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MACRO-DETERMINANTS OF STOCK MARKET LIQUIDITY IN NIGERIA

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ABSTRACT

Globally, the stock market has been recognized as a catalyst in the process of economic growth and development. This significant position occupied by the stock market is precipitated by its function as an intermediary within the financial system. This pivotal role has elicited a focus on expanding and deepening financial markets by governments. Therefore, this study examined the effect of selected macroeconomic variables on stock market liquidity in Nigeria spanning over the period 1981 to 2022 utilising ex-post facto design and secondary data. The autoregressive distributed lag (ARDL) result revealed that inflation rate, exchange rate and interest rate exerted significant effect on stock market liquidity in Nigeria. Contrariwise, GDP and broad money supply had insignificant impact on market liquidity. The study therefore concluded that macroeconomic policy tools are significant determinants of stock market liquidity in Nigeria. Based on this, the study recommended the deployment of price stabilisation polices to eliminate price distortions. Furthermore, the study recommended the relaxation of credit controls and excessively high reserve requirements to induce liquidity within the stock market.

Keywords: *Stock Market Liquidity, Autoregressive Distributed lag, Inflation Rate, Exchange Rate and Interest Rate*

1. Introduction

Stock market development is a critical indicator of the development of any economy hence the pronounced attention it has received from policymakers, regulators, academia and investors (Yahaya, et al., 2023). In its recognised role as a catalyst in the process of economic growth and development, Imhanzenobe (2022) explained that stock market functions as an intermediary within the financial

system creating an avenue for participants to source for capital and diversify risk while Magbonde and Konte (2022) emphasized its pivotal role in maintaining macroeconomic stability. However, the efficient actualization of the potentials of stock market development fundamentally requires the comprehensive understanding of various dimensions or indicators of stock market development. Yahaya et al. (2023), however accentuated the dependency of stock market development and efficiency on the adequacy of stock market liquidity as a rationale for the global initiative to deepen and strengthen stock market liquidity.

Describing stock market liquidity, Naik and Reddy (2021) explained that a liquid market is characterised by low transaction costs, rapid security trades and negligible effect of volume of trades on price. Stock market liquidity, according to Ajaja (2024), ensures optimal capital allocation, encourages long term investment and facilitates technological innovation. It is crucial to financial system stability as a liquid market is able to adequately absorb systemic shocks and lower volatility (Abidin, et al., 2022). Motivated by the advantages of stock market liquidity and to avoid systemic liquidity crises, empirical researches have strove to expose the determinants of stock market liquidity resulting to theoretical and empirical studies that have suggested that fluctuations in macroeconomic variables can significantly impact stock market liquidity.

Macroeconomic policy tools include exchange rate, inflation rate, economic growth, interest rate and money supply. Exchange rate is viewed as the level at which a currency will be exchanged for another. It is also viewed as the value of one country's exchange in relation to another while inflation is generally used to describe a situation of rapid, persisted and unacceptably high rises in the general price level in an economy, resulting to general loss of purchasing power of the currency. The money supply is the total amount of monetary assets available in an economy at a specific time. Economic growth is defined as the rate of change in real output. It is usually stated as percentage change on an annual basis and Interest rate is the return or yield on equity or the opportunity cost of deferring current consumption in the future.

A review of related studies revealed a preponderance of empirical evidence on the relationship between macroeconomic variables and stock market liquidity. However, majority of the studies concentrated on developed economies (see. Chordia, et al., 2021; Marozva, 2020; Naik & Reddy, 2021) while the possible impact of macroeconomic variables on stock market performance in developing and emerging markets remains either unclear or relatively underexplored. Due to the notable difference between developed markets and emerging markets, in terms of their institutional and regulatory set ups, results from developed markets may not be readily generalised for emerging markets. Furthermore, empirical

results obtained from previous studies have been inconsistent with regards to the magnitude and direction of the effect of macroeconomic variables on market liquidity. This inconsistency may be due to the utilisation of diverse methodology or could be attributed to the consistent variation in aggregate liquidity in the stock market over time as highlighted by Mannoun and Sjoblom (2021). Propelled on these premises, this study examined the effect of selected macroeconomic policy tools on stock market liquidity in Nigeria, an emerging market.

