

DETERMINANTS OF DEMAND FOR HEALTH INSURANCE IN SOUTH AFRICA

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—Abstract—

Many low and middle income countries are trying to expand health insurance to achieve universal coverage; however, enrolling low income earners, informal sector workers and the rural population remains a huge challenge. This study sought to investigate the determinants of demand for health insurance in South Africa using the 2018 general households survey data. Using the logistic regression, the results from the study showed that health insurance in South Africa is low, and the regression revealed that the probability of health insurance increases with race with whites having the higher probability than other races; gender, with male having higher probability than female; marital status; and education level. The presence of chronic diseases, asthma in particular, decreases the probability of demand for health insurance. Speeding up the establishment of the National Health Insurance (NHI) in South Africa can help to ensure that equal access to healthcare among different socio-economic groups is achieved.

Key Words: Determinants, logit model, health insurance, South Africa

JEL Classification: I13, I15, O10

1. INTRODUCTION AND BACKGROUND

Many low and middle income countries are doing a great deal to expand health insurance in order to achieve universal coverage; however, enrolling low income earners, informal sector workers and the rural population remains a huge challenge. Many people who are employed in the informal sector and those residing in rural areas are increasingly becoming excluded from health insurance coverage. The high numbers of individuals employed in the informal sector and those staying in the rural areas worldwide is a major concern, coupled with a rise in the number of individuals employed in the informal sector in many countries (Aregbeshola and Khan 2018; Organization 2002). The International Labour Office (ILO) states that more than 60 percent of the population in the world is employed in the informal sector of the economy, while the World Bank Group (WBG) insinuates that, in low to middle income countries, the rural population as a percentage of the total population was at 50 percent, while South Africa had 34 percent (WBG 2018:10; Aregbeshola and Khan 2018; Organization 2002). Moreover, the ILO went on to state that developing countries in general have approximately 90 percent of informal employment as a percentage of total employment, which is a high percentage (Aregbeshola and Khan 2018; Bhattacharya 2019; Organization 2002).

In particular, when the African continent is taken into consideration, it is alleged that the continent has 86 percent of informal employment as a percentage of total employment (Aregbeshola and Khan 2018). However, in South Africa, StatsSA indicated that the number of people working in the informal sector is on the rise, registering almost 14.4 percent in 2018 (STATSSA 2018). On the other hand, the Human Sciences Research Council (HSRC) in 2018 indicated that almost one out of every six people in South Africa works in the informal sector of the economy. In like manner, the number of people working in the informal sector is growing to the extent that, in countries such as India and Ethiopia, more than 50 percent of the population is working in the informal sector (Potter and Lloyd-Evans 2018). In countries such as Nigeria, Ghana, Mali and Zimbabwe, the figures are as high as 90 percent (Aregbeshola and Khan 2018). As a matter of fact, the people who are employed in the informal sector, the poor, those residing in rural areas, those who work part time and other vulnerable groups find it too difficult to finance healthcare through health insurance (Owusu-Sekyere and Chiaraah 2014). To make matters worse, some groups are even working in occupations where it is

difficult to collect health insurance contributions, for instance part-time jobs (Aregbeshola and Khan 2018).

In 2018, StatsSA indicated that, in South Africa, from September 2018 to December 2018, there was a 2.3 percent increase in the number of part-time employees, a sign of an increase in the number of people with difficulties in financing health through health insurance (STATSSA 2018). As an illustration, the Department of Health (DOH) in South Africa indicated that, from the total number of 23.5 million people employed in the formal sector in South Africa, only 8.8 million people (that is 34 percent) had access to health through medical aid insurance. When the total population is taken into consideration only 16 percent of individuals had access to healthcare through medical aid schemes. This was supported by the figures released by StatsSA indicating that, between 2002 and 2018, the percentage of individuals covered by a medical aid scheme increased marginally from 15.9 percent to 17.1 percent in 2016 before declining to 16.4 percent in 2018 (STATSSA 2018). During this period, the number of individuals who were covered by a medical aid scheme increased from only 7.3 million to 9.4 million persons compared to approximately 54 million people in the country.

