International Journal of Multidisciplinary Research and Growth Evaluation.

Liquidity risk and market value of insurance companies in Nigeria

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Article Info

ISSN (online): 2582-7138
Volume: 05
Issue: 03
May-June 2024
Received: 06-03-2024
Accepted: 12-04-2024
Page No: 264-274

Abstract
The study examines the market value effect of liquidity risk of insurance companies in Nigeria. Liquidity risk has caused market value related problems and even insolvencies in the Nigeria insurance industry in the past and it remains a key risk for insurance companies to manage it now and in the future. Twenty seven (27) quoted insurance companies were used in the study. Ex-post facto research design method was also employed while the panel data were sourced from the Securities and Exchange Commission (SEC) Statistical Bulletin, Nigerian Stock Exchange (NSE) and Audited Annual Financial Reports of the studied companies from 2004 to 2023. This research adopts stationarity test, cointegration test, and pooled least squares regression test methods. The finding shows that there are significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria ($p = 0.0000, 0.0019$ & $0.0000 < 0.05$). This study concludes that there is a significant market value effect of liquidity risk of insurance companies in Nigeria. Insurance companies should have enough cash to meet their obligations both in short run and long run. There is need for regular cash flow modeling, which can project potential liquidity needs from the liability side of the balance sheet. Also, a liquidity-adjusted assets analysis can be applied to asset positions to estimate the cost of supplying liquidity from the asset side of the balance sheet to match those liability cash flow needs.

DOI: https://doi.org/10.54660/.IJMRGE.2024.5.3.264-274

Keywords: Liquidity risk, market value, liquidity ratio, leverage ratio, firm's size

1. Introduction

Liquidity risk embodies the potential hurdles an insurance company might encounter in fulfilling its short-term financial obligations due to a lack of cash on hand, or an inability to convert assets into cash without suffering a significant loss. This form of risk arises from various scenarios including market changes, unforeseen expenses or withdrawals, or a sudden uptick in liabilities. The essence of liquidity risk lies in the mismatch between assets and liabilities, where the assets cannot be easily liquidated at market value to meet the short-term obligations. The ability to manage liquidity risk is essential for ensuring it has enough cash on hand to meet its short term needs and obligations. This implies that liquidity risk relates to short-term cash flow issues. Liquidity problems can potentially lead to insolvency of insurance company if not addressed. This is because solvency risk indicates that the company is insolvent on its overall balance sheet, especially related to long-term debts.

Liquidity ratio is a major measurement of liquidity risk of insurance company. It measures the ability of an insurance company to pay off its short-term liabilities. Liquidity ratios determine how quickly an insurance company can convert the assets and use them for meeting the dues that arise. The higher the ratio, the easier is the ability to clear the debts and avoid defaulting on payments. Liquidity ratio indicates an insurer's ability to settle its current liabilities without prematurely selling long-term investments or to borrow money. If this ratio is less than one, then the insurer's liquidity becomes sensitive to the cash flow from premium collections. The overall liquidity ratio is calculated by dividing total assets by the difference between its total liabilities.

and conditional reserves. This ratio is used in the insurance industry, as well as in the analysis of other financial institutions

The ratio of liquid assets to liabilities and the composition of liquid assets provide a broad overview of the liquidity positions of insurers.

There is a link between liquidity risk and market value. Liquidity risk, market risk, and credit risk are distinct but interrelated types of financial risks that determine the market value of insurance companies. Market risk pertains to the fluctuations in share prices due to changes in market conditions. Credit risk involves the potential loss from a borrower's failure to repay a loan or meet contractual obligations. Liquidity risk might exacerbate market risk and credit risk. For instance, an insurance company facing liquidity issues might sell shares in a declining market price, incurring losses (market risk), or might default on its obligations (credit risk).

For insurance companies, liquidity risk arises naturally from certain aspects of their day-to-day operations. For example, insurance companies tend to fund long-term projects with short-term liabilities (like premiums from non-life insurance policies). This maturity mismatch creates liquidity risk if loss events occur suddenly and claims are paid. The mismatch between insurer's short-term funding and long-term illiquid assets creates inherent liquidity risk. This exposes them to potential liquidity risk. Volatile cash flows from operations can make it difficult to service short-term liabilities. Liquidity risk can have ripple effects across the broader insurance industry and economy at large. For instance, during a financial crisis, liquidity issues in major insurance companies can lead to a credit crunch, where lending becomes restricted, thereby impacting businesses, stakeholders, market value, and overall economic growth. Similarly, liquidity problems in some insurance companies can result in job losses, a crash in share price, and a decline in investor's confidence.