Following this introductory section, the rest of the paper is organized as follows. In section 2, we present the conceptual and empirical review in the literature review. Section 3 presents the methodology. The empirical results are presented in section 4 while section 5 concludes the paper with policy recommendations.

2. Literature Review

Conceptual Review

Stock Market Liquidity

Stock market liquidity refers to the ease of trading an asset. It estimates the cost, speed, volume and price impact of transforming cash into financial assets and vice versa (Chordia & Subrahmanyam, 2018). According to Abidin et al. (2022), stock market liquidity creates efficiency by lowering volatility and transaction cost. More so, Mannoun and Sjoblom (2021) explained that stock market liquidity is pivotal for the well-functioning of financial markets as illiquidity had adverse impact on market risk and financial system stability. Furthermore, on the significance of stock market liquidity, Yahaya (2023) revealed its considerable effect on stock market volatility.

Stock market liquidity is typically measured with regards to tightness, depth and resilience of the market. However, according to Andabai (2024), the fundamental metrics of market liquidity can be quantified as total value of shares traded ratio, turnover ratio, market depth measures (Quantity depth and value depth) and transaction cost measure.

The study utilised turnover ratio as the proxy for stock market liquidity. Turnover ratio quantifies trading in relation to the size of the stock market. The ratio captures trading frequency, which plays a significant role in liquidity (Kungu & Kinyua, 2024). Moreover, the authors noted that turnover ratio sufficiently reflected the breadth, the depth and the resiliency of stock market.

Macroeconomic Policy Tools

Inflation Rate

Inflation is a sustained increase in the general price level consequently undermining the value of money i.e. you can buy fewer goods and services for the same amount of money (Riksbank cited in Mannoun & Sjoblom, 2021). It is a persistent, continuous, sustained and appreciable rise in overall prices of a wide range of goods and services in a country. Cecchetti and Schoenholtz (2016) defined inflation rate as a measure of the incessant rise in the prices of wide ranging goods and services, indicated by variation in the general price level in an economy.

Exchange Rate

Nwaogwugwu (2018) expounded that exchange rate referred to the rate that relates local currency units to the foreign currency. It is the rate of conversion between two currencies that is the value at which a local currency exchanges for another currency. Exchange rate is the relative value of one currency with respect to another currency. In Nigeria, it can be stated that the exchange rate for Naira is the value of naira in terms of any foreign currency.

Interest Rates

Interest rate is defined as the cost of borrowing or gain on lending (Mushtaq & Siddiqui, 2016). Succinctly, it can be said that interest rate is the price paid for the use of money. Interest rates can also be explained as the rental payment for the use of credit by borrowers and return for parting with liquidity by lenders. Like other prices, interest rates perform a rationing function by allocating limited supply of credit among the many competing demands.

Economic Growth

Economic growth is the increase in economic activities depicted by increase in a country's real per capital income in the long run (Kuznets, 1973). It comprises all the outputs of the private sector, government, non-governmental organizations and households within the nation's economic territory. Economic growth is measured as Gross domestic product which is the quantification of the worth of a country's final goods and services produced within a definite time.

Money Supply

Money supply is the total amount of monetary assets available in an economy at a specific time. Zeder (2017) defined it as the total quantity of money circulating in the economy at a particular time. There are several ways to define money supply but standard measures usually include currency in circulation and demand deposits.

Empirical Review

Chowdhury et al. (2018) examined the effect of monetary and fiscal policy variables on the market and firm level liquidity of eight emerging stock markets of Asia. The study provided empirical evidence of significant influence of money supply, government expenditure and private borrowing. Similar effect was demonstrated by bank rate, short-term interest rate and government borrowing. Furthermore, the study noted a significant variation across different economic sectors. While the liquidity of the manufacturing sector was affected by changes in all the understudied policy variables, financial institutions were only influenced by monetary policy variables. The study also pointed out that the service sector liquidity was the least affected by all the policies.

