Financial Development and Life Insurance Demand in Sub-Sahara Africa

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Abstract

This study examines the relationship between financial development and life insurance demand in Sub-Saharan Africa with a sample of fifteen countries. These countries are Nigeria, South Africa, Namibia, Cameroon, Ghana, Cote d'Ivoire, Sudan, Kenya, Uganda, Mozambique, Togo, Benin, Senegal, Cape Verde and Zambia. The specific objectives are to determine the relative effect of financial depth, as well as major macroeconomic factors, preferences and life insurance demand in the sampled countries. It is argued in this study that the traditional textbook and theoretical factors driving demand for life insurance may not be extensively dominant in the case of Sub-Sahara Africa where low formal financial patronage are rife. Using annual data covering the period 1990 – 2011 (22 years), the study applies the panel data estimation, which allows for endogenization of individual country characteristics in the analysis. The model adopted in this study categorises all the necessary macroeconomic factors in the study that seek to explain both insurance penetration and insurance density for the sampled countries. The results of the study show that financial development in African countries drives life insurance demand than major macroeconomic factors.

Keywords: financial development, financial depth, life insurance, insurance density, insurance penetration, Sub-Sahara Africa

1. Introduction

The insurance sector plays a critical role in financial and economic development. By introducing risk pooling and reducing the impact of large losses on firms and households, the sector reduces the amount of capital that would be needed to cover these losses individually, encouraging additional output, investment, innovation, and competition. By introducing risk-based pricing for insurance protection, the sector can change the behaviour of economic agents, contributing inter alia to the prevention of accidents, improved health outcomes, and efficiency gains. As financial intermediaries with long investment horizons, life insurance companies can contribute to the provision of long-term finance and more effective risk management. Finally, the sector can also improve the efficiency of other segments of the financial sector, such as banking and bond markets (e.g., by enhancing the value of collateral through property insurance, and reducing losses at default through credit guarantees and enhancements).

From the study by Beck and Webb (2002) on the economic, demographic and institutional determinants of life insurance demand across countries, strong evidences such as gross domestic product (GDP), old dependency ratio, inflation and banking sector development, additional factors also included anticipated inflation rate, real interest rate, secondary school enrolment and the private savings rate were found to be significant. It appears from this and most researches done that macroeconomic factors seem to have a stronger effect than other factors on life insurance demand. However, studies are not easily available discerning which of these macroeconomic factors has the strongest effect on life insurance demand in Sub-Sahara Africa. To bridge this information gap, this study addresses the following objectives:

- to ascertain the influence of financial development on life insurance demand in Sub-Sahara Africa

- to investigate the impact of income on life insurance demand in Sub-Sahara Africa,

- to determine the effect of inflation on life insurance demand in Sub-Sahara Africa, and

- to evaluate the significance of interest rate on life insurance demand in Sub-Sahara Africa.

2. Litreature Review and Framework

Financial development should have a positive effect on the life insurance sector. Also, the structure of the insurance market could have significant effects on the growth of the market. The presence of foreign insurers would be expected to contribute to market development through product innovation and marketing techniques. Outreville (1996) tested the impact of oligopolistic markets on market development, finding a negative and significant effect. Financial development is associated with the widespread securitization of cash flows, which enables households to secure future income through the ownership of financial assets. By offering similar benefits, life insurance is expected to generate higher sales in countries with a high level of financial development. Focusing on developing countries, Outreville (1996) documents a positive relationship between life insurance consumption and the complexity of the financial structure defined as the ratio of quasi-money (M2–M1) to broad money (M2).

Financial development as used in the study refers to the level of financial sector activities in an economy in in terms of breadth and depth. It is defined as the ratio of broad money supply to GDP. A country's level of financial development and the degree of competition in its insurance market appear to stimulate life insurance sales, whereas high inflation and real interest rates tend to decrease consumption.

Outreville (1996) focused on life insurance demand in 48 developing countries for 1986 and found that life insurance market size is related to the level of disposable income, the country's level of financial development, anticipated inflation and competitive markets. While this study employed one year data, Beck and Webb (2003) used panel data from 1961-2000 from 68 countries to determine factors driving insurance demand. They found that inflation, per capita income, banking sector development, religion and institutional development were predictors of demand. Surprisingly, education, life expectancy, dependency ratio and social security did not play a role in the demand for insurance.

There are established theories that provide some framework for this study. Two of them are discussed here. The implications are that there is the need for insurance in developing regions of the world especially Africa, and how life insurance demand can beneficially result into increase in output and economic activities of host economies.