Liquidity risk has caused problems and even insolvencies in the Nigeria insurance industry in the past and it remains a key risk for insurance companies to manage it now and in the future. Liquidity risk is the risk that cash resources are insufficient to meet cash needs either under current conditions or in stress scenarios. Insurance companies in Nigeria are confronted with both asset and liability liquidity risks. As regards liability-side liquidity risks, insurers, unlike banks, generally have liabilities with a longer maturity than their assets, which makes them less vulnerable to customer runs. Additionally, insurers' liabilities are in general less liquid than bank deposits, as the possibilities for savings withdrawals are restricted in most insurance contracts and are also more costly for customers (owing to tax and surrender penalties). Among insurance companies in Nigeria, liability-side liquidity risks still exist for insurers. For instance, life insurers, in particular, face the risk of simultaneous withdrawals or policy surrenders by policy-holders. This risk could, for instance, be triggered if policy-holders have reason to question the financial soundness of the insurance company. General insurance companies can experience liquidity shortages as a consequence of large natural or man-made catastrophes, leading to large claims that have to be paid over a short period of time. Furthermore, from the perspective of asset-side liquidity risks, insurance companies face the risk of impaired liquidity in capital markets. When previously liquid asset classes become illiquid, raising cash can prove to be difficult and may force insurance companies to sell their most liquid assets even though they may have preferred to keep them. This problem may likely lead to the decline in the market value of the concerned insurance companies. These assertions corroborate the statements of Cucinelli (2013) [10] and Olalekan (2018) [25] that financial institution have demonstrated the lack of good forecasting models to manage liquidity risk, which has led to a liquidity spiral and given rise to a sudden deterioration of financial institution balance sheets with consequent difficulties in finding new sources of liquidity on financial markets (Cucinelli, 2013) [10]. The inability of insurance firms to raise liquidity can be attributed to a funding liquidity risk that is caused either by the maturity mismatch between inflows and outflows and/or the sudden and unexpected liquidity needs arising from contingency conditions. Therefore, the main aim of this study is to examine the market value effect of liquidity risk of insurance companies in Nigeria. In specific assertion, this study examines the influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria.

2. Literature Review

2.1. Conceptual underpinnings of liquidity risk

Liquidity is the ability to meet expected and unexpected demands for cash. Liquidity risk is the risk that in current or possible future environments, an entity will not have enough cash or liquid assets to meet its cash obligations or will only be able to obtain sufficient cash at excessive cost. According to American Academy of Actuaries (2024) [3], there are certain liquidity risks emanating from and driven by insurance product such as increased cash demands from policyholders; mass policyholder lapses due to a reputation event, contagion from a tangentially related event, or economic drivers; catastrophic levels of claims requiring near-term payout; choice of lump-sum payouts instead of annuity payouts; delays in receivables, such as reinsurance recoverables; and reduction in anticipated premium volume due to lower-than-expected sales or higher-than-expected lapses. Liquidity risk is a risk of insufficient liquid assets to meet payouts from policies (surrender, expenses, maturities, etc.), forcing the sale of assets at lower prices, leading to losses, despite company being solvent (kamau & Njeru, 2016; Olalekan, 2018) [15, 25]. Loss from meeting liquidity comes either from fire sale or by paying interest on borrowing to meet payouts. Liquidity risk arises due to two reasons, one on the liability side and other on the asset side.

According to Kumar (2016) [17], liquidity risk is a risk of insufficient liquid assets to meet payouts from policies (surrender, expenses, maturities, etc.), forcing the sale of assets at lower prices, and leading to losses, despite company being solvent. Loss from meeting liquidity comes either from fire sale or by paying interest on borrowing to meet payouts. Liquidity risk is the risk of loss as a result of the inability of the insurance company to convert its assets into cash when it needs cash. In simply words, liquidity risk is the risk that the insurance company will not be able to fulfill its obligation when requested (Yıldırım, 2021) [35]. Although the insurance companies have enough assets to pay their liabilities, but these liabilities cannot be paid by the said insurers because they cannot convert these assets into cash when needed. It is pertinent to talk about many reasons that cause insurance companies to be exposed to liquidity risk. The chief reason is that the premiums collected by insurance companies are insufficient for claims payments. Liquidity risk is one of the types of financial risks that insurance companies face, and it

refers to whether insurance companies have the cash to meet their monetary obligations (Bonfim and Kim, 2012) [8]. What is essential in insurance companies is the coverage ratio of the premiums they collect from the insured to the damages that may occur. They must have sufficient cash to cover the damages that may occur during the insurance period.

Liquidity risk is a risk of inadequate liquid assets to meet payouts from projects, forcing the sale of assets at lower prices and leading to losses (Bala *et al*., 2021) [7]. Loss from meeting liquidity comes either from quick sales or by paying interest on borrowings to meet payouts (Nabee1 & Hussain, 2017) [23]. Liquidity risk arises from the inability to find sufficient cash and cash equivalents or the inability to convert the assets that can be converted into cash, especially during periods of cash need (Gaspar and Sousa, 2010) [11]. Liquidity risk If the maturities of the assets owned by the enterprise are longer than the maturities of the operating liabilities, the liquidity risk increases even more (CEIOPS, 2010) [9]. In particular, insurance companies are required to have enough cash to meet their obligations in claims payments. If an insurance company fails to calculate the increase in its liabilities well, the company that has liquidity problems may not be able to provide the liquidity it needs by converting its assets into cash in a short time.

