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RESEARCH ARTICLE

Determinants of insurance enrollment

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Abstract

Ownership of health insurance policy is a mechanism for protecting an individual family's financial security. It is also a means for a risk-aversion strategy for the cost of medical care, loss of productivity time during the illness, and in a more serious case death. This study examines the factors that influence the ownership of insurance policies at an individual level using a binary logistic regression model. The data used in this study was taken from the Health and Retirement Study (HRS), the fifth wave in 2002 with 3206 respondents of the survey, whereby thirty-nine percent of the respondents happened to have an insurance policy scheme. The outcome of this model indicated that retirement status, household income, years of schooling, and marital status variables were all found to have a statistically (at 95% confidence level) associated with ownership of insurance policy. Contrastingly, the other covariates, namely: age at the time of the survey, race, and gender of the respondents had insignificantly relationship with the ownership of insurance policy.

Keywords: Insurance policy, age, retirement status, household income, marital status

INTRODUCTION

The motivation for this article resides to understand what drives the insurance policy ownership among these aged groups of individuals. This study will be relevant to policymakers as it will deepen their understanding of the factors that influence the decision of individuals to get insurance. The main objective of this article is to evaluate the determinants of insurance coverage in the 52–86-year-old population. Moreover, it also estimates the predictors of insurance policy ownership among the sampled respondents. This study will be relevant to policy-makers as it will deepen their understanding of the factors that influence the decision to get insurance[1]. This knowledge is expected to help policy-makers decide on the best strategies to adopt to increase insurance enrollment[2]. Therefore, it is imperative to recognize the factors which influence the purchase of insurance policy at an individual level of the above age group. This article examines the factors that affect health policy ownership using the fifth wave of the Health and Retirement Study. The paper is organized as follows. Section two provides a brief account of the pieces of literature and empirical findings on the ownership of insurance. Section three presents the empirical method of the study. Section four summarizes the dependent and explanatory variables and how they were measured operationally. The next section provides the result of descriptive statistics and binary logistic regression. This section also offers the discussion part of the result. Finally, the article finishes with some concluding remarks and policy implications.

Theoretical framework

As far as the household level of income is concerned, the larger the level of income, the more life insurance consumer can afford to purchase. Thus, with the household income of an individual, I expected to 'have a positive relationship with the life insurance consumption[3]. The level of education of a given individual positively affects his/her demand for life insurance ownership[4]. As argued by Truett and Truett (1990) an individual's higher level of education is associated with a strong desire to protect dependents and safeguard their standard of living[5]. Hence, I hypothesized a positive association between insurance ownership and the level of individual education, since higher education is attributable to the corresponding purchasing power and access to information on a health insurance policy in general[6].

Among the demographic measure, 'empirical evidence of the factors influencing health insurance uptake indicates

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[1] Duke, 2018, p.3.
[2] Ibid.
[3] Kjosevski, 2012, p. 240
[4] Ibid., p, 241.
[5] Truett & Truett, 1990 quoted in Ibid.
[6] Badu, et al., 2018; Kimani, et al., 2014

that age plays an important role'[7] in insurance policy enrolment. This is because health insurance coverage increases with age[8]. It 'was attributed to an increment in additional healthcare needs and increased older people's financial security. It is hypothesized that an increase in age would influence ownership of insurance policy as an individual risk-avoiding strategy. In connection to this, the other predisposing factor that makes it more likely that individuals will seek insurance policy ownership is gender[9]. In addition to age, gender is expected to be associated with the probability of owning an insurance policy. Within the category of a social factor, marital status also predisposes an individual to acquire an insurance policy[10]. The other variable associated with the attainment of insurance policy is race. Particularly, in some countries, racial disparities are reflected in insurance status, whereby racial/ethnic minorities are more likely to experience being devoid of an insurance policy[11]. As compared to other races, the majority race, (82%)[12] of the white race is expected to be positively associated with the probability of owing insurance policy.

RESEARCH METHODOLOGY

The data set of this article was taken from the Health and Retirement Study (HRS), the fifth wave in 2002. It was collected by the National Institute of Aging at the University of Michigan Institute for Social Research. The concern of this study is to interpret the outcome variable as a likelihood of owning an insurance policy or not. For this paper, a total of 3206 respondents with complete data on the key dependent variable were included in the data analysis. Descriptive statistics and a binary logistic regression model were used to overview the sample's characteristics and identify factors associated with insurance policy ownership[13]. The logistic regression analysis was used to determine the relationship between a binary response of the outcome variable and continuous or categorical independent variables of this paper[14]. Thus, as compared to Linear Probability Model (LPM), the logit model was employed in the empirical estimation of this paper because 'the logit model can overcome the problem associated with LPM'[15] which is 'plagued with heteroscedasticity, non-normality of the distribution term, low R^2 and non-fulfillment of the $0 \leq (Y_1/X_1) \leq 1$ restriction of binary model'[16]. Moreover, the other justification employing the logit model is to realize 'the advantage of being more robust such that the independent variables do not have to be normally distributed or have equal variance in each group, does not assume a linear relationship between the independent and dependent variable, does not assume homogeneity of variance and does not assume normality of error term'[17].