Moreover, DOH (2018) went on to highlight the groups of people employed in the informal sector who are unable to access healthcare through health insurance. This groups includes domestic employees, hawkers, those employed in the tax industry and casual labourers, individuals in households with no income who are not employed, the elderly with no income, children, school kids, the unemployed and unemployable individuals. The Department of Health approximated the number of individuals who are not able to access healthcare through health insurance to approximately 32 million, which is about 58 percent (DOH 2018). If school children are excluded, almost 36 percent of individuals in South Africa cannot access healthcare through health insurance (DOH 2018). However, health insurance has been recognised as a critical component in health financing, which can help in financial risk protection, ensuring access to safe, effective, quality and affordable essential medicines, and vaccines for all especially those in the informal sector and individuals in households with no income or those who are not employed (Finkelstein, Hendren, and Shepard 2019).

The World Health Organization (WHO) is even encouraging countries to achieve universal health coverage (UHC) through sustainable health financing mechanisms. Goal 3.8 of Sustainable Development Goals (SDGs) talks about

UHC, including financial risk protection, access to quality essential healthcare services, and access to safe, effective, quality and affordable essential medicines, and vaccines for all. WHO argues that many people are pushed into extreme poverty through bearing the excessive burdens of health spending. It is alleged that UHC can help in lifting people out of poverty through relieving them from the burden of health spending. Currently, the South African Government is working on establishing a National Health Insurance (NHI) system due to concerns of disparities within the national healthcare system, such as unequal access to healthcare among different socio-economic groups. The central philosophy of implementation of NHI is to bring into fold those people who are not insured, specifically those who are unable to afford medical scheme cover (DOH 2018). In actual fact, the NHI seeks to find ways to make healthcare more available to those who currently cannot afford it or whose situation prevents them from attaining the services they need.

The other reason is that there is a discrepancy between money spent in the private sector, which serves the wealthy, and that spent in the public sector, which serves about 84 percent of the population. In addition, the Presidential Health Summit (PHS) held in 2018 indicated that quality healthcare in South Africa is fully enjoyed by those who can afford it; South Africa spends approximately 8.7 percent of gross domestic product (GDP) on health, but almost half of that amount services only 16 percent of the population (PHS 2018). As indicated, only 16 percent of households in South Africa are able to access healthcare through health insurance, which is a low percentage considering the population in the country. Therefore, a good knowledge of factors driving demand for health insurance among different groups in South Africa is therefore important. There is a need to understand the factors that either encourage or discourage households to demand health insurance in South Africa because of its importance in ensuring that people are able to access healthcare.

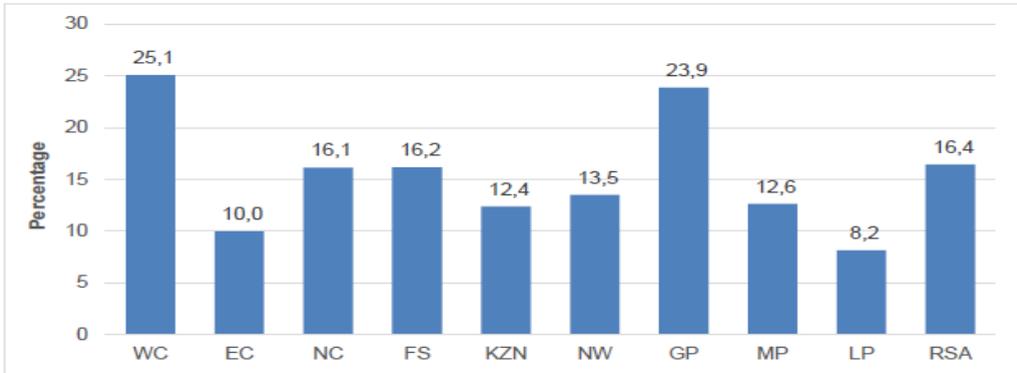
Many studies have been done in Africa to investigate the factors influencing demand for health insurance, for instance, in Nigeria, Aregbeshola and Khan (2018), in Malawi, Makoka, Kaluwa, and Kambewa (2007) and in South Asia, Nguyen and Knowles (2010). The results from these various studies showed that factors such as age, education, place of residence, region, marital status, ethnicity, employment status, household wealth, gender, household size and exposure to media, as well as access to health information influenced the demand for health insurance in one way or the other. However, in South Africa, studies where