Liquidity ratios are a commonly used tool to assess a company's liquidity risk (American Academy of Actuaries, 2024; Bala *et al*, 2021; Kumar, 2016) [3, 17, 7]. The concept itself is straightforward. For a given point in time, liquidity-adjusted assets are divided by liquidity-adjusted liabilities. If the resulting ratio is greater than some target number, such as 1.0, then the company can feel fairly confident that its exposure to liquidity risk is acceptable. If the resulting ratio is too small, the company will want to take steps to reduce the risk. For example, the assets or the liability mix may need to be restructured. "Liquidity-adjusted" assets refers to the application of a haircut to the book value of the asset portfolio that considers two things: the difference between the book value and the market value of assets, and the execution costs involved in selling the assets needed over the desired time horizon and in the desired quantity. The larger the quantity and the shorter the timeline, the higher the execution cost. "Liquidity-adjusted" liabilities rely on estimating what portions of the liabilities are going to turn into short-term cash outflows. This could be 100% for payments due in the near future that cannot be deferred, but they could also be as low as 0% for liabilities that are fully illiquid. In practice, these two risk analysis techniques can also be combined. For example, cash flow modeling can project potential liquidity needs from the liability side of the balance sheet, and haircuts can be applied to asset positions to estimate the cost of supplying liquidity from the asset side of the balance sheet to match those liability cash flow needs. In general, liquidity ratios are useful for monitoring exposures and setting risk appetite measures. However, cash flow modeling will typically provide more insight for management of the business than standalone liquidity ratios (American Academy of Actuaries, 2024) [3].

2.2. Synopsis of market value concept

The market value of insurance company owners' equity is defined as the difference between the market value of assets and the market value of liabilities (Babbel & Fabozzi, 2000) [4]. For purposes of valuation, it is helpful to partition more finely the components of equity value. In this study, we will partition the value of insurance company owners' equity, or stock in the case of a stock company, into its four major components: franchise value, market value of tangible assets, present value of liabilities, and put option value. These components have the following elements. The franchise value stems from what economists call "economic rents." It is the present value of the "rents" that an insurer is expected to garner because it has scarce resources, scarce capital, charter value, licenses, a distribution network, personnel, reputation, and so forth (Vanderhoof & Altman, 1997; Babbel & Fabozzi, 2000) [4, 32]. It includes renewal business. Franchise value is dependent on firm insolvency risk or liquidity risk. The less insolvency risk or liquidity risk there is, the more likely the firm is to stay solvent long enough to capture all the available economic rents arising from its renewal business, its distribution network, its reputation, and so forth. The next two of these components can be netted together, producing what we will call "net tangible value." This value is simply the market value of tangible assets, less the present value of liabilities. This net tangible value is independent of what kind of assets an insurer has, but does depend on the amount of assets it holds (Babbel & Fabozzi, 2000; Babbel, 1998; Babbel & Merrill, 1997) [4, 5, 6].

Also**,** market value is the value of shares in the market as indicated by the price of these shares in the market. And the last is the intrinsic value of the stock, which is the actual or supposed value of the stock. In making investment decisions, these three values are important information for investors. In simple terms, if the market value of a stock is higher than its intrinsic value, it means that the stock is classified as expensive (overvalued). Under these circumstances, investors can decide by selling the shares. However, if the market value is below the intrinsic value, the stock is classified as cheap (undervalued), so investors should buy the stock (Leny, Hamid & Wirasmi, 2023) [19].

2.3. Conceptual expositions of leverage ratio and firm size

Insurance companies could prosper by taking reasonable leverage risk or could become insolvent if the risk is out of control. Nevertheless more empirical evidence supports the view that leverage risk reduces the performance of the companies. It is a financial ratio that indicates the percentage of firm's asset that is financed with debt. Leverage is measured as total liabilities to total assets (Nikhik, Kingshuk, and Mihir. 2015; Mehari and Aemiro, 2013) [24, 21]. In this study the ratio of total liabilities to total asset is taken as a leverage ratio. According to Zaki, Islahuddin and Shabri (2017) [36] leverage is a description of being able to use assets to have fixed expenses that will use assets to increase the level of income for company owners. This ratio is used to assess the coverage of capital to pay debts. This ratio is important for investors and potential investors to assess the company's ability to pay debts with the capital owned by the company (Rizki, Riana & Purnama, 2020) [28]. Leverage reveals that a company that has a debt that is greater than its own capital means that the company has a higher level of leverage. Sari, Jariyah and Hidayat (2019) [31] revealed that leverage has an effect on market value, while Saprudi (2019) [30] found that leverage has no effect on market value. Company size describes the size of a company which will be measured by the log of total assets. There are several studies that still show inconsistencies in results, including research by Wijay (2017) [33] that company size has a significant and significant effect on market value. The size of the firm is a

balance of the size of the firm which is obtained by varying things, including the overall sales, overall assets and the average sales stage of the firm (Rizki, Riana & Purnama, 2020) [28]. According to Hutabarat (2019) [14], firm size can be calculated taking the natural logarithms of total assets.

2.3. Theoretical Framework

There are three theories that guide this study; Liquidity Transformation Theory, Risk Return Theory and Extreme Value Theory.

2.3.1. Liquidity Transformation Theory

Propounded by Keynes (1936), described the theory in terms of three motives that determine the demand for liquidity: The transactions motive states that companies have a preference for liquidity to guarantee having sufficient cash on hand for basic day-to-day needs. The precautionary motive relates to companies' preference for additional liquidity if an unexpected problem or cost arises that requires a substantial outlay of cash. Insurance companies may also have a speculative motive. When interest rates are low, demand for cash is high and they may prefer to hold assets until interest rates rise. The speculative motive refers to companies' reluctance to tying up investment capital for fear of missing out on a better opportunity in the future. The relationship between insurance company and liquidity transformation theory is threefold: first, insurance company contributes to ensuring liquidity by pooling the risks it covers; second, it enhances liquidity by reducing the cost of financial intermediation; and third, insurance can be the source of a liquidity crisis and systemic risk.

