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Risk Transfer and Growth of Nigeria's Insurance Industry: An Empirical Analysis

Kingsley Onyekachi Onyele & Florence Ariwa
Michael Okpara University of Agriculture, Umudike-Umuahia, Abia State, Nigeria

Abstract

The study investigated the effect of risk transfer on Nigerian insurance industry for the period 1988 to 2018. Data collated for the study was analyzed using Johansen cointegration tests and vector error correction because the unit root test revealed that all the model variables were stationary after first differencing. Growth of insurance industry was measured by insurance sector contribution to the financial sector while premium claims on fire, accident, motor vehicle, employers' liability and marine insurance policies was used as mechanisms of risk transfer. The Johansen cointegration test indicated that a long-run relationship existed between mechanisms of risk transfer and growth of the insurance industry such that policies undertaken on fire and motor vehicle insurance covers had a significant long-run relationship with growth of the insurance industry while claims on accident, marine and employers' liability had no significant long-run relationship with growth of insurance industry. Also, claims on fire, accident and employers' liability had a negative relationship with growth of insurance industry over a longer period. The Granger causality test showed that claims on fire, accident, motor vehicle and employers' liability motivated growth of the insurance industry. The impulse response function indicated that while the insurance industry responded positively to innovation in fire insurance cover and negatively to accident insurance cover, responses of insurance industry to innovations in motor vehicle, employer's liability and marine insurance policies varied within the periods. The variance decomposition output revealed that contributions of motor vehicle and employer's liability cover to the insurance industry persisted over a longer period, while the contribution of other independent variables was inconsistent over the period. Hence, proactive measures to enhance effectiveness and efficiency in the Nigerian insurance industry were recommended.

Key words: Risk Transfer, Pure Risk, Insurance, Premium, Insurance Industry

JEL Classification: C32, E31, E37, F31, G22

Paper Classification: Case Study

Introduction

The world is surrounded by diverse events that trigger loss of lives and properties which are either man-made or natural (Act of God). As such, there have been increasing quests to ameliorate the quality of living through varieties of technological innovations and developments due to

the frequent occurrences of undesired events in the business and other facets of life (Okonkwo & Eche, 2019). The various loss mitigation mechanisms vary from crude to scientific techniques as well as insurance contracts (which is the focus of the study). Insurance contract is a financial arrangement aimed at indemnifying persons that suffer from events leading to loss of value. It refers to a contract between two parties, namely; the insured and the insurer, where the insured pays a certain amount of money referred to as premium to the insurer (insurance company) who agrees to pay the amount insured or its equivalent should the insured experience a loss within the contract terms D'Hulster (2016). By underwriting insurable risks for a premium, insurance cover emerges as a prominent factor in any investment activity.

In practice, insurance business involves transfer of risks (risks that are beyond human control) from an insured to an insurer with the insurer providing compensation to the insured to mitigate the effect of financial loss Doshi, Kumar, & Yerramilli (2017). Consequently, based on the law of large numbers, insurance companies have the ability to manage a pool of pure risks than individuals insured OECD (2018). However, deviations in expected business outcome is very likely, especially if there is positive relationship among risks African Reinsurance Corporation, (2019). As a result, in a bid to shield themselves from the adverse effects arising from these deviations in business expectations of the insured, insurance firms raise additional equity or debt capital and leverage on mechanisms of channeling accumulated risks to other carriers, a process known as reinsurance Aduloju & Ajemunigbohun (2017) Thus, in management of risks, the major problem that insurance firms encounter is to take decisions on risks to be accepted, retained and those to be transferred Soladoye (2020). Nevertheless, the initial risk transferred to the insurance companies (insurer) by their customers (insured) is the hub Fadun & Shoyemi (2018).

In Nigeria, like other countries, the insurance industry is an important segment of the financial system. To an extent, the Nigerian insurance industry has improved its services and delivery capacity in terms of protecting citizens from total financial loss. This is because the National Insurance Commission (NAICOM) as well as the Chartered Insurance Institute (CII) of Nigeria alongside other allied institutions has persistently enhanced insurance business through various policies and trainings to deepen insurance business in Nigeria. Various insurance associations such as Nigerian Insurers' Association (NIA) have held regular conferences to create awareness of insurance business in Nigeria. Hence, the regulatory bodies have persistently adhered to the directives and reorganization of their structure to improve and maintain supervision as well as regulatory performance in line with practices of international standard. However, it has been affirmed by several studies that the Nigerian insurance sector has not grown as expected due to several downturns experienced in the financial system Adetunji, Nwude, & Udeh (2018). For instance, the global financial crisis of 2008 that crippled the Nigerian financial system had adverse effect on stocks of financial service providers, including insurance firms (Onyele, Opara, & Ikwuagwu, 2017; Piljan, Cogoljević, & Piljan, 2015).