Focusing on African market (Nigeria, South Africa, Egypt, Mauritius and Morocco), Igbinosa and Uhunmwangho (2019) assessed the interaction between macro-economic aggregates and stock market liquidity using data sourced from World Bank database for the period 2006 to 2016. The fixed effect panel least squares regression technique analysis found that macroeconomic aggregate variables significantly explained stock market liquidity in Africa. Specifically, economic growth had an insignificant effect while inflation, foreign portfolio investments exerted significant and positive impact. Contrariwise, money supply and exchange rates had a negative relationship with turnover ratio, the proxy for stock market liquidity.

Marozva (2020) examined the effect of monetary policy on stock market liquidity in South Africa over the period of 2002 to 2019. The OLS regression analysis revealed the dependence of liquidity on monetary policy adjustments. The study aptly captured market liquidity using various dimensions such as tightness, immediacy, depth, breadth and resiliency, while monetary policy was estimated as South African benchmark overnight rate (SABOR). Furthermore, the study revealed that stock liquidity was time variant and index dependent. Ochenge et al. (2020) also assessed the effect of macro-economic factors on market liquidity in Kenya. The OLS regression model estimated indicated that monetary policy changes, exchange rate fluctuations and global risk aversion significantly affected stock market liquidity in Kenya.

In a related study, Naik and Reddy (2021) investigated the effect of macroeconomic indicators on the liquidity of the Indian stock market measured across four aspects, i.e. depth, breadth, immediacy, and tightness, utilising the Granger Causality, Vector Auto-Regressive Model, and Impulse Response Functions. The findings showed that foreign investment inflows and gold prices exerted significant

and adverse effect on liquidity while money supply had a positive impact. Chordia et al. (2021) identified interest rates, market returns, market volatility and seasonality as key determinant of market liquidity at the aggregate market level. Lone et al. (2021) explored the ability of selected macroeconomic variables to determine stock market performance in the BRICS economies. The study employed monthly data over the period 2011–2021, ARDL bounds testing model and PMG/ARDL model to estimate both short and long-run associations. The estimated models confirmed the existence of a short as well as a long-run relationship for all the BRICS economies excluding South Africa.

Adopting a systematic literature review to expose the factors that stimulate liquidity in stock markets of emerging countries covering the years 2010 to 2021, Abidin et al. (2022) posited that the features of firms, practices of firms and the policies and regulations imposed by regulatory bodies and governments in emerging countries were significant in explaining market liquidity in emerging economies. The authors also revealed that monetary policy changes and global risk aversion had significant effect on stock market liquidity. Examining the Nigerian situation for the period 1985 to 2022, Anyanwu and Ohurogu (2024) found a significant relationship between interest rate, money supply and stock market liquidity. However, while the effect of interest rate was negative, money supply exerted a positive effect on stock market liquidity. The study had employed Vector auto regression estimation technique with Variance decomposition and Impulse response function.

Emphasising on the critical role of financial markets in economic development, Wainaina et al. (2024) delved into exploring the factors that affect stock market performance in the East African Community member countries covering the period from 2002 to 2021. The results from the estimated fixed-effects regression models revealed that financial liberalization, market liquidity, and macroeconomic stability were pivotal in shaping stock market returns. More importantly, the study revealed a strong correlation between financial liberalization and market liquidity.

Theoretical Framework

Arbitrage Pricing Theory

This asset pricing theory was developed primarily by the economist Stephen Ross in 1976 as an alternative to the CAPM. In 1976, Stephen Ross developed the APT, as an arbitraging process rather than an equilibrium condition (Ajlouni & Khasawneh 2017). The theory states that asset prices and returns are linearly related to a set of indexes where each represents a factor that influences the return

on an asset (Paul & Asarebea, 2013). It propounds that the expected return of certain assets is based on the sensitivity of the assets against one or more systematic factors (Elshqirat 2019; Megginson, as cited in Bahri, 2015). It is a multi-factor model that attempts to take into account other influences exogenous to the market that affect securities prices including macroeconomic indicators. The theory states that the expected return of an investment or a financial asset can be modeled as a linear relationship of various variables (Prempeh, 2016). Explaining the theory, Sadiye (2014) stated that the APT model was an expansion of the CAPM that describes returns as a linear function of several variables such as macroeconomic factors and other market indices. The beta coefficient of each factor represents its degree of correlation with the asset price.

The arbitrage pricing theory (APT) provides important theoretical frameworks that show the conduits through which the behaviour of macroeconomic variables are factored into stock prices consequently determining liquidity in stock market.

