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THE IMPACT OF INSURANCE RISK MANAGEMENT ON FIXED CAPITAL FORMATION IN NIGERIA

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ABSTRACT*: The resolution of the controversy surrounding which insurance risk management factors account for the growth of capital formation in developing countries is still a research burden. This study is an attempt at investigating the relationship between insurance risk management represented by claims payment and Gross Fixed Capital Formation (GFCF) in Nigeria. The study employed the ordinary least square, Johansen co-integration, Granger causality, impulse response and variance decomposition procedures on annual rate of change in Nigerian, using data from 1980 to 2011. The results indicate that claims paid on Accident, Fire, Motor vehicle and Employers' Liability insurance policies affect growth in GFCF in the short run. It was found that unidirectional causality flow exists from GFCF to claims paid on Fire and Marine insurance policies. This implies that growth in the acquisition of new productive capital stocks could trigger up insurance patronage especially in fire and marine insurance. The variance decomposition analysis of GFCF to innovations emanating from claims paid on fire and motor vehicle insurance policies exhibit positive and consistent expansionary effects over the ten-years forecast period into the future; thus, as insurance claims payment increase, the tendency of indemnification pressures drive the economy to increase its capital formation in general terms.*

KEYWORDS*:* Risk Management, Claims payment, Gross Fixed Capital Formation.

INTRODUCTION

One of the important roles of the insurance industry is the management of various financial risks. Risk management, for our purpose, refers to risk pooling, transfer and indemnification in order to reduce the costly financial loss arising from uncertainty and volatility. Skipper (1997) opined that this fundamental aspect of insurance through the structured risk management process involves:

- Identifying the exposures to accidental loss,
- Evaluating alternative techniques for treating each loss exposure,
- Choosing the best alternative,

- Monitoring the results to refine the choices.

Those economic agents who do not apply a structured process make decisions about risk sometimes by default rather than design. However, insurance companies contribute specialized expertise in the identification, measurement and pricing of risk. According to Curak and Loncar (2008), in the process of making decision on underwriting risk, insurance companies gather relevant information on risk factors and assess risk which reflects in the price of risk (premium) and the policy conditions.

There have been raging disparaging contentions as to the benefits of especially non-life insurance to the economy. Few studies have shown that insurance activities, as a means of risk transfer and indemnification, contribute to economic growth by promoting financial stability, allowing different risks to be managed more efficiently, encouraging the accumulation of new capital and helping to mitigate losses as well as the negative consequences that random shocks may have on capital investment in the economy (Haiss & Sumegi, 2006; Levine, 2004).

The studies argued that by restoring/reinstating the financial positions of individuals and businesses to their pre-loss positions through indemnity, insurance lowers aggregate risks, frees or conserves funds for other productive activities thereby accentuating the existing stock of capital in the economy. This contention is heightened by erroneous view in Nigeria that insurance is gambling and the lack of comprehensive studies (in disaggregated form) of the response of Gross Fixed Capital Formation (GFCF) to stimuli emanating from the claims payments on key non-life insurance policies.

It is in view of these that the researchers sought to investigate the impact of insurance claims payments on GFCF in Nigeria. The findings of this study will provide financial analysts, investors and policy makers the basis for evaluating and formulating enticing insurance policies.

REVIEW OF RELATED LITERATURE

Insurance policy can be used by a lender in securing his/her money through a process known as underwriting where the liabilities of the borrower are transferred to an insurance company in case of eventual default by the borrower.It is important to note that some negative influences flow from insurance risk transfer and indemnification to the economy. This can be derived from the change in the behaviour of the policy holder based on the type of insurance coverage purchased. Risk transfer, not only enables the insured to cover his losses in the case of the occurrence of the insured event, it also dispenses him/her from taking precautionary actions to prevent the occurrence of the covered event and the extent of the resulting damage. Hence, the purchase of insurance (transferer of risk) encourages moral and morale hazard. It has the tendency of creating the attitude of carelessness or indifference towards loss or the outright exaggeration of the extent and severity of loss. Butler, Gardner and Gardner (1998) examined the influence of workmen compensation insurance on productivity and their results showed that due to the beneficial insurance coverage, productivity was lower, the number of severe injuries was higher and the periods of illness were longer than in companies not offering workmen compensation insurance benefit.