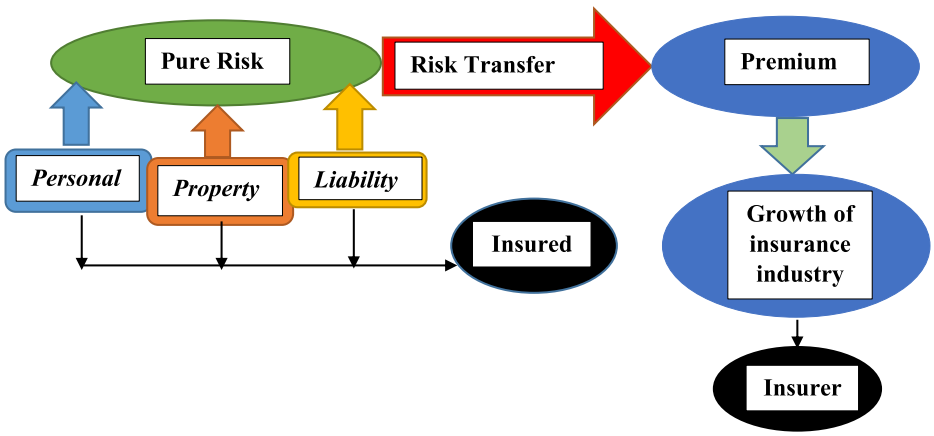
Building on this backdrop, the primary objective of the paper is to assess the effect of risk transfer on growth of Nigeria's insurance industry. The specific objectives are to ascertain the effect of risk transfer components such as, fire insurance, accident insurance, motor vehicle insurance and employer's liability insurance premium on growth of insurance industry in Nigeria from 1988 to 2018. The paper covered the entire insurance industry. The time period chosen for the study was justified by the fact that the base year, 1988 came shortly after financial liberalization of 1986. Secondly, there was availability and regularity of data for the chosen time period. The study is important as it was envisaged that its findings would be beneficial to policymakers, academia and researchers in the field of finance.

Literature Review

Concepts of Insurance and Risk Transfer

Insurance entails a mechanism through which corporations mitigate adverse effect of financial consequences arising from uncertain events or possible financial losses D'Hulster (2016). In fact, insurance reduces the negative effect of financial loss on companies in every line of business. The term "insurance" was defined as a precautionary measure that mitigates the risks associated with unforeseen circumstances, and over which the insured has no control to a very large extent Sawadogo & Guerineau (2015). Hence, three fundamental factors; pooling of risk, risk transfer, and law of large numbers are critical to insurance business activities. Pooling of risk involves grouping of similar risk exposures to ascertain the likelihood of losses in the future; while transfer of risk involves shifting of insurable risks to an insurer by the insured Etale (2019). On the other hand, the law of large numbers proposes that large number of participants boosts confidence of insurance company in its predictions of future outcomes Mehr, Cammack, & Rose, (1961). Insurance aids transfer of insurable risk to an insurer, while the actual risk is left with the insured. The link between risk transfer and insurance industry is as shown in Figure 1 below:

Figure. 1: Link between risk transfer and insurance industry



Source: Developed by Author (2020).

Insurance premium, on the other hand, refers to a specified price an insured pay for being protected from risk of financial loss. It connotes the amount payable by the insured to the insurer for the financial guarantee Okonkwo & Eche (2019). It is hoped that the amount paid as premium for an insurance cover is sufficient enough to cover future claims on the pool of risks as well as expenses including commissions to the insurance and it should be an amount the insured is willing and capable of paying Adetunji, Nwude, & Udeh (2018).

Theoretical Underpinning of Risk Transfer and Insurance

This study is hinged on the theoretical frameworks of principle of equivalence and real options theories as explained below:

Principle of Equivalence

Illustrating the principle of equivalence, Borch (1964), started by considering an insurance

contract in which the sole possible payment is an amount of a monetary unit. He assumed that the said amount is only payable in an occurrence of an event with probability 'p'. This contract defines the following claim distribution:

o when probability is i - p

i when probability is p

Where p defines the net premium of the contract.

It is also assumed that an insurance firm offers the contract for public subscription, at a certain premium (x > p) and that the contract incorporates demand for the insurance cover, and that this demand is influenced by the premium. This was formalized based on the assumption that the insurance company will have the ability to sell n = n(x) contracts supposing the premium is fixed at x. It is normal to presume that n(x) would increase with decreasing x.

Now, the puzzle is how to determine the premium x the insurance company should offer in this insurance contract. This appears to be simple, and ought to be solved satisfactorily, prior to embarking on the task theorizing of insurance business. To proffer solution to this problem, Borch depended on the principle of equivalence. This principle explains that the premium should be equivalent to expected claim payments + administrative costs. This implies that x should be expressed as follows:

$$x = p + \frac{i}{n} C(n) \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (2.1)$$

Where,

C(n) denotes the cost of selling and managing portfolio of n contracts. If the costs can be dichotomized into "fixed" and "variable" costs, equation (1) can be written as:

$$C(n) = C1 + nC_2 \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (2.2)$$

Then, equation (2) will represent the premium:

$$x = p + C_2 + \frac{C_1}{n(x)} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (2.3)$$

From the illustration above, it is seen that n(x) declines with increasing x. This implies that both sides of the equation will accelerate with x such that the equation might have a number of solutions based on the shape associated with the function n(x). Hence, to practically solve the problem, the following ought to be noted:

a. "p" denotes the basic probability

b. "C1" and "C2" represent the cost elements

c. n(x) is the function

To communicate this, Borch resorted to statistical techniques. The primary task of the actuary is to give the best possible estimate of p. Also, they are often called upon to provide estimates of C_1 and C_2, since this usually requires statistical approach. In determining the last element, the n(x) function is often considered as being exogenous to the duties of an actuary. Most often, it will likely be the sales manager of the firm or a market research department that is responsible for estimating the shape of n(x). The function n(x) represents demand or market for the insurance

contract under consideration. These concepts indicate that the problem cannot be completely solved, without the consideration of some economic theories.

Consequently, based on the principle of equivalence, the expected profit on a transaction is zero if an insurance contract is offered to the public at a premium determined by the principle of equivalence. Then the company will be unable to meet its obligation in the insurance contracts. This implies that the insurance contracts will no longer serve the purpose for which they were designed Ugwunta & Ugwuanyi (2019).

