0.422)	(0.198)	(0.196)
	1.830***	0.756***	0.744***
Residence: Rural (**Ref)**			
Urban	(0.292)	(0.0677)	(0.0645)
Household size:	0.962	0.972	0.967*
	(0.0228)	(0.0170)	(0.0171)
Wealth: Poor **(Ref)**			
Neither Poor nor Rich	1.571***	1.550***	1.511***
	(0.218)	(0.144)	(0.143)
Rich	2.922***	1.307	1.244
	(0.705)	(0.225)	(0.209)
Region: Central **(Ref)**			
Eastern	0.811	1.132	1.168
	(0.146)	(0.195)	(0.201)
Northern	1.208	0.393***	0.407***
	(0.311)	(0.0553)	(0.0600)
Western	1.027	0.711***	0.675***
	(0.186)	(0.0760)	(0.0696)
lnPrice:	0.865	0.955	0.966
	(0.0944)	(0.0438)	(0.0439)
NCD: No NCD **(Ref)**			
Has NCD			1.335**
			(0.165)
Constant	0.00590***	0.480	0.602
	(0.00727)	(0.248)	(0.310)
Observations	10,262	9,668	9,668

Note: **Ref** stands for the reference category or the base category of a categorical variable
Standard errors in parentheses, (*** p<0.01, ** p<0.05, * p<0.1).
***, **, * indicate significance levels at 1%, 5% and 10% respectively.

4.1 Interpretation and Discussion of Results

We find that the odds ratio of an individual who is aware about health insurance to utilise health insurance is 3.632 in contrast to an individual who is not aware of health insurance. In other words, an individual who is aware of health insurance as a form of paying for medical care is 263.2[5] percent more likely to utilise health insurance compared to an individual who is not aware of it. In the same direction, a person who is aware of health insurance, his/her odds of willingness to pay for health insurance are 3.200 and 3.243 for M(1) and M(2) models, respectively; compared to an individual who is not aware of health insurance. This result concurs with Ssempala (2018) who found that listening to radio as a form of access to information positively influenced female individuals' demand for health insurance. Mathauer et al. (2008) also suggest the same for individuals in Kenya.

The age of an individual has a very significant impact on the utilisation of health insurance. The odds ratio of 1.141, which is greater than 1, depicts a positive relationship, implying that health insurance utilization is 14.1 percent higher for each year of age for an individual. Salari et al. (2019) concluded that an individual's age is positively associated with her/his enrolment into health insurance. As for Age squared, the odds ratio of 0.858 implies that the utilization of health insurance by an individual

[5]This is calculated as a percentage of the deviation from one ***(1)*** which is **3.632-1 = 2.632**, implying **2.632x100 = 263.2%.**

is 14.2 percent lower for each year past the optimal age. This result about age and age squared concurs with Ramesh and Nishant (2006) who concluded that age has a significant but non-linear relationship with health insurance purchase.

We further find that individuals who are in polygamous marriages are 33.2 percent less likely to utilize health insurance compared to those who are married monogamously. As for the divorced or separated individuals, the odds ratios of 0.534 and 0.733 for utilization and willingness to pay, respectively, imply that those individuals who are divorced are 46.6 percent less likely to utilize health insurance when compared to those in monogamous marriages, whereas the divorced are 26.7 percent less willing to pay for health insurance if compared to those who are married monogamously. This is an indication that being married increases an individual's demand for health insurance; whereas those in monogamous families are more likely to demand for health insurance than those in polygamous marriages. Dror et al. (2016), Owusu-Sekyere and Chiaraah (2014) and Salari et al. (2019): all agree that marital status is a very crucial factor in determining an individual's enrolment into health insurance.

The results further reveal that unhealthy or sick individuals are 60.3 percent more willing to pay for health insurance compared to individuals who are healthy. Being able to read implies more willingness to pay for health insurance compared to persons who cannot read. Ahmed et al. (2016), and Aregbeshola and Khan (2018) present similar results about the education level of an individual. Those who are capable of reading and writing are 66.3 percent and 67.6 percent more willing to pay for health insurance if compared to individuals who are unable to read (see Table 4). Furthermore, being an urban dweller is associated with more likeliness to utilize health insurance, even though it is associated with less willingness to pay for health insurance as per the results in Table 4. An urban dweller is 83.0 percent more likely to utilize health insurance compared to one who lives in rural areas.