However, significant risks are attached to the services of insurance. These risks are mitigated through the service of another insurance company known as Re-Insurance Company. The re-insurer provides coverage for the main insurance company for significant risks that appear to be too much for the primary insurance company to bankroll. Re-insurance is secondary level insurance that insures the insurers (Ngerebo-a, 2012).

In other advanced climates, the concept of insurance is statutorily established. This makes it compulsory for all citizens to take insurance policies on every sphere of life because failure to do so is a crime. In Nigeria, under the Insurance Act of 2003 (as Amended), certain insurance policies have been made mandatory because of their peculiarities in our daily lives. These policies include those relating to buildings under construction, group life assurance undertaken by an organization on behalf of their employees, cash-in-transit insurance and motor vehicle insurance. All these insurance policies have been statutorily made compulsory in Nigeria and anyone who fails to adhere to this contravenes an established law.

Risk Management Concept

According to Dorfman (2005), risk management is the logical development and carrying out of a plan to deal with potential losses in order to manage individual's and organization's exposure to loss and to protect its assets. This could be referred to as traditional risk management. Risk management could be traditional, financial or holistic. While Traditional risk management is devoted to solving management problems associated with pure risk – the exposures that can only result in a loss or no change; Financial risk management describes a program to manage efficiently potential losses arising from such things as interest rate changes, currency fluctuations, or commodity price changes; and Holistic or enterprise risk management refer to a programme that simultaneously considers all sources of loss both pure risk which can only result in loss or no change and speculative risk, which can result in gain, losses, or no change.

A holistic risk management program combines traditional and financial risk management programs. A broader view of enterprise risk management includes cost of capital issues, and cash flow management issues which are common threads connected to a holistic risk management program (Dorfman, 2005).Risk management recognizes two broad approaches to dealing with risk facing an individual or organization: (a) Risk control, and (b) Risk financing. Risk control approach focuses on minimizing the risk of loss to which the entity is exposed, and includes the techniques of (i) Risk avoidance and (ii) Risk reduction. Risk financing approach concentrates on accumulation of funds to mitigate or neutralize the impact of losses arising from those risks that remain after application of risk control techniques, and includes (i) Risk retention and (ii) Risk transfer.

Definitively, while risk avoidance refers to when an insurable person refuses to accept a risk even temporarily by not engaging in a hazardous activity, risk reduction refers to all measures other than avoidance designed and applied to reduce the frequency, severity, and/or predictability of losses. It does not include obtaining insurance to indemnify a person against losses. Risk retention refers to a situation whereby a person does not take positive action to avoid, reduce or transfer a risk, but is prepared to contain the impact of the risk. Risk transfer refers to the

movement of risk from the original owner or bearer to another entity, realized through a contractual arrangement such as insurance company (Vaughan and Vaughan, 1999).
The concern of this paper is the aspect of transfer of loss exposures to an insurance pool and the redistribution of losses among members of the pool, with certainty of financial compensation for loss from the pool of resources and accurate predictability of losses as its hallmarks. That is the combination of uncertain risks of persons under one management, making the possibly large uncertain financial loss (the contingencies insured against) more certain, yet providing financial solution (indemnity) to the problems created by the loss through the pooling of small but certain contributions (known as *premia* or premiums) of people who share similar loss exposure.

Insurance thus manages the uncertainty of one party (the insured) through the transfer of a particular risk to another party (the insurer) who offers a restoration/indemnification of relatively large financial losses suffered by the insured. The essence of insurance is the principle of indemnity, by which is the party who suffers a financial loss is placed in the same financial position after the loss as before the loss occurred. The insured party neither profits nor is disadvantaged by the loss, except with life insurance where the sum assured reflects the economic value of the covered life gives recognition to the principle of indemnity (Dorfman, 2005).