Real Options, Uncertainty and Capital Investment

Myriads of studies opine that the interaction of irreversibility of capital and uncertainties brings about a real option of delaying investments while awaiting the outcome of uncertainties Ugwunta & Ugwuanyi (2019). As the real value of the option to wait rises due to uncertainties, higher uncertainties will, ceteris paribus, hinder capital investments. However, the effects of uncertainties on investments amidst adjustment of capital costs are perplexing since firms are faced with higher expected expansion (or option exercise) costs by possibly delaying investments for a period. With intense competition in the product markets (i.e., high price elasticity of demand), the expansion cost effect can cushion the real option motivation to delay investments Caballero(1991). Hence, the resolution of uncertainty-investment relationship is of paramount interest to insurance firms Ehiogu(2018).

Empirical Review

Though, empirical studies on how risk transfer affect growth of the Nigerian insurance industry are sparse, there are recent empirical studies that support the significance of insurance business activities. Some of these studies have been reviewed as follows: Recently, Ehiogu (2018) appraised the nexus between insurance and investments in Nigeria using regression analysis. The results showed a positive and insignificant nexus between insurance and investments. On the other hand, insurance business positively influenced total assets of insurance firms. Also, Fadun & Shoyemi (2018) investigated the contributions of insurance investments to economic growth of Nigeria. Regression technique was applied for the analysis of data. The findings showed a strong positive link between economic growth and insurance investments in Nigeria. Similarly, Torbira (2018) estimated the impact of insurance risk management on output growth in Nigeria using multivariate regression technique. The analysis revealed that insurance claims significantly impact economic output in Nigeria.

On the other hand, Aduloju & Ajemunigbohun (2017) established the nexus between insurance premium income, profits and financial stability. Results emanating from the analysis indicated that reinsurance increased insurers' income significantly. The analysis established that purchasing reinsurance declined insurers' insolvency risk by reducing loss experience and increasing aggregate income. Also, Sawadogo & Guerineau (2015), in consonance Piljan, Cogoljević, & Piljan, (2015) ascertained the impact of insurance premiums on financial market development in thirty-seven (37) developing economies over the period 1987-2011 using the System Generalized Method of Moment approach. Results showed that insurance premiums significantly increased stock market value. Thus, the results argued that insurance policies be promoted and improved to benefit the financial markets. Olajide (2013) studied insurance as a formidable risk transfer technique for mitigating uncertainties associated with Nigerian banks. The study employed quantitative approach using survey of twenty (20) randomly selected commercial banks. The study concluded that purchase of insurance claims enhanced banking operations in Nigeria.

Methodology

Research Design

The paper adopted *ex-post-facto* design which involves the use of secondary data to study the effects of explanatory variables on a dependent variable. Hence, the variables understudy cannot be manipulated. The inability to manipulate the variables arises from the fact that data on the selected variables have already occurred.

Sources of Data

The study used annual series of insurance industry growth (INSGRWT), premiums paid by insurance companies on fire insurance (FIRE), accident insurance (ACCDENT), motor vehicle insurance (MOTVEH), employers' liability insurance (EMPLIAB) and marine insurance (MARINE) in Nigeria from 1988-2018 drawn from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) annual abstract.

Techniques of Data Analysis

To empirically examine the effect of risk transfer on insurance industry in Nigeria, time series procedure of data analysis was applied. First, stationarity test based on Augmented Dickey-Fuller (ADF) unit root test was applied to ascertain the integration order of the data. A variable is said to be integrated of a certain order, let's say "d", written as 1(d), if it must be differenced "d" times to be stationary. Specifically, a variable is said to be nonstationary if it achieves stationarity at first difference or higher. The classification of model variables into stationary and nonstationary is key to avoiding spurious regression results. The equation 3.1 below represents the ADF mechanism for unit root testing:

$$\Delta Y_t = \beta_0 + \beta_1 t + \delta Y_{t-1} + \alpha \sum_{t-1}^{m} \Delta Y_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

Where, ε_t is white noise error term and $\Delta Y_{t-1} - \Delta Y_{t-2}$; and $\Delta Y_{t-2} - \Delta Y_{t-3}$

Moreover, there is the possibility of long-run co-movement, referred to as cointegration, among a group of non-stationary time series data. Accordingly, in the second step, a VAR-based approach of cointegration test suggested by (Johansen & Juselius, 1990) Johansen & Juselius, (1990) was used. The cointegration test gives information as to whether the model variables, particularly insurance industry growth (measured by insurance industry contribution to the financial sector) and risk transfer variables such as fire insurance, accident insurance, motor vehicle insurance, employers' liability insurance and marine insurance premiums are bound in the long-run.

After testing for cointegration, vector error correction model (VECM) was employed to test for the speed of adjustment of the model. Consequently, the VECM is given in its log-linearized form as:

$$\Delta \text{ In } Y_t = \alpha_{0y} + \sum_{i=1}^{n} \alpha_{yi} \Delta Y_{t-1} + \sum_{i=1}^{n} \alpha_{yi} \Delta X_{it-i} + \beta_{1y} \text{In } Y_{it-1} + \beta_{2y} \text{In } Xit_{it-1} + e_{1t} \ldots \quad (3.2)$$

Where Δ denotes the first difference operator. The model represented in equation 3.2 showed how change in Y_t(INSGRWT) responds to changes in X_t(i.e. vector of risk transfer variables).