3. Methodology

This research adopted the ex-post facto research design to study the linkage between macroeconomic policy tools and stock market liquidity in Nigeria. Secondary data were collected from CBN statistical bulletin 2022 covering the period from 1981 to 2022.

After testing for stationarity using Augmented Dickey Fuller (ADF), the study utilised Autoregressive distributed lag (ARDL) to examine the relationship between the study variables.

The study adapted the model specified by Anyanwu and Ohurogu (2024) thus:

$TOR_t = \beta_0 + \beta_1 INR_t + \beta_2 EXR_t + \beta_3 INT_t + \beta_4 GDP_t + \beta_5 MS_t + \varepsilon_t$

Where,

TOR – Turnover Ratio (Stock Market Liquidity)

INFL – Inflation rate

EXR – Exchange rate

INT – Interest rate

GDP – Gross Domestic Product

MS – Money supply

$\beta_0 - \beta_5$ – Coefficients to be estimated

ε – Error term

Table 1: Variables and Measurement

Variables	Nature	Measurement
Market Liquidity	Dependent	Turnover Ratio. Total value of shares transacted/Market capitalization of the stock
Inflation rate	Independent	Consumer price Index
Exchange rate	Independent	Annual exchange rate between Nigerian Naira and US Dollar
Interest rate	Independent	Minimum rediscount rate (1981-2005) and Monetary policy rate (2006-2022)
GDP	Independent	Annual GDP for the current year
Money supply	Independent	Broad money supply; Currency in circulation and demand deposits) plus short-term time deposits in banks

4. Data Analysis

Descriptive Analysis

Table 2. Descriptive Statistics

VAR	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability
TOR	9.011	9.0483	24.134	1.0501	5.5179	0.6710	3.2085	3.2285	0.19903
INR	18.94	12.943	72.8355	5.38610	16.455	1.87714	5.4369	35.058	0.00000
EXR	117.9	115.25	460.000	0.61002	124.58	1.15663	3.6567	10.119	0.00634
INT	13.08	13.250	26.0000	6.00000	3.9477	0.67553	4.4359	6.8030	0.03332
GDP	52912	28999.	202365.	16211.4	48546.	1.56797	4.4645	20.963	0.00002
MS	33555	5655.5	196525.	55.3244	49427.	1.62888	4.9899	25.503	0.00000

Source: Eviews Output

Correlation Matrix

Table 3. Results from Correlation Analysis

	TOR	INR	EXR	INT	GDP	MS2
TOR	1					
INR	-0.3135	1				
EXR	-0.10810	-0.27979	1			
INT	-0.59905	0.35733	-0.01352	1		
GDP	-0.12973	-0.21658	0.55873	-0.02042	1	
MS	-0.08950	-0.22214	0.65042	-0.06900	0.79215	1

Source: Eviews Output

The correlation results indicated that all the independent variables of the study exhibited a negative association with market liquidity in Nigeria. The coefficients are also less than 80% indicating the absence of multicollinearity.

Though ARDL is efficient in the presence of variables cointegrated at level and at first difference, it is invalid beyond first difference, hence the study tested for stationarity of data using Augmented Dickey Fuller Test.

Table 4. Unit Root Tests Using Augmented Dickey-Fuller (ADF) method

Variable	**t-statistics**	**Stationary @**
TOR	-05.312	1(1)
INF	-12.496	1(0)
EXR	-13.131	1(0)
INT	-11.299	1(1)
GDP	-6.6597	1(0)
MS	-14.370	1(1)

Source: Author's Compilation from ADF results using E-views 12.

As presented on Table 4, the variables were found to be stationary at different orders of integration.

