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Harnessing Nigeria's Insurance Industry Potentials for Sustainable Economic Growth

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ABSTRACT
This research paper focuses on harnessing Nigeria's insurance industry potentials for sustainable economic growth. Data on Gross Domestic Product, Insurance Premium Incomes from Life, Fire, Accident, Motor, Employer's Liability, Marine and Oil/gas Insurance were obtained from the CBN Statistical Bulletin 2015 edition, and analyzed using the Ordinary Least Square (OLS) regression technique. The data properties i.e. whether the variables are stationary and whether a long run relationship exists amongst the variables were established using the Johansen's Unit Root and Cointegration tests. The cointegration test indicated a long run relationship amongst the variables. Also, the Unit Root test shows that GDP, Premium incomes from Life, Fire, Motor, Liability, Marine and Oil/Gas are stationary at first difference while only Accident Insurance is stationary at level. The model estimation shows positive and significant linear relationship between Life, Accident, Motor, Employers' Liability, Oil/gas and GDP while Fire and Marine insurance have negative and insignificant relationship with GDP. The variables are jointly significant at 5% level. The implication of these findings is that Life, Accident, Motor, Liability and Oil/gas insurance businesses are the classes of insurance with most potential for driving the growth of the economy while Fire and Marine insurance retard economic growth. It is recommended that NAICOM should make all classes of insurance compulsory especially Fire and Marine Insurance as well as follow up on these regulations with strict penalties for defaulters, both corporate firms and individuals in order to cater for insurance need of every sector of the economy and drive economic growth in Nigeria.
Keywords: Insurance, Insured, Sustainable Growth, Risk

INTRODUCTION

Evidence from the National Bureau of Statistics (NBS, 2016) shows that Nigeria is no longer in a technical recession, but full economic recession. The consecutive negative growth of gross domestic product (GDP) in the first two quarters of 2016, the current double digit inflation rate of 17.5%, high unemployment rate of over 20%, plummeting foreign exchange and continuous slide in the value of the naira are all evidence of an economy in recession.

In the face of the challenging economic climate, Babington-Ashaye (2016) holds that the insurance industry in Nigeria faces an enormous task of sustaining business practices by considering the impact of its business on future generations while at the same time remaining profitable. According to the Africa Insurance Organization (AIO) Annual Report 2017 held in Kampala, Nigeria currently is the fifth largest insurance market in Africa with overall market share of 85% of premiums in the continent. This gives the industry the upper hand in being the driving force for every sector of the economy.

The landscape of risks facing the insurance industry seems to expand daily. The sustainability and profitable growth of any industry hinges on the value proposition that it offers to customers as well as the needs of customers it addresses. In the case of Insurance services, the value proposition offered to customers is an aggregate of aspects such as the quantum of protection offered, addressing the long

term financial goals by enabling long term wealth creation finally, ensuring a speedy and hassle-free claim settlement that provides financial support to the family that has suffered the loss of a loved one. Soares (2017) posits that insurance policies should be designed for virtually every sector of the economy with pricing reflecting a balance between the current down trend in the economy and future growth in the economy. Insurance as an industry which significantly contributes towards the economic growth of a country, the foundation needs to be further fortified to build a strong platform for the next phase of growth. This paper therefore, brings to limelight the roles played by the insurance industry towards achieving sustainable economic growth.

Literature Review

Over the past decade, the Nigerian insurance industry has grown steadily and this is shown in the total premiums which have gone from about ₦75 billion in 2005 to over N300 billion currently (NAICOM, 2017). The recapitalization and consolidation exercise carried out in 2005 gave the insurance industry a very strong capital base from ₦150 million to ₦26 billion for life insurance companies while composite insurance firms' rose to ₦5 billion. Also, non-life underwriting companies have a minimum capital base of ₦3 billion with re-insurance companies having a capital base of ₦10 billion. The overall impact of the new capital base has been far reaching, given the sustained growth of the companies over the years (Omoke, 2011).

There have been products innovations by insurance companies with the introduction of low cost insurance policies such as Takaful Insurance, Students' Insurance Policies, Group Life Savings etc, but sustaining these products is an enormous task for these companies (Han, 2010).