Persons from the northern region of Uganda are 60.7 percent less willing to pay for health insurance compared to those from the central region, that is for M(2). An individual staying in the western region of Uganda is 28.9 percent and 32.5 percent less willing to pay for health insurance compared to one staying in the central region, i.e., M(2) and M(3), respectively. Despite the fact that both the northern and western regions exhibit less willingness to pay for health insurance, we witnessed further differences amongst the two regions with individuals staying in the northern region more unwilling to pay for health insurance compared to those from the western region if all are compared to their counterparts from the central region. This is commensurate with the poverty levels which are lower in both the central and west regions, but high in the north and east.

Finally, the wealth of an individual, the size of the household, as well as the emerging issue of non-communicable diseases are strong determinants of the demand for health insurance. Individuals who are neither poor nor rich (middle class) are 57.1

percent more likely to utilize health insurance compared to individuals who are poor; whereas the rich are 192.2 percent more likely to utilize health insurance if compared to the poor. Jutting (2003) argued that an individual's income or wealth is a major determinant of demand for health insurance in Senegal. A study by Adebayo et al. (2015) concluded that low levels of income and lack of financial resources are major factors affecting enrolment in health insurance. In the same regard the rich are as well more willing to pay for health insurance compared to the poor. This result is consistent with Umeh and Feeley (2017) who confirmed that rich individuals are more willing to pay for health insurance.

An individual with a non-communicable disease is 33.5 percent more willing to pay for health insurance compared to one without a non-communicable disease. We also noted that having a non-communicable disease has no significant impact on the utilization of health insurance, but has a significant impact on the willingness to pay for health insurance. This is mainly because most insurance companies tend to shy away from covering individuals against such diseases since they are expensive to manage, and the fact that in most cases treatment takes a very long-time spell, and in some instances, treatment may stretch until death. This happens however much individuals are willing to pay for their coverage. We also find that, for each extra member in a household the willingness to pay for health insurance declines by 3.3 percent. This is so because the bigger the size of a family, the more expenditure on other basic needs like food; hence reducing the amount available to cater for health and health insurance in that regard.

The main findings of our study include:

(a) Most Ugandans are not aware[6] about health insurance as a mode of paying for medical care, which is a very crucial factor in explaining demand for health insurance. The '*awareness'* variable was highly significant at 1 percent level of significance, representing 99% confidence in all models presented in Table 4.

(b) Many Ugandans suffering from non-communicable diseases are willing to pay for health insurance, but very few are holders of health insurance policies in that regard. The '*NCD'* variable was not significant under the utilisation model,[7] but highly significant in the willingness model. This is so because most insurance companies shy away from insuring people against non-communicable diseases, and instead find it easy to insure individuals against easily manageable diseases.

(c) An individual's gender or sex does not in any way influence his/her demand for health insurance in Uganda. The variable '*Gender'* was not significant in all the regressions that were run (see Table 4).

[6] Awareness stands at 11%, according to UBOS.

[7] The utilisation model with the *NCD* variable was not presented in table 4. It was left out since the magnitudes of the rest of the variables were similar as those of M(1).

(d) There is an upsurge of non-communicable diseases (NCDs) compared to communicable diseases in Uganda (Mpuuga et al., 2019). Since the study used a one point in time data (cross-section data), the trend was easily shown by data from world development indicators (see Appendix C).

(e) There are clear regional differences in demand for health insurance in Uganda with more utilisation found in the central region of Uganda, followed by the western region. The regions of east and north exhibit both less utilisation and willingness to pay for health insurance, which is highly commensurate with the prevailing differentials in poverty head count.

(f) Generally, the willingness to pay for health insurance does not translate into actual utilisation of health insurance. This can partly be explained by the prevailing affordability constraints among other reasons.