Table 5: Extract of ARDL and Bound Tests Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TOR(-1)	0.429251	0.134011	3.203088	0.0031
INR	0.020381	0.046574	0.437604	0.6646
INR(-1)	-0.107000	0.046834	-2.284656	0.0291
EXR	-0.060221	0.034019	-1.770218	0.0862
EXR(-1)	0.072848	0.035128	2.073757	0.0462

INT	-0.270241	0.204032	-1.324499	0.1947
INT(-1)	-0.674953	0.252084	-2.677497	0.0154
GDP	-0.000101	0.000116	-0.870867	0.3903
MS	6.89E-05	0.000105	0.655779	0.5167
C	12.51365	3.891942	3.215272	0.0030
R-squared	0.640209	Durbin-Watson stat		2.258757
Adjusted R-squared	0.550261	F-statistic		7.117566
		Prob(F-statistic)		0.000022
	F-Bounds Test Result			
			I(0) Bound @ 5%	I(1) Bound @ 5%
F-statistic	2.992372		2.39	3.38

Source: ARDL test results using Econometric views 12

The model demonstrated that 64% of the variability in stock market liquidity is explained by the independent variables. Table 5 also revealed that the current values of the independent variables did not exert any significant effect on the turnover ratio. However, the p-values of the coefficients of the lagged values of inflation rate, exchange rate and interest rate are less than 0.05 indicating a one period delay in the effect of these variables on stock market liquidity. The results as presented also specify a positive relationship between exchange rate and stock market liquidity, while the effects of inflation rate and interest rate are negative. Furthermore, the p-value of the F-statistics (0.000022) is significant indicating the fitness of the model while the Durbin-Watson statistics (2.258757) validates the absence of autocorrelation in the residuals of the model estimated.

The computed F-statistic of 2.992372 for the bounds test is in the middle of the lower and upper bound values. This suggests that the existence of a long-term (cointegrating) relationship between the variables is not conclusively demonstrated by the bounds test.