demand for health insurance was investigated include Ataguba (2010), Ataguba and Alaba (2012), Rowe and Moodley (2013) and Macha et al. (2012). However, these studies did not fully investigate the determinants of demand for health insurance using household data measured at individual level for South Africa. For instance, Macha et al. (2012) were investigating factors responsible for influencing for burden of healthcare financing and distribution of healthcare benefits in Tanzania and Ghana. Therefore, it is important to investigate the factors that influence individuals to demand health insurance using the 2018 National Household Survey data in South Africa measured at individual level to get the nature of factors responsible for the low uptake of health insurance in South Africa.

1.1. Health financing system in South Africa

The current system of healthcare financing in South Africa is two-tiered, with a relatively large proportion of funding allocated through medical aid schemes, various hospital care plans and out of pocket payments (DOH 2011). The private medical insurance provides cover to private patients who have purchased a benefit option with a scheme of their choice or as a result of their employment conditions. It only benefits those who are employed and are subsidised by their employer, both the state or private companies (DOH 2011). According to STATSSA (2018), between 2002 and 2018, the percentage of individuals covered by a medical aid scheme increased marginally from 15.9 percent to 17.1 percent in 2016 before declining to 16.4 percent in 2018. During this period, the number of individuals who were covered by a medical aid scheme increased from 7.3 million to 9.4 million persons – a relatively low figure compared to the population in the country (STATSSA 2018). Also, only 22.6 percent of households, slightly above one fifth, had a family member with medical insurance. Figure 1 shows the number of individual covered by medical aid schemes per province and in South Africa

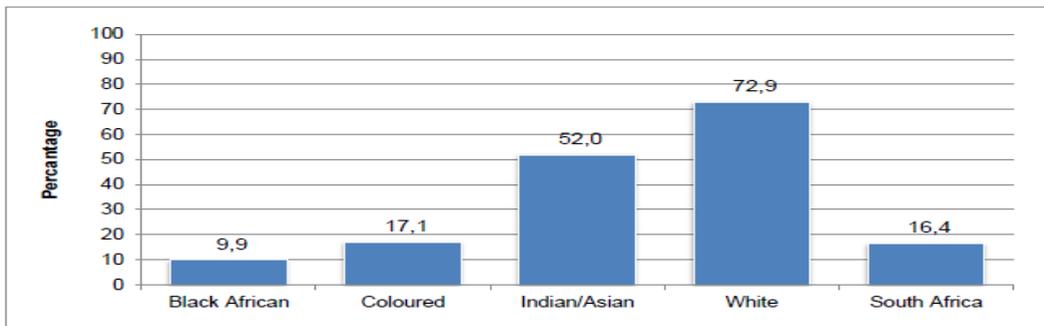
Figure 1: Individuals who are members of a medical aid scheme per province: 2018



Source: (STATSSA 2018)

Figure 1 shows that individuals were more frequently covered by medical aid schemes in the Western Cape, with 25.1 percent, and Gauteng, with 23.9 percent; and the province with the least covered individuals is Limpopo, with 8.2 percent and the Eastern Cape with 10.0 percent. Figure 2 shows the percentage of individuals covered by medical aid per population group in the country.

Figure 2: Individuals who are members of medical aid schemes by population group: 2018



Source (STATSSA 2018)

Figure 2 shows that 72.9 percent of white individuals were members of a medical aid scheme compared to just over one-half (52.0%) of Indian/Asian individuals. By comparison, only 9.9 percent of black Africans were covered by a medical aid

scheme. The whole country (South Africa) had only 16.4 percent of individuals who are members of a medical aid scheme.