Conventional Expected Utility Theory: Under the simplest form, conventional expected utility theory assumes that a consumer's utility, U, is a function of disposable income, Y. Assuming a health insurance context, there is a probability, p, that the consumer will become ill and spend L on medical care. Alternatively, the consumer could purchase full insurance coverage for the actuarially fair premium of P = pL, for which the consumer would receive a payoff transfer, I, if ill. For simplicity, assume that I = L. Thus, expected utility without insurance is:

$$EUu = (1\text{-}p)U(Y) + pU(Y\text{-}L) \tag{1}$$

With insurance, expected utility is:

$$EUi = (1\text{-}p)U(YP) + pU(YL+IP)=U(YP) \tag{2}$$

If marginal utility of income is diminishing, the consumer is better off paying P for insurance and avoiding the risk of loss, L. Thus, the expected-utility-maximizing consumer would purchase insurance coverage for these expenditures if *EUi* > *EU*u, or if

$$U(Y\text{-}P) > (1\text{-}p)U(Y) + pU(Y\text{-}L) \tag{3}$$

Because of the way that the theory is specified mathematically, it appears as if the choice is between certainty and uncertainty of actuarially equivalent losses. The choice to purchase insurance is associated with certainty and a higher level of expected utility, therefore, it appears as if insurance is demanded because of the certainty it provides (Nyman, 2001).

Cumulative Prospective Theory: The theory of choice called prospect theory (Kahnemann and Tversky, 1982; Tversky and Kahnemann, 1981, 1990) argues that from a given reference point, the value that individuals realize from gains in income increases with the size of the gain, but at a diminishing rate. Likewise, the value that individuals lose from losses of income increases with the size of the loss, but also at a diminishing rate. Cumulative Prospect Theory (CPT) was developed as the original Prospect theory violated first order Stochastic Dominance. Cumulative Prospect Theory (CPT) is a model for descriptive decisions under risk which was introduced by Amos Tversky and Daniel Kahneman in 1992 (Tversky and Kahneman, 1992). As a variant of prospect theory, the difference is that weighting is applied to the cumulative probability distribution function, as in rank-dependent expected utility theory but not applied to the probabilities of individual outcome.

Cumulative prospect theory assumes that investors display a risk seeking behavior on losses (e.g., payoffs below the reference point): investors are willing to take risk in order to avoid missing their investment goals for sure. This behavior has been documented in several experimental works. Recently, the risk attitude of fund managers has also been related to their contractual incentives. Dass, Massa, and Patgiri (2008) found that mutual fund managers with high contractual incentives to rank at the top (i.e., those with more ambitious investment goals) adopted riskier investment strategies.

Macroeconomic Determinants of Life Insurance Demand

Inflation: The negative effect of inflation on life insurance demand is well documented. Fortune (1973) explains that inflation erodes the value of life insurance, making it a less attractive product. Browne and Kim (1993) and Outreville (1996) provide empirical evidence that anticipated inflation has a negative effect on life insurance consumption.

Disposable Income: Income is a central variable in insurance demand models that positively affects life insurance consumption (see Fortune, 1973; Lewis, 1989). In addition to increasing the affordability of life insurance products, a large income results in a greater loss of expected utility for the dependents in the event of the income earner's death. This effect increases the value of life insurance coverage, and therefore contributes to the positive relationship with income. Working on household level data, Fitzgerald (1987) shows that insurance demand increases with the husband's future earnings (and decreases with the wife's future earnings). Most empirical works on cross-country data use nominal GDP per capita as a proxy for disposable income.

Real Interest Rates: Real interest rate has not been systematically included in many studies. For example, Browne and Kim (1993) neglect the influence of this variable on life insurance demand. Outreville (1996) finds the correlation of real interest rates with life insurance demand to be almost not significant. One theoretical justification for this outcome is that high real interest rates may decrease the cost of insurance, thus stimulating its demand. On the other hand, they may cause consumers to reduce their number of purchases given the anticipation of higher returns. Beck and Webb (2003) appear to detect a positive relationship using average lending rates. However, it can be noted that lending rates contain a credit risk premium that varies from one country to another, depending on its credit default experience. In some cases, such as Iceland and Turkey, where bond markets are nonexistent, bond yields are replaced by money market rates. Beck and Webb, further argue that higher real interest rates would increase the investment return of providers which would be able to offer more attractive returns to consumers.

3. Methodology

3.1 Data

Panel data with time series covering the period 1990 to 2011 and a cross section of fifteen (15) African countries from Sub-Sahara region are utilized for the analysis. The study involves the use of inferential techniques to estimate the empirical determinants of insurance demand.

3.2 Model Specification

The model specified in this study is an extension of the research works of Browne and Kim (1993), Li et al (2007), and Elango and Jones (2011). Since the prospects and utility theories that feed the model show decision making under uncertainty, the basic tenets from the framework show that insurance demand can be decomposed into two observable concepts – risks (uncertainty) and preferences.