Insurance Industry and Sustainable Growth

Insurance plays a very important role in developing a sustainable economy through its products and services. By insuring the society, business organizations etc against the uncertainties of risks, it improves the standard of living of the society and builds confidence to take challenges and catch the opportunities available in the business society. In the words of ***Riegel and Miller*** (2012) *"Insurance is a social device whereby uncertain risks of individuals may be combined in a group and thus made more certain; small periodic contributions by the individuals providing a fund out of which those who suffer losses may be reimbursed*." It provides financial assistance and security against the risks to the society with an element of saving and investment.

The core function of insurance is to transfer risk and this entails that the insurance industry plays a critical role in mitigating the adverse economic, social and environmental consequences of financial losses arising from fortuitous events (Swiss Re, 2016). Expectedly, when the economy is growing steadily, economic activities will also increase in number and value raising the need for insurance protection. Indeed, economic growth leads to more insurance business as more risky investments are undertaken requiring insurance cover. Greg (2011) asserts that a by-product of economic growth is a booming insurance industry with diverse products created to cater for the needs of consumers.

A close examination of the insurance industry in Nigeria suggests that the various sectors have not achieved sustained growth through insurance services. The controversy that erupted in 2012 in the aviation industry when Dana aircraft crashed and the victims were yet to be compensated even after almost two years is a major case study. Further findings revealed that aircrafts of associated airlines have been flying without valid insurance cover prior to the 2012 disaster. (NAICOM, 2012). Nigeria recorded only 3 million policyholders out of a population of over 170 million people (NAICOM, 2017). This gives potential policyholders of almost 10 million plus in the nearest future. There cannot be sustainable economic growth and development without a vibrant, active and well sought after insurance industry in Nigeria. The National Insurance Commission in its 2013 report states that a major hindrance to the growth of the manufacturing sector in Nigeria is the unwillingness of the industrial sector's players to purchase and pay premiums on insurance policies which they attributed to poor infrastructural facilities and poor business climate occasioned by unstable power, bad access roads etc. These have raised operational costs hence making the manufacturers to see insurance covers as additional expenses. Osuji (2015) asserts that most manufacturing firms in Nigeria avoid paying insurance premiums in order to increase profits.

The Swiss-Re annual reports (2015 and 2016) limit the contribution of insurance industry to sustainable economic growth to its three main roles namely – risk carrying, risk management and institutional investment.

1. *Risk Carrying:* Insurance as a financial loss "shock absorber" builds the financial resilience of communities, businesses and households to unexpected losses such as those resulting from national disasters, currency fluctuations, policy shifts, illness or accident. This in turn enables investment and supports economic resilience and growth.
2. *Risk Management:* The insurance industry's contribution to managing risk extends well beyond the losses it pays out but includes developing an understanding and reduction of risks in homes, offices, factories, vehicles and vessels. Insurers help reduce risk through research, as well as advocacy and support at local level. Insurance pricing and other policy terms and conditions can provide clear risk signals and reward risk reduction efforts.
3. *Institutional Investment:* Insurance premiums are pooled and become part of a fund of financial assets which the Insurance Companies invest to generate additional funds to meet their obligations to the policy holders.

A significant portion of Insurance Companies' profitability is based on the investment income earned by the Insurance Companies from the time they take in premiums until the time they pay out claims. The implications of declining investment income in Nigeria are both profound and immediate. If insurers cannot rely on this income, then they will need to earn more in premium through higher rates to compensate for lower investment earnings (Swiss Re, 2016). Although this can be bad news for consumers, higher rates don't always materialize when more and more insurers move capital away from poor performing investments and into underwriting. This means that insurers compete for fewer (or at best stable number of) policyholders, which ultimately leads to lower prices even while investment income declines. For this reason, the insurance industry benefits from transparent sound business practices based on long term growth and sustainable profitability.

Theoretical and Empirical frameworks

The core principles of insurance is to understand, manage and carry risk by pricing and creating a market for risk, it enables it to be pooled, diversified managed and reduced, thereby protecting society, and supporting innovation and economic development. (UNEPFI, 2012). The main guiding theory in this paper is the principles for sustainable insurance (PSI). The PSI was developed by the United Nation's Environmental Programme Finance Initiative (UNEPFI) and launched at the 2012 UN conference on sustainable development. The principles for sustainable insurance (PSI) advocate for a risk-aware world where the insurance industry is trusted and plays its full role in enabling a healthy, safe, resilient and sustainable society. Its purpose is to better understand, present and reduce environmental, social and governance risks and better manage opportunities to provide quality and reliable risk protection.

