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FINANCIAL RISK AND THE VALUATION OF LIFE INSURANCE COMPANIES IN NIGERIA: A 2008 – 2017 ANALYSIS

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Abstract:
This study is an attempt to investigate the relationship between financial risk and the valuation of life insurance companies in Nigeria. Financial risk being the risk organizations are exposed to in financial markets is represented by liquidity risk and interest rate risk while the value of the life insurance industry is assessed through the return on equity and the combined ratio. The authors seek to achieve two objectives which are to determine the relationship between changes in interest rate and the combined ratio and to investigate the relationship between liquidity risk and the return on equity of life insurance companies in Nigeria. The expost facto research design is adopted for the study and biannual data is sourced from Nigerian Insurers' Association (NIA), CBN Statistical Bulletin and World Bank database spanning through 2008 – 2017. Descriptive statistics, stationarity tests, and cointegration tests are carried out on the data to test the suitability of the data. Hypothesis are tested through regression analysis which reveals that whereas there is a significant relationship between interest rate risk and the combined ratio, there is no significant relationship between liquidity risk and the return on equity. It is therefore recommended that life insurers should adopt a risk-based approach in their operations to enhance the value of the sector. An effective inculcation of appropriate risk management practices would help the insurer to identify internal and external risks which are likely to pose challenges to the value of the life insurance industry.

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1. Introduction

The ability to predict the likelihood of loss as well as manage a financial loss is very desirable. Losses are caused by risk exposures which do not often exist in isolation. In developing and understanding the nature of financial risks, the interactions of several exposures may have to be considered. These interactions may be difficult to forecast since they mostly depend on human behaviour. The process of financial risk management thus comprises strategies that enable an organization to manage the risks associated with its financial markets.

The insurance industry offers solutions to risks to which other players in the industry are exposed to. Life insurance companies provide various solutions for the sick such as paying hospital bills, paying for drugs and treatment and the provision of an endowment opportunity for beneficiaries (Soekarno and Azhari, 2009; Ironkwe and Osaat, 2019). Wilper (2009) asserts that health insurance provides individuals with access to health care services and reduces the expenses on chronic illnesses. The researcher maintains that an insured is more likely to receive recommended screening and good health care against critical illnesses. Life assurance provides cover against old age, premature death and disability. It protects one's survivors and dependents against financial challenges. It also has a savings component attached. Doherty and Singer (2012) assert that the rationale for combining savings and life assurance is that life assurance savings are taxed cheaply than other types of savings. In addition, life assurance provides a good medium of mobilizing funds required for national development and provision of job opportunities (Ironkwe and Osaat, 2019).

1.2 Statement of Problem

Financial risks arise from an organization's exposure to financial markets, its transactions with others and its reliance on processes, systems and people. Horcher (2005) opines that in the insurance industry these risks arise majorly from changes in financial market prices such as interest rates, credit risks, and liquidity risks. These risks if not effectively managed are capable of not only impairing the company's growth but also negatively impacting on the economy. Interest rate risk is the probability of an adverse impact on asset value as a result of interest rate changes. It arises from changes in the level of interest rate. Balcombe (2011) asserts that to understand a company's exposure to interest rate risk, the impact of interest rates on the firm's assets and liabilities must be assessed. In the life insurance market, the sensitivity to interest rate changes of both investment assets as well as liabilities in the form of policyholder's claims can have a significant impact on equity value.

Liquidity risk is the risk of insufficient liquid assets to meet payouts from policies (i.e. surrenders, expenses, maturities etc) leading to losses even when the company is

solvent (Sonjai 2015). Eling and Schmeiser (2010) maintain that if short-term cash is insufficient, liquidity issues may require decisions that are detrimental to long-term growth. Since liquidity and interest rates are financial risks that insurance organizations are exposed to, a proper management of which could aid the proper functioning of the insurance organization, we try to unravel the influence of these risks on the valuation of life insurance companies in Nigeria. Thus, we seek to assess the relationship between changes in interest rate and liquidity risk on Return on Equity and Combined Ratio of life insurance companies in Nigeria.