The uncertainties expressed in the models generally presents risk as a negative outcome that occurs with some given probability and implies a given loss with a money equivalent. This basic framework can be extended in various directions by considering some cases where correlated risks have to be considered simultaneously (e.g., an accident). More complex issues arise when utility is state dependent, since the risk then cannot be considered as purely monetary. For instance, the benefits derived from a life insurance contract depend on the current utility, for a person, of a future transfer to the offspring after the person's death. The underlying inter temporal rate of substitution/ altruistic motive may be hard to assess, let alone to distinguish from risk aversion. Hence, factors that generate risk for the policy holders are included in the model developed in this study. In particular, we draw the model from both the prospects and utility models as effectively combined by Einav (2013) - who devised that insurance demand evolves from a vector of consumer characteristics as well as tendency for market/public sector failure (or macroeconomic uncertainties).

The demand for insurance is therefore hypothesized to depend on both aggregate macroeconomic uncertainties (risks) and individual consumers (or demographic) factors in the economy. Thus, the general form of the model may be specified as:

$$DINS = f\ (MAC) \tag{3.1}$$

Where DINS = demand for insurance which may be measured as the number of insurance policy taken by individuals/households

MAC = vector of macroeconomic factors (representing risks or prospects-based factors)

Since, the price of a product is essential in the demand function, the price of insurance (PRICE) is included in the model. The use of the demand function in the model implies that estimates should report elasticities at the mean (Iyoha, 2004) by which the percentage changes in each of the explanatory variables can explain the percentage changes in insurance demand.

Equation 3.1 is therefore presented as a mathematical demand function as follows:

$$DINS = A\, MAC^{\alpha}\ PRICE^{\rho} \tag{3.2}$$

Where α is the elasticity of insurance demand with respect to changes in macroeconomic factors, and ρ is the price elasticity of demand for insurance. The demand function above is a power function and reports how (after accounting for the price effect) demand for insurance will change when macroeconomic (policy induced) factors change.

To estimate equation 3.2, there is need to make it linear by taking logarithms of both sides and also include a stochastic term. Thus, equation (3.2) becomes

$$logDINS = logA + \alpha logMAC + \rho logPRICE + u \tag{3.3}$$

where u a Gaussian whit noise error term.

In the general demand function quantity demanded and price of the product are endogenous (at the equilibrium level) and anyone can be used to measure the behavior of demand (see Iyoha, 2004). Indeed, a study like Phelps (1973) used insurance price to model insurance demand while Browne and Kim (1993) and Fitzgerald (1987) use quantity of insurance policy taken as representative of insurance demand. It should however be noted that using insurance quantity is often associated with micro-level studies while the macro-level studies, such as this current one, uses insurance price. Hence, in this study, the price of insurance (insurance premium) is used to represent the size of demand for insurance. MAC in equation (3.3) is a vector of exogenous variables that cover the macroeconomic factors in the model. Hence, following Einav (2013) and Einav, Finkelstein and Levin (2010),

MAC = {FIND, GDPPC, INFR, RIR}

Where FIND = Financial Depth/Development

GDPPC = Gross Domestic Product per Capita

INFR = Inflation Rate

RIR = Real Interest Rate

Note that insurance price has been endogenized in the model and the effects of the exogenous variables on insurance demand are now captured by observing their impacts on the size of the amount of price paid for insurance cover. The relationship between price of insurance (premium) and insurance demand is rather straight forward as demonstrated in Spinnewijn (2012). A rise in insurance premium received by insurers due to the peculiarity of the African systems, indicates that the level of individual socio/economic development may play a major part in demand for insurance policy. Thus, the expanded demand for insurance model is presented as:

$$DINS = f\,(FIND, GDPPC, INFR, RIR)$$

Where DINS = Demand for insurance coverage (the insurance premium), the apriori relationships between each of the exogenous variables and the endogenous variable may be written as: $f_1, f_2, f_3 > 0$; $f_4 < 0$

where f_i is the partial derivative of DINS with respect to each exogenous variable.

In order to obtain more robust results, we break down insurance demand to the extent of penetration within the economy (*PEN*) and the density of insurance cover (*DEN*). Penetration shows the level of development of insurance industry in the economy while density indicates the extent of individual embrace of the industry.

Hence two models are specified:

$$PEN = f\ (FIND,\ GDPPC,\ INFR,\ RIR) \tag{3.5}$$

Where PEN = insurance penetration (measured as insurance demand/GDP);

$$DEN = f\ (FIND,\ GDPPC,\ INFR,\ RIR) \tag{3.6}$$

Where DEN = insurance density (measured as insurance demand/population)

In equations (3.5) and (3.6), it is argued that the same factors that explain development of the insurance industry in terms of demand are also responsible for explaining the level of individual demand for insurance coverage.