Suppose the outcome variable of this study y can be assumed only dichotomous response values, which for convenience and without any loss of generality will be the value of 1 if ownership of insurance policy occurs and 0 if it does not. In this case, let the probability of $y = 1$ be p and the probability of $y = 0$ be $(1- p)$[18]. Then the expected value of y is the probability that owning an insurance policy will occur. In this regard, when the logit model is applied, it can be expressed as follows[19]:

$$Logit\,(y^*) = \beta o + \sum_{i,j=1}^{k} \beta j + \varepsilon ij$$

Whereby the maximum likelihood estimable equation of binary logistic regression model is given as $\text{Logit}(\pi) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p$ (1), where β_0, β_1, ……, β_p are regression parameter; X_1, $X_2 \ldots X_p$ are explanatory variables, and π is the probability of success[20]. Accordingly, for this paper, Insurance Policy ownership $(y) = \beta_0 + \beta_1$ retirement status + β_2 age + $\beta_3$household income + β_4 years of schooling + $\beta_5$martial status + β_6 race + β_7 gender[21].

Measurement of variables

In this econometric estimation, health insurance enrollment is defined as the dependent variable of interest of this article. This dependent variable is equal to whether or not a person has health insurance (0 or 1). In other words, it assumes a value of 1 if the person is currently enrolled in the insurance scheme otherwise 0[22]. In the estimation of a binary logistic regression model, demographic and socio-economic characteristics of the respondents were included as an explanatory variable. The predictors' variables examined in the study were selected based on the factors cited in the literature as influencing insurance policy ownership. The demographic measure comprises age, race, and gender. Socio-economic factor includes retirement status, income, and years of schooling. Accordingly, the seven explanatory variables of this model that are likely to influence the ownership of insurance policy are defined as retirement status, age at the time of the survey, household income, years of schooling, marital status, race, and gender of the respondent. Table 1 below summarizes the dependent and explanatory variables and how they were measured operationally.

Table 1 Measurement of variables

Dependent Variable	Operational Measurement
Health Insurance	0 = "no" 1 = "yes"
Key Independent Variable	Operational Measurement
Retired	0 = "no" 1 = "yes"
Age	Continuous positive whole numbers in years
HH Income	Amount earned measured in thousands
Educational years	Continuous positive whole numbers in years
Married	0 = "no" 1 = "yes"
White	0 = "no" 1 = "yes"
Gender of the respondent	0 = "male" 1 = "female"

[7] Alesane & Anang, 2018, p. 2
[8] Masengeli, Mwaura-Tenambergen, Mutai, & Joseph, 2017
[9] Wan, et al., 2020, p.3
[10] Ibid.
[11] Hao, et al., 2021; Gonzales & Ortiz, 2015
[12] See Table 2 outcome of this paper
[13] Astari & Kismiantini, 2019
[14] Kimani, Ettarh, & Bellows, 2014
[15] Duku, 2018, p. 4
[16] Ibid.
[17] Ibid.
[18] Hsiao, 1996, p. 411
[19] Duku, 2018, p. 5
[20] Astari & Kismiantini, 2019
[21] Adopted from Duku, 2018, p.5
[22] Duke, 2018, p.5.

RESULTS AND DISCUSSION

Descriptive statistics

Table 2 presents the percentage of distribution of dependent and independent variables. Overall, thirty-nine percent of the respondents happened to have an insurance policy scheme, and sixty-one percent of the sub-sample do not have a health policy. In the overall sample, the retirement status mean was 62 %, with a Standard Deviation (STD) of 0.484. Thirty-nine percent of the sample respondents do not have retirement status. The average age was 67 years (STD = 3.676) and the household income was 45, 263.9. Seventy-three percent of the respondents were married individuals. Among the total sample, the majority of the respondents are white (82%) with an STD = 0.384.