1.3 Objective of Study

This study is aimed at assessing the effect of financial risks on the valuation of life insurance companies in Nigeria. Its specific objectives include to:

1) Determine the relationship between changes in interest rate and the combined ratio of Life Insurance companies in Nigeria.
2) Assess the relationship between liquidity risk and the return on equity of Life Insurance companies in Nigeria.

Similarly, the research hypotheses posed for the study are as follows:

1) Changes in interest rate are not significantly related to the combined ratio of life insurance companies in Nigeria.
2) Liquidity risk is not significantly related to the return on equity of life insurance companies in Nigeria.

1.4 Significance of the Study

This study would be of advantage to insurance companies and insurance regulators as it provides valuable contributions from both a theoretical and practical perspective. From the theoretical view, it increases knowledge on financial risks such as interest rate risks and liquidity risks while at the same time provides practical evidence on the effect of these risks on the value of life insurance companies in Nigeria. This would help life insurance companies perform better, grow their business and maintain a competitive advantage. Knowledge derived from the study would be of benefit to the public through the creation of improved insurance services and better management of risk which would result in affordable rates of insurance premiums and reduction in levels of non-payment and fraud.

This study would be of benefit to the government as it aids in setting regulations on insurance practices thereby safeguarding the resources of the country. The study would also add to the existing body of knowledge on risk management in the insurance sector and serve as a basis for further research for students and academicians.

2. Literature Review

Financial risk management can be regarded as a process of dealing with uncertainties resulting from financial markets (Horcher, 2005). It involves assessing the financial risks

facing an organization and developing management strategies consistent with internal priorities and policies. The author maintains that addressing financial risks proactively may provide an organization with a competitive advantage. Managing financial risks necessitates making organizational decisions about risks that are acceptable versus those that are not. The risk management process involves both internal and external analysis. Some of the areas to be analysed are the interest rate and liquidity (Bodie, Kane and Marcus, 1999; Torbira and Ngerebo-A., 2012).

2.1 Interest Rate

Interest rates are a key component in many market prices and an important economic barometer. It comprises the real rate plus a component for expected inflation since inflation reduces the purchasing power of a lender's assets (Horcher, 2005). Interest rates are particularly important to companies and government because they are the key ingredient in the cost of capital. Omasete (2014) opines that insurers are constantly being exposed to risks associated with interest rate changes as they invest much of the collected premiums. Siba (2012) maintains that rising interest rates imply a higher return on bond although higher rates can lower the value of bonds currently in their portfolio. The author is of the view that market interest rate fluctuations may have an influence on the profits on new assets of insurance companies.

2.2 Liquidity Risk

This indicates a firm's ability to meet its financial obligations as and when they mature without disrupting the normal operations of the business (Saunders and Cornett, 2008). Regulators examine liquidity ratios to determine whether the company is complying with its legal requirements. A low overall liquidity ratio could indicate that the insurance company is in financial trouble whether from poor operational management, risk management or investment management. However, a high overall liquidity ratio may not be good either especially if current assets represent a high percentage of total assets.

Liquidity risk is the risk that a firm, though solvent, either does not have sufficient financial resources available to meet its obligations as they fall due or can secure them only at excessive cost. It occurs when, in spite of holding a higher level of assets than liabilities, the firm's assets are illiquid and cannot be easily converted into cash. In life insurance, liquidity risk can result in a mass surrender of policies that arise due to a loss in the confidence of the financial strength of the firm. This was experienced by the life insurance company – Equitable Life when it received an adverse legal ruling by the House of Lords on its guaranteed annuity liabilities in 2001. Due to this, surrenders rose sharply. In 2001, its net claims arising from surrenders and maturity rose to £6.2bn from £3bn it experienced in 2000 (Barlett, Kelliher, Chaplin, Dowd and O'Brien, 2005).

2.3 Return on Equity

The return on equity (ROE) measures the return per dollar of equity investment. Nissim and Penman (2011) affirm that ROE is a summary measure of profitability from all

business activities. Thus, firms generate value if the ROE is greater than the cost of equity capital. ROE helps in predicting future earnings changes especially because of its mean-reversion property. High ROE is mostly followed by lower ROE and earnings decline. Low ROE is also on average followed by higher ROE and earnings increase.