In order to further highlight insurance industry's role in sustainable economic growth, several empirical works are reviewed. Cuperus (2012) studied sustainable insurance using the explorative research approach and a convenience sample of 12 insurers representing various regions in Africa and Europe were sampled using the CSR framework. He found that insurance firms' drive towards sustaining premium charges to meet consumers' demands are very defensive and based on extrinsic motives. In other words, Cuperus (2012) suggests that global insurance companies must be pro-active in their sustainability approach towards mitigating new risks.

Aderoju (2016) analysed insurance and economic growth nexus using regression and causality approach. Using insurance premium income and inflation rate as the independent variables, he found that insurance sector activity exerts a statistically significant positive relationship with economic growth (GDP) in Nigeria. Arena (2008) employed the Generalized Method of Moments (GMM) for dynamic models of panel data for 55 countries between 1976 and 2004 to test whether there is a causal relationship between insurance market activity and economic development. He found that both life and nonlife insurance have a positive and significant causal effect on economic growth.

Igbodika, Ibenta and Isaac (2006) in their research work on insurance contribution to economic growth in Nigeria from 1980 to 2014 used GDP as a measure of economic growth while insurance investment is the explanatory variable. using the GMM approach, their study found that there is a positive effect of insurance investment on Nigeria's gross domestic product. This finding was also buttressed by Mojekwu, Agwuegbo and Olowokudejo (2016) where insurance investments were found to have a sustained impact on Nigeria's economic growth.

METHODOLOGY

Following the empirical review, a unique model is formulated showing the insurance industry's premium income generated from different classes of insurance and economic development proxied by gross domestic product. The data were generated from the Central Bank of Nigeria (CBN) Statistical Bulletin and covers a period of 37 years (1980 to 2015). The analyses adopted the Ordinary Least Square regression technique comprising of the Unit root test, cointegration test, individual and joint tests of significance of the parameter estimates and the Granger Causality test.

Model Specification

In order to ascertain the role of insurance policies in ensuring sustainable economic growth, we assume, for simplicity, a linear relationship between Insurance industry's contribution to Gross Domestic Product (GDP) and Insurance Premium Incomes from various classes of insurance. In doing so, we follow the model adopted by Igbodika, Ibenta & Isaac (2016) by modifying it and including all insurance premiums generated from different classes of insurance as captured in the CBN Statistical Bulletin (2015 Edition). The model is modified thus:

GDP = F(IPIG) …(1)

Where:

GDP = Insurance Contribution to Gross Domestic Product

IPIG = Insurance Premium Income Generated

This can be stated in a functional linear form as follows

GDP = F(LIFE, FIRE, ACCDT, MOTOR, LIAB, MARINE, OIL/GAS) …(2)

Where:

LIFE = Premium income from life insurance; FIRE = Premium income from Fire insurance; ACCDT = Premium income from Accident insurance; MOTOR = Premium income from Motor insurance; LIAB = Premium income from Employers Liability insurance; MARINE = Premium income from Marine insurance; OIL/GAS = Premium income from Oil and Gas insurance.

Putting the above model in a multiple regression format, we have:

$GDP = b_0 + b_1LIFE + b_2ACCDT + b_3MOTOR + b_4LIAB + b_5MARINE + b_6OIL/GAS + U$

Where: b_0, b_1, b_2, b_3, b_4, b_5 are the unknown parameters to be estimated by the multiple regression technique, and U is the Stochastic Error term

RESULTS AND DISCUSSIONS

Unit Root Test

The unit root test is carried out for the data series to ascertain the stationarity of the data. This is very necessary since the data are time series and to avoid a spurious and non-sense regression estimation. The Unit root test for the variables are summarized below as follows:

Table 1: Unit root test

Variables	ADF test statistic at level	ADF test statistic at 1st Difference	5% critical value	Order of integratiion
GDP	1.497546	-4.148132	-3.548490	I(1)
LIFE	0.177320	-4.787137	-3.548490	I(1)
FIRE	-1.500596	-5.105979	-3.548490	I(1)
ACCDT	4.989881	1.769833	-3.548490	I(0)
MOTOR	-1.932580	-3.762841	-3.548490	I(1)
LIAB	-3.083036	-8.287492	-3.548490	I(1)
MARINE	-2.132672	-5.610032	-3.548490	I(1)
OIL/GAS	-2.693730	-7.598984	-3.548490	I(1)

Source: Extract from Eviews 9 output

The unit root test above shows that the time series data for GDP, premium income from life, fire, motor, liability, marine and oil/gas insurance are stationary at first difference i.e. they are integrated of order I(1) while premium income from accident insurance is integrated of order I(0) i.e. at level. This means that all the variables are stationary at First difference except for premium income from Accident Insurance which is stationary at level. Having established the stationarity of the time series data, we can now go ahead to determine the long run relationship among the variables as well as estimating the model coefficients.

Cointegration test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.965113	373.3009	159.5297	0.0000
At most 1 *	0.927849	259.2091	125.6154	0.0000
At most 2 *	0.789350	169.8233	95.75366	0.0000
At most 3 *	0.697288	116.8663	69.81889	0.0000
At most 4 *	0.624129	76.23712	47.85613	0.0000
At most 5 *	0.502526	42.96783	29.79707	0.0009
At most 6 *	0.423264	19.22861	15.49471	0.0130
At most 7	0.015062	0.516001	3.841466	0.4726

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level

Source: Extract from Eviews 9 output

The Johansen cointegration test above shows that there are seven (7) cointegrating equations at 5% level. This confirms the long run relationship that exists among the variables. Since the variables are cointegrated, we can go ahead to estimate the parameters using the Ordinary Least Square (OLS) technique in order to ascertain the degree of relationship that exists among the variables.

Model Estimation

Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.252091	7.402836	-0.439303	0.6638
LIFE	0.004170	0.000650	6.414920	0.0000
FIRE	-0.014253	0.044381	-0.321151	0.4030
ACCDT	0.023097	0.004244	5.442515	0.0000
MOTOR	0.005774	0.002112	2.733774	0.0107
LIAB	0.046614	0.024654	1.890727	0.0691
MARINE	-0.000775	0.001497	-0.518132	0.6084
OIL_GAS	0.011905	0.001811	6.573716	0.0002

R-squared	0.981065
Adjusted R-squared	0.976331
F-statistic	207.2494
Prob(F-statistic)	0.000000
Durbin-Watson stat.	1.889511

Source: Extract from Eviews 9 output

The model estimates above show that premium income from life, accident, motor, employers' liability and oil/gas insurance all have positive linear relationship with Insurance GDP which increases by 0.0042, 0.0231, 0.0058, 0.0466 and 0.0119 units respectively for every unit increase in the respective premium incomes. Conversely, premium incomes from fire insurance and marine insurance have negative relationship with GDP decreasing it by -0.0143 and -0.0008 units respectively. The intercept value of the model is -3.252 which means that insurance contribution to GDP declines by 3.252 units when all the variables used here are each equal to zero i.e. given the absence of insurance premium income returns, GDP declines by 3.252 units.

Furthermore, the individual significance shows that premium income from Life, Accident, Motor and Oil/Gas insurance are individually significant at 5% meaning that Life, Accident, Motor and Oil/gas insurance have significant impact on Insurance contribution to GDP while Fire, Liability and Marine Insurance Premium incomes are not individually significant. The non-significance of Fire, Liability and Marine Insurance Premium incomes is attributed to the Paucity of organized data for these classes

of insurance as well as what Ojo (2016) referred to as the lackluster attitude of potential policyholders (individuals and Corporate bodies) towards certain classes of insurance. The joint test reveals that all the variables used in the model are jointly significant at 5% with F-statistic value of 207.24 and p-value of 0.000. The R-squared adjusted is 0.976 meaning that about 97.6% of the variations in GDP are explained by the joint influence of insurance premium incomes from Life, Fire, Accident, Motor insurance, Employer's Liability, Marine and Oil/gas insurance which shows a very good fit. The Durbin Watson value of the model (1.8895) shows that there is no autocorrelation in the error term.