2. LITERATURE REVIEW

Govender et al. (2013) analysed the coverage of the South African government health insurance scheme, the population groups with low uptake, and the individual-level factors, as well as characteristics of the scheme, which influenced enrolment. Multi-stage random sampling was used to select 1 329 civil servants from the health and education sectors in four of South Africa's nine provinces. The results from the multivariate logistic regression indicated that non-insurance was highest among men, black African or coloured ethnic groups, less educated and lower-income employees, and those living in informal housing. Barriers to enrolment include insufficient information, unaffordability of payments and perceived administrative complexity. Aregbeshola and Khan (2018), using secondary data from the 2013 Nigeria Demographic and Health Survey (NDHS), examined the factors influencing enrolment in the NHIS among women of reproductive age in Nigeria using secondary data. The study found that 97.9 percent of women were not covered by health insurance and factors such as age, education, geo-political zone, socio-economic status, and employment status were significant predictors of enrolment in the NHIS among women of reproductive age.

In Malawi, Makoka, Kaluwa, and Kambewa (2007) assessed the determinants of demand for health insurance among formal employees. Using the multinomial logit model, the study found that formal sector employees prefer to receive medical treatment from private health facilities, but a lack of adequate information hinders many from being insured. Moreover, Makoka, Kaluwa, and Kambewa (2007) discovered that the probability of enrolling in any of the medical aid societies in Malawi increases with income and age of the individuals. More children and good health status reduce the probability of enrolling the two lower medical aid schemes.

Nguyen and Knowles (2010) in Vietnam analysed the demand for health insurance by school-age children and adolescents. Using data from the Vietnam National Health Survey of 2001 to 2002, the study found that demand for health insurance increases significantly with the expected benefits of insurance as measured by proximity to and quality of a tertiary hospital. In addition, wealthier and more educated households are more likely to purchase insurance for their

children. Finally, while female heads of households are generally more prone to purchase health insurance for their children, households prioritise young children, male children, and those children with more schooling in their purchase decision. Osei-Akoto (2003) investigated the social inclusion aspects of the two medical aid schemes in rural Ghana. The results from this study show that the schemes perform quite well in terms of paying hospitalisation bills for beneficiaries. However, the findings portray a remarkable exclusion of the poorest of the poor, even from other forms of risk-sharing arrangements in the informal sector.

Apart from poverty, the analysis also reveals that high-risk households are less likely to participate fully in the insurance schemes. Chen and Yan (2012) investigated key factors associated with the demand for Urban Resident Basic Medical Insurance (URBMI), which was established in 2007 and aims to cover all Chinese urban residents. Two waves of longitudinal household survey data were used. The results from the three-level random-intercept logit model suggest for both the adult and the child samples that income, health status, age and health risk behaviours are key influencing factors for basic medical insurance demand. The household head's characteristics are also significantly related to other household members' medical insurance demands. Specifically, household heads who are more educated or retired are more likely to purchase medical insurance for their children. The following section will describe the methodology and data used in the study.

3. METHODOLOGY AND DATA

Relevant data for the study were extracted from the South Africa 2018 General Household Survey (GHS) dataset. Among the numerous variables in the dataset, only important variables were selected for the purpose of this study. Individuals who did not specify whether they were covered or not by health insurance were removed from the analysis as well as those who did not know. The data were thereafter cleaned, re-categorised and recoded as necessary. The dataset included data for 71 137 individuals and 185 variables from which the required variables were selected (STATSSA 2018). A total of 20 000 individuals were used in the study after removing the groups of individuals who did not know and those who did not specify whether they were covered or not (STATSSA 2018).

3.1. Dependent variable

The dependent variable is dichotomous in nature; that is, either the household is covered or not represented by a 0 or 1, respectively. The dependent variable is

generated from the question that was asking participants whether a person was covered by a medical aid or medical benefit scheme or other private health insurance. The question included those who are dependants, covered by someone else's scheme.

