RISK MANAGEMENT AND CATASTROPHIC LOSS MINIMIZATION IN NIGERIA INSURANCE COMPANIES

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Abstract

This study is carried out to investigate the influence of risk management in minimizing catastrophic loss risks in Nigeria. Adopted exploratory research design to accomplish the research objectives, taken entire insurance companies on the National Insurance Commission as the study population and ten insurance companies are randomly selected, with two hundred sample size. Primary data was sourced for this study through the aid of well-structured questionnaire while correlation and regression analysis were used to analyse the extracted data. The result of the findings reveal that Risk securitization practice (RSEC) has positive and significant relationship with Catastrophic Loss Minimization (CASL) with the coefficient of 0.066; reinsurance policy/strategy (REPL) has positive and significant relationship on Catastrophic Loss Minimization (CASL) with the coefficient output of 0.821; Operational policy(COPL) has positive relationship with Catastrophic Loss Minimization (CASL) of insurance companies with the coefficient output of 0.031, but not significant. However, Insurers retention (INRT) has negative and significant relationship with the Catastrophic Loss Minimization (CASL) of insurance companies with the coefficient output of 0.071. The study recommended that the management of insurance companies should put in place risk management frameworks such as Enterprise Risk Management that conform with National Insurance Commission (NAICOM) guidelines and international best practice. Also, insurance companies should address corporate governance issues in their risk management programs.

Keywords: Risk, Risk Management, Securitization, Reinsurance and Catastrophic loss

Introduction

Many property and general insurance policies are, by their nature, subject to large aggregate losses resulting from relatively infrequent events or natural phenomena,

i.e., from catastrophes. These losses can cause extreme volatility in historical insurance data and generally require separate and different treatment from other losses in rate making methodologies. When insurers suffer substantial losses following a catastrophic event, pressures on property insurance markets can increase as insurers attempt to raise their prices and reduce their exposures (AAA, 2001). This can bring insurers into conflict with regulators who seek to maintain the affordability and availability of insurance.

Catastrophes represent significant financial hazards to an insurer, including the risk of insolvency, an immediate reduction in earnings and statutory surplus, the possibility of forced asset liquidation to meet cash needs, and the risk of a ratings downgrade (AAA, 2001).

A major threat to insurers' viability is the losses associated with catastrophes. Atkins & Bates (2008) identified catastrophe risks as 'a serious threat to the viability of non-life insurance industry and the society it serves'. Natural and man-made catastrophes have both resulted in exorbitant losses and claims for insurers. Natural disasters in particular have been exacerbated by the phenomenon of climate change resulting in increased intensity in natural catastrophes.

In 1992 and 1994, two events occurred that changed the actuarial profession's view of catastrophe losses. The Hurricane Andrew and Northridge Earthquake catastrophes clearly demonstrated the limitations of relying exclusively on historical insurance data in estimating the financial impact of potential future events. In addition, property/casualty insurers (including self-insurers) and their actuaries began to focus on the impact that large individual events or sequences of events could have on the insurers' solvency, cash flow, and earnings.

Banks (2005) stated that 'natural catastrophes will occur regardless of attempts at intervention' and 'can only be managed to a limited degree'. He added that there is need to 'turn to the management of vulnerabilities and the transfer and reduction of losses'. This is possible through risk management approaches.

The years 2001, 2005, 2011, and 2012 according to Cengage Learning (2016), were difficult ones for the United States' insurance industry as surge of catastrophic claims after the September 11 terrorist attacks left the industry reeling. The terrorist attack was the largest single event in all segments of the insurance industry, including health, workers' compensation, property, and airline liability insurance (Cengage, 2016). In fact, catastrophic losses were the highest in the insurance industry's history, amounting to approximately $50 billion in 2001.

In 2005, insurance companies in the United States and worldwide suffered the costliest catastrophe year in history. Hurricanes Katrina, Rita, and Wilma—three of the ten costliest world insurance losses in history—occurred in the United States

between August 2005 and October 2005 (Dulin,2008). Insured losses in the United States for the 2005 catastrophes totaled $61.2 billion and more than doubled the record setting 2004 losses of $27.3 billion (Dulin 2008). Unfortunately, catastrophe losses are expected to double every ten years.