The mean reversion tendency of ROE is due to both economic factors and accounting effects such as competition among firms, entry and exit of firms and diffusion of new ideas or practices drive abnormal levels of profitability towards the mean. Earnings reinvestment and infusion of new capital can cause further convergence. Harris, Estridge and Nissim (2008) assert that the tendency of ROE to revert towards the mean is also due to transitory earnings items, such as one time economic shocks, realized gains and losses, market to market gains and losses and leverage effects. These items aside from causing an abnormal level of ROE in any given year also affect the subsequent ROE due to their transitory nature. The mean reversion for low ROE is also due to real options and accounting distortions. Abandonment options and other real options allow firms to discontinue or restructure low profitability projects thus reducing the duration of negative profitability shocks (Nissim, 2010).

2.4 The Combined Ratio

The combined ratio and its components measure the underwriting profitability of insurance companies. In a study conducted by Cummins and Philips (2009) the authors discovered that the policyholder dividend ratio is insignificant for the insurance industry constituting less than one percentage point. However, the loss ratio is the most significant element fluctuating between 50 and 70 percentage points in recent years. Similarly, the loss expense ratio and the underwriting expense ratio are quite stable constituting about 12 and 26 percentage points respectively. Nissim (2010) defines the combined ratio and its components as a combination of the loss ratio, the loss expense ratio, the underwriting expense ratio and the policyholder dividend ratio. The loss ratio and loss expense ratio are often aggregated together and referred to as the loss expense ratio or simply as the loss ratio. They indicate the average cost of insurance protection per naira of net premiums earned during the period. Aside from a reflection of the cost of protection provided during the year, the loss expense ratio also provides an adjustment to the previous year's balance of the loss reserve. This adjustment is due to changes in loss estimates (the net redundancy/deficiency) and accrued interest on discounted reserves such as settled workers compensation. Unlike premiums which reflect current income, losses and loss expenses generally measure undiscounted future payments. This causes an overstatement of the loss and loss expense ratio particularly for long-tail liability lines.

The underwriting expense ratio measures the operational efficiency in underwriting. Cummins, Weiss, Xie and Zi (2010) assert that it represents the percentage of a company's net premiums earned that went towards underwriting expenses such as commissions to agents and brokers, state and municipal taxes, salaries, employee benefits and other operating costs. However, the underwriting expense ratios for group health insurance are quite low. Myers and Read (2001) attribute this to the fact that the

underwriting expense ratio is an important determinant of overall profitability. Moreover, insurers attempt to set premium rates at levels adequate to generate profits as differences in the underwriting expense ratio across business lines imply opposite differences in the loss ratio. However, high underwriting expense ratio may be offset by a long tail which allows insurers to generate significant investment income (Nissim, 2010).

The combined ratio reflects both the cost of protection and the cost of generating and maintaining the business. According to Harris, Estridge and Nissim (2008) when the combined ratio is below 100 percent, underwriting results are considered profitable; however, when the combined ratio is above 100 percent, underwriting profits are considered unprofitable. This is because the combined ratio understates true underwriting profitability by measuring losses undiscounted and does not reflect the investment profits that insurers generate on the float (Nissim, 2010).

2.5 Valuation of Insurance Firms

When valuing non-financial service firms, most analysts first estimate the value of operations and then subtract the value of net debt which is often estimated using its book value. The value of operations is calculated using either relative or fundamental valuation models which focus on flow measures such as free cash flow or earnings before interest and cash without considering the book values of operating assets and liabilities. However, when valuing financial service firms such as insurance companies, most researchers and analysts often value equity directly and focus on book values. Liu, Nissim and Thomas (2002) maintain that the unique characteristics of insurers account for the differences in valuation approach for insurance firms. Such characteristics include:

1) Insurers especially life insurers have high leverage ratios and earn a substantial portion of their profits from the spread between the return on invested assets and the cost of liabilities. Hence, a valuation approach that focuses on operating activities would omit a major part of value creation for insurers.
2) The book values of major assets and liabilities of insurers are often close to fair values. Mostly, balance sheet amounts can be used to value those assets and liabilities which at the very least, serves as a reasonable starting point for valuation.
3) The requirement by insurance regulators for insurers to maintain minimum equity capital at levels commensurate with the scope and riskiness of their activities. In this regard, the insurer's ability to write premiums is directly related to their surplus which is a regulatory proxy for equity capital. These regulations make book equity a relatively useful measure of the scale of operations.