Granger Causality Test

The Granger Causality test is used to determine the direction of causality or the causal relationship that exists between the variables. The result is shown below:

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LIFE does not Granger Cause GDP	34	3.83063	0.0334
GDP does not Granger Cause LIFE		19.6853	0.0006
FIRE does not Granger Cause GDP	34	1.35442	0.2739
GDP does not Granger Cause FIRE		0.22211	0.8022
ACCDT does not Granger Cause GDP	34	4.92855	0.0066
GDP does not Granger Cause ACCDT		3.04390	0.0478
MOTOR does not Granger Cause GDP	34	13.5853	0.0034
GDP does not Granger Cause MOTOR		1.02840	0.3703
LIAB does not Granger Cause GDP	34	2.10712	0.1398
GDP does not Granger Cause LIAB		0.11854	0.8886
MARINE does not Granger Cause GDP	34	0.85184	0.4370
GDP does not Granger Cause MARINE		2.73187	0.0818
OIL_GAS does not Granger Cause GDP	34	7.16938	0.0150
GDP does not Granger Cause OIL_GAS		5.23503	0.0115

Source: Extract from Eviews 9 output

The result above shows that Life, Accident, Motor and Oil/Gas insurance businesses granger causes GDP. In other words, premium incomes from Life, Accident, Motor and Oil/Gas insurance can be used to predict future growth in gross domestic product given their current trends. It can also be seen that Life, Accident and Oil/Gas insurance policies have bi-directional causality with GDP.

CONCLUSION AND RECOMMENDATIONS

The insurance industry in Nigeria has growth potentials. The various classes of insurance have the potential to drive and sustain every other sector when utilized optimally. The premium income generated from the identified classes of insurance for the period 1980 to 2015 have had positive impact on economic growth except for Fire and Marine insurance policies which show negative relationship each. Based on the findings made in this work, we can safely conclude that Fire and Marine insurance being negative and non-significant have been largely neglected by the insurance industry which according to Onyekwere and Olaleye (2015) can be attributed to the paucity of data captured by the insurance industry which has posed an unclear picture of the value of Marine insurance premiums in Nigeria. Also, Life assurance, Accident, Motor and Oil/gas insurance businesses are the classes of insurance that have positive and significant impact on GDP. Furthermore, current trends in premium incomes generated from Life, Accident, Motor and Oil/Gas insurance can be used to predict the future outcome of Gross Domestic Product in Nigeria due to the Granger Causality effect of these insurance policies on GDP.

Going by the above findings and conclusion drawn there-from, it is recommended that the National insurance Commission (NAICOM) should enact compulsory insurance policies that will cover every sphere of human endeavor in Nigeria and most especially Fire and Marine insurance policies and as

well follow up these regulations with strict penalties for defaulters since many prospective insureds lack the willingness to purchase insurance policies or rather subvert the system in order not to insure. The less than 1% insurance penetration rate in Nigeria calls for a more aggressive insurance policy implementation and a mandatory purchase of insurance policies which have been identified as one of the major drivers of a sustainable economy. In addition, insurers should offer greener businesses, lower insurance premiums and adapt their products to encourage good corporate behavior among firms and drive economic growth in Nigeria.