e_{1t}= Error correction term

Granger causality test was adopted to determine whether one variable is important in forecasting another variable. A variable X is said to granger -cause Y if those X values provide

reasonable information on future value of Y or vice versa. The Granger causality test according to Greene (2002), involves the estimation of the following pairs.

$$W_t = \sum_{t-1}^{n} \propto_1 Z_{t-1} + \sum_{j-1}^{n} \beta_1 W_{t-1} + \mu_{1t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.3)$$

$$Z_t = \sum_{t-1}^{n} \propto_1 Z_{t-1} + \sum_{j-1}^{n} \delta_1 W_{t-1} + \mu_{2t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.4)$$

Where,

W_t = proxies for risk transfer in Nigeria at period t;

Z_t = measure of insurance industry at period t;

t-1 = Lag variables;

α_1, δ_1 and β_1 = Parameters to be estimated;

μ_{1t} and μ_{1t}= Error term

Model Specification

To determine the effect of risk transfer on Nigeria's insurance industry, it is needful to develop a model that shows the relationship existing between the variables. The framework of the paper is hinged on the principle of equivalence which states that 'if insurance companies persistently make losses, they will become unable to indemnify the insured.' Therefore, the empirical model for this paper was stated as follows:

$$\text{Log(INSGRWT)} = \beta_0 + \beta_1\text{Log(FIRE)} + \beta_2\text{Log(ACCDENT)} + \beta_3\text{Log(MOTVEH)} + \beta_4\text{Log(EMPLIAB)} + \beta_5\text{ Log(MARINE)} + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots \quad (3.5)$$

Where,

INSGRWT = Insurance industry growth (proxied by insurance industry contribution to the financial sector)

FIRE = Total premium paid by insurance industry on fire insurance policies

ACCDENT = Total premium paid by insurance industry on accident insurance policies

MOTVEH = Total premium paid by insurance industry on motor vehicle insurance policies

EMPLIAB = Total premium paid by insurance industry on employers' liability insurance policies

MARINE = Total premium paid by insurance industry on marine insurance policies

β_o = Constant parameter

β_1, β_2, β_3, β_4 and β_5 = Estimated coefficient of the independent variables

ε = Error term

Log = Natural log

Results and Discussion of Findings

Stationarity Test

The tests for stationarity was determined by Augmented Dickey Fuller (ADF) unit root test. The t-values of ADF tests are reported in Table 1.

Table 1: Summary of ADF Unit Root Test Results

Variable	t-Statistic @ level	Prob. @ level	t-Statistic @ first diff.	Prob. @first diff.	I(d)
Log(INSGRWT)	-2.467085	0.3407	-6.881814	0.0000	I(1)
Log(FIRE)	-2.247835	0.4478	-5.420950	0.0008	I(1)
Log(ACCD)	-1.387626	0.8424	-4.153020	0.0147	I(1)
Log(MOTVEH)	-1.738893	0.7085	-3.746177	0.0349	I(1)
Log(EMPLIAB)	-2.422603	0.3614	-6.874756	0.0000	I(1)
Log(MARINE)	-2.857881	0.1894	-6.501226	0.0000	I(1)
		I(0)	I(1)		
Critical values:	1% level	-4.296729	-4.309824		
	5% level	-3.568379	-3.574244		
	10% level	-3.218382	-3.221728		

Source: Author's computations using EViews 10.0

Table 1 presents the results of ADF unit root test. At levels, the null hypothesis of nonstationary data cannot be rejected for all the variables understudy. Therefore, the variables were adjudged nonstationary which indicates that they had unit root, but stationary after first difference. This scenario justifies the use of Johansen method of cointegration and vector error correction mechanism (VECM) approach for data analysis.

Johansen Cointegration Tests and VECM

Prior to the cointegration tests and VECM analysis, the optimal lag used for the study was ascertained by the VAR lag order selection criteria as shown in Table 2. The VAR lag order selection criteria indicated different lag order for the analysis. However, the optimal lag for the model was two (2) based on the Schwarz Information Criteria (SC) and Akaike Information Criteria (AIC). Hence, one period lag was used for the Johansen cointegration tests and VECM.

Table 2: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-90.47712	NA	3.12e-05	6.653594	6.936483	6.742192
1	34.25556	189.2496	7.29e-08	0.534099	2.514321	1.154280
2	78.64918	48.9860*	5.81e-08*	-0.044771*	3.63278*	1.106993*
* indicates lag order selected by the criterion						

Source: Author's computations using EViews 10.0

In order to determine the extent of cointegration in the model, the Johansen based cointegration test was conducted as shown in Table 3 below:

Table 3: Johansen Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.870675	161.3985	95.75366	0.0000
At most 1 *	0.747853	104.1265	69.81889	0.0000
At most 2 *	0.737472	65.54964	47.85613	0.0005
At most 3	0.407176	28.10253	29.79707	0.0774
At most 4	0.239826	13.46251	15.49471	0.0989
At most 5 *	0.186652	5.784684	3.841466	0.0162
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.870675	57.27196	40.07757	0.0002
At most 1 *	0.747853	38.57686	33.87687	0.0128
At most 2 *	0.737472	37.44711	27.58434	0.0020
At most 3	0.407176	14.64003	21.13162	0.3149
At most 4	0.239826	7.677822	14.26460	0.4124
At most 5 *	0.186652	5.784684	3.841466	0.0162