In Nigeria insurance market, there were several incidents that have caused catastrophic losses to the insurance companies in the past whereby some have liquidated due to their inability to apply appropriate risk management mechanism required of insurance company to manage catastrophic loss situation. Some of such organizations alive today are suffering from reputational/image risk resulting from the catastrophic loss events.

In the risk management process, insurance is viewed as a form of risk transfer mechanism and sought by many to assist in reinstatement and recovery, subsequent to losses. Insurance entities therefore seek to effect risk management practices which can assist in minimization of catastrophic risks. Management of risks is essential for the success of any business entity. Risks are varied and the purpose of risk management is to ultimately mitigate or eliminate the risks which can threaten the success, livelihood and prosperity of the business world and the public. Insurance companies aure faced with a number of risks. A risk in the context of insurers' refers to 'an estimate of the probable loss expected from the effect of a given hazardous event.

Risk management is the human activity which integrates identification of risk, risk assessment, developing strategies to manage it and mitigation of risk using managerial resources. The strategies include transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk.

Risk management is the process of identification, analysis and either acceptance or mitigation of uncertainty in investment decision making. Essentially, risk management occurs anytime an investor or fund manager analyses and attempts to quantify the potential for losses in an investment and then takes the appropriate action given their investment objectives and risk tolorence (www.investopedia.com/terms/r/riskmanagement.asp).

Poor management of risk, by insurance companies, leads to accumulation of claims from the clients hence leading to increased losses and hence poor financial performance (Meredith,2014). Risk management activities are affected by the risk behaviour of managers. A robust risk management framework can help organizations to reduce their exposure to risks, and enhance their financial performance (Iqbal and Mirakhor, 2007). Further; it is argued that the selection of particular risk tools tends to be associated with the firm's calculative culture and the measurable attitudes that

senior decision makers display towards the use of risk management models. While some risk functions focus on extensive risk measurement and risk based performance management, others focus instead on qualitative discourse and the mobilization of expert opinions about emerging risk issues (Mikes and Kaplan, 2014).

Lately, insurance companies have increased their focus on risk management. Meredith (2014) advised that there should be careful judgment, by management of insurance companies, of insurable risks in order to avoid excessive losses in settling claims. It follows that risk management is an important factor in improving financial performance (Okotha, 2003). Sanusi (2010) pointed out that in recent years excessive credits and financial asset growth went unchecked. Risk, in insurance terms, is the possibility of a loss or other adverse event that has the potential to interfere with an organization's ability to fulfill its mandate, and for which an insurance claim may be submitted.

According to Charity (2013), insurers as risk-bearing institutions, can and do, fail if risks are not managed properly and adequately. The central function of an insurance company is its ability to distribute risk across different participants (Merton, 1995). Saunders and Cornett (2008), also state that modern insurance companies are in the risk management business. The authors further discuss that insurance companies undertake risk bearing and management functions on behalf of their customers through the pooling of risks and the sale of their services as risk specialists. This indicates that management of risks should take the center stage in the operations of insurance companies.

Risk management is the identification, assessment, and prioritization of risks on objectives, whether positive or negative) followed by coordinated and economical application of resources. The essence is to minimize, monitor and control the probability and/or impact of unfortunate events or to maximize the reaction of opportunities (Dawson, 2013). In ideal risk management, a prioritization process is followed where by the risks with the greatest loss and the greatest probability of occurring are handled first, and risks with lower probability of occurrence and lower loss are handled in descending order. In practice the process can be very difficult, and balancing between risks with a high probability of occurrence but lower loss versus a risk with high loss but lower probability of occurrence can often be mishandled.

Intangible risk management identifies a risk that has 100% probability of occurring but is ignored by the organization due to lack of identification ability. For example, when deficient knowledge is applied to a situation, a knowledge risk materializes. Relationship risk appears when ineffective collaboration occurs. Process engagement risk may be an issue when ineffective operational procedures are applied. These risks

directly reduce the productivity of knowledge workers, decrease cost effectiveness, profitability, service, quality, reputation, brand value, and earnings quality.

Ideal risk management minimizes spending while maximizing the reduction of the negative effects of risks. In financial institutions, enterprise risk management is normally thought of as the combination of credit risk, interest rate risk or asset liability management, market risk, and operational risk. Its impact can be on the very existence: the resources (human and capital), the products and services, or the customers of the enterprise, as well as external impacts on society, markets, or the environment (Ezigbo, 2011).