3. Theoretical Review

The major theories employed in this work are the multivariate theory, the stakeholder theory and the Extreme Value theory. The multivariate analysis has to do with the

examination of two or more variables at the same time. This analysis is of importance in evaluating the interactions of variables as predictors of losses in the insurance industry (Powell, 2008). A multivariate analysis would involve advanced regression and time series models which are used by business firms to predict the trends or relationships of balance sheet and profit and loss account items. (Nyce, 2007; Powell, 2008; Amaya and Memba, 2015).

3.1 Stakeholder Theory

This theory, as originally promulgated by Freeman (1984) focuses explicitly on equilibrium of stakeholder interests as the main determinant of corporate policy. As corporate risk management practices lead to a decrease in expected costs, the company value rises. The stakeholder theory provides a new insight into possible rationale for risk management. This theory is useful to risk management research because it helps to address the importance of customer trust and financial distress costs to insurance companies (Magezi, 2003; Mwangi, 2010). The theory also suggests that smaller firms are more prone to financial problems and should inculcate greater risk management strategies. It emphasizes the need for risk management in insurance companies and its importance in improving the value of the company (Omasete, 2014).

3.2 Extreme Value Theory

This theory was pioneered by Leonard Tippet in the 1950s. It borders on modelling and measuring events which occur with very small probability. Olalekan (2018) considers it a practical and useful tool for modelling and quantifying risk. The theory indicates that the probability on very large losses is eventually governed by a simple function regardless of the specific distribution that underlies the return process. It proves very useful in risk modelling.

3.3 Empirical Study

Many authors have written on different financial risks to which an insurance organization is exposed to. Shiu (2006) in a study of corporate liquidity among UK life insurers from 1985 to 2002 discovered that claims ratio, free assets, equity returns and termination rates increased liquidity in the market. Chang and Tsai (2014) examined the explanatory factors of liquidity in the US insurance market using annual data from 2006 to 2010. The authors applied the quantile regression technique to estimate the differential effect of the independent variables on various distributions of liquidity. The authors found evidence to suggest that higher and lower levels of insurance liquidity are associated with lower leverage usage.

Ali (2006) conducted a study on credit risk management while investigating the current practices of credit risk management by large US-based financial institutions. It was found that identifying counterparty default risk is the single most important purpose served by the credit risk models utilized. Chen, Chang, Hui-Kuang and Mayes (2005) showed that the book-to-market ratio and firm size are indicators of financial risk in

investment decisions. They proved that firm size and book-to-market ratio had a strong relationship with the betas of returns of various industries from 1981 to 2001. Dempsey (2010) utilized the book-to-market ratio as a proxy for a study of Australian markets. He found a positive link between the firm's book-to-market ratio and stock returns. Cakici and Topyan (2014) found that the book to market ratio was a significant predictor of the future returns of companies in 8 emerging Asian markets between 1992 and 2012.

3.4 Gap in the Literature

A number of studies as revealed in the literature reviewed indicate that interest rates risk, credit risk and liquidity risks are all different types of financial risks that an insurance company is exposed to. In addition, most of these studies evaluate these risks with the performance of the entire insurance industry. Studies on financial risks have rarely been specifically conducted on life insurance companies in Nigeria let alone on the valuation of these companies. In line with this realization, this research is carried out to bridge this gap and establish a relationship between financial risks and the value of life insurance companies in Nigeria.