5. Conclusion and Policy Implications

Based on the findings of the study, we conclude that the demand for health insurance is influenced by both demographic and socioeconomic factors and to boost this demand in Uganda, policy measures need to influence both demographic and socioeconomic factors. It is in this regard that we recommend the following policies to boost demand for health insurance and achieve the third Sustainable Development Goal (SDG 3), which aims at achieving universal health coverage and providing access to safe and affordable medicines and vaccines for all (Kisaame et al., 2019):

(i) Promoting awareness about health insurance. This was the only variable that was found to be highly significant in all the models. This re-affirms the importance of awareness as far as demand is concerned. Advocacy about the importance of health insurance, and how to get enrolled should be scaled up country wide with more emphasis on the eastern and northern regions where awareness was reported to be the lowest. This will increase the percentage of awareness from the current 11 percent reported in the UNHS 2016/17 to a better percentage to attain SDG 3. Media campaigns and social marketing activities can all be used to boost awareness;

(ii) Increasing the literacy levels of Ugandans through education. The study found out that individuals who were at least capable of reading, together with those who could both read and write, utilised health insurance more compared to those who were unable to read and write. The same individuals were more willing to pay for health insurance compared to those who were unable to read and write. Therefore, emphasis on basic literacy should be prioritized, with more priority on individuals from the eastern and northern regions of Uganda;

(iii) Promoting poverty reduction and income enhancing programs. There is a clear consensus that affordability of the different insurance policies by individuals is key as far as demand is concerned, which is a serious bottleneck. Therefore, there is an urgent need to implement effective income boosting and poverty reduction programs. This will enhance the incomes of both individuals and households in Uganda, which will eventually boost the demand for health

insurance in the entire country. Since most Ugandans engage in agriculture, the sector needs to be prioritized through increased funding, improved research for better agricultural methods, among others;

(iv) Extending insurance coverage to those with non-communicable diseases (NCDs). Considering that suffering from a non-communicable disease was not significant on an individual's utilisation of health insurance, but rather highly significant on an individual's willingness to pay for health insurance. This means that although many Ugandans suffer from such diseases are willing to pay for coverage, however they are frustrated because insurance providers shy away from covering such diseases. Therefore, we recommend insurance coverage to include diseases like diabetes, high blood pressure, cancer, etc., since these are emerging diseases both globally and nationally. This should be prioritized as well in the proposed national health insurance scheme;

(v) Urgently implementing a national health insurance scheme (NHIS). The insurance sector in Uganda is dominated by private companies, which always choose what to cover with profitability as their number one goal. A government-run health insurance scheme needs to be urgently put into place not only to increase the number of individuals utilizing health insurance, but also to incorporate high risk diseases like non-communicable diseases that are rarely considered by private companies. This is in line with efforts geared towards the attainment of SDG 3;

(vi) Emphasising disease preventive measures countrywide, such as mandatory physical exercises in all schools, together with a clear feeding plan for students, work stations adapted to accommodate healthy working such as tables adjustable to allow standing while working, and mandatory work out areas at places of work, roads with gazetted cycling (bicycle) lanes, among others, to follow the saying that '*prevention is better than cure'*.

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Appendices

Appendix A

Variance Inflation Factor[8]

The mean VIF is 5.385 for the utilisation model, 5.369 and 5.378 for the willingness models. This is far lower than the acceptable maximum of 10 and all the variables have a VIF of less than 2 except for age and age squared whose VIFs are expected to be high, since age squared is generated from age.

M (1)			**M (1)**			**M (1)**		
Variable	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**	**Variable**	**VIF**	**1/VIF**
Age	28.347	.035	Age	28.416	.035	Age	28.324	.035
Agesq2	24.331	.041	Agesq2	24.446	.041	Agesq2	24.399	.041
Mstatus	1.924	.52	Mstatus	1.903	.525	Mstatus	1.921	.521
Awareness	1.199	.834	Awareness	1.215	.823	Awareness	1.192	.839
Residence	1.146	.873	Residence	1.156	.865	Residence	1.144	.874
Education	1.131	.884	Education	1.131	.884	Education	1.131	.884
Region	1.101	.909	Region	1.1	.909	NCD	1.118	.895
Hhsize	1.07	.935	Hhsize	1.074	.931	Region	1.094	.914
Wealth	1.068	.937	Wealth	1.074	.931	Hhsize	1.067	.937
Hstatus	1.04	.962	Hstatus	1.037	.964	Wealth	1.066	.938
Gender	1.037	.965	Gender	1.037	.964	lnPrice	1.041	.961
lnPrice	1.034	.967	lnPrice	1.032	.969	Gender	1.037	.965
Mean VIF	**5.369**		**Mean VIF**	**5.385**		**Mean VIF**	**5.378**	

Pairwise Correlation Coefficients

The pairwise correlation coefficients between variables are normal (all coefficients are below 0.7) except for age and age squared which are expected to have a high correlation coefficient since age squared is generated from age in order to investigate the possibility of a non-linear relationship between age and demand (Utilisation and willingness) for health insurance.