2.3.2. Risk Return Theory

Markowitz (1952) [20] is the pioneer scholar that propounded the risk return theory. This theory states that since insurance companies is both a risk-taking and profit making business, therefore insurance firms activities should return profits commensurate with their risk. The higher the risk, the higher will be the market value and vice versa. This postulation is true when the insurance firm risk appetite is lower than the risk tolerance.

2.3.3. Extreme Value Theory

This theory was pioneered by Leonard Tippet in the 1950's, which is a practical and useful tool for modeling and quantifying risk. It is the theory of modeling and measuring events which occur with very small probability. This implies its usefulness in risk modeling as risky events per definition happen with low probability. This theory shows that the probability on very large losses is eventually governed by a simple function, regardless the specific distribution that underlies the return process. Therefore, liquidity risk should be modeled and quantified to determine its impact on market value.

2.4. Review of empirical studies

Most empirical studies were conducted in other countries with mixed results (Laminfoday, 2018; Nabeel & Hussain, 2017; Muriithi & Waweru, 2017; Kama & Njeru, 2016) [18, 23, 22, 15]. Only few studies in Nigeria with more focus on banking sector to the detriment of insurance subsector (Otekunrin, *et al*, 2019; Olarewaju & Adeyemi, 2015) [27, 26].

Leny, *et al*. (2023) [19] examined the effect of Return on Equity, Debt to Equity Ratio, Current Ratio and Earning Per Share on stock prices, and also to test the Price Earning Ratio as a moderating variable strengthening or weakening the relationship Return on Equity, Debt to Equity Ratio, Current Ratio Earning Per Share on stock prices in insurance companies. The population used in this study is insurance companies listed on the Indonesia Stock Exchange during the period 2015 to 2020 using a purposive sampling technique in sampling. The data analysis used is Moderation Regression Analysis (MRA) with the SPSS.28 program in data processing. The results of this study indicate that Return on Equity has a positive and insignificant effect on stock prices; Debt to Equity Ratio has a negative and insignificant effect on stock prices; Current Ratio has a positive and significant effect on stock prices; Earning Per Share has a positive and significant effect on stock prices; Price Earning Ratio does not moderate the relationship of Return on Equity to stock prices; The Price Earning Ratio moderates the effect of the Debt to Equity Ratio on stock prices; Price Earning Ratio moderates the effect of Current Ratio on stock prices; The Price Earning Ratio moderates the effect of Earning Per Share on stock prices in insurance companies.

Yıldırım (2021) [35] conducted a study to determine the factors affecting liquidity risk in insurance companies in Borsa İstanbul. Factors affecting the liquidity risk were identified using the main variables of liquidity for 5 insurance companies which were listed in Borsa Istanbul Stock Exchange (BIST) with a panel data regression analysis for periods between 2014 and 2020. The results of the analysis showed that the variables of loss ratio and return on equity are negatively correlated with the liquidity risk while variables such as company size and return on assets are positively correlated with the liquidity risk.

Adhikari (2021) [1] examined the factors affecting the share price of Nepalese life insurance companies. Market price per share is selected as dependent variable while earning per share, divided per share, price earnings ratio, dividend payout ratio, and dividend yield ratio were chosen as firm specific independent variables. The data were collected from the insurance and banking statistics and supervision report published by Nepal Rastra Bank and annual report of selected life insurance companies. The correlation and multiple regression models were estimated to test impact of firm specific factors on share price of Nepalese life insurance companies. Using data of 4 insurance companies listed in NEPSE for the period 2012/13- 2018/19, the result shows that company's specific variables like earnings per share, divided per share, price earnings ratio, dividend payout ratio, and dividend yield ratio are the major determining stock price in context of life insurance companies in Nepal. There is positive relationship between market price per share and other dividend variables like, earnings per share, dividend per share, dividend payout ratio, price earnings ratio and dividend yield ratio.

Bala *et al*. (2021) [7] embarked on a study to determine the influence of firms' liquidity on financial performance of quoted insurance companies in Nigeria. The study employed a descriptive research design. The population of the study consisted of twenty (20) insurance firms listed on the floor of Nigerian Stock Exchange as at 30th September, 2021 covering the periods of 2014 to 2019. The sample size of the study is made up of seven (7) insurance and assurance companies in Nigeria. Simple random sampling technique was employed in selecting the sample size of the study. The study used GLS random effects regression method to analyze

the data of the study. The outcome of the study revealed that capital adequacy ratio is the major factor that influences financial performance of quoted insurance firms in Nigeria.

Yahaya & Alkasim (2020) [34] examined the effects of market valuation measures on share price of 28 listed insurance firms in Nigeria using a 10-year data set (2010-2019). Data set was extracted from the Nigerian Stock Exchange website and analyzed with the aid of mean, standard deviation, minimum, maximum mean, correlation and regression. Analytical checks (normality, multicollinearity, heteroskedasticity, panel effect) were conducted in order to ensure best linear unbiased estimation. The results indicate that book value of equity per share, earnings per share and dividend per share show significant positive effects on share price. However, cash per share and debt per share show insignificant negative effects on share price.

Rizki, Riana & Purnama (2020) [28] examined the factors affecting stock prices in insurance companies listed on BEI. This study aimed to analyze the effect of profitability, leverage and company size on stock prices. The data source was obtained from the financial statements of insurance companies listed on the IDX in 2014 -2018. Quantitative research design was used. A purposive sampling technique of 9 insurance companies was used. The analysis method used was multiple linear regression, F test and T test. The results of the study showed that the variables of profitability, leverage and firm size simultaneously influence stock prices. While the partial analysis showed that the profitability variable has no and no effect on stock prices, the leverage variable also showed that there is a negative and significant effect on stock prices, the firm size variable has a positive and significant effect on stock prices.