Insurance companies (the insured or assured) perform this risk management by adopting several strategies including hedging and diversification of investments in financial and real assets. Hedging involves investing in an asset with a pay off pattern that offsets one's exposure to a particular source of risk in a portfolio while, diversification controls portfolio risk by investing in a wide variety of assets so that the exposure to the risk of any particular security is limited (Bodie, Kane & Marcus 1999).

The overall performance of insurance companies is linked to the performance of their investment, premium mobilization and claims payment. These investments, claims payment and premium collection are major channels through which the insurance industry impact on the economy (Dorfman, 2005).

METHOD OF THE STUDY

The study applies time series regression analysis (using e-view 7.0) and employed the impact model to capture the relative effects of the correlates. The research sampled all the insurance companies listed on the Nigerian Stock Exchange. The paper constructed a single disaggregated insurance claims payment-capital formation model patterned after multivariate regression analysis as well as granger causality technique, co-integration and variance decomposition within the contest of vector auto regression system.

The relevant annual data on Gross domestic product (GDP), GFCF and components of claims paid on fire, accidents, motor vehicle, employers' liability and marine insurance policies from 1980 – 2011 (converted from their absolute values to rate of change and expressed on yearly basis in order to capture growth and performance) were collected from statistical bulletin of the Central bank of Nigeria (2012).

Model Specification

Modeling GFCF as positive functions of disaggregated non-life insurance claims payment functionality is expressed as:

GFCF = f(CF, CA, CMV, CEL, CMA) - - - - - (1)

Where

CF = Claims Payment on fire policies
CA = Claims payment on Accident policies
CMV = Claims payment on Motor Vehicle policies
CEL = Claims payment in Employers Liabilities
CMA = Claims payment on Marine policies

Expressing equations (1) in the econometric model; *we have:*

$GFCF = \square_0 + \square_1 CF + \square_2 CA + \square_3 CMV + \square_4 CEL + \square_5 CMA + U_t$; - - - - - - - (2)

$\square_1, \square_2, \square_3, \square_4, \square_5 > 0$

Where U_t is the error term, $\square_n$ represent the logarithmic component and other variables remain as defined above.

Log linearly, we have:

$LnGFCF = L_nZ_0 + Z_1L_nCF + Z_2L_nCA + Z_3L_nCMV + Z_4L_nCEL +$
$Z_5L_nCMA + V_t$; $Z_1, Z_2, Z_3, Z_4, Z_5 > 0$ - - - - (3)

The causal relationship between GFCF and the insurance claims payment variables (ICPV) can be expressed as:

$GFCF = \sum aj\ RGDP_{t-j} + \sum bj\ ICPV_{t-j} + U_t$ - - - - - - (4)

Data analysis technique

The analytical framework of this study consists of ten basic steps carried out on the models specified above. They include: descriptive statistical analysis, correlation matrix, unit root test, diagnostic test, ordinary least square regression method, vector error correction mechanism (VECM), co-integration test, granger causality test, impulse response analysis, variance decomposition analysis.

ESTIMATION RESULTS AND ANALYSIS

Table 4.1: Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std.Dev.	Skewness	Kurtosis	Jarque Bera	Probability
GFCF	24.27154	22.22530	92.25809	-31.38710	28.17420	0.287386	2.751814	0.522613	0.770045
CF	-480.892	9.632.629	911.3977	-49214.30	8712.043	-5.384785	30.00906	1127.297	0.000000
CA	112.2134	17.72682	1974.200	-88.59020	365.2830	4.395014	22.59090	614.7571	0.000000
CMV	32.40783	8.741854	455.3928	-70.11760	85.42583	3.972630	20.18503	477.9364	0.000000
CEL	71.00075	13.26277	862.1394	-89.61900	192.1305	2.855451	11.02925	129.4443	0.000000
CMA	-3484.869	12.36204	824.5630	-114100.0	20186.28	-5.387025	30.02441	1128.532	0.000000

Source: Author's computation

Table 4.1 displays the behaviour of the data on the series GFCF, CF, CA, CMV, CEL and CMA. As in the proceeding descriptive statistic table, changes in claims paid on accident policies maintain the highest average value, followed by CEL and CMV. GFCF has the highest median of 22.23, seconded by CA with a median of 17.73. CA also has the widest range of values from 1,974 to -88.59 while CF is the most volatile variable in the model with a standard deviation value of 8712.0.