Given the function generated in equation (3.3), the two main models specified in this study are presented in logarithmic forms as:

$$logPEN_{it} = \alpha_{it} + \alpha_1 logFIND_{it} + \alpha_2 logGDPPC_{it} + \alpha_3 logINFR_{it} + \alpha_4 logRIR_{it} + \delta_i + \gamma_t + U_{it} \tag{3.7}$$

$$logDEN_{it} = \alpha_{it} + \beta_1 logFIND_{it} + \beta_2 logGDPPC_{it} + \beta_3 logINFR_{it} + \beta_4 logRIR_{it} + \delta_i + \gamma_t + Ui_t \tag{3.8}$$

Where *i* represents the country, *t* represents time, α represents the general intercept and Ui_t is the general stochastic error term.

It should be noted that the model specified above (3.7) and (3.8) is a panel regression model that takes the cross sectional heterogeneity among the data into cognizance. The use of fifteen (15) countries in the sub Sahara Africa sub region would definitely generate within-sample bias when OLS technique is applied in the estimation. Hence, a model that can capture such biases and endogenise them is employed. The panel model also include the random effects (or cross sectional) term (δ) and the fixed effects (or period specific) term (γ). These coefficients account for the variations across countries and over time period (Greene, 2004).

Technique of Estimation: In this study, the panel regression technique is applied. A variety of different models for panel data are used in studies where heterogeneous effects are noticed within time series across space. In the panel regression method, if z_i contains only a constant term, then ordinary least squares method provides consistent and efficient estimates of the common α and the slope vector β. In this estimation, two effects are highlighted:

(a) Fixed Effects: If $z_i$is unobserved, but correlated with x_{it}, then the least squares estimator of β is biased and inconsistent as a consequence of an omitted variable. However, in this instance, the model

$$y_{it} = x'_{it}\beta + \alpha_i + \varepsilon_{it}, \tag{3.9}$$

(where $\alpha i = z'_i\alpha$,) embodies all the observable effects and specifies an estimable conditional mean. This fixed effects approach takes α_i to be a group-specific constant term in the regression model. It should be noted that the term “fixed” as used here signifies the correlation of α_i and x_{it}, note that α_i is non stochastic.

(b) Random Effects: If the unobserved individual heterogeneity, however formulated, can be assumed to be uncorrelated with the included variables, then the model may be formulated as

$$y_{it} = x'_{it}\beta + E[z'_i\alpha] + z'_i\alpha - E[z'_i\alpha]' + \varepsilon it \tag{3.10}$$
$$= x'_{it}\beta + \alpha + u_i + \varepsilon_{it}$$

that is, as a linear regression model with a compound disturbance that may be consistently, albeit inefficiently, estimated by least squares. This random effects approach specifies that u_i is a group-specific random element, similar to ε_{it} except that for each group, there is but a single draw that enters the regression identically in each period.

The Hausman test of randomness is used to determine the best effects model to be used. The software package used in the analysis is the EVIEWS 8.0.

3.3 Method of Analysis

The study employs panel data for fifteen African countries for the period of twenty-two years; therefore the conditions for panel unit roots test of times series and cross-sectional observations greater than fifteen years and balanced panel data are met by the pooled observations of the study. In the study, the purposive sampling approach was used to select the fifteen (15) countries in the Sub-Sahara African region; Benin, Cameroon, Cape Verde, Cote d’Voire, Ghana, Kenya, Mozambique, Namibia, Nigeria, Senegal, South Africa, Sudan, Togo, Uganda and Zambia. The selected national economies range from large ones like Nigeria to very small ones like Benin Republic as can be seen from the sample list. The data also ranges across different sub-regional blocks in the region including 7 countries from West Africa, 2 from Central Africa region, 2 from East Africa and 4 from Southern African region (See Appendix). The data used in study are all sourced from the World Bank. The insurance data were obtained from the World Bank schedule of the Sigma Reports (*Swiss Re*) while the other data were obtained from the World Bank *World Development Report* (2012).

Explanation of Variables is summarised below:

Variable	Description/Measurement
FIND = Financial Development	Broad Money Supply/GDP
GDPPC= Gross Domestic Product Per Capita	GDP/Total Population
INFL= Inflation	% increase in prices of goods per year (average)
RIR = Real Interest Rate	Interest rate adjusted for inflation per year

4. Presentation and Analysis of Results

The following are the hypothesis as drawn from the study;

Ho: Financial Development does not have a significant relationship with Life Insurance Demand in Sub-Sahara Africa

Ho: Macroeconomic variables (Inflation Rate, Real Interest Rate and Gross Domestic Product Per Capita) do not have a significant relationship with Life Insurance Demand in Sub-Sahara Africa

Data Presentation: See Appendix for Table 1.