3.2. Independent variables

Guided by the works of Andersen's Behavioural Model (Aday and Andersen 1974), Grossman's Model of Demand for Health (Grossman 1972), and the empirical literature on the determinants of demand for health insurance, for instance, Aregbeshola and Khan (2018), Nguyen and Knowles (2010), Chen and Yan (2012) and many more, the independent variables included in the model were race, level of education, gender, age of the head of household, chronic disease with the proxy of asthma and diabetes. Andersen's Behavioural Model divided the determinants of demand for health insurance into three, which are predisposing factors such as age and gender, as well as enabling factors such as location, education, and need factors such as presence of chronic diseases (Aregbeshola and Khan 2018). Grossman also argued that demand for health is influenced by factors such as age, wage rate and education (Grossman 1972). The following is a description of the variables used in the model. The study hypothesises that these factors described below have an influence on demand for health insurance – either a positive or negative influence. Gender (GENDER) is a dummy variable where 1= male and 0 otherwise, and is expected to be +/- . Age (AGE) is a continuous variable that explains the number of years the individual has been covered by a medical scheme. The variable is expected to be +.

Race (RACE) is a categorical variable that explains the grouping of humans based on shared physical or social qualities. In this variable, 1=African black, 2= coloured, 3=Indian/Asian, 4=white. The variable is expected to be -/+ depending on the reference category in the dummy variable. Marital status (MASTS), explains whether the individual is married or not, where 1 =legally married and 0 otherwise. The variable is expected to be +. Chronic diseases (CHRASMA), referring to whether the individual has been diagnosed with a chronic disease – a proxy is asthma. This variable is a dummy variable where 1 = yes and 0 otherwise. The variable is expected to be +. Chronic diseases (CHRDBT) refer to whether an individual has been diagnosed with diabetes; the individual is suffering from diabetes or not. The variable is a categorical variable where 1= yes and 0 otherwise. The variable is expected to be +. Highest education level

(HIEDUR) refers to the level of education of the individuals and the variable is expected to be +.

4. EMPIRICAL MODEL

As outlined in the above sections, the dependent variable in this study assumes two variables, i.e. 0 and 1, where 0 represents that the individual is not covered while 1 represents that the individual is covered by medical insurance. According to Green Silverman (1993), and Maddala et al. (2001), using the ordinary least square brings many problems, which arise from the idea that sometimes one aspect of the dependent variable may be observable, but in some instances, it may fail to be observable, leading to omissions of unobservable variables and generation of inconsistent parameter estimates. In fact, the expected value of the error term will not necessarily be zero. This problem can only be solved by using maximum likelihood estimations (MLEs) (Green and Silverman 1993; Maddala, Li, and Srivastava 2001). As a result, the MLE results in a model with a variable shown in equation 1 below:

$$Y_i = \begin{cases} 1 & \text{if } Y_i > 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

Equation 1 above shows the unobserved variable of Y_i which becomes a latent variable given as Y_i^* expressed in the equation 2 below:

$$Y_i^* = \beta_0 + \sum_{j=1}^k \beta_j X_{ij} + \mu_i \quad (2)$$

In equation 2 above, it can be expressed as a logit or probit model depending on the distribution of the error term μ_i (Johnston and DiNardo 1972). In this paper, the logit model was used, which is an extension of the probit model (Johnston and DiNardo 1972). One of the reasons that the study did not use the probit model was because of its restrictive assumption that the error term should be normally distributed (Johnston 1997). It is alleged that the logistic distribution is flexible in its own right, and it is easy to use from a mathematical point of view as compared to the probit model and other econometric model (Johnston and DiNardo 1972). The other advantage of the logit model is that the results generated from the logit model are more meaningful in interpretation compared to other models (Johnston 1997). The logistic probability function is specified clearly in equation 3 below:

$$P_i = F(Z_i) = F\left(\alpha + \sum_{i=1}^n \beta_i X_i\right) = \frac{1}{1+e^{-Z_i}} \quad (3)$$