Researchers have conducted only few empirical studies on minimization of catastrophic risks in Nigeria, despite the great interest in the topic (Liebenberg and Hoyt, 2003). Insurance risk management proponents argue that an integrated approach increases the value of the company by reducing inefficiencies that are inherent in the traditional approach, improving capital efficiency, stabilizing earnings, and reducing the external capital and regulatory scrutiny expected costs (Miccolis and Shah, 2000; Hoyt and Liebenberg, 2011). Meanwhile, only a few case studies have been conducted to study minimization of catastrophic risks in Nigeria. The majority of extant research takes the form of surveys examining the success and advantages of risk management, and the risk and capital management issues. These studies are valuable as a source of descriptive information concerning minimization of catastrophic risks by the insurance companies in Nigeria, but they do not address the fundamental question of how insurance risk management influences minimization of catastrophic risks. Qualitative research methods address such actions and determinants.

Literature Review

Researchers have emphasized the benefits of insurance in the management of risks. Kunreuther& Freeman (2006) view insurance as' beneficial in that it is an effective risk management tool'. Furthermore, the writers state that' insurance possesses five attributes which makes it an 'effective risk management tool'. Those attributes include the role of insurance in 'variance reduction'; 'its ability to segregate risks, its encouragement of loss reduction measures and its ability to 'monitor and control behavior'.

The insurance process in its risk management role needs a process of effective identification of risks, a process of loss prevention as well as some form of evaluation and monitoring. Policyholders should therefore be monitored by insurers to ensure that their risks are minimized. According to Kunreuther& et al (2006)

'insurers provide a valuable function by monitoring the activities of policyholders to verify that the insured operates in a manner consistent with underwriting standards'.

Other researchers have also contributed to the theory that insurance is beneficial in its role of risk management. For instance, Hoeppe, Gurenko, I. Burton, and A. Haas., (2009) views insurance as' an important risk management tool as today, the insurance industry absorbs about 40% of catastrophic economic losses in industrialized countries'.

Insurance has played the role of providing some form of education in particular with regard to management of risks. This has taken the form of sponsoring of conferences, through publications on issues related to the provision of services and loss reduction' (OECD, 2011). Furthermore 'Programs sponsored by the insurance sector has improved hazard resistant construction practices in some countries' (OECD, 2011:42).

Conceptual Review

Risks are about events that, when triggered, cause problems. Hence, risk identification can start with the source of problems, or with the problem itself.

Risk sources may be internal or external to the system. Examples of risk sources are stakeholders of a project, employees of a company or the weather over an airport. Risks are related to identified threats. For example, the threat of losing money, the threat of abuse of privacy, information or the threat of accidents and casualties. The threat may exist with various entities, most important with shareholders, customers, and legislative bodies such as the government.

The chosen method of identifying risks may depend on culture, industry practice and compliance.

A catastrophe model is a new and innovative approach to monitoring catastrophe risks. It provides projections of likely results of the occurrence of a catastrophic event such as hurricanes and earthquakes. Redja et al (2014) state that this approach is used by many private insurers in their risk management programs for instance 'in the USA, an insurance company with hurricane exposure on the Gulf Coast may use this concept to estimate aggregate losses from this event'.

The alternative risk transfer mechanisms can be viewed as beneficial especially in covering risks not possible through reinsurance and insurance. However there are many challenges with use of those methods including 'regulatory disparities' such as 'favoritism of reinsurance over the use of catastrophe bonds' and 'structural flaws' in terms of factors such as complexity and prices (Beasley, Clune, & Dana, 2005).

Some insurers may opt to offer parametric insurance or micro insurance to its customers however this is most often a government initiative. Insurers are more

inclined to offer traditional insurance policies as was outlined earlier. According to Linnerooth et al (2009) this is form of 'index insurance which is novel and made possible by new developments in modeling risks and financial transactions'. This type of insurance covers' perils like flood and other hazards because of the systematic nature of the risks' (Hunter, 2012). Furthermore, the 'intent of micro-insurance is to service low income markets by offering limited coverage and greatly reducing transaction costs'.

Other mechanisms which can assist in minimizing risks are those specific to the location of risks. Those include surveys on the property to be insured; the use of risk or hazard mapping and Global Positioning system (GPS). Hazard maps for instance provide information on the probability or magnitude of a loss and areas most prone to catastrophes. The maps assist in better underwriting practices, to determine insurability and to apply suitable premiums. In Germany, hazard maps are produced by the German Insurance Association to determine in which areas and under what conditions buildings can be insured' (Moel, Alphen &Aerts, 2008).