4.1 Model I Interpretation

Hausman Test

Ho: Fixed effect model is appropriate

H1: Random effect model is appropriate

From the Hausman test result, the Chi-square statistic is 5.9969. With a probability value of 0.1994.

This shows that the Chi-square statistic is not significant at the 10% level. Hence, we fail to reject the null hypothesis that fixed effects model is appropriate. Thus the results of the fixed effects model is reported below in table.

Correlated Random Effects - Hausman Test
Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.996851	4	0.1994

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOG(FIND)	0.482489	0.561093	0.001519	0.0437
LOG(GDPPC)	2.154740	1.809659	0.020982	0.0172
LOG(INFL)	-0.049154	-0.067706	0.000077	0.0343
LOG(RIR)	-0.011064	-0.022908	0.000034	0.0430

The coefficient of determination (R^2) is approximately 0.87. It shows that about 87% of the systematic variations in the dependent variable Insurance penetration are explained by the independent variables. Similarly, the adjusted R^2 is approximately 0.86. This implies that 86% of the systematic variations in insurance penetration are accounted for by the explanatory variables. While, about 13% of these variations are attributable to disturbance terms.

The F- Statistic is 97.37 with its probability value of 0.0000. This shows that the overall model is highly significant at the 1% level. That is, all the explanatory variables are jointly significant in explaining the dependent variable (Insurance penetration).

4.2 Analysis of Results

Dependent Variable: LOG(PEN)
Method: Panel Least Squares
Date: 02/02/16 Time: 07:22
Sample: 1990 2011
Periods included: 22
Cross-sections included: 15
Total panel (unbalanced) observations: 287

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FIND)	0.482489	0.180073	2.679404	0.0078
LOG(GDPPC)	2.154740	0.277644	7.760808	0.0000
LOG(INFL)	-0.049154	0.048228	-1.019196	0.3090
LOG(RIR)	-0.011064	0.062744	-0.176336	0.8602
C	-18.59383	1.961332	-9.480207	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.867364	Mean dependent var	-1.536034
Adjusted R-squared	0.858456	S.D. dependent var	1.810060
S.E. of regression	0.680987	Akaike info criterion	2.133362
Sum squared resid	124.2833	Schwarz criterion	2.375628
Log likelihood	-287.1375	Hannan-Quinn criter.	2.230459
F-statistic	97.36512	Durbin-Watson stat	0.851466
Prob(F-statistic)	0.000000		

Source: *Eviews 8.0*

All the explanatory variables conform to their expected signs. Financial depth/development and Gross domestic product per capita were found to be positive. While, inflation and real interest rate were negative. The coefficient of financial development is 0.48. Its t-statistic is 2.68 with a probability value of 0.00. It is highly significant at 1% level of significance. This implies that 10% increase in financial development will result in about 4.8% increase in insurance penetration. Thus financial depth/development has a significant positive effect on insurance penetration in Sub-Sahara Africa.

Gross Domestic Product Per Capita (GPPC) has a coefficient of 2.15. Its t-statistic is 7.76 with a p-value of 0.00. The coefficient passes the individual test of statistical significance at 1% the level. This shows that 10% increase in gross domestic product per capita will lead to about 21.5% increase in insurance penetration. Thus, gross domestic product per capita has a significant positive effect on insurance penetration in Sub-Saharan Africa.

The coefficient of inflation is -0.49. It has at-statistic of -1.01 with a probability value of 0.3090. It is not significant at 10% level of significance. Thus inflation does not have a significant effect on insurance penetration in Sub-Saharan Africa.

Real interest rate has a coefficient of -0.01. Its t-statistic is -0.18. It is not significant at the 10% level. Thus real interest rate has no significant effect on insurance penetration in Sub-Saharan Africa.

4.3 Model II Interpretation

Hausman Test

Ho: Fixed effect model is appropriate

H1: Random effect model is appropriate

From the Hausman test result, the Chi-square statistic is 13.671220 with a probability value of 0.0084. This shows that the Chi-square statistic is not significant at the 10% (percent) level. Hence, we reject the null hypothesis that fixed effects model is appropriate. Thus the results of the random effect model is reported below in the table.