Olalekan (2018) [25] assessed the effect of liquidity risk on firm performance of listed insurance companies in Nigeria for the period of 2011-2015. The listed insurance firms are twenty Five (25) in numbers out of which a sample of twelve (12) were used for the study. Liquidity risk as the independent variable was proxy with leverage, claim loss ratio and premium growth, while the return on asset was used to proxy firm performance. The study adopts a panel multiple regression techniques and data were collected from secondary source through the annual reports of the firms after controlling for fixed/random effects. The findings of random effect reveal that leverage has significant negative effect on return on assets. The claim loss ratio has insignificant negative influence on return on assets while premium growth has positive and insignificant effect on firm performance of listed insurance companies in Nigeria.

Muriithi & Waweru, (2017) [22] conduct a study on liquidity risk and financial performance of 43 registered commercial banks in Kenya over a period of (2005 – 2014). Liquidity risk was measured by liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) while financial performance by return on equity (ROE). Panel data techniques of random effects estimation was used for the study. Findings indicate that NSFR is negatively associated with bank profitability both in long run and short run while LCR does not significantly influence the financial performance both in long run and short run. It is recommended that bank's management to pay the required attention to the liquidity management.

Zengin and Yüksel (2016) [37] investigated the factors affecting the liquidity risk of banks in Turkey with the logit model in the period of 2005-2014. The 10 banks with the highest asset size were included in the analysis and it was determined that the "capital adequacy ratio" and "net interest margin" variables affected the liquidity risk.

Kamau, & Njeru, (2016) [15] examine the effect of liquidity risk on financial performance of six Insurance Companies Listed at the Nairobi Securities Exchange for the period 2012-2015. The risks studied included operational risk, market risk and credit risk. The study was descriptive in nature. It was found out that operational, market and credit risks has negative effect on the financial performance. The study recommended that measures should be put into place to hedge these risks and hence maintain a healthy financial performance.

Nikhik, Kingshuk, Mihir (2015) [24] conducted a study on firm specific factors affecting the overall financial performance of life insurance companies in India over the period of ten (10) years from 2003-04 to 2012-13. The analysis shows that there is significant negative relationship between leverage and financial performance (ROE).

Saeed & Khurram, (2015) [29] examine the factors influencing the financial performance of 24 non-life insurance companies of Pakistan over the period 2005 - 2013. Fixed effect model of Hausman test was employed for the study. The findings indicate that loss ratio proves significant in determining performance.

Hossein, Dezfouli, Hasanzadeh, & Shahchera, (2014) [13] inspect the effectiveness of liquidity risk on banks profitability in Iran. Using a four-step econometric model and GMM linear forecasting model, it was concluded that there is a significant relation between mentioned factors (NPL (dependent variables- Non-Performing loans ratios, liquidity ratios, liquidity gap ratio, capital ratio, and bank size) and the profitability ones (independent variables- ROE and ROA).

Mehari & Aemiro, (2013) [21] conduct a study on firm specific factors that determine insurance companies' performance in Ethiopia. Return on total assets (ROA) - a key indicator of insurance company's performance- is used as dependent variable while age of company, size of the company, growth in writing premium, liquidity, leverage and loss ratio are independent variables. The sample includes 9 insurance companies over the period 2005- 2010. The results of regression analysis reveal loss ratio (risk) is statistically significant and negatively related with ROA of insurance companies in Ethiopia. But, growth in writing premium, insurers' age and liquidity have statistically insignificant relationship with ROA.

Cucinelli, (2013) [10] conduct a study on the relationship between liquidity risk and probability of default: Evidence from the Euro Area. The sample is composed of 575 listed and non-listed Eurozone banks and the methodology applied in the analysis is OLS regression based on panel data. The results show a relationship only between the liquidity coverage ratio and credit rating, while there is no relationship between the long- term liquidity measure and probability of default.

Ail, Tabari, Ahmadi, & Emami, (2013) [2] examine the effect of liquidity risk on the performance of commercial banks using of panel data related to commercial banks of Iran during the years 2003 to 2010. In the estimated research model, two groups of bank-specific variables and macroeconomic variables are used. The results of research show that the variables of bank's size, bank's asset, gross domestic product and inflation will cause to improve the performance of banks while credit risk and liquidity risk will cause to weaken the performance of bank.

Guimarães & Nossa (2010) [12] researched on working capital, profitability, liquidity and solvency of healthcare insurance companies. The purpose of this study was to analyze the adequacy of a working capital management normative model, in terms of profitability, liquidity and solvency. Through an empirical and analytical research, the analysis of variance results (ANOVA) of a sample containing financial information from 621 healthcare insurance companies for the year 2006, show that different working capital structures are associated with different levels of profitability, liquidity and solvency, suggesting a preference order different from the one theorized by Fleuriet / Braga. The results indicate that a certain structure – where financial current assets exceed onerous current liabilities, and cyclical current assets exceed cyclical current liabilities – is associated with higher levels of profitability, liquidity and solvency. In view of these conflicting findings, this paper hypothesizes that:

Ho: There are no significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria.