Table 2 Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Insurance policy	3206	0	1	.39	.487
Retirement status	3206	0	1	.62	.484
Age	3206	52	86	66.91	3.676
Income in thousand	3206	.00	1312.12	45.2639	64.33936
Years of schooling	3206	0	17	11.90	3.305
Marital status	3206	0	1	.73	.442
Race	3206	0	1	.82	.384
Gender	3206	0	1	.48	.500
Valid N (listwise)	3206				

Logistic regression and discussion

Binary regression is used to assess the strength of a relationship between one dichotomous dependent and independent variable. This regression method helps in predicting the value of a dependent variable from one or more independent variables. This model also helps in predicting how much variance is being accounted for in a single response by a set of independent variables. Among the binary regression, the logit model was used to analyze data to predict an outcome of insurance ownership among 3206 respondents of the survey. As table 4 of the next page illustrates, the final model was able to explain between 78.0 % and 10.6 % of the variance. The model was found to fit the data adequately (Hosmer and Lemeshow's X^2 = 42.627. P < .001). Overall, the model was able to correctly predict 61.8 % of all cases. Seven predictors were included in the model, using the Enter method. Table 3 below depicts that, three of these predictors successfully predicted insurance ownership since they have positive co-efficient as the table shows clearly the relationship between the predictors and the outcome. The beta (B) is the predicated change in Log Odds - for 1 unit change in the independent variable, there is Exp (B) change in the probability of the outcome[23].

When we come to coefficient interpretation, retired individuals in comparison to those who are non-retired are less likely to have an insurance policy because they have a negative coefficient of significance. Those who have high household income is more likely to have insurance. Table 3 above shows the most important outcome of the logistic analysis of insurance. The B column of this table indicates the regression coefficient for each independent variable of the model[24]. The Wald statistic and the respective significance indicate which of the independent variable predict insurance policy ownership[25]. Whereas the Exp (B) column indicates the odds ratios for each independent variable[26]. Specifically values greater than 1 indicate a greater likelihood of insurance policy; values less than 1 signify reducing likelihood[27]. Retirement status, age, and marital status were associated with decreased likelihoods of insurance ownership. Income, years of schooling, and gender were associated with an increased likelihood of insurance ownership. These three predictors were more than once are more likely to be received insurance policy (OR 1.003; 100.3 % CI: 1.001 -1.004, 1.147; 114.7% CI: 1117 – 1178, 1.111; 111.1% CI: .945-1307 respectively).

Table 3 Variable in the equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Retirement status	-.194	.085	5.204	1	.023	.823	.697	.973
	Age	-.012	.011	1.113	1	.291	.988	.967	1.010
	Income	.003	.001	10.488	1	.001	1.003	1.001	1.004
	Years of schooling	.137	.013	103.549	1	.000	1.147	1.117	1.178
	Marital status	-.543	.097	31.113	1	.000	.581	.480	.703
	Race	-.070	.106	.432	1	.511	.933	.758	1.148
	Gender	.106	.083	1.628	1	.202	1.111	.945	1.307
	Constant	-1.290	.769	2.813	1	.094	.275		

a. Variable(s) entered on step 1: Retirement status, Age at the time of the survey in years, Income in thousand, Years of schooling, Marital status, Race, Gender of the respondent.

[23] Mayers, 2013.

[24] Mayers, 2013, p. 458
[25] Ibid.
[26] Ibid.
[27] Ibid.

Table 4 Logistic regression analysis of insurance (n= 3206)

	Cox & Snell R^2	Nagelkerke R^2	HL X^2	sig	Wald^2	*df*	p	Exp (B)
Model	.78	.106	42.627	.000				
Predictor Variable:								
Retirement status					5.204	1	.023	.823
Age					1.113	1	.291	.988
Income					10.488	1	.001	1.003
Year of schooling					103.549	1	< .001	1.147
Marital status					31.113	1	< .001	.581
Race					.432	1	.511	.933
Gender					1.628	1	.202	1.111
Constant					2.813	1	.094	.275

Key HL – Hosmer and Lemeshow goodness of fit

Retirement status, age, and race indicate better scores. Since table 3 (variables in the equation)[28] of the preceding page shows that the regression coefficient is negative and the Exp (B) value is less than 1, increases in these scores represent decreasing likelihood for ownership of insurance policy: for every unit increase in retirement status, the likelihoods for insurance policy ownership decrease (OR .823; the 82.3 % confidence intervals suggest that this is in the range of .697 to .973); and for every unit increase in age, the likelihood for insurance policy ownership decrease (OR .988; 98.9% CI: .967 - 1.010). Moreover, table 3 above indicates that white people are more likely to be owned insurance policies than non-white individuals (OR .933; 93.3% CI: .758 – 1.148).

In the above binary logistic regression model, the assumption for linearity and multicollinearity were satisfied. Particularly for the multicollinearity test see table 5 of Collinearity Statistics below which shows the "Tolerance" data to be not too close to 0 (preferably nor below.2) and the VIF figure not exceed 10[29]. The Table suggests that we are fine on both accounts.