Review of Empirical Literature

Earlier work focuses on the relationship between risk management and minimization of insurance losses especially in the area of insurer's retention, operational policy, reinsurance strategy and risk securitization. The relationship between these variables has not been extensively studied. These variables will therefore be reviewed and test the possibilities of the variables having effect on the catastrophic minimization of losses in the insurance companies in Nigeria.

Insurer's Retention and Catastrophic Loss

According to Munich Re (2010), retention is the amount of risk the ceding company keeps for its own account or the account of others. This is the proportion of the risk which is either expressed as a percentage of the risk or monetary amount which the insurer has agreed to bear in case of any loss that result in claim with the insurance company.

The determination of retention is a main key for non-life insurance started from retention policies.

Generally, non-life insurance companies develop their own retention strategies. The process of determining the retention is related to control of exposure. Control of exposure is the last of three stages, namely identify exposure, quantify exposure, and control exposure.

The center of the reinsurance program is the retention of the insurance companies. The first step to formulate a reinsurance program is to determine the retention rate (Saragih and Nugroho, 2017). Retention can be defined as:

"The amount of sum insured which a ceding company retains for its own net account on a particular risk or in the event of a catastrophe event affects several risks at the same time." (Pagach et al, 2010).

In fixing the net retention according to Cumming et al (2001), the insurer has to fix the limit or net retention below which all claims are for it's own account. If this net retention is set too high, it runs the risk of destabilizing its financial position. If it opts for too low a retention, the reinsurer will increase the price of its cover considerably since it will have to pay for a higher number of claims. Both parties administration costs would also be increased, thus distorting the main purpose of such treaties.

The determination of retention is quite complex because there are many factors affecting it. According to Siba (2012), the factors affecting the retention are solvency, capacity, financing, services, reciprocity and net rate received by the insurance companies.

The greater the risk, the smaller the retention (Cumming et al, 2001), with so called 'simple risks' or 'mass risks', where claims are of a lower probability and intensity and the volume is such that it permits some statistical certainty regarding variations in claims experience. In practice and professionally, the insurer tries to transfer to the reinsurer the lowest amount of premium possible. With large risk on the other hand or those most exposed to claims, the cedant passes on a greater level of liability to the reinsurer establishing as it's retention the smallest amount possible, even though the number of lines still has to be maintained.

Operational policy and Minimization of Catastrophic Loss

As stated, the insurance industry is traditionally a risk transfer mechanism to compensate for financial losses and spread the risk over the policy holders. Insurers carry out loss prevention and loss mitigation actions in conducting their business and are incorporating this risk management as an essential element of their business model. Hence, insurers are risk carriers. According to Delocitte (2013), in order to financially take on this task, the insurance company's capital needs to hold a buffer against unexpected claims or losses. This buffer – referred to as risk bearing capital - is necessary if the insurer is to fulfil the legitimate claims of policyholders. As stipulated in the introduction, this principle is the primary function and lies at the core of the insurance industry.

Many companies in Nigeria, after the recapitalization of the insurance companies in 2007 have embarked on undercutting the specified rate for the insurance risks they are assuming leading to the diminution of or diminishing returns in their annual cash

flows and subsequently reducing their technical profit (Epetimehin&Ekundayo, 2012).

Therefore, the sustainability any insurance company has do with effective risk underwriting and ability of the underwriter to charge sufficient premium that could cover loading, administrative, claims expenses, and operation expenses. Arguably, (Epetimehin, 2012) submitted that the premium level that is just sufficient to cover the insurers expected costs and provide insurance company owners with a fair return on their invested

In today's volatile business environment, many insurers do not have the resources or the ability to undertake a complete underwriting business and technology transformation, instead, they are looking at each element of the underwriting function, determining the gap(s) within a particular function, and investing resources to tackle that specific problem. An observation of the financial reports of insurance companies in Nigeria between 2007 and 2011 reveals significant fluctuations in profits, and it further shows that a higher percentage of the premium income is spent on claim payment; this suggests that claim cost is a key factor that determines the profitability of insurance firms (Yusuf & Dansu, 2014).