Source: Author's computations using EViews 10.0

The Johansen cointegration test results were presented in Table 3 below. Both the trace and maximum eigenvalue statistic detected at least three (3 cointegrating equations at 5% level of significance. In other words, these cointegration results was indicative of a long-run equilibrium relationship in the model. Therefore, this result was plausible that growth in the Nigerian insurance industry is driven by the independent variables just like some empirical works revealed (Fadun & Shoyemi, 2018; Torbira, 2018). The long-run relationship between risk transfer components (FIRE, ACCDENT, MOTVEH, EMPLIAB and MARINE) and growth of insurance industry was captured by the normalized cointegrating coefficients estimates as shown in Table 4 below:

Table 4: Normalized Cointegrating Coefficients (standard error in parentheses)

Variable	Coefficient	Std. Error	t-Statistic
LOG(FIRE)	-0.891280	0.28700	-3.105505
LOG(ACCDENT)	-0.119873	0.29463	-0.406859
LOG(MOTVEH)	0.992166	0.16713	5.936492
LOG(MARINE)	0.022042	0.05540	0.397870
LOG(EMPLIAB	-0.187563	0.15351	-1.221829}

Source: Author's computations using EViews 10.0

Table 4 above displayed the long run cointegrating coefficients of the explanatory variables. Apart from the long-run coefficient estimates of motor vehicle insurance premium (MOTVEH) and marine insurance premium (MARINE), all the other risk transfer variables such as, fire insurance premium (FIRE), accident insurance premium (ACCDENT) and EMPLIAB had negative long run effect on insurance industry growth (INSGRWT). The magnitude of the estimated coefficient associated with FIRE implies that an increase in fire insurance premium caused approximately 89% decrease in growth of insurance industry (INSGRWT) in the long run. Also, an increase in ACCDENT resulted to approximately 11.98% decrease in INSGRWT as a result of

increase in premium paid to accident insurance policy holders (ACCDENT). Again, the positive coefficient of MOTVEH showed that INSGRWT increased by 99.21% due to increase in premium paid to motor vehicle insurance policy holders in the long run. Similarly, the coefficient associated with MARINE indicated that increase in premium paid with respect to marine insurance policy holders caused 2.20% increase in INSGRWT in the long run. Also, it was found that increased EMPLIAB caused a long run diminishing effect of approximately 18.75% on INSGRWT in the long run. Using the 2t-rule of thumb, it was found that only claims on fire and motor vehicle insurance policies had significant long run effect on growth of insurance industry in Nigeria since the respective t-Statistic of FIRE and MOTVEH were greater than 2 using the 2t rule of thumb.

The estimated coefficients in the VECM output indicates the short-run dynamics of the regression model. The results obtained from the VECM was reported in Table 5. The results presented in Table 5 indicate that the coefficient of the error correction model (ECM) is correctly signed and statistically significant which is in conformity with the short-run equilibrium after lag adjustments. Therefore, the ECM implies that approximately 32.54% disequilibrium in the previous period is corrected in the current period showing a relative speed of adjustment from short-run disequilibrium to long-run equilibrium. The R-squared (0.684057) implied that 68.40% of the variations in growth of insurance industry is explained by the explanatory variables (components of risk transfer). The F-statistic of 3.010471 indicates that the explanatory variables collectively explained variations in the growth in insurance industry. This reiterated the significant role collectively played by insurance firms in the process of risk transfer. This finding was in consonance with those of Fadun & Shoyemi (2018); Ehiogu & Aguguom (2018); Torbira (2018); Lesaazi & Tamunonimim (2012) that insurance industry could survive by accepting to cover the insured against future losses.

Table 5: Vector Error Correction Mechanism (VECM) Results

	Coefficient	Std. Error	t-Statistic	Prob.
ECM	-0.325408	0.130639	-2.490898	0.0270
D(LOG(INSGRWT(-1)))	0.105426	0.251888	0.418543	0.6824
D(LOG(INSGRWT(-2)))	0.347133	0.284885	1.218501	0.2447
D(LOG(FIRE(-1)))	-0.107605	0.067601	-1.591762	0.1355
D(LOG(FIRE(-2)))	-0.108525	0.086902	-1.248819	0.2338
D(LOG(ACCDENT(-1)))	0.046301	0.099519	0.465244	0.6495
D(LOG(ACCDENT(-2)))	0.215261	0.099646	2.160258	0.0490
D(LOG(MOTVEH(-1)))	-0.076945	0.108921	-0.706428	0.4924
D(LOG(MOTVEH(-2)))	-0.019429	0.086592	-0.224374	0.8260
D(LOG(MARINE(-1)))	0.047013	0.030219	1.555773	0.1438
D(LOG(MARINE(-2)))	0.000452	0.021247	0.021283	0.9833
D(LOG(EMPLIAB(-1)))	0.013202	0.048374	0.272927	0.7892
D(LOG(EMPLIAB(-2)))	0.030822	0.036670	0.840525	0.4158
C	0.014627	0.042570	0.343600	0.7366
R-squared	0.684057			
Adjusted R-squared	0.443810			
F-statistic	3.010471			
Prob(F-statistic)	0.048519			
Durbin-Watson stat	1.944655			

Source: Author's computations using EViews 10.0

The differenced (D) coefficients represent the short-run dynamics. The short-run estimates revealed that the amount of insurance premium due to accident insurance policy holders caused diminishing and significant effect on growth of insurance industry in Nigeria. On the other hand, MOTVEH had negative but insignificant effect on insurance industry in the short run. All the other variables had positive but insignificant short-run effect on growth of Nigeria's insurance industry growth. It was also found that only the estimated coefficient of ACCDENT was found to be significant in the short-run probably because most risks may likely not occur immediately when an insurance policy is undertaken, but could take a longer period (see, Ehiogu & Aguguom, 2018).