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.671220	4	0.0084

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOG(FIND)	0.434236	0.547193	0.001236	0.0013
LOG(GDPPC)	3.373785	2.930471	0.016881	0.0006
LOG(INFL)	-0.050681	-0.076273	0.000065	0.0015
LOG(RIR)	0.042055	0.025107	0.000025	0.0006

Source: *Eviews 8.0*

The coefficient of determination (R^2) is approximately 0.45. It shows that about 45% of the systematic variations in the dependent variable Insurance density are explained by the independent variables. Similarly the adjusted R^2 is approximately 0.44. This implies that 44% of the systematic variations in Insurance density are accounted for by the explanatory variables. While, about 56% of these variations are attributable to disturbance terms.

The F-Statistic is 58.33 with its probability value of 0.0000. This shows that the overall model is highly significant at the 1% level. Implying that all the variables are jointly significant in explaining the dependent variable (Insurance density).

Dependent Variable: LOG(DEN)

Method: Panel EGLS (Cross-section random effects)

Date: 02/02/16 Time: 07:35

Sample: 1990 2011

Periods included: 22

Cross-sections included: 15

Total panel (unbalanced) observations: 290

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FIND)	0.547193	0.174750	3.131301	0.0019
LOG(GDPPC)	2.930471	0.238756	12.27394	0.0000
LOG(INFL)	-0.076273	0.047045	-1.621282	0.1061
LOG(RIR)	0.025107	0.061557	0.407869	0.6837
C	-18.14889	1.747218	-10.38731	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			1.583421	0.8463
Idiosyncratic random			0.674679	0.1537
	Weighted Statistics			
R-squared	0.450128	Mean dependent var		0.458847
Adjusted R-squared	0.442411	S.D. dependent var		0.918647
S.E. of regression	0.686474	Sum squared resid		134.3051
F-statistic	58.32562	Durbin-Watson stat		0.739564
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.311291	Mean dependent var		4.814167
Sum squared resid	1142.693	Durbin-Watson stat		0.123265

Source: *Eviews 8.0*

All the explanatory variables conform to their expected signs. Financial depth/development and Gross domestic product per capita were found to be positive. While Inflation and Real interest rate were negative. The coefficient of financial development is 0.55. Its t- statistic 3.13 with a probability value of 0.002. It is highly significant at 1% level. This implies that 100% increase in financial development will result in about 55% increase in Insurance density. Thus financial depth/ development has a significant positive effect on insurance density in Sub-Sahara Africa.

The coefficient of (GPPC) Gross domestic product per capita is 2.93. The t- statistic is 12.27 with a probability value of 0.0000. It is highly significant at 1% level. This implies that 10% increase in Gross domestic product per capita will result in about 29.3% increase in Insurance density. Thus Gross domestic product per capita has a significant positive effect on insurance density in Sub-Sahara Africa.

The coefficient of inflation is -0.076. And its t- statistic is -1.62 with a probability value of 0.1061. It is not significant at 1% level. Thus inflation has a significant negative effect on insurance density in Sub-Sahara Africa.

The coefficient of Real interest rate is- 0.03. Its t- statistic -0.47 with a probability value of 0.68 It is not significant at 1% level. Thus real interest rate has a negative effect on insurance density in Sub-Sahara Africa.

5. Conclusion

It is obvious from the results that macroeconomic variables are largely responsible for the demand of life insurance in the African region. Beyond the macroeconomic factors that influence life insurance demand in Sub-Sahara African region, there is also is the financial indicator-(financial development).

This paper investigated the impact of financial development on life insurance demand in the Sub-Sahara region of Africa. In the analysis of financial development and major macroeconomic indicators, it was observed that apart from Gross Domestic Product per Capita other major macroeconomic indicators do not have any significant effect on life insurance demand. From the analysis, it was observed that financial development, the main variable under investigation has significant and positive effect on life insurance demand in Sub-Sahara Africa. This goes to show that for increased life insurance penetration and demand in this region of Africa, the level of involvement in the financial markets by individuals and corporations must deepen.