4. Research Method

4.1 Research Design

This section shows the methodology used in establishing the effect of financial risks on the value of life insurance companies in Nigeria. Mugenda and Mugenda (2003) in Omasete (2010) describe a research design as the plan or structure of investigation conceived to obtain answers to research questions that includes an outline of the research work to enable the representation of results in a form understandable by all. The expost facto research design is adopted for the study.

4.2 Population of Study

A population is the aggregate of all elements that conform to some general set of specifications. Thus, the population of this study is made up of the 49 registered life insurance companies in Nigeria as at 2017. The choice of this population was made based on the availability of data in the insurance industry.

4.3 Data Collection

This is a quantitative study where secondary data is the major form of data employed. Secondary data on insurance activities are sourced from Nigerian Insurers' Association (NIA) and CBN Statistical Bulletin while data on real Interest Rate in Nigeria are sourced from World Bank database covering years 2008 – 2017. In order to obtain a more accurate result, semi-annual data is obtained from the life insurance industry covering 10 years giving a total of 20 representations.

4.4 Data Analysis Technique

Data obtained for the study are used in the calculation of change in interest rate and liquidity for the life insurance industry in the affected years. Changes in interest rate and liquidity are dependent variables used to represent financial risks while return on equity and the combined ratio represent the value of the firm as independent variables.

Change in interest rate (INTR) is given thus: $\frac{\text{New rate – Old rate}}{\text{Old rate}}$

Liquidity risk is measured by Quick Ratio (QR) = $\frac{\text{Current assets}}{\text{Current liabilities}}$

Return on Equity (ROE) = $\frac{\text{Net income before taxes}}{\text{Equity}}$

Combined Ratio (CR) = $\frac{\text{Losses + Expenses}}{\text{Earned premiums}}$

The model specification is as follows:

INTR = f(ROE) - - - - -- - - - - - - - - -- - - - (i)
QR = f(CR) - - - - -- - - - - - - - - - --- - - - (ii)
INTR = $\beta_0 + \beta_1 CR + \mu$ - - - - -- - - - - - - - - -- - - - (iii)
QR = $\beta_0 + \beta_1 ROE + \mu$ - - - - -- - - - - - - - - -- - - - (iv)

Where INT = change in interest rate
QR = Quick ratio
ROE = Return on equity
CR = Combined Ratio
β_0 = Regression constant
β_1 = Regression coefficients, and
μ = error term

The ordinary least square test is used in examining the effect of the dependent variable on the independent variable. The significance of the t-values is used in determining their rejection or acceptance accordingly. The importance of each of the regressions is determined by the F-test at 95% confidence interval which provides information on the fitness of the equation. The coefficient of determination R_2 is used to measure the strength with which the independent variables explain the variations in the dependent variable.

5. Results and Discussion

Descriptive statistics were carried out on the data and the result is as presented in Table 2. From the table, it can be observed that the mean values for CR, INTR, QR and ROE are 0.1415, 0.3115, 2.484 and 1.399 respectively.

The descriptive statistics illustrates little variation among the variables which implies low volatility among the variables. The median value for ROE of 0.330 is the highest among the variables considered while INTR recorded the lowest median value of 0.10. Similarly, there is a little variation in standard deviation among the variables. QR recorded the largest standard deviation of 6.4356 which implies a greater deviation from the mean in QR in the period under consideration while CR recorded the lowest standard deviation.

Further statistics indicate that all the variables are positively skewed. The analysis also reveals the presence of one platykurtic variable (INTR) having a kurtosis value of less than 3 which is also known as fat or short-tailed. CR, QR and ROE are leptokurtic variables with kurtosis value greater than 3 which implies a slim or long-tailed distribution. From the Jarque-Bera statistics, it can be observed that the probabilities of all variables are greater than 0.05 except CR which has a probability value equal to 0.05.

5.1 Test for Stationarity

The Augmented Dicker-Fuller test is employed in this study to test for stationarity of the time series variables. This is to avoid obtaining apparently significant results from unrelated data when non-stationary series are used in regression analysis. Such data are said to be spurious. We shall also ascertain the order of integration of the series to understand the minimum number of times in which the data must be differenced to obtain a stationary result. The result of our analysis is as presented in Table 3.