Given that the mean of GFCF, CA, CMV and CEL are greater than their corresponding median values, it follows that the change in these variables are positively skewed toward normality while those of CF and CMA are negatively skewed.

Since the kurtosis of all the predictor variables are larger than 3. We can infer that all the independent variables in this model are leptokurtic in nature. That is, they are with higher than normal Kurtosis and the weight in the tails of their probability density function is larger than normal. The Kurtosis of GFCF is said to be plelytokurtic in nature because it is less than 3.
The probability values of the Jarque-Bera statistics for all the explanatory variables are all significant at a 5% confidence level. The results indicate that CF, CA, CMV, CEL and CMA are normally distributed but GFCF may not be normally distributed at 5% significant level.

Table 4.2: Correlation matrix result

	GFCF	CF	CA	CMV	CEL	CMA
GFCF	1.000000					
CF	-0.027118	1.000000				
CA	0.397003	0.064539	1.000000			
CMV	0.418964	0.076136	0.208195	1.000000		
CEL	0.313098	0.074880	0.056706	0.409921	1.000000	
CMA	-0.028799	0.999769	0.061881	0.075909	0.072503	1.000000

Source: Authors' computation

But for the correlation co-efficient between CF and GFCF, and between CMA and GFCF that are negative -0.023 and -0.029 respectively, the correlation co-efficient of the pairs CA and GFCF, CMV and GFCF, CEL and GFCF reveal strong positive correlation 0.4; 0.4 and 0.3 respectively. This implies that the pair with negative sign shows that the variables are inversely related with one another. While the pairs that are positively signed moves in the same direction. A rise in one implies that the other variables in the pair will also rise in

Table 4.3: Unit Root Test Result

Variable	**ADF Stat@ Level**	**ADF Stat@ 1st Diff.**	**Order of Integration**
GFCF	-4.748	-8.932	1(1)
CF	-3.859	-6.230	1(1)
CA	-4.310	-7.056	1(1)
CMV	-4.036	-6.568	1(1)
CEL	-4.465	-6.865	1(1)
CMA	-3.891	-6.248	1(1)

Critical value: 1%= -3.675; 5%= -2.966; 10%= -2.622

Source: Authors' computation

The summary of the unit root test presented in table 4.3 shows that the variables in the model are all co-integrated series of order 1(1). This is evidenced by the fact that the ADF test statistic is higher than the 5% critical value both at level data and at first difference. The ADF test statistics of GFCF at level and at first difference are -4.748186 and -3.85856. These are larger in absolute value than -2.9627 and -2.9665 5% critical values at levels and at first difference. The situation is the same for all the variables in the model. Hence we can say that the data on the variables are stationary in nature and can be used for further econometric analysis.

Table 4.4: Summary of the Diagnostic Test Result

Test statistics	**L.M. Version**	**Prob. Value**	**F- version**	**P.V.**
J.B. Normality test	0.700752	0.704423	-	-
First order serial correlation	0.000	1.000	1.748094	0.197631
White heteroskedasticity	16.27059	0.699702	0.568923	0.868417
Ramsey reset	0.932491	0.932491	0.005831	0.939716

Source: Researchers' computation

(a) Normality Test

Inferring from the background that the probability value of the Jarque-Bara statistic of 0.704423 is greater than the benchmark of 0.05, we can posit that the residuals of the variables specified in this model six may not be normally distributed. Base on this, we reject the alternative hypothesis of normality assumption given that the J.B value is not significant at 95% confidence level.