Granger Causality Test

The result of the Granger causality test was presented in Table 6 below:

Table 6: Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(FIRE) does not Granger Cause LOG(INSGRWT)	29	4.40314	0.0235
LOG(INSGRWT) does not Granger Cause LOG(FIRE)		0.53482	0.5926
LOG(ACCDENT) does not Granger Cause LOG(INSGRWT)	29	4.05569	0.0304
LOG(INSGRWT) does not Granger Cause LOG(ACCDENT)		2.32845	0.1191
LOG(MOTVEH) does not Granger Cause LOG(INSGRWT)	29	3.33726	0.0426
LOG(INSGRWT) does not Granger Cause LOG(MOTVEH)		0.44312	0.6472
LOG(MARINE) does not Granger Cause LOG(INSGRWT)	29	1.66355	0.2106
LOG(INSGRWT) does not Granger Cause LOG(MARINE)		0.83871	0.4445
LOG(EMPLIAB) does not Granger Cause LOG(INSGRWT)	29	4.89857	0.0164
LOG(INSGRWT) does not Granger Cause LOG(EMPLIAB)		1.22189	0.3124

Source: Author's computations using EViews 10.0

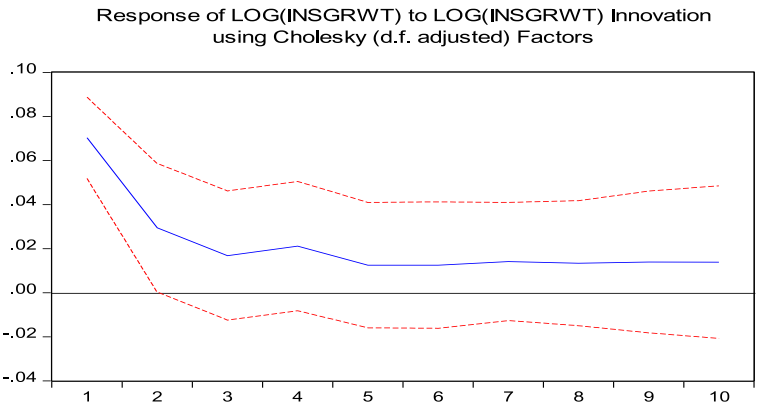
The results of the Granger causality test in Table 6 established that the claims on fire insurance had unidirectional causal relationship with growth of insurance industry at 0.05 significant level. Similarly, a one-way causal relationship running from claims (premium) on accident insurance policies to growth of insurance industry was found at 0.05 level of significance. Also, premium on employers' liability insurance (EMPLIAB) had a unidirectional causal relationship with growth of insurance industry. On the other hand, no strong causality was found between growth of insurance industry and claims of marine insurance in Nigeria. This shows that insurance cover on FIRE, ACCDENT, MOTVEH and EMPLIAB significantly motivated growth in the Nigerian insurance industry over the sampled period.

Impulse Response Function

An impulse response refers to the reaction of a dynamic system to external changes. The figures below display the outcome of the impulse response function of insurance industry to components of risk transfer. The first diagram indicates the response of one standard deviation

innovation from growth of insurance industry (INSGRWT) on itself. The response of this variable to itself is positive up to the last period with the first-four periods having the highest impulse rate.

Figure 1: Response of LOG(INSGRWT) to LOG(INSGRWT)



The second figure shows the effect of one standard deviation innovation in fire insurance on insurance industry where INSGRWT responded positively to fire insurance, though the response was mild in the first-two periods. In the third figure, INSGRWT responded negatively to innovation to accident insurance.

Figure 2: Response of LOG(INSGRWT) to LOG(FIRE)

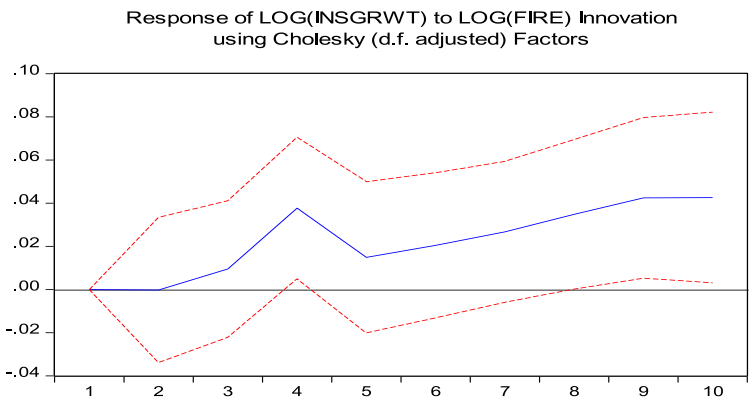
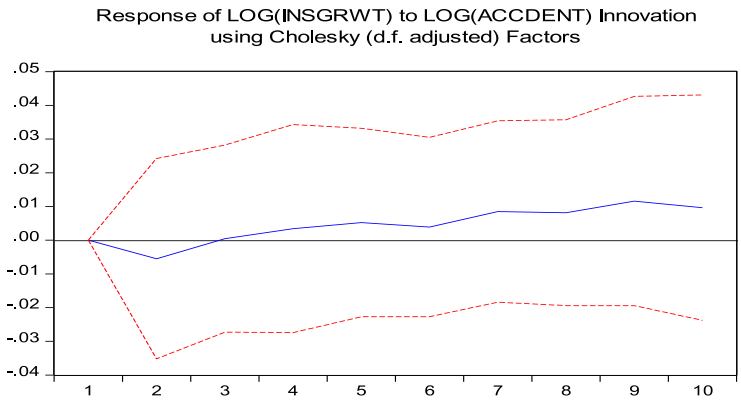
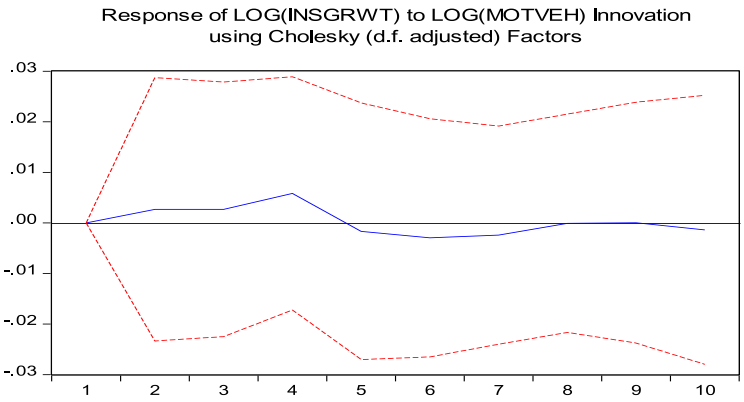