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Appendix

Table 1

	DEN	FIND	GDPPC	INFL	PEN	RIR
1 - 90	2.220000	22.32000	1152.602	2.180000	0.000000	13.53000
1 - 91	2.560000	25.19000	1162.124	0.760000	0.010000	15.13000
1 - 92	3.180000	27.29000	1155.681	3.030000	0.010000	13.32000
1 - 93	3.900000	26.91000	1180.999	2.380000	0.010000	13.39000
1 - 94	3.850000	23.84000	1164.651	35.03000	0.010000	13.48000
1 - 95	5.270000	23.09000	1196.171	15.10000	0.020000	13.57000
1 - 96	16.35000	21.84000	1211.278	6.910000	0.050000	13.64000
1 - 97	30.53000	21.64000	1245.213	3.670000	0.090000	13.70000
1 - 98	43.03000	19.87000	1259.492	5.230000	0.120000	13.75000
1 - 99	49.76000	21.64000	1290.133	0.440000	0.140000	13.80000
1 - 00	47.42000	25.62000	1313.763	4.530000	0.130000	13.84000
1 - 01	51.46000	27.80000	1353.585	2.660000	0.140000	13.87000
1 - 02	44.14000	26.63000	1369.293	2.290000	0.120000	13.91000
1 - 03	45.92000	25.58000	1377.391	1.700000	0.120000	13.94000
1 - 04	44.34000	24.70000	1375.628	0.380000	0.120000	13.99000
1 - 05	60.83000	24.31000	1371.338	4.420000	0.160000	14.04000
1 - 06	71.09000	27.25000	1379.784	3.160000	0.190000	14.10000
1 - 07	81.04000	30.23000	1400.757	2.520000	0.210000	14.18000
1 - 08	102.7000	33.15000	1428.202	7.190000	0.260000	14.27000
1 - 09	100.8500	36.81000	1424.386	1.960000	0.260000	14.37000
1 - 10	112.6500	30.71000	1419.794	1.860000	0.290000	14.48000
1 - 11	125.2400	24.34000	1429.535	2.360000	0.320000	15.29000
2 - 90	66.54000	21.31000	2081.746	1.640000	0.150000	16.58000
2 - 91	68.45000	21.47000	1946.672	3.570000	0.110000	14.08000
2 - 92	64.51000	20.72000	1834.695	-1.280000	0.110000	19.29000
2 - 93	66.30000	15.98000	1728.479	16.10000	0.120000	1.170000
2 - 94	99.69000	15.45000	1641.475	14.38000	0.190000	2.720000
2 - 95	100.3900	14.79000	1652.994	9.480000	0.190000	5.950000
2 - 96	86.61000	12.61000	1693.473	2.690000	0.160000	18.80000
2 - 97	77.77000	11.97000	1737.943	3.740000	0.140000	17.60000

2 - 98	91.22000	12.39000	1783.555	3.660000	0.160000	17.69000
2 - 99	98.88000	12.88000	1819.656	1.950000	0.170000	19.67000
2 - 00	94.78000	13.99000	1853.244	2.840000	0.160000	18.63000
2 - 01	96.83000	14.49000	1893.254	2.180000	0.160000	18.09000
2 - 02	92.29000	15.16000	1924.950	3.250000	0.150000	14.29000
2 - 03	106.3800	15.95000	1957.767	0.360000	0.170000	17.58000
2 - 04	120.5600	15.78000	1985.071	1.510000	0.190000	16.25000
2 - 05	126.9400	16.02000	1985.739	2.630000	0.200000	14.65000
2 - 06	134.5600	15.97000	2004.635	3.940000	0.210000	10.96000
2 - 07	149.0300	17.09000	2027.103	0.900000	0.230000	13.98000
2 - 08	156.0100	17.96000	2033.646	5.840000	0.240000	15.03000
2 - 09	162.1200	20.09000	2028.796	-3.340000	0.250000	15.03000
2 - 10	169.7900	16.36000	2043.009	3.000000	0.260000	17.88000
2 - 11	203.0700	12.99000	2082.958	2.890000	0.310000	18.03000
3 - 90	8.040000	32.22000	1426.503	2.350000	0.010000	7.480000
3 - 91	6.390000	33.42000	1416.069	4.790000	0.010000	4.970000
3 - 92	16.05000	37.73000	1422.885	3.230000	0.020000	6.560000
3 - 93	25.13000	38.02000	1485.789	51.30000	0.030000	-27.30000
3 - 94	34.88000	62.59000	1546.332	-21.06000	0.040000	40.18000
3 - 95	54.83000	63.00000	1620.742	4.610000	0.060000	7.070000
3 - 96	28.59000	64.18000	1689.783	3.790000	0.030000	7.910000
3 - 97	30.12000	64.54000	1780.429	2.370000	0.030000	9.460000
3 - 98	32.01000	60.86000	1892.134	3.440000	0.030000	8.780000
3 - 99	35.13000	55.65000	2076.731	7.000000	0.030000	4.700000
3 - 00	209.6500	60.67000	2187.091	-1.880000	0.170000	14.08000
3 - 01	205.7300	62.79000	2280.345	1.290000	0.160000	11.42000
3 - 02	13.31000	67.10000	2360.269	-0.390000	0.010000	13.62000
3 - 03	27.42000	68.28000	2431.646	4.410000	0.020000	7.970000
3 - 04	14.09000	72.52000	2499.036	-1.020000	0.010000	13.85000
3 - 05	14.82000	78.27000	2627.662	-1.430000	0.010000	13.92000
3 - 06	32.27000	81.03000	2861.573	2.590000	0.020000	7.080000
3 - 07	52.08000	83.94000	3078.462	1.370000	0.030000	9.060000
3 - 08	73.08000	83.53000	3240.088	3.220000	0.040000	6.560000
3 - 09	112.7100	81.49000	3331.331	4.220000	0.060000	6.490000
3 - 10	117.5300	55.54000	3473.945	3.320000	0.060000	7.470000
3 - 11	142.7200	30.99000	3615.804	3.930000	0.070000	5.660000
4 - 90	139.2000	29.14000	1910.528	-4.520000	0.210000	21.50000
4 - 91	166.7100	28.58000	1848.099	0.660000	0.260000	15.24000
4 - 92	179.4500	28.50000	1783.523	-0.020000	0.290000	16.78000
4 - 93	197.3500	26.56000	1723.619	6.150000	0.330000	17.27000
4 - 94	210.4300	22.05000	1684.729	46.39000	0.360000	17.40000
4 - 95	218.9200	24.05000	1752.734	11.04000	0.360000	17.50000
4 - 96	242.1400	23.48000	1836.566	4.980000	0.380000	17.60000
4 - 97	249.3400	22.61000	1891.191	4.220000	0.380000	17.68000