From equation 4, P_i is the probability that an individual has a medical insurance or not, given X_i . In addition, X_i represents the i^{th} explanatory variables and n is the total number of explanatory variables and e denotes the base of natural logarithms which is approximately equal to 2.718. β_i and α are parameters to be estimated. Hosmer and Lemeshow (1989) indicated that it is possible to write the logit model in terms of odds and log of odds that will help researchers to fully interpret the coefficients. The odds ratio implies the ratio of the probability P_i that an individual will choose an alternative to the probability and $1 - P_i$, that the person will not choose it. However, the major problem that arises with the logit model is that P_i is non-linear not only in X_i , but also in α and β . This creates an estimation problem and disqualifies the use of familiar OLS procedures to estimate the parameters (Hosmer and Lemeshow 1989). Hosmer and Lemeshow (1989) further argued that, taking the natural logarithms of the odds ratio will result in the logit model given in equation below:

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 \dots \dots + \beta_n X_n \quad (4)$$

From equation 7 above, as P moves from 0 to 1, the logit moves from $-\infty$ to ∞ . This implies that the logit is not so bounded even if the probabilities lie between 0 and 1 (Gujarati 2009). If the disturbance term μ_i is taken into account, equation 4 is transformed into equation 5 below:

$$Z_i = \alpha + \sum_{i=1}^m \beta_i X_i + \mu_i \quad (5)$$

The econometric model in equation 5 is the one used in this study to get the determinants of demand for health insurance. It is treated against the potential variable affecting households' access to medical insurance. The coefficient of the logit model presents the change in the log of the odds associated with a change in the explanatory variables (Hanushek and Jackson 2013). The model is specified below, with the variables explained in section 3.2. $HIC = F(GENDER, AGE, RACE, MASTS, ASMA, DBT, HIEDU)$.

5. PRESENTATION AND INTERPRETATION OF RESULTS

The results from the estimation of the demand for the health insurance model using the logit model are presented in Table 1.

Table 1: Determinants of demand for health insurance-logit estimates

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)
RACE			1260.591	3	.000	
RACE(1)	.724	.046	247.719	1	.000	2.063
RACE(2)	1.358	.294	21.297	1	.000	3.889
RACE(3)	2.167	.062	1239.346	1	.000	8.733
GENDER(1)	.087	.042	4.438	1	.035	1.091
AGE	.001	.001	.218	1	.641	1.001
MASTS(1)	.249	.054	21.272	1	.000	1.283
ASMA(1)	-.330	.145	5.225	1	.022	.719
DBT(1)	-.087	.108	.652	1	.419	.916
HIEDU	.002	.001	5.122	1	.024	1.002
Constant	-2.371	.053	1981.622	1	.000	.093

Source: Author's computation

Omnibus test: Step, model and block: Chi-square (1462.276) df (9) Sig (0.000). -2 log likelihood (15577.050a) Cox and Snell R Square (0.0073), Nagelkerke (0.127)

The results from the estimation of the demand for health insurance using the logit model are presented in Table 2. The model is free from multicollinearity since all the independent variables had a variable less than 0.8 in absolute terms. Kennedy (2003) outlines that, for non-continuous variables, a value of 0.8 and above in absolute terms in one of the correlation coefficients indicates a high correlation between two independent variables. The results show that there is a positive relationship between race, gender, age, marital status, and highest education level and the demand for health insurance. On the other hand, chronic diseases had a negative relationship with the demand for health insurance.