Evidence from the result presented in the table indicates that ROE and CR are stationary at the level while INTR and QR were stationary at the first difference. This indicates the absence of shocks in the model and the possibility of a long run relationship among the variables. Since all the probabilities are less than the 0.05 critical value, we reject the null hypothesis of a unit root among the variables and conclude that data is suitable for the study.

5.2 Regression Analysis

A regression analysis is conducted to test the hypothesis and determine the strength of the relationship between the explained and explanatory variables. The hypotheses to be tested are as follows:

1) Changes in interest rate are not significantly related to the combined ratio of life insurance companies in Nigeria
2) Liquidity risk is not significantly related to the return on equity of life insurance companies in Nigeria

The analysis as shown in Table 4 indicates a p-value of 0.0068 which is lower than the 95% critical value. Hence, we reject the null hypothesis of no significant relationship between interest rates and the combined ratio. A coefficient of 8.91 represents a positive and direct relationship between the variables. Our coefficient of determination (R_2) of 34.16% implies that CR accounts for 34.16% variation in interest rates while the remaining percentage is accounted for elsewhere. An F-stat probability of 0.00067 which is lower than the 0.05 critical value indicates that the model has a good fit. A Durbin Watson figure of 1.34 also indicates the absence of autocorrelation in the model.

From Table 5, it can be observed that the probability of the t-statistic is 0.64 which is higher than the 95 percent confidence interval. Thus, we accept the null hypothesis of no significant relationship between QR and ROE. A coefficient of -0.342266 signifies a negative and indirect relationship. A Durbin Watson statistic of 1.15 indicates the absence of autocorrelation among the residuals.

6. Findings and Discussion

From our first model, a regression analysis between changes in interest rate (INTR) and the combined ratio indicates a p-value of 0.0068 which is lower than the 0.05 critical value. This shows that there is a significant relationship between interest rates and the combined ratio, thus we reject the null hypothesis. A coefficient of 8.91 represents a positive and direct relationship between the variables which confirms the existence of a positive and direct relationship between changes in interest rate and the combined ratio in the life insurance industry.

In our second model, a p-value of 0.64 which is higher than the critical value indicates an insignificant relationship between liquidity risk as proxy by quick ratio and the return on equity. The test also indicates a negative and indirect relationship between the variables. Therefore, we accept the null hypothesis of no significant relationship between liquidity risk and the return on equity in the Nigerian life insurance industry.

7. Conclusion and Recommendation

This study was set out to review and analyse the financial risks to which the life insurance industry in Nigeria is exposed to and its relationship with the value of the firm. Liquidity risk and changes in interest rate were selected as financial risks to which life insurance companies are exposed to while the return on equity and the combined ratio were used to represent the value of industry. The primary objectives of the study were to assess the relationship between changes in interest rate and the combined ratio as well as the relationship between liquidity risk and the return on equity.

Our results reveal the presence of a significant relationship between changes in interest rate and the combined ratio while an insignificant relationship exists between liquidity risk and the return on equity. This is in line with existing theories and works from other researchers.

We therefore recommend that life insurers should adopt a risk-based approach in their operations to not only ensure an appropriate valuation of the sector but also proper maintenance of standards. Management should inculcate effective risk management practices which would help to identify internal and external risks which are likely to pose challenges to maintaining appropriate valuations. By identifying and dealing with potential risks in advance, life insurers can respond effectively to challenges whenever they emerge. Moreover, life insurers may need to properly recapitalize in order to take on large businesses without compromising their solvency state.