Figure 3: Response of LOG(INSGRWT) to LOG(ACCD)



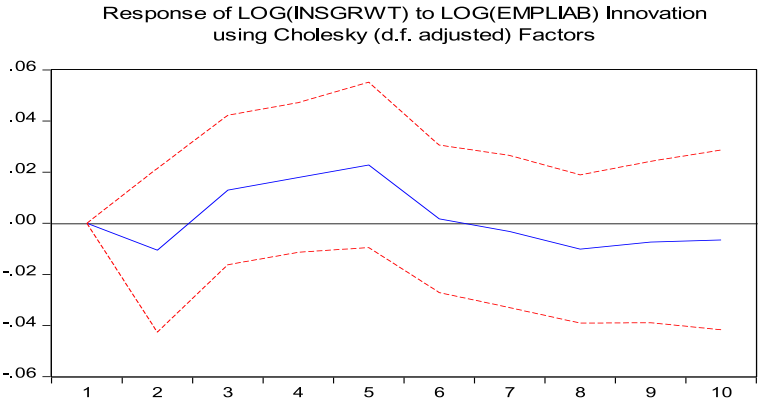
In the fourth figure, it is revealed that INSGRWT responded positively to innovation to motor vehicle insurance in the first-four periods and the turned negative up through the end of the tenth period.

Figure 4: Response of LOG(INSGRWT) to LOG(MOTVEH)



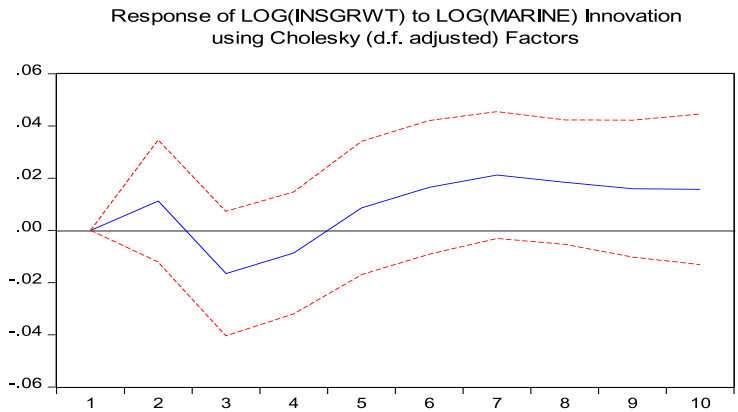
The fifth figure showed that INSGRWT responded negatively to one period standard deviation of employer's liability in the first-two periods then it began to respond negatively until the sixth period when the response turned positive, thus implying fluctuations in the response of INSGRWT to innovations in employer's liability.

Figure 5: Response of LOG(INSGRWT) to LOG(EMPLIAB)



Finally, the sixth figure indicates that INSGRWT responded negatively to one period innovation to marine insurance in the first-two years and then responded negatively till the fifth period and later responded positively from the sixth period to the tenth period.

Figure 6: Response of LOG(INSGRWT) to LOG(MARINE)



Variance Decomposition (VDC)

Table 7 presents the result of the VDC for the variables. The results were reported for a ten (10)-periods horizons. The VDC was based on Cholesky Ordering: LOG(INSGRWT) LOG(FIRE) LOG(ACCD) LOG(MOTVEH) LOG(EMPLIAB) LOG(MARINE).

Table 7: Variance Decomposition of LOG(INSGRWT)

Period	S.E.	LOG (INSGRWT)	LOG (FIRE)	LOG (ACCDENT)	LOG (MOTVEH)	LOG (EMPLIAB)	LOG (MARINE)
1	0.079270	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.106751	88.13868	1.924638	0.251700	3.226042	4.180005	2.278931
3	0.126089	86.77143	2.652875	0.340187	3.583286	4.850855	1.801366
4	0.147374	86.37238	1.943939	0.324137	3.761166	5.808552	1.789826
5	0.163136	85.51246	1.950446	0.269660	4.074689	6.183425	2.009322
6	0.178350	84.93195	1.672441	0.234229	4.372414	6.844488	1.944482
7	0.192485	84.81536	1.455177	0.212099	4.470255	7.031122	2.015985
8	0.205498	84.38425	1.326372	0.200935	4.651261	7.378485	2.058701
9	0.217730	84.19245	1.197448	0.185922	4.765947	7.582811	2.075427
10	0.229461	84.00860	1.093667	0.179098	4.852745	7.760729	2.105162

Source: Author's computations using EViews 10.0

According to Table 7, it is seen that over 80% of variations in INSGRWT were contributed by itself. The contribution of fire insurance to INSGRWT increased from 1.92% in period one to 2.65% in period 2 and then it reduced slowly over the remaining periods. Similarly, contribution of accident insurance premium to INSGRWT increased from 0.25% to 0.34% within the first-two periods and then decreased persistently for the remaining periods while the contributions of motor vehicle insurance premium increased persistently from 3.22% in period two to 4.85% in period ten. Also, the contribution of employee liability premium to INSGRWT increased persistently from 4.18% in the second period to 7.76% in the tenth period. Finally, contribution of premium on marine insurance to INSGRWT decreased from 2.27% in the second period to 1.78% in the fourth period and then increased to 2.00% in the fifth period which later dropped to 1.94% and maintained a persistent increase to 2.10% in the tenth period.