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APPENDIX 1

TIME SERIES DATA FOR GDP, PREMIUM INCOMES FROM LIFE, ACCIDENT, MOTOR, LIABILITY, MARINE AND OIL/GAS INSURANCE

YEAR	INSURANCE GDP (₦ Billion)	LIFE PREMIUM (₦ Million)	FIRE PREMIUM (₦ Million)	ACCIDENT PREMIUM (₦ Million)	MOTOR PREMIUM (₦ Million)	LIABILITY PREMIUM (₦ Million)	MARINE PREMIUM (₦ Million)	OIL/GAS PREMIUM (₦ Million)
1980	2.80	947.80	19.60	26.50	110.43	9.46	16.23	1,855.45
1981	2.94	1,101.23	22.10	27.90	116.40	10.00	42.10	2,211.49
1982	4.47	1,543.10	27.50	28.40	121.40	11.00	43.20	3,785.21
1983	2.91	1,984.22	26.40	24.90	115.70	6.70	22.90	4,638.39
1984	3.46	2,453.11	28.30	28.70	94.20	6.10	24.60	5,834.94
1985	3.48	3,376.66	35.60	29.40	99.30	6.10	22.20	5,173.24
1986	3.89	3,658.34	41.60	30.20	104.70	5.80	34.70	6,432.58
1987	4.66	3,645.25	75.10	47.80	126.80	6.60	95.10	6,845.47
1988	5.56	3,756.37	82.70	58.40	151.50	10.80	103.50	7,443.12
1989	6.47	4,011.23	154.90	111.30	161.90	13.10	149.50	8,456.30
1990	6.53	4,114.36	194.44	124.17	343.86	11.68	188.58	9,564.67
1991	7.28	5,387.16	233.42	176.27	501.76	38.15	213.21	19,344.44
1992	8.37	6,473.25	839.25	249.78	906.28	24.18	363.48	12,452.89
1993	8.93	6,674.77	543.50	605.50	1,907.97	95.66	566.60	6,541.95
1994	6.86	7,224.59	535.49	602.82	2,284.88	62.13	10,703.49	13,266.83
1995	10.97	7,678.84	781.96	763.10	2,346.81	99.47	9,083.42	10,441.62
1996	20.31	8,647.22	1,822.20	1,832.62	3,384.71	160.40	2,771.95	11,456.34
1997	16.37	9,431.55	2,068.12	1,286.32	3,771.25	565.60	1,786.40	15,967.00
1998	18.66	10,231.43	2,385.07	1,717.81	3,616.41	514.31	1,624.01	22,100.00
1999	20.64	11,182.39	2,920.50	2,351.91	6,293.13	244.27	2,349.66	11,759.00
2000	23.34	12,746.75	3,449.78	2,872.57	7,403.98	260.68	3,103.37	7,204.00
2001	28.86	12,281.74	3,807.94	3,888.02	10,101.83	384.17	3,997.07	12,045.00
2002	42.16	13,857.11	4,908.30	4,918.67	11,715.49	402.32	4,269.54	9,765.00
2003	38.41	14,110.34	5,940.65	5,812.68	12,871.62	512.57	7,219.71	11,764.00
2004	52.63	15,003.44	6,965.13	8,370.93	15,482.44	682.86	7,959.76	10,237.00
2005	72.11	16,011.59	12,252.55	11,050.14	16,322.63	758.47	10,983.38	17,236.00
2006	142.19	16,114.22	11,970.62	15,239.75	20,734.98	912.73	10,493.41	18,023.00
2007	172.29	16,274.39	11,458.44	16,566.74	25,771.39	992.34	10,757.81	18,100.00
2008	198.13	30,735.72	17,454.90	23,208.40	38,701.20	1,005.20	16,510.25	19,249.00
2009	226.24	36,833.33	19,534.95	25,918.89	43,784.17	895.59	17,191.14	35,064.76
2010	260.07	43,039.17	24,249.95	27,816.16	43,925.65	1,437.45	21,264.62	30,509.32
2011	283.96	57,996.13	24,990.02	30,706.67	45,421.77	1,008.87	22,558.84	37,289.39
2012	271.88	58,956.20	22,925.00	28,147.20	44,377.20	1,114.00	20,338.20	34,287.80
2013	314.95	58,997.20	22,583.10	28,890.00	44,574.90	1,186.80	21,387.20	34,028.80
2014	364.74	59,983.20	23,499.40	29,248.00	44,791.30	1,103.20	21,428.10	35,202.00
2015	418.11	68,645.50	23,002.50	28,761.70	44,581.10	1,134.70	21,051.20	34,506.20

Source: Central Bank of Nigeria (CBN) Statistical Bulletin 2015 Edition

APPENDIX 2: ORDINARY LEAST SQUARE REGRESSION

Dependent Variable: GDP
Method: Least Squares
Date: 09/19/17 Time: 14:14
Sample: 1980 2015
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.252091	7.402836	-0.439303	0.6638
LIFE	0.004170	0.000650	6.414920	0.0000
FIRE	-0.014253	0.044381	-0.321151	0.4030
ACCDT	0.023097	0.004244	5.442515	0.0000
MOTOR	0.005774	0.002112	2.733774	0.0107
LIAB	0.046614	0.024654	1.890727	0.0691
MARINE	-0.000775	0.001497	-0.518132	0.6084
OIL_GAS	0.011905	0.001811	6.573716	0.0002