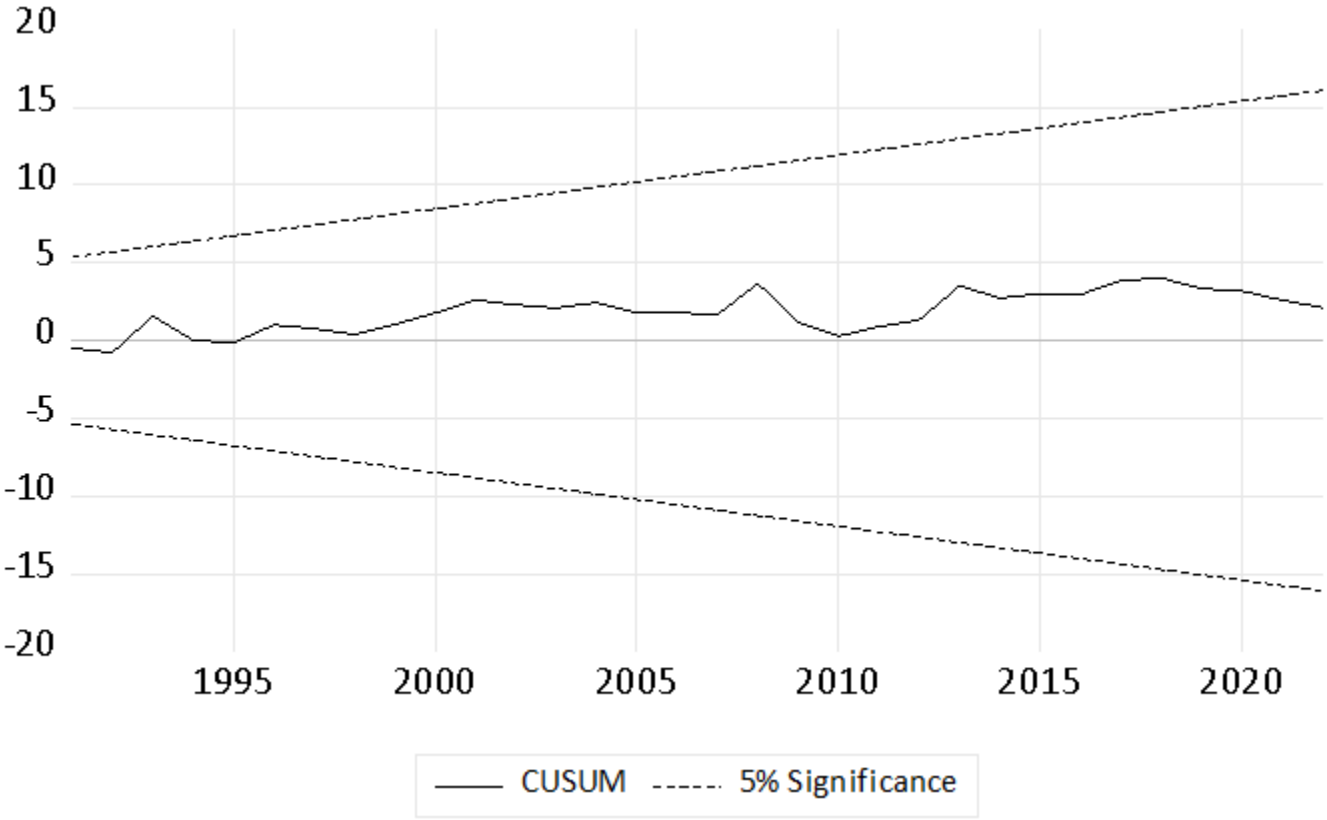
Table 6. Diagnostics Tests Results

Test	Q/F Statistics	Prob*
Correlogram Q-statistics	1.9277	0.165
B-G Serial Correlation LM	3.085826	0.0604
ARCH: Heteroskedasticity	0.098912	0.7549
Ramsey Reset	0.082710	0.7756

Source: Diagnostic tests results using Econometric views 12

The p-values of the diagnostic tests are not significant indicating the absence of autocorrelation, serial correlation, heteroskedasticity and functional misspecification. The CUSUM results also proved that the model was stable.

Fig 1: Cumulative sum of recursive residuals (CUSUM)



Source: Eviews 12 Output

Discussion of Findings

The significant effect of inflation rate negates the findings of Ochenge et al. (2020) while aligning with the results from Igbinosa and Uhunmwangho (2019). However this study revealed a negative association dissimilar to the positive effect revealed by Igbinosa and Uhunmwangho's research. The adverse effect of inflation can be transmitted via the detrimental effect of inflation on investable funds and cost of borrowings.

With regards to exchange rate, the study corroborates the significant results from Igbinosa and Uhunmwangho (2019) and Ochenge et al. (2020). This suggests the presence of significant foreign participation within the Nigerian stock market.

The negative and significant effect of interest rate supports the findings of Chowdhury et al. (2018), Marozva (2020) Ochenge et al. (2020), Chordia et al. (2021) and Anyanwu and Ohurogu (2024) but contradicts with the findings of a positive effect indicated by Igbinosa and Uhunmwangho (2019). Increase in interest rate denotes an increase in cost of borrowings which would typically deter investments.

The insignificant effect of money supply is inconsistent with the findings of Chowdhury et al. (2018), Igbinosa and Uhunmwangho (2019), Naik and Reddy (2021) and Anyanwu and Ohurogu (2024). These studies revealed a significant effect of money supply. However, consistent with the result of this research, Igbinosa and Uhunmwangho (2019) indicated that GDP was insignificant in explaining the variations in stock market liquidity.

The significance of the effect of most of the macroeconomic variables utilized supports the postulation of APT that the behaviour of macroeconomic variables are factored into stock prices consequently determining liquidity in stock market.

5. Conclusion

Stock market liquidity determines the return and the risk associated with a stock and the general performance of the market. Motivated by theoretical postulations and empirical studies on the ability of macroeconomic variables to significantly impact stock market liquidity, this study examined the effect of inflation rate, exchange rate, interest rate, gross domestic product and money supply on stock market liquidity in Nigeria and revealed a significant effect of macroeconomic variables. Specifically, the lagged value of inflation rate, exchange rate and interest exerted significant influence on stock market liquidity.

Based on the findings of the study, the following recommendations are hereby made:

i. The positive effect of exchange rate alludes to the contribution of foreign investors, therefore, policymakers and regulators should regularly assess the effectiveness of financial liberalization policies to enable greater participation of foreign investors. Furthermore, policies such as the relaxation of credit controls and excessively high reserve requirements would also induce liquidity within the stock market.

ii. To improve market liquidity, policymakers and market regulators should focus on developing infrastructure that supports efficient trading systems. This includes the deployment of price stabilisation polices to eliminate price distortions. Government should also invest in advanced

technology for trading platforms that would reduce transaction costs and ensure transparency in market operations.

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