The results show that race has a positive influence on the demand for health insurance and is significant at the one percent level of significance with a significant value of 0.000. The results reveal that, among the four races in South

Africa, i.e. blacks/African, coloureds, whites and Indians/Asian, whites tend to have more investment in healthcare than others, and therefore they have a greater likelihood of demand for health insurance compared to other races. The odds of demand for health insurance is 8.733 greater for whites compared to blacks/Africans, coloureds and Indians/Asians. In addition, Indians/Asians have a higher probability of demand for health insurance compared to coloureds and blacks. The odds of demand for health insurance is 3.889 greater for Indians compared to coloureds and blacks. Moreover, coloureds have a higher probability of demand for health insurance compared to blacks. The odds of demand for health insurance are 2.063 higher for coloureds compared to blacks. This was in line with the results found by Govender et al. (2013). The implications of the findings are that whites have more investment in healthcare compared to other races.

The results also revealed that gender has a positive impact on demand for health insurance. The variable is significant at the 5 percent level of significance. The results also showed that the odds of demand for health insurance are 1.091 greater for males compared to females. In this way, males have a greater probability of demand for health insurance compared to females. This shows us that males, being heads of the households, are more likely to demand more health insurance compared to females. This was supported by Owusu-Sekyere and Chiaraah (2014) in the study done in Ghana; however, Aregbeshola and Khan (2018), in a study done in Nigeria, showed that the variable was not significant. Also, the variable age has a positive coefficient; however, the variable did not add any significance or prediction to the model because it has a 0.641 level of significance.

The study results also show that marital status is a significant factor in explaining demand for health insurance. The variable has a positive influence on demand for health insurance and the variable is significant at all levels with the significant value of 0.000. The results also indicated that the odds of demand for health insurance are 1.283 greater for married households compared to those who are not married. Individuals who are married have a greater probability of demand for health insurance compared to those who are not married. The variable chronic diseases, with a proxy of asthma, had a negative influence on the demand for health insurance. The variable was significant at the 5 percent level, with a significance figure of 0.22. The results indicated that individuals without chronic diseases such as asthma have more probability of demand for health insurance compared to individuals with traces of chronic diseases. The odds of demand for

health insurance for individuals with asthma were 0.719 less compared to individuals without chronic diseases, asthma in this case. This may be because individuals with chronic diseases are viewed to be more at risk by insurance companies (Aregbeshola and Khan 2018).

Level of education has a positive influence on demand for health insurance. The variable is significant at the 5 percent level of significance. The odds of demand for health insurance indicated that, holding all other factors constant, a one percent increase in the level of education will mean a 1.002 percent increase in the demand for health insurance. These results were supported by the studies of Aregbeshola and Khan (2018), Owusu-Sekyere and Chiaraah (2014), Cameron et al. (1988), Marquis and Long (1995) and Owusu-Sekyere and Chiaraah (2014). The level of education influences the income stream of the individual, which will motivate the desire to invest in healthcare and subsequently buy health insurance (Owusu-Sekyere and Chiaraah 2014).

6. CONCLUSION AND POLICY RECOMMENDATIONS

The study found that the demand for health insurance in South Africa is very low, especially among the black South Africans who were the least in terms of demand for health insurance. Since the government of South Africa is in the process of coming up with the NHI policy, it is important that the government speeds up the process so that many individuals will have access to quality healthcare services. The study also found that women have a low demand for health insurance compared to men. This may be due to imbalances in access to opportunities such as jobs between male and females. The government of South Africa should encourage policies that allow women to have access to opportunities that increase their incomes, which will allow them to demand health insurance. The study also found that married individuals have a higher demand for health insurance compared to the who are not married, widows, the youth and the divorced. It is the duty of the government to ensure that the other groups of the unmarried are educated on the benefits of health insurance in access to healthcare service. In general, in South Africa, a great deal of effort should be put forward to ensure that demand for health insurance increases as the number of individuals with health insurance is too in the whole country. The study has the following limitations: the study focused on the determinants of demand for health insurance at national level – in future we suggest that more research can be done at per provincial level to analyse the determinants of demand for health insurance so as to do comparisons and to see the province that the government should focus on more. Furthermore,

other factors that can be taken into consideration in future research are issues to do with the influence of access to financial assets, equity and nature of employment on demand to health insurance.

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