Kuncoro (2018), emphasized that the magnitude of business opportunities for insurance companies make insurance companies to be more selective in taking risks. To avoid risks that can occur due to marine hazard, general insurance companies must carefully select risk, because the risks are large and unpredictable.

The underwriting risk in property-casualty business is determined by aggregating the catastrophe risk and the premium/reserve risk (Munic Re, 2008). The major objective of underwriting is to determine if an applicant is acceptable for the insurance under the conditions indicated, and through underwriting, an insurance company can produce a safe and profitable distribution of business. As the major function of underwriting, the insurance underwriters evaluate the risk and exposures of potential clients, they decide how much coverage the client should receive, how much they should pay for it, or whether to accept the risk and insure them.

Within the non-life insurance product range (property and liability insurance) this risk bearing capital is generally subject to market conditions. If the market is 'soft', insurance products can be purchased at favourable conditions (i.e. lower premiums, more coverage). The competitive nature of the insurance industry has a synergetic effect in a 'soft' market and stimulates a further reduction of premiums and underwriting standards are usually less stringently applied. If the market is 'hard', more precaution is taken and the insurance coverage is limited in availability or may not even be affordable by the consumers (Rejda: 68).

In practice, it is imminent that each insurance company has as part of its corporate policy that certain category of risks should be considered carefully before taking them and on some, insurers should be selective because of the catastrophic nature of the risk and in some cases insurers need to just accept the risk and take little proportion of it and cede the rest out

Reinsurance and Minimization of Catastrophic Loss

Insurance companies underwrite the risk of other companies but to mitigate their own risk, these insurance companies use reinsurance (Iqbal, Rehman &Shahzad, 2014). The nature and intensity of these risks are so high that the insurance companies cannot deal with them individually and they need an extra ergonomic hedging cover for the proper handling of such risks (Iqbal&Rehman, 2014). Reinsurance can be regarded as insurance of the insurer (Iqbal*et al.,* 2014). Reinsurance is an action for increasing business and for decreasing the probability of losses because this technique allows the insurer to increase its underwriting capacity without increasing its capital (Pitselis, 2008). Reinsurance is a supportive tool for primary insurance business operations. It also, benefits the policyholders, by way of reducing the load of high premiums on the policyholders which they have to pay for compensating the insurer's cost of bankruptcy due to large policies in the absence of reinsurance.

Reinsurance helps protect insurers against unforeseen or extraordinary losses by allowing them to spread their risks. For example, a catastrophic fire at an industrial enterprise could financially devastate its insurer. With reinsurance, no single insurer finds itself saddled with a financial burden beyond its ability to pay (Munich Re, 2010)

Reinsurance is an economic instrument used by insurance companies to further improve their risk-spreading exercise. This means that the buying of reinsurance is very paramount to insurance companies. Dror& Armstrong (2006) in their study express that, the purchase of reinsurance has also been identified as one of the vital links in the sustainability of micro-insurance schemes in times of environmental disasters and economic shocks. This implies that reinsurance invariably holds sustainability pillars of any national economy. The main motivation for purchasing insurance or reinsurance is risk sharing, but there are many evidences that advocate that optimal risk sharing is not the only motive for using reinsurance (Plantin, 2006). In line with this, Adams (1996) contented that, the purchase of reinsurance by primary insurance carriers could also help to mitigate the underinvestment problem which arises due to the agency cost of debt, as well as the expected bankruptcy costs, thus contributing to sustainable profitability.

Risk Securitisation and Minimisation of Catastrophic Loss

According to Craighead, Ketchen, and Hult (2011), insurance securitization may be defined as the transfer of underwriting risks to the capital markets through the creation and issuance of financial securities. Rather than an insurer transferring its underwriting risk to a reinsurer within the insurance industry, the risk is transferred to the broader capital markets. Securitizing insurance risk involves the transformation of underwriting cash flows into tradable financial securities and the transfer of these underwriting risks to the capital markets through the trading of those securities.

The rationale for the increasing interest in securitization is easy to comprehend. Insurance markets operate most efficiently when individual losses due to a certain peril are random, easily

measurable, and uncorrelated among exposure units (Craighead et. al. 2011). In such cases, losses can be spread efficiently across a large number of policyholders while the risk of failure for primary insurers is minimized.

Research Hypotheses

Hypotheses are statements of truth which are adopted for further investigation which may be accepted or rejected. The following hypotheses will be used to test the research questions put forward by the researchers aligning with the hypotheses.