(b) Serial Correlation Test

Observing that the Breusch-Godfrey first order serial correlation test result reveal that the probability value of the L.M CHQ statistic and that of the F-statistic of 1.000 and 0.1976 are not significant at 5% significant level. It is proper to reject the alternative hypothesis that the error terms of the residuals are independent. This implies that the successive error terms of the residuals are serially correlated. This assertion is not in line with the a priori expectations.

(c) White Heteroskedasticity Test

Noting the benmark probability level of 0.05, we observed that the probability values of both the L.M CHQ statistics and that of the F- statistics (0.6997 and 0.8684 respectively) are larger than 0.05 implying that the successive variance of the error terms are (Heteroskedastic) identical in nature. This also is not in agreement with the basic OLS assumption of Homoskedasticity.

(d) Ramsey Reset

Since the probability of the L.M statistic of 0.9325 and its F-statistic counterpart (9397) are not significant at the level of 0.05, we will reject the alternative hypothesis which states that the model is well specified.

Table 4.5: OLS Test Result

Dependent Variable: GFCF				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CF	0.005839	0.028544	0.204548	0.8395
CA	0.034162	0.014542	2.349194	0.0264
CMV	0.126807	0.068021	1.864236	0.0732
CEL	0.044541	0.029607	1.504408	0.1441
CMA	-0.002776	0.012313	-0.22548	0.8233
R-squared		0.057256		
Durbin-Watson stat		1.536337		

Source: Authors' computation

The test result in table 4.5 report that of the five explanatory variables of component claims payment on non-life insurance policies, only the changes in claims paid on accident insurance policies positively and significantly correlate with the growth in the output level of Gross Fixed Capital. Formation in Nigeria, such that, a 1% increase in accident insurance claims payment

would lead to about 0.034 growths in Gross Fixed Capital Formation. Changes in CF, CMV, CER and CMA have very weak association with GFCF though the relationship is positive

Table 4.6: Vector Error Correction Test Result

Variables	**Adjustment parameter**
GDP	1.000
CF	-0.196372
CA	-1.303698
CMV	6.664020
CEL	-0.904260
CMA	0.087215

Source: Authors' computation

Taking cognizance of the fact that negative sign represents significance in this test, we can report that it may take the speed of about 19.6% to restore changes in fire policy claims payment to its long run equilibrium position, while the rate of adjustment for changes in accident and employer liability insurance claims payment is about 130% and 90% respectively, should there be distortion in their short-run equilibrium position.

TABLE 4.7 Johansen Co-Integration Test Result

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0.627112	113.1315	114.9	124.75	None
0.584864	83.53724	87.31	96.58	At most 1
0.494645	57.16278	62.99	70.05	At most 2
0.386205	36.68794	42.44	48.45	At most 3
0.317524	22.04512	25.32	30.45	At most 4
0.297289	10.58428	12.25	16.26	At most 5
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. rejects any cointegration at 5% significance level				

Source: Authors' computation

Since from the results in table 4.7, the likelihood ratios are all smaller in absolute value when compared with the 5% critical values, we reject the hypothesis and report that there is no long-run equilibrium relationship among the variables in this model.

Table 4.8: Pairwise Granger Causality Test Result

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Probability
CF does not Granger Cause GFCF	26	0.42781	0.84764
GFCF does not Granger Cause CF		3.96234	0.01786
CA does not Granger Cause GFCF	26	2.25024	0.10381
GFCF does not Granger Cause CA		1.22511	0.35452
CMV does not Granger Cause GFCF	26	1.73075	0.19133
GFCF does not Granger Cause CMV		2.23311	0.10587
CEL does not Granger Cause GFCF	26	0.09226	0.99603
GFCF does not Granger Cause CEL		1.3385	0.3086
CMA does not Granger Cause GFCF	26	0.41472	0.85639
GFCF does not Granger Cause CMA		3.82706	0.02024

Source: Authors' computation

From the granger causality test result in Table 4.8 above, estimated with a maximum lag of 6 and at a 5% level of significance, it could be seen that GFCF granger cause CF and CMA, while CA, CMV and CEL granger cause changes in the growth of Gross Fixed Capital Formation.