3. Methodology

An ex post facto research design was employed in the study. The research covers the activities of 27 insurance companies that are listed on the Nigerian Stock Exchange. The population of the study consisted of all insurance companies quoted on the Nigerian stock exchange as at December 31, 2023. An analysis of the website of the Nigerian Stock Exchange (NSE) showed that 27 insurance companies were listed on the main board of the NSE. Hence the population of this study consists of 27 insurance companies listed on the main board of the NSE as at December 31, 2023. The data sample of the study comprises of liquidity ratio, leverage ratio, fir size and market value data of 27 listed insurance companies for the period 2004 - 2023.

Table 1: Variable Measurement and econometric notations

Variable	Notation	Measurement	Predicted signs
Dependent			
Market value of insurance companies	MVAL	Market value of assets minus the market value of liabilities (Babbel & Fabozzi, 2000; Babbel, 1998; Babbel & Merrill, 1997) [4, 5, 6].	
Independent			
Liquidity ratio	LIQR	total asset/ total Liabilities (American Academy of Actuaries, 2024; Bala *et al*, 2021; Kumar, 2016) [3, 17, 7] Total Liabilities/Total Asset (Olalekan, 2018) [25]	+/-
Leverage ratio	LEVR	The natural logarithm of total asset (Yıldırım, 2021 [35];	+/-
Firm Size	FISZ	Rizki, Riana & Purnama, 2020) [28].	+/-

The data collected for the analysis were panel data. Some statistical tests are conducted using appropriate tools for the analysis of the panel data. Such tests are stationarity test, cointegration test, and pooled least squares regression test. P-value from the Pooled Least squares regression analysis will be adopted to test the research hypotheses.

The market value model for insurance companies propounded by Babbel & Fabozzi (2000) [4] was adopted in this study. According to Babbel & Fabozzi (2000) [4] model, market value of insurance company equity is equal to market value of assets minus market value of liabilities. Equally, market value of insurance company equity is equal to franchise value plus market value of tangible assets minus present value of liabilities plus put option.

In what follows, we will use the more compact equations to represent the above statements:

$$MV(E) = MV(A) - MV(L)$$

$$MV(E) = FV + MV(TA) - PV(L) + PO$$

Where; $MV(E)$ = market value of insurance company equity, $MV(A)$ = market value of assets, $MV(L)$ = market value of liabilities, FV = franchise value, $MV(TA)$ = market value of tangible assets, $PV(L)$ = present value of liabilities, and PO = put option.

At this point it is useful to consider these juxtaposed equations. It is clear that the right-hand-sides of both equations must be equal to each other. It is equally clear that the market value of liabilities differs from the present value of liabilities unless the market value of assets is defined as the sum of the franchise value, market value of tangible assets, and put option (*i.e.*, unless $MV(A) = FV + MV(TA) + PO$).

Accordingly, the market value of liabilities is reduced when the debt becomes risky. This is ironic from an insurance regulatory perspective. If the insurer is likely to default on its insurance policies, it would suggest that the liabilities are worth less than they would be if they were secure. The riskier a firm is, the lower would be the market value of its liabilities. Therefore, if the insurer were to report this market value of liabilities to regulators, the lower market value could suggest the insurer is in better financial health than if the insurer were to report a present value of liabilities that is not reduced by the prospect of insolvency (Babbel & Fabozzi, 2000) [4].

Based on the above Babbel & Fabozzi model, the panel multiple regression model for the study is specified below:

$$MVAL_{it} = \beta_{0it} + \beta_1 LIQR_{it} + \beta_2 LEVR_{it} + \beta_3 FMSIZE_{it} + \varepsilon_{it}$$

Where;
MVAL = Market value for insurance firm i at year end t
LIQR = Liquidity ratio for insurance firm i at year end t
LEVR = Leverage ratio for insurance firm i at year end t
FMSIZE = Firm Size for insurance firm i at year end t
β_0 = constant
β_1- β_3 = Coefficients
ε_{it} = Error term over cross section and time.

4. Empirical Results

4.1.1. Descriptive Statistics

From the descriptive statistics results in Table 2, we may infer that the variations between the mean and standard deviation scores were minimal indicating that the dataset were

clustered below the mean translating to a desired outcome that the dataset has low level of variability. This indicates that the liquidity risk indicators used in the study were at low level leading to the mean score of 1.95 of market value of insurance companies in Nigeria.

Table 2: Descriptive Statistics Analysis Result

	MVAL	LIQR	LEVR	FMSIZE
Mean	1.9565821	1.528630	15.05196	6.855741
Median	3.367284	1.355000	0.740000	7.040000
Maximum	7.8117589	23.13000	1860.430	8.200000
Minimum	-66969458	0.000000	0.040000	3.550000
Std. Dev.	1.7920443	1.352957	9.863313	0.770831
Skewness	-0.404486	4.872858	13.93527	-0.909808
Kurtosis	6.000663	56.78344	237.8691	4.049547
Jarque-Bera	869.2575	268887.4	5034623.	397.1299
Probability	0.000000	0.000000	0.000000	0.000000
Sum	3.38E+09	3301.840	32512.24	14808.40
Sum Sq. Dev.	6.93E+17	5898.967	21003820	1282.834
Observations	2160	2160	2160	2160
Cross sections	4	4	4	4

4.1.2. Stationarity or Unit Root Tests

In order to avoid the occurrence of spurious results, this study adopted the Pool unit root test for testing the Stationarity of the panel data. The Pool unit root test statistic outcome of the panel data for the period, 2004 – 2023 shows that all the panel data are stationary at first difference at 1% level of significance.