Table 5 of Collinearity Statistics

Model		Tolerance	VIEW
1	Retirement status	.849	1178
	Age	.864	1157
	Income	.867	1.153
	Years of schooling	.874	1145
	Marital status	.833	1201
	Race	.929	1.076
	Gender	.821	1.218

CONCLUSIONS AND POLICY IMPLICATION

The retirement status, household income, years of schooling, and marital status variables were all found to have a statistically (at 95% confidence level) associated with ownership of insurance policy. Contrastingly, the other covariates, namely: age at the time of the survey, race, and gender of the respondents had insignificantly relationship with the ownership of insurance policy. Thus, there is two policy implication of this article. The policy options for promoting insurance ownership among the 52–86-year-old population could be aided by the two major findings of this article[30]. Higher household incomes are significant predictors of insurance policy ownership. And hence, economic development program geared at (a) improving income of the retired married individuals of the society[31]; (b) policies should be aimed at ensuring that the majority of the society to attain a secondary education level will increase the probability of owning an insurance policy[32]. Furthermore, the insurance industry may use the findings to inform actions to enhance insurance schemes for individuals.

REFERENCES

Duku, S. K. (2018). Differences in the determinants of health insurance enrollment among working-age adult in the two regions in Ghana. *BMC Health Services Research , 18*(384), 1-16.

Kirigia, J. M., Sambo, L. G., Nganda, B., Mwabu, G. M., Chatora, R., & Mwase, T. (2005). Determinants of health insurance ownnership among South African women. *BMC Health Services Research, 5*(17), 1-10.

Mayers, A. (2013). *Introduction to statistics and SPSS in psychology.* Edinburgh: Pearson.

Markowitz, M. A., Gold, M., & Rice, T. (1991, January). Determinates of Health Insurance status among Young Adults. *Medical care, 29*(1), 6-19.

Kjosevski, J. (2012). The Determinants of Life Insurance Demand In Central and Southeastern Europe. *International Journal of Economics and Finance, 4*(3), 237-247.

Truett, D., & L.J., T. (1990). The Demand for Life Insurance in Mexico and the United States: A Comparative Study. *The Journal of Risk and Insurance, 57*, 321-328.

Alesane, A., & Anang, B. T. (2018). Uptake of health insurance by the rural poor in Ghana: determinants and implications for policy. *Pan African Medical Journal, 31*(124), 1- 10.

Masengeli, N. L., Mwaura-Tenambergen, W., Mutai, & Joseph, S. B. (2017). Determinants of uptake of health insurance cover among Adult patients attending Bungoma County Referral Hospital. *International Journal of Health Economics and Policy., 2*(4), 145-151.

Badu, E., Agyei-Baffour, P., Acheampong, I., Opoku, M., & AddaiDonkor, K. (2018). Households sociodemographic profile as predictors of health insurance uptake and service utilization: a crosssectional study in a

[28] See in page 6
[29] Mayers, 2013, p. 457
[30] Markowitz, Gold 7 Rice, 1991
[31] Kirigia, et al., 2005, p. 8
[32] Ibid.

municipality of Ghana. *Advances in Public Health, 2018*, 1-13.

Kimani, J., Ettarh, R., Warren, C., & Bellows, B. (2014). Determinants of health insurance ownership among women in Kenya: evidence from the 2008-09 Kenya demographic and health survey. *International Journal for Equity in Health, 13*(27), 1-8.

Kimani, J. K., Ettarh, R. W., & Bellows, B. (2014). Determinants of health insurance ownership among women in Kenya: evidence from the 2008–09 Kenya demographic and health survey . *International Journal Equity Health, 13*(27), 1-8.

Astari, D., & Kismiantini, K. (2019). Analysis of Factors Affecting the Health Insurance Ownership with Binary Logistic Regression Model. *Journal of Physics: Conf. Series, 1320*(1), 1-9.

Hsiao, C. (1996). Logit and Probit model. In L. Mátyás, & P. Sevestre (Eds.), *The Econometrics of Panel Data: A Handbook of the Theory with Applications* (pp. 420-428). Boston: Kluwer Academic Publishers.

Wan, G., Peng, Z., Shi, Yufeng, & Coyte, P. C. (2020). What Are the Determinants of the Decision to Purchase Private Health Insurance in China? *International Environmental research Public Health, 17*, 1-15.

Gonzales, G., & Ortiz, K. (2015, June). Health Insurance Disparities Among Racial/Ethnic Minorities in Same-Sex Relationships: An Intersectional Approach . *American Journal of Public Health , 105*(6), 1106-1113.

Hao, S., Snyder, R. A., Irish, W., & Parikh, A. A. (2021, October 25). Association of race and health insurance in treatment disparities of colon cancer: A retrospective analysis utilizing a national population database in the United States. *PLOS Medicine*, 1-8.