[8] The variance inflation factor is defined as, $VIF = \frac{1}{1-R^2}$

M (1)

	Utilisation	Awareness	Age	Agesq2	Gender	Mstatus	Hstatus	Education	Residence	Hhsize	Wealth	Region
Utilisation	1											
Awareness	0.1869*	1										
Age	0.0543*	0.0316*	1									
Agesq2	0.0336*	0.0073	0.9382*	1								
Gender	0.0043	-0.0378*	0.0298*	0.0259*	1							
Mstatus	-0.0801*	-0.0731*	-0.6666*	-0.5128*	-0.0389*	1						
Hstatus	0.0135	-0.0031	-0.0289*	0.0192*	0.0445*	0.0293*	1					
Education	0.0384*	0.1653*	0.1817*	0.0311*	-0.0561*	-0.2097*	-0.1073*	1				
Residence	0.0955*	0.1772*	0.0132*	-0.0135*	0.0162*	-0.0094*	-0.0260*	0.1707*	1			
Hhsize	-0.0773*	-0.0890*	-0.1640*	-0.1513*	-0.0086*	0.1729*	-0.0242*	-0.0874*	-0.1113*	1		
Wealth	0.0850*	0.1941*	0.0085*	-0.0123*	-0.0011	-0.0080*	-0.0648*	0.1782*	0.1852*	-0.0111*	1	
Region	-0.0323*	-0.0568*	0.0056	0.0105*	0.0026	-0.0025	-0.0905*	-0.1022*	-0.1416*	0.0029	0.0142*	1

M (2)

	Willingness	Awareness	Age	Agesq2	Gender	Mstatus	Hstatus	Education	Residence	Hhsize	Wealth	Region
Willingness	1											
Awareness	0.3840*	1										
Age	0.0765*	0.0316*	1									
Agesq2	0.0575*	0.0073	0.9382*	1								
Gender	0.0431*	-0.0378*	0.0298*	0.0259*	1							
Mstatus	-0.0923*	-0.0731*	-0.6666*	-0.5128*	-0.0389*	1						
Hstatus	0.1389*	-0.0031	-0.0289*	0.0192*	0.0445*	0.0293*	1					
Education	0.0883*	0.1653*	0.1817*	0.0311*	-0.0561*	-0.2097*	-0.1073*	1				
Residence	0.0841*	0.1772*	0.0132*	-0.0135*	0.0162*	-0.0094*	-0.0260*	0.1707*	1			
Hhsize	-0.1313*	-0.0890*	-0.1640*	-0.1513*	-0.0086*	0.1729*	-0.0242*	-0.0874*	-0.1113*	1		
Wealth	0.1087*	0.1941*	0.0085*	-0.0123*	-0.0011	-0.0080*	-0.0648*	0.1782*	0.1852*	-0.0111*	1	
Region	-0.0920*	-0.0568*	0.0056	0.0105*	0.0026	-0.0025	-0.0905*	-0.1022*	-0.1416*	0.0029	0.0142*	1

M (3)[1]