Conclusion and Recommendations

The study concluded that claims on fire and motor vehicle insurance policies contribute significantly to growth of insurance industry in Nigeria in the long run, but only claims on motor vehicle insurance had affected the growth of insurance industry positively. On the other hand, claims on accident insurance had positive and significant effect on growth of insurance industry in the short run. Also, claims on fire, accident, motor vehicle and employers' liability insurance had unidirectional causality with the growth of insurance industry in Nigeria, while no causality was found between claims on marine insurance and the growth of insurance industry in Nigeria.

In view of the findings, the following policies were raised:

1. There is need to take proactive measures to stimulate the effectiveness and efficiency of the insurance industry as well as create favourable investment platforms that would encourage individuals and entrepreneurs to better utilize insurance policy as an effective risk diversification mechanism for financial and operation risks.
2. The Nigerian insurance industry should aim at regaining trust by promoting group insurance schemes, especially among low income earners who find it difficult to obtain insurance cover.
3. Products that would guarantee microinsurance should be designed to cater for the insuring public and packaged via electronic and telecommunication services in Nigeria.

4. Association of the Nigerian insurance market should continue to embrace professionalism and sponsored career development in insurance and related disciplines.

References

Adetunji, A., Nwude, C., & Udeh, S. (2018). Interface of insurance and economic growth: Nigerian experience. *International Journal of Economics and Financial Issues*, *8*(4), 16-26.

Aduloju, S.A., & Ajemunigbohun, S.S. (2017). Reinsurance and performance of the ceding companies: the Nigerian insurance industry experience. *Economics and Business, 31*(1), 19-29.

Caballero, R.J. (1991). On the sign of the investment-uncertainty relationship. *American Economic Review*, *81*, 279-288.

Doshi, H., Kumar, P., & Yerramilli, V. (2017). Uncertainty, capital investment, and risk management. *Journal of Finance*, *47*, 1425-1460.

Ehiogu, C. (2018). Relationship between components of insurance investment activities and economic growth. African *Journal of Business Management*, *6*(23), 7016-7023.

Etale, L.M. (2019). Insurance sector development and economic growth in Nigeria: an empirical analysis. *International Journal of Development and Economic Sustainability, 7*(4), 34-48.

Fadun, O. S., & Shoyemi, O. S. (2018). Insurance investment funds and economic growth in Nigeria. *International Journal of Development and Management Review*, *13*(1), 73-88.

Johansen, S., &Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with application to demand for money. *Oxford Bulletin of Economics and Statistics*, *52*, 169-210.

Mehr, R., I., Cammack, E., & Rose, T. (1961). *Principles of insurance.* Illinois: Richard D. Irwin Inc.

OECD (2018). *The contribution of reinsurance markets to managing catastrophe risk.* Retrieved from www.oecd.org/finance/the-contribution-of-reinsurance-markets-to-managing-catastrophe-risk.pdf.

Okonkwo, I.V., & Eche, E.A. (2019). Insurance penetration rate and economic growth in Nigeria: 1981-2017. *International Journal of Social Sciences and Management Review, 2*(1), 22-45.

Olajide, F. (2013). Insurance, a risk transfer mechanism: an examination of the Nigerian banking industry. *IOSR Journal of Business and Management, 7*(4), 93-101.

Onyele, K.O., Opara, C.C., & Ikwuagwu, E.B. (2017). Does stock market performance influence capital flight from Nigeria? *International Journal of Economics and Business Management, 3*(7), 22-37.

Piljan, I., Cogolgevic, D., & Piljan, T. (2015). Role of insurance companies in financial market. *Faculty of Business Economics and Entrepreneurship International Review, 1*(2), 94-102.

Torbira, L. (2018). Insurance risk management: a correlate of economic growth in Nigeria. *Research Journal of Finance and Accounting*, *9*(7), 1-10.

Ugwunta, D., & Ugwuanyi, U. (2019). Insurance development and economic growth: an examination of the non-bank financial institutions in Nigeria. *International Journal of Financial Research, 10*(2), 538-546.

Authors' Profile

Kingsley Onyele is a Ph.D student at the Department of Banking and Finance, College of Management Sciences, Michael Okpara University of Agriculture, Umudike, Nigeria. He had his B.Sc. and M.Sc. in Banking and Finance from Michael Okpara University, Umudike, Nigeria. He has published well over fourteen articles in International and National Journals.

Florence Ariwa is currently a Lecturer in the University of Agriculture, Umudike, Nigeria. She holds a Bachelor's Degree in Banking and Finance from Ahmadu Bello University, Zaria, Kaduna, Nigeria. She obtained her M.Sc and Ph.D in Banking and Finance from Michael Okpara University of Agriculture, Umudike, Nigeria. Her research areas are Banking and Risk Management.