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Appendix

Table 1: Biannual presentation of data for changes in interest rate (INTR), quick ratio (QR), return on equity (ROE) and combined ratio (CR) for 2008 - 2017

Year	INTR	QR	ROE	CR
2008(a)	0.13	0.40	0.10	0.19
2008(b)	0.14	0.39	0.21	0.12
2009(a)	-0.80	0.29	4.08	0.04
2009(b)	-0.92	0.31	6.88	0.05
2010(a)	-0.52	0.34	0.18	0.12
2010(b)	-0.42	0.30	0.12	0.08
2011(a)	2.0	0.12	0.31	0.34
2011(b)	2.31	0.17	0.32	0.24
2012(a)	0.10	0.35	0.52	0.12
2012(b)	0.06	0.23	0.34	0.08
2013(a)	2.13	0.22	0.31	0.13
2013(b)	2.45	0.26	0.41	0.13
2014(a)	0.01	24.92	1.06	0.17
2014(b)	0.00	16.86	0.11	0.11
2015(a)	0.10	1.05	5.02	0.18
2015(b)	0.10	0.45	4.65	0.12
2016(a)	-0.63	0.34	0.80	0.19
2016(b)	0.12	1.07	0.29	0.13
2017(a)	-0.75	0.51	0.26	0.09
2017(b)	0.62	1.10	2.02	0.20

Source: Author's computation from Nigeria Insurance Digest 2009-2018.

Table 2: Results for Descriptive Analysis

	CR	INTR	QR	ROE
Mean	0.141500	0.311500	2.484000	1.399500
Median	0.125000	0.100000	0.345000	0.330000
Maximum	0.340000	2.450000	24.92000	6.880000
Minimum	0.040000	-0.920000	0.120000	0.100000
Std. Dev.	0.069455	1.058710	6.435629	2.033782
Skewness	1.095381	1.012974	2.856816	1.580365
Kurtosis	4.490310	2.761236	9.574297	4.080894
Jarque-Bera	5.850383	3.467892	63.22247	9.298793
Probability	0.053654	0.176586	0.000000	0.009567
Sum	2.830000	6.230000	49.68000	27.99000
Sum Sq. Dev.	0.091655	21.29645	786.9291	78.58910
Observations	20	20	20	20

Source: Eviews 10.0

Table 3: Result for test of Stationarity

Variable	Adf t-statistic	Critical value at 0.05 sig. level			Order of integration	Probability
		1%	5%	10%		
INTR	-5.042565	-3.886751	-3.052169	-2.666593	I(1)	0.0010
QR	-4.283687	-3.886751	-3.052169	-2.666593	I(1)	0.0046
ROE	-3.126230	-3.831511	-3.028870	-2.655194	I(0)	0.0415
CR	-3.502932	-3.831511	-3.029970	-2.655194	I(0)	0.0196

Source: Author's computation from Eviews

Table 4: Regression analysis for INTR $= \beta_0 + \beta_1 CR + \mu$

Dependent Variable: INTR
Method: Least Squares
Date: 11/18/19 Time: 20:21
Sample: 1 20
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	8.910098	2.915140	3.056491	0.0068
C	-0.949279	0.457268	-2.075978	0.0525

R-squared	0.341675	Mean dependent var	0.311500
Adjusted R-squared	0.305102	S.D. dependent var	1.058710
S.E. of regression	0.882546	Akaike info criterion	2.682628
Sum squared resid	14.01998	Schwarz criterion	2.782201
Log likelihood	-24.82628	Hannan-Quinn criter.	2.702066
F-statistic	9.342137	Durbin-Watson stat	1.348430
Prob(F-statistic)	0.006796		

Source: Eviews 10.0

Table 5: Regression Analysis for QR = $\beta_0 + \beta_1 ROE + \mu$

Dependent Variable: QR
Method: Least Squares
Date: 11/30/19 Time: 14:55
Sample: 1 20
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROE	-0.342226	0.741473	-0.461549	0.6499
C	2.962946	1.799209	1.646805	0.1169

R-squared	0.011696	Mean dependent var	2.484000
Adjusted R-squared	-0.043209	S.D. dependent var	6.435629
S.E. of regression	6.573198	Akaike info criterion	6.698518
Sum squared resid	777.7248	Schwarz criterion	6.798091
Log likelihood	-64.98518	Hannan-Quinn criter.	6.717955
F-statistic	0.213028	Durbin-Watson stat	1.159039
Prob(F-statistic)	0.649934		

Source: Eviews 10.0