H_1: Insurers retention has no influence on minimization catastrophic loss in Nigeria insurance companies.

H_2: Underwriting/corporate policy has no significant impact on minimization of catastrophic loss in Nigeria insurance companies

H_3: There is no significant relationship between reinsurance policy/strategy and minimization of catastrophic loss in Nigeria insurance companies.

H_4: Risk securitization practice does not have effect on minimization of catastrophic loss in Nigeria insurance companies.

Methodology

Population of the Study

The target population is made up of 193 employees of managerial cadre of the 10 licensed companies insurance selected among the listed 58 insurance companies on the official website of the National Insurance Commission.

Model Specification

The study evaluates the effect of risk management variables on the catastrophic loss minimization in the Nigeria Insurance Companies. The general regression equation to be estimated is as follows.

$$Y = \beta_0 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_2$$

Y is the dependent variable, that is Catastrophic Loss Minimization while X is a set of explanatory variables, insurer's retention, operational policy, reinsurance strategy and risk securitization. B is the vector of coefficients to be estimated and ε is the unobserved effect

Y_1 =Catastrophic Loss Minimization

X_1=Insurer's Retention (INRT) X_2= Operational policy (COPL), X_3 = Reinsurance Strategy (REPL), X_4= Risk securitization (RSEC)

Results and Interpretation
Correlation analysis

Correlation analysis was performed among the variables considered for this study. Correlation analysis was applied purposely to show the relationships among the variables in the study for the evaluation of effect of independent variables on the dependent variable. Correlation coefficient, (r) is the statistic which measures the relationship between the ranges of -1 to +1. When correlation analysis is positive it shows an increase in one variable leads to an increase in the other variable. When correlation analysis is negative it shows an indirect relationship between variables meaning that an increase in one of the variables corresponds to a decrease in another and vice versa. The relationship between the dependent and independent variable in this study is investigated using the Pearson product-moment correlation coefficient at 0.01 levels of significance. This was carried out with the use of Statistical package for Social Scientist (SPSS, version 20).

Table 1		Correlations				
		RSEC	REPL	INRT	COPL	CASL
RSEC	Pearson Correlation	1	.433**	.471**	.773**	.483**
	Sig. (1-tailed)		.000	.000	.000	.000
	N	193	193	193	193	193
REPL	Pearson Correlation	.433**	1	.433**	.313**	.968**
	Sig. (1-tailed)	.000		.000	.000	.000
	N	193	193	193	193	193
INRT	Pearson Correlation	.471**	.433**	1	.379**	.390**
	Sig. (1-tailed)	.000	.000		.000	.000
	N	193	193	193	193	193
COPL	Pearson Correlation	.773**	.313**	.379**	1	.366**
	Sig. (1-tailed)	.000	.000	.000		.000
	N	193	193	193	193	193

CASL	Pearson Correlation	.483**	.968**	.390**	.366**	1
	Sig. (1-tailed)	.000	.000	.000	.000	
	N	193	193	193	193	193

**. Correlation is significant at the 0.01 level (1-tailed).

Source: SPSS Version 20.0, 2020

Table 1 shows the Pearson correlation coefficients between the dependent variable, and the independent variables. In response to the first hypothesis (H_1:), the Pearson shows that Insurers retention (INRT) and catastrophic losses (CASL) in Nigeria insurance companies are positively correlated significantly. Where: (r = 0.390**, n = 193, p = 0.000). this indicates that the two variables have weak relationship since their r= 0.390**, but significant with the corresponding p-value=0.000 (p≤0.01, two-tailed test).

Furthermore, in contrast with the second hypothesis (H_2), Table 1. above reveals that the correlation coefficient established positive relationship between corporate policy (COPL) and catastrophic losses (CASL) significantly. Where: (r = 0.366**, n = 193, p = 0.000). This means that weak relationship exists between these two variables, since their r= 0.366**, but significant with the p-value=0.000 (p≤0.01, two-tailed test).

Also, the third hypothesis (H_3), above shows that Pearson correlation analysis averred positive and significant relationship between reinsurance policy/strategy (REPL) and catastrophic losses (CASL) in Nigeria insurance companies, where: (r = 0.968**, n = 193, p = 0.000).This reveals that strong relationship exists between the two variables significantly, with their r= 0.968**with the associated probability p-value=0.000 (p≤0.01, two-tailed test).