R-squared	0.981065	Mean dependent var	85.43436
Adjusted R-squared	0.976331	S.D. dependent var	122.0607
S.E. of regression	18.77859	Akaike info criterion	8.896442
Sum squared resid	9873.797	Schwarz criterion	9.248335
Log likelihood	-152.1360	Hannan-Quinn criter.	9.019262
F-statistic	207.2494	Durbin-Watson stat	1.889511
Prob(F-statistic)	0.000000		

APPENDIX 3: UNIT ROOT TEST

UNIT ROOT TEST FOR GDP

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.497546	1.0000
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.148132	0.0129
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR LIFE ASSURANCE PREMIUM

Null Hypothesis: LIFE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.177320	0.9969
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LIFE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.787137	0.0026
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR FIRE INSURANCE PREMIUM

Null Hypothesis: FIRE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.500596	0.8103
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(FIRE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.105979	0.0012
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR ACCIDENT INSURANCE PREMIUM

Null Hypothesis: ACCDT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 9 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		4.989881	1.0000
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(ACCDT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 9 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.769833	1.0000
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR MOTOR INSURANCE PREMIUM

Null Hypothesis: MOTOR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.932580	0.6158
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MOTOR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.762841	0.0088
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR LIABILITY INSURANCE PREMIUM

Null Hypothesis: LIAB has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.083036	0.1259
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LIAB) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.287492	0.0000
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR MARINE INSURANCE PREMIUM

Null Hypothesis: MARINE has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.132672	0.5105
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MARINE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.610032	0.0003
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

UNIT ROOT TEST FOR OIL/GAS INSURANCE PREMIUM

Null Hypothesis: OIL_GAS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.693730	0.2451
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(OIL_GAS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.598984	0.0000
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

APPENDIX 4: COINTEGRATION TEST

Date: 09/19/17 Time: 14:08
Sample (adjusted): 1982 2015
Included observations: 34 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP LIFE FIRE ACCDT MOTOR LIAB MARINE OIL_GAS
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.965113	373.3009	159.5297	0.0000
At most 1 *	0.927849	259.2091	125.6154	0.0000
At most 2 *	0.789350	169.8233	95.75366	0.0000
At most 3 *	0.697288	116.8663	69.81889	0.0000
At most 4 *	0.624129	76.23712	47.85613	0.0000
At most 5 *	0.502526	42.96783	29.79707	0.0009
At most 6 *	0.423264	19.22861	15.49471	0.0130
At most 7	0.015062	0.516001	3.841466	0.4726

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.965113	114.0918	52.36261	0.0000
At most 1 *	0.927849	89.38579	46.23142	0.0000
At most 2 *	0.789350	52.95700	40.07757	0.0011
At most 3 *	0.697288	40.62915	33.87687	0.0067
At most 4 *	0.624129	33.26930	27.58434	0.0083
At most 5 *	0.502526	23.73922	21.13162	0.0210
At most 6 *	0.423264	18.71261	14.26460	0.0093
At most 7	0.015062	0.516001	3.841466	0.4726

Max-eigenvalue test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

APPENDIX 5: GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 09/19/17 Time: 14:09
Sample: 1980 2015
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LIFE does not Granger Cause GDP	34	3.83063	0.0334
GDP does not Granger Cause LIFE		19.6853	0.0006
FIRE does not Granger Cause GDP	34	1.35442	0.2739
GDP does not Granger Cause FIRE		0.22211	0.8022
ACCDT does not Granger Cause GDP	34	4.92855	0.0066
GDP does not Granger Cause ACCDT		3.04390	0.0478
MOTOR does not Granger Cause GDP	34	13.5853	0.0034
GDP does not Granger Cause MOTOR		1.02840	0.3703
LIAB does not Granger Cause GDP	34	2.10712	0.1398
GDP does not Granger Cause LIAB		0.11854	0.8886
MARINE does not Granger Cause GDP	34	0.85184	0.4370
GDP does not Granger Cause MARINE		2.73187	0.0818
OIL_GAS does not Granger Cause GDP	34	7.16938	0.0150
GDP does not Granger Cause OIL_GAS		5.23503	0.0115