Table 4.9: Impulse Response Result

Response of GFCF:						
Period	GFCF	CF	CA	CMV	CEL	CMA
1	27.88342	0.000000	0.000000	0.000000	0.000000	0.000000
2	16.71162	-4.499033	-13.86538	-4.674340	5.058037	1.219355
3	7.244508	0.452808	-14.31887	-3.769515	2.226562	0.941112
4	23.38946	-1.066476	5.797663	-5.790519	3.586610	1.374933
5	22.11193	-2.540161	-6.354217	-4.064409	2.917598	0.166847
6	11.27049	-1.631544	-10.50347	-4.901349	4.646813	1.861303
7	16.32903	-1.000487	-4.221645	-3.603300	2.077870	1.119789
8	19.95916	-2.339208	-5.390572	-3.740728	2.959369	0.539115
9	15.71489	-1.149102	-7.968088	-4.517903	3.470328	1.035597
10	16.18444	-1.264727	-5.478922	-4.682947	3.380473	1.330527

Source: Authors' computation

In table 4.9, the response of GFCF to own shock is positive 27.88% but gradually fluctuates throughout the 10 year period and assumed a value 16.18% in the 10^{th} year. Though the response of GFCF to shocks from all claims fluctuates, the shocks emanating from CEL and CMA are all positive, while those from CF, CA and CMV were all negative.

Table 4.10: Variance Decomposition Test Result

Variance Decomposition of GFCF:							
Period	S.E.	GFCF	CF	CA	CMV	CEL	CMA
1	27.88342	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	36.30666	80.16878	1.535556	14.58447	1.657556	1.940847	0.112794
3	39.94927	69.50410	1.281144	24.89302	2.259397	1.913683	0.148659
4	47.18099	74.40609	0.969598	19.35682	3.126118	1.949874	0.191504
5	52.79083	76.97704	1.006007	16.91028	3.089782	1.862930	0.153965
6	55.46134	73.87204	0.997999	18.90761	3.580393	2.389834	0.252124
7	58.13756	75.11627	0.937848	17.73423	3.642488	2.302616	0.266545
8	61.93477	76.57311	0.969024	16.38386	3.574330	2.257238	0.242441
9	64.66229	76.15586	0.920579	16.54931	3.767323	2.358860	0.248069
10	67.15574	76.41364	0.888954	16.00881	3.979023	2.440335	0.269243

Source: Author's computation

In the variance decomposition of Gross Fixed Capital Formation, own shock constitutes 80.17% in the 2nd year with the other variables contributing 1.54%, 14.58%, 1.66%, 1.94% and 0.11% respectively. However, from the fourth year, own shock gradually fluctuates between 76.97% and 76.41%, while CF contributed 0.89% in the 10th year. The contribution of CMV, CEL and CMA gradually increase from 3.09%, 1.86%, and 0.15% in the 5th year to 3.98%, 2.44% and 0.27% in the 10% year. The contribution of CA fluctuates throughout the period.

CONCLUDING REMARKS

In this study, we discovered that claims paid on accident insurance policies positively and significantly correlate with growth in Gross Fixed Capital Formation, suggest that indemnities by insurers on accident insurance policies mitigate the adverse effect of accident losses on businesses, households and Governments thereby contributing to the preservation of gross capital needed for improving productive capacity of the economy and hence growth in GDP. While indemnities on fire, motor vehicles, and employers' liability insurance policies have positive but weak relationship, marine insurance policies have negative and insignificant with GFCF.

Unidirectional causality flow from Gross Fixed Capital Formation to claims paid on Fire Policies and Marine insurance policies, suggest that growth in the acquisition of new productive capital stocks by the insured public could add value to the economy, raise the level of productivity and increase the flow of funds to insurance companies through increased patronage especially the patronage of fire and marine insurances. This is in line with the findings of Kugler and Ofoghi (2005).Given the positive and consistent expansionary pattern resulting from variance decomposition analysis, we conclude that the policy implication will be the triggering of growth in capital formation in the economy if economy-managers invoke necessary policies and programmes that would promote effective and efficient accident insurance risk management.

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