Finally, the fourth hypothesis (H_4), Table.1. above also indicates that the Pearson correlation analysis averred positive and statistically significant relationship between Risk securitization practice(RSEC) and catastrophic losses (CASL) in Nigeria insurance companies, where: (r = 0.483**, n = 193, p = 0.000). This means that weak relationship exists between the two variables, since their r= 0.366**, but significant with the p-value=0.000 (p≤0.01, two-tailed test).

Regression Analysis

This part of the study used linear regression analysis, a form of general linear modeling basically to predict the significant relationship between the dependent variable and independent variables, with the aim of examining the predictive ability of independent variables on the dependent variable. By applying linear-regression

analysis, the relative contribution of each independent variable in explaining variance in the criterion variable can be well determined.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.973ª	.947	.946	.86969
a. Predictors: (Constant), COPL, REPL, INRT, RSEC				

Source: SPSS Version 20.0, 2020

The four explanatory variables that were studied, explain 0.947% of the catastrophic losses (CASL) in Nigeria insurance companies as represented by the R^2. This therefore means the four independent variables contribute to 94.7% of catastrophic losses (CASL) in Nigeria insurance companies, while other factors not studied in this research contributes 5.3%. of catastrophic losses (CASL) in Nigeria insurance companies. Therefore, further research should be conducted to investigate the other (5.3%) factors influencing catastrophic losses (CASL) in Nigeria insurance companies.

The Adjusted R^2-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 0.94.6%. The standard error of the estimate shows the standard deviation of the residuals to be 0.86969.

From the regression model, the positivity and significance of all values of R^2 shows that model summary is significant and therefore gives a logical support to the study model. This implies that about 94.7% of the total variation in the dependent variable i.e catastrophic losses (CASL) in Nigeria insurance companies being explained by the independent variables i.e (RSEC), (REPL), (INTR), and (COPL). While the remaining 5.3%. is due to error term or factors do not capture within the model.

Table 2	Coefficientsª				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.107	.490		.218	.828
	RSEC	.066	.025	.076	2.669	.008
	REPL	.821	.017	.956	49.108	.000
	INRT	-.071	.019	-.073	-3.673	.000
	COPL	.031	.023	.036	1.354	.177

a. Dependent Variable: CASL

Source: SPSS Version 20.0, 2020

From the regression findings in table2, the substitution of the equation:

$(Y = a_0 + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + \beta 4 X4)$ becomes:

CASL=0.107+0.066RSEC +0.821REPL + (-0.071)1INRT +0.031COPL

Where: Y is the dependent variable i.e Catastrophic Loss Minimization(CASL); and where for independent variables: Insurer's Retention(INRT), Operational/Corporate policy (COPL), Reinsurance Strategy(REPL), and Risk Securitization (RSEC).The model indicates that the Y-intercept is 0.107 which means that 0.107 is an autonomous component of Catastrophic Loss Minimization(CASL)(dependent variable) that is not affected by the independent variables (RSEC, REPL, INRT, and COPL).

The output shows the results of fitting a multiple linear regression model to describe the relationship between CASL and the four (4) independent variables. The equation of the fitted model is CASL=0.107+0.066RSEC +0.821REPL + (-0.071) INRT +0.031COPL

In determining whether the model can be simplified, we considered P-values associated with the independent variables in table.2. The multiple regression result of RSEC has positive and significant relationship with Catastrophic Loss Minimization (CASL) with the coefficient of 0.066. this means a unit increase in RSEC will lead to 6.6% increase in Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria. The associated p-value is 0.008, which means that RSEC has affected CASL significantly.

Also, the coefficient model reveals that REPL has positive and significant relationship with Catastrophic Loss Minimization (CASL) with the coefficient output of 0.821. This indicates that a unit increase in REPL will lead to 82.1% increase in Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria. The corresponding p-value is 0.000, meaning that REPL has affected CASL significantly. Again, the table 2 shows that COPL has positive relationship with Catastrophic Loss Minimization (CASL) of insurance companies, but not significant. This means that a unit increase in COPL will result to 3.1% increase in Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria. The p-value is 0.177 ($P \geq$ 0.05). this indicates that COPL has not affected Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria significantly as at the time of this study, since P-value is greater than 0.05 level of significant.