	Willingness	Awareness	Age	Agesq2	Gender	Mstatus	NCD	Education	Residence	Hhsize	Wealth	Region
Willingness	1											
Awareness	0.3840*	1										
Age	0.0765*	0.0316*	1									
Agesq2	0.0575*	0.0073	0.9382*	1								
Gender	0.0431*	-0.0378*	0.0298*	0.0259*	1							
Mstatus	-0.0923*	-0.0731*	-0.6666*	-0.5128*	-0.0389*	1						
NCD	0.0713*	0.0114*	0.3034*	0.3070*	0.0839*	-0.1299*	1					
Education	0.0883*	0.1653*	0.1817*	0.0311*	-0.0561*	-0.2097*	-0.0857*	1				
Residence	0.0841*	0.1772*	0.0132*	-0.0135*	0.0162*	-0.0094*	0.0033	0.1707*	1			
Hhsize	-0.1313*	-0.0890*	-0.1640*	-0.1513*	-0.0086*	0.1729*	-0.0601*	-0.0874*	-0.1113*	1		
Wealth	0.1087*	0.1941*	0.0085*	-0.0123*	-0.0011	-0.0080*	-0.005	0.1782*	0.1852*	-0.0111*	1	
Region	-0.0920*	-0.0568*	0.0056	0.0105*	0.0026	-0.0025	-0.0298*	-0.1022*	-0.1416*	0.0029	0.0142*	1

[1] The ***** indicates significance at 5% (0.05)

Appendix B

Weighting of Regressions (Summary of Survey Logistic Regressions)

For this study all the logit regressions were run on the estimation sample not only to report consistent estimates but also to make recommendations at a national level.

Regression	M (1)	M (2)	M (3)
Number of strata	15	15	15
Number of PSUs	188	188	188
Number of observations	10,262	9,668	9,668
Design df	173	173	173
F (20, 154)	23.15	24.04	24.41
Prob > F	0.0000	0.0000	0.0000
Population size	31,327,409	29,932,709	29,932,709

Appendix C

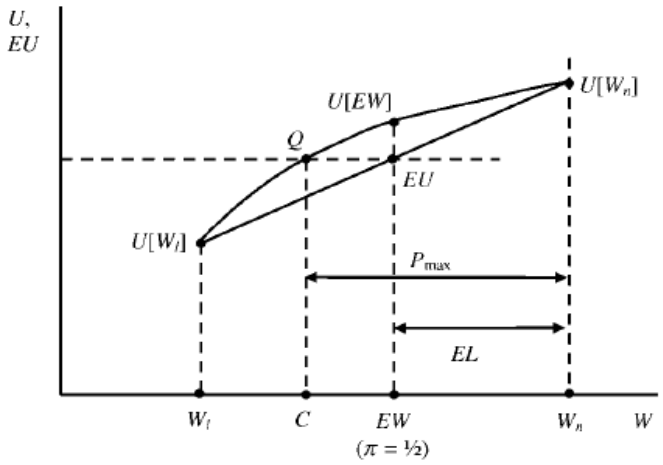

Figure A1: The demand for insurance (case when $\pi = 1/2$)
Source*:* Zweifel, 2007

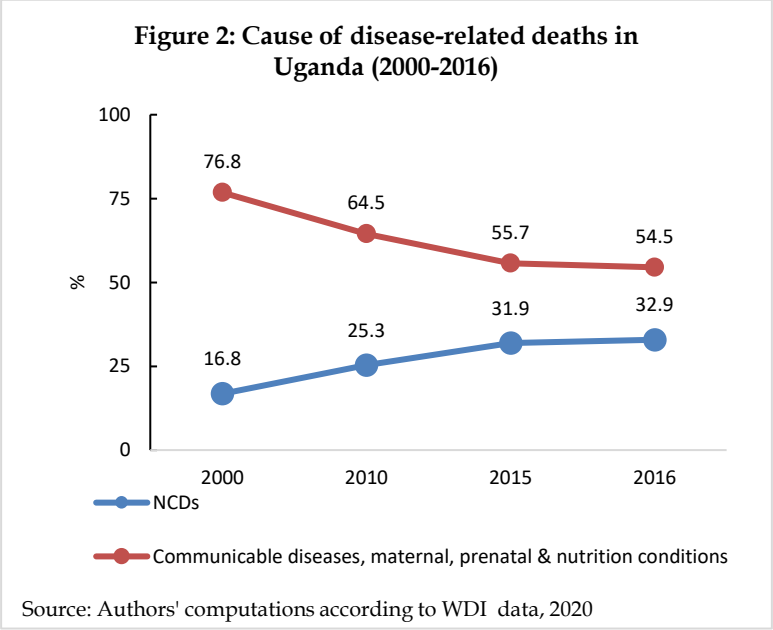

Figure A2: Cause of deaths (disease-related) in Uganda (2000-2006)