Table 3: Unit Root Test

Pool unit root test: Summary				
Series: MVAL, LIQR, LEVR, FMSIZE				
Date: 05/06/24 Time: 15:58				
Sample: 2004 2023				
Exogenous variables: Individual effects				
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 3 to 17				
Newey-West automatic bandwidth selection and Bartlett kernel				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.34213	0.0000	4	2123
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.2071	0.0000	4	2123
ADF - Fisher Chi-square	133.685	0.0000	4	2123
PP - Fisher Chi-square	667.447	0.0000	4	2156
** Probabilities for Fisher tests are computed using an asymptotic Chi				
-square distribution. All other tests assume asymptotic normality.				

Table 3 shows the results of the unit root (stationarity) tests of the series in respect to variables at 1%, 5% and 10% level of confidence. If p- value of Pool unit root test model is less than 0.05 at 1%, 5% and 10%, then this means shocks are not present in the model. Therefore, from the above table p-values of Pool unit root test model were less than 0.05, hence, it is concluded that shocks have been removed from these models and confirmed that the panel data series were stationary. This indicates that all the variables can be linearly combined with each other and some may likely have a long-run cointegration with other variables. Therefore, the Johansen Fisher Panel Cointegration Test is employed in this study to test for the presence of a long-run relationship between the dependent and independent variables.

4.1.3. Co-integration Test

This test seeks to determine whether there exists long-run equilibrium relationship among the variables in the study. Johansen Fisher Panel Cointegration Test result in Table 4 shows that the p-values were less than 0.05 level of significance. The implication of this result is that there is a long-run equilibrium relationship between liquidity risk indicators and market value of insurance companies in Nigeria. Thus, we are not accepting the null hypothesis of no cointegrating relationships among the variables.

Table 4: Johansen Fisher Panel Cointegration Test

Johansen Fisher Panel Cointegration Test				
Series: MVAL LIQR LEVR FMSIZE				
Date: 05/06/24 Time: 16:00				
Sample: 2004 2023				
Included observations: 540				
Trend assumption: Linear deterministic trend				
Lags interval (in first differences): 1 1				
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
None	73.68	0.0000	73.68	0.0000
At most 1	73.68	0.0000	100.4	0.0000
At most 2	134.1	0.0000	122.9	0.0000
At most 3	159.0	0.0000	159.0	0.0000
* Probabilities are computed using asymptotic Chi-square distribution.				
**MacKinnon-Haug-Michelis (1999) p-values				

4.1.2. Bivariate Correlation Matrix

Table 5: Correlations

		MVAL	**LIQR**	**LEVR**	**FMSIZE**
MVAL	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	540			
LIQR	Pearson Correlation	.886*	1		
	Sig. (2-tailed)	.000			
	N	540	540		
LEVR	Pearson Correlation	.750*	.135**	1	
	Sig. (2-tailed)	.000	.002		
	N	540	540	540	
FMSIZE	Pearson Correlation	.897*	.406**	.427**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	540	540	540	540
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

For the purposes of testing the influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria, there is need to perform a bivariate correlation to ensure that the variables are less likely to correlate among themselves to avoid multicollinearity problem in the estimated parameters. A correlation coefficient value of 1 means perfect, 0.7-0.9 value of correlation coefficient means strong and 0.4-0.6 value of correlation coefficient means moderate and 0.1- 0.3 value of correlation coefficient means weak. In Table 5, all the variables maintained positive correlations with correlation coefficients ranging from 0.750 -0.897 hence, the variables correlate strongly among themselves and the multicollinearity problem in the estimated parameters were avoided.

4.2. Testing of Research Hypothesis

The hypothesis was that there are no significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria. The empirical results presented in Table 6 revealed that liquidity ratio, leverage ratio and firm size have positive coefficients indicating positive influences on market value of insurance companies in Nigeria. However, the p-values of liquidity ratio, leverage ratio and firm size were less than 0.05 ($p = 0.0000, 0.0019$ & $0.0000 < 0.05$). The finding is that there are significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria. The model returning this result is significant given the F-statistic value of 381.0776 with p-value of 0.000, which is significant at 5%, the explanatory power of the model as indicated by the R^2 value of 0.346 means that the variables in the model combined together explained about 34.6% variations in market value of insurance companies in Nigeria while the remaining 65.4% of the variations are explained by variables not included in the model. The Durbin-Watson Stat (DW-Stat.) value of 1.68 was within acceptable region of no autocorrelation problem.

The blue lines in the graphs in Appendix B clearly show the residual errors were moving within the bound, hence the null hypothesis that the pooled regression model fits the data well is accepted and hence the parameter estimate in this model are stable over time. By implications, the result can be considered valid and reliable for both predictive research analysis and policy decision making.

4.3. Discussion of Findings

The study examined the market value effect of liquidity risk of insurance companies in Nigeria. The finding revealed that there are significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria. It was found that liquidity ratio, leverage ratio and firm size have positive coefficients indicating positive influences on market value of insurance companies in Nigeria. This implies that all the independent variables used in the study made strongest significant influence on market

value. The business implication of this finding is that the listed insurance companies in Nigeria can feel fairly confident that their exposure to liquidity risk is acceptable. The listed insurance companies in Nigeria have no liquidity problems may likely be able to provide the liquidity they need by converting their assets into cash in a short time. Although the study variables differ, the finding of this study is close to the finding of Mehari & Aemiro, (2013) [21] that liquidity ratio, leverage ratio and firm size have statistical significant with ROA of insurance companies in Ethiopia.