However, the coefficient result reveals that INRT has negative and significant relationship with the Catastrophic Loss Minimization (CASL) of insurance

companies. This means that a unit increase in INRT will lead to 7.1% decrease in Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria. The associated probability is 0.000. this means that even though INRT has a negative relationship with Catastrophic Loss Minimization (CASL) of insurance companies, its still affected it significantly.

The t-statistics values of RSEC, REPL, INRT, and COPL in respect to CASL were presented as 2.669, 49.108, -3.673, and 1,354 respectively. Their p-values were computed as 0.008, 0.000, 0.000, and 0.177 respectively. The output of multiple regression analysis presented in table 4.3.2. indicated that three (3) independent variables achieved the p-values less than 0.05 (5%) level of significance; while one (1) independent variable achieved the p-values greater than 0.05 (5%) level of significance.

Table.3. ANOVAª						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2542.800	4	635.700	840.480	.000ᵇ
	Residual	142.194	188	.756		
	Total	2684.995	192			
a. Dependent Variable: CASL						
b. Predictors: (Constant), COPL, REPL, INRT, RSEC						

Source: SPSS Version 20.0, 2020

From the ANOVA statistics in table.3, the processed data, which are the population parameters, had a significance level of 0.000 which shows that the data is ideal for making a conclusion on the population's parameter. The F calculated at 5% Level of significance was 480.480. Since F calculated is greater than the F critical (value = 3.555), this shows that the overall model was significant i.e. there is a significant relationship between Catastrophic Loss Minimization (CASL) of insurance companies in Nigeria (dependent variable) and set of independent variables (RSEC, REPL, INRT, and COPL).

The p-value (0.000) in ANOVA shows that the regression model is statistically significant, therefore, the study accepted the idea of statistical significant relationship between the variables under investigation, meaning that the study suggested the rejection of null hypothesis H_1, H_3, and H_4, , but accept hypothesis H_2, of this study.

Variables Entered/Removedª			
Model	Variables Entered	Variables Removed	Method

1		COPL, REPL, INRT, RSEC[b]	.		Enter
a. Dependent Variable: CASL					
b. All requested variables entered.					

Summary and Conclusion of the Study

Risk management must be factor in, in every business plan because business decisions are made based on uncertainty, and this involves taking risk. From the findings of the study a negative relationship between Insurers retention and minimization catastrophic losses (CASL) significantly. This indicates that in decision taking about assumption of risk, insurance companies should give their retention strong preference, as this will assist them in managing catastrophic risk effectively. A further implication of the findings for insurance company is that the study shows that underwriting/corporate policy has no significant relationship with minimization of catastrophic losses in Nigeria insurance companies. This indicates that insurance companies need to continue improving their corporate policy as this will enhance their risk management skill and efficiently increase their profitability.

Another implication is that relationship exists between reinsurance policy/strategy and minimization of catastrophic losses in Nigeria insurance companies. This means that when insurance companies reinsure their risks, they are strategically increase their retention capacity. Although, when claims arise as regards to insured perils, the insurance companies share part of the losses with their reinsurer commensurate to the ratio of the risk ceded by them to the reinsurance companies. Which means that the lower the risks retained, the lower the share of losses thus reinsurers will have a larger share of the loss.It therefore indicates that use of more reinsurance can improve the financial performance and profitability of an insurance company more through diversification of risks.Finally, the las timplication in this study is that risk securitization practice has significant effect on minimization of catastrophic losses in Nigeria insurance companies. indicates that risk securitization practice in insurance companies, if not efficiently implemented it will help them to minimize their business losses.

The result of the findings reveal that Risk securitization practice (RSEC) has positive and significant relationship with Catastrophic Loss Minimization (CASL) with the coefficient of 0.066; reinsurance policy/strategy (REPL) has positive and significant relationship with Catastrophic Loss Minimization (CASL) with the coefficient output of 0.821; Underwriting/corporate policy(COPL) has positive relationship with Catastrophic Loss Minimization (CASL) of insurance companies with the coefficient output of 0.031, but not significant. However, Insurers retention (INRT) has negative and significant relationship with the Catastrophic Loss Minimization (CASL) of

insurance companies with the coefficient output of 0.071. The study recommended that the management of insurance companies should put in place risk management frameworks such as Enterprise Risk Management that conform with National Insurance Commission (NAICOM) guidelines and international best practice. Also, insurance companies should address corporate governance issues in their risk management programs.

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