4 - 98	274.9500	21.96000	1932.857	5.220000	0.410000	17.75000
4 - 99	293.0300	21.86000	1919.478	0.920000	0.440000	17.81000
4 - 00	276.4200	22.40000	1810.690	-0.380000	0.440000	17.86000
4 - 01	277.4400	22.55000	1776.955	4.250000	0.450000	17.90000
4 - 02	286.8100	26.43000	1722.191	5.070000	0.480000	17.95000
4 - 03	272.1100	26.01000	1668.709	1.300000	0.470000	17.99000
4 - 04	301.6900	22.58000	1672.171	0.630000	0.520000	18.05000
4 - 05	317.9200	23.25000	1666.010	4.230000	0.550000	18.12000
4 - 06	331.9300	24.09000	1649.484	4.500000	0.580000	18.20000
4 - 07	343.2600	27.04000	1648.906	2.710000	0.600000	18.30000
4 - 08	373.7100	27.82000	1657.088	8.000000	0.650000	18.42000
4 - 09	386.3000	29.91000	1686.975	0.020000	0.660000	18.55000
4 - 10	428.9100	27.52000	1693.431	1.900000	0.730000	18.69000
4 - 11	487.9300	25.88000	1580.122	5.030000	0.890000	18.93000
5 - 90	8.400000	13.31000	907.1008	31.17000	0.040000	18.12000
5 - 91	11.09000	13.38000	928.4812	20.04000	0.050000	20.46000
5 - 92	11.88000	17.00000	937.4117	11.15000	0.050000	22.16000
5 - 93	10.48000	17.35000	955.4349	31.76000	0.050000	21.85000
5 - 94	13.57000	18.63000	960.1748	30.13000	0.060000	19.35000
5 - 95	12.81000	18.38000	973.6626	43.05000	0.050000	18.75000
5 - 96	15.25000	17.70000	993.2131	39.84000	0.060000	17.74000
5 - 97	16.99000	20.19000	1010.199	19.46000	0.070000	17.57000
5 - 98	20.90000	21.16000	1033.043	17.05000	0.080000	16.13000
5 - 99	20.54000	21.65000	1053.455	13.97000	0.080000	17.58000
5 - 00	30.16000	23.21000	1066.793	27.23000	0.120000	20.80000
5 - 01	36.16000	25.77000	1083.086	34.82000	0.140000	22.58000
5 - 02	49.27000	29.30000	1104.698	22.82000	0.180000	21.63000
5 - 03	59.15000	28.12000	1134.145	28.70000	0.210000	20.77000
5 - 04	78.90000	29.22000	1168.792	14.35000	0.280000	20.05000
5 - 05	94.50000	29.49000	1208.014	14.96000	0.320000	19.74000
5 - 06	81.02000	19.98000	1254.557	80.75000	0.270000	22.13000
5 - 07	92.78000	22.26000	1303.735	16.28000	0.290000	24.54000
5 - 08	101.5800	23.60000	1380.118	20.20000	0.300000	21.92000
5 - 09	113.7400	20.04000	1401.457	16.62000	0.330000	20.89000
5 - 10	140.8900	16.31000	1478.481	16.48000	0.390000	24.93000
5 - 11	167.5200	17.47000	1652.339	12.52000	0.420000	24.57000
6 - 90	55.82000	27.11000	1421.068	10.64000	0.120000	7.330000
6 - 91	95.41000	28.45000	1394.354	12.53000	0.220000	5.750000

Source: Sigma Reports (*Swiss Re)*, World Bank World Development Report (2012)