Table 6: Pooled Least Squares Regression Test Results

Dependent Variable: MVAL				
Method: Pooled Least Squares				
Date: 05/06/24 Time: 15:56				
Sample: 2004 2023				
Included observations: 540				
Cross-sections included: 4				
Total pool (balanced) observations: 2160				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-65662108	3259043.	-20.14767	0.0000
LIQR	3655518.	206788.7	17.67755	0.0000
LEVR	10896.05	3502.100	3.111290	0.0019
FMSIZE	8967082.	485923.1	18.45371	0.0000
R-squared	0.346515	Mean dependent var		1565821.
Adjusted R-squared	0.345605	S.D. dependent var		17920447
S.E. of regression	14496685	Akaike info criterion		35.81859
Sum squared resid	4.53E+17	Schwarz criterion		35.82910
Log likelihood	-38680.08	Hannan-Quinn criter.		35.82243
F-statistic	381.0776	Durbin-Watson stat		1.680362
Prob(F-statistic)	0.000000			

5. Conclusion and Recommendations

The study sought to examine the market value effect of liquidity risk of insurance companies in Nigeria. This involved examining the model's predictions and statistical significance of the explanatory variables on market value. Furthermore, mimicking market value model for insurance companies was constructed using the Babbel & Fabozzi (2000) [4] methodology. The study employed the panel multiple regression model where a Pooled Least Squares regression method was used test the hypothesis. The study found that there are significant influences of liquidity ratio, leverage ratio and firm size on market value of insurance companies in Nigeria. Based on this finding, it is concluded that there is a significant market value effect of liquidity risk of insurance companies in Nigeria.

The study arrived at various policy recommendations. First, insurance companies should have enough cash to meet their obligations both in short run and long run. Insurance companies should not fails to calculate the increase in their liabilities in order to detect their liquidity problems, which will enable them to provide the liquidity it needs by converting their assets into cash in a short time. There is need for regular cash flow modeling, which can project potential liquidity needs from the liability side of the balance sheet. Also, a liquidity-adjusted assets analysis such as the application of a haircut to the book value of the asset portfolio can be applied to asset positions to estimate the cost of supplying liquidity from the asset side of the balance sheet to match those liability cash flow needs. Lastly, insurance companies should analyze their liquidity ratios, which are useful for monitoring exposures and setting risk appetite measures.

Market value effect of liquidity risk only gained prominence in the developed economies and few in the developing or emerging economies with mix results focusing more on banks. There are few studies that examined specifically the market value effect of liquidity risk of insurance companies in Nigeria using the variables of this study. This work serves among the few in the developing economy like Nigeria and Africa at large to use these variables to fill the gap in literature.

Based on the outcome of the present study, further investigations on the subject matter should be on comparative analysis of the market value effect of liquidity risk of insurance companies and banks in Nigeria. More so, a panel study may also be desirable in a bid to capture some specific effects of the individual insurance company in Nigeria.

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Appendix A

List of quoted insurance firms used in the study

S. NO.	Quoted Insurance Firm	Date listed on NSE	Date of incorporation
1.	African Alliance Insurance Plc	2009	May 6th, 1960
2.	AIICO Insurance Plc	1990	1963
3.	Axa Mansard Insurance Plc	2009	1989
4.	Consolidated Hallmark Insurance Plc	2007	Aug. 2, 1991
5.	Continental Reinsurance Plc	May 30, 2007	1985
6.	Cornerstone Insurance Plc	1997	July 26, 1991
7.	Custodian & Allied Plc	1990	1970
8.	Equity Assurance Plc/Sunu Assurance Nig Plc	July 18, 2007	December 13, 1984
9.	Goldlink Insurance Plc	Feb 12, 2008	15 April, 1992
10.	Great Nigeria Insurance Plc	Feb 12, 2008	1992
11.	Guinea Insurance Plc	1990	Dec 3, 1958
12.	International Energy Insurance Plc	July 13, 2007	1969
13.	Lasaco Assurance Plc	*June 14, 1991*	1979
14.	Law Union & Rock Insurance Plc	July 9, 1990	1951
15.	Linkage Assurance Plc	November 18, 2003	1991
16.	Mutual Benefits Assurance Plc	September 5, 1990	1948
17.	NEM Insurance Plc	1989	1970
18.	Niger Insurance Company Plc	September 1, 1993	1962
19.	Prestige Assurance Plc	December 3, 1990	1952
20.	Regency Alliance Insurance Company Plc	May 27, 2008	1993
21.	Royal Exchange Plc	Dec 3, 1990	Feb-28-1921
22.	Soverign Trust Insurance Plc	November 29, 2006	1980
23.	Standard Alliance Insurance Plc	December 19, 2003	1981
24.	Standard Trust assurance Plc	July 25, 2007	1991
25.	Unity Kapital Assurance Plc	December 17, 2009	1973
26.	Universal Insurance Plc	February 11, 2008	1961
27.	Wapic Insurance Plc	January 1, 1978	1958

***Source*:** Securities and Exchange Commission (SEC) Statistical Bulletin, 2020

Appendix B