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EFFECT OF SELECTED MACROECONOMIC VARIABLES ON STOCK MARKET LIQUIDITY IN NIGERIA

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Abstract

This study examines the effect of selected macroeconomic variables on stock market liquidity in Nigeria for the periods of 1985 to 2021 using Autoregressive Distributed Lag technique to analyse the data. The study employs ex post facto research design with the use of time series secondary data. The selected macroeconomic variables are exchange rate, Gross Domestic Product growth rate and inflation rate. The study found that exchange rate has a negative significant effect on stock market liquidity in Nigeria, while GDP growth rate has no significant effect on stock market liquidity in Nigeria. The result likewise shows that inflation rate has a positive significant effect on stock market liquidity in Nigeria. Based on these findings, the study concludes that macroeconomic variables have significant effect on stock market liquidity in Nigeria. The study recommends that Government should put in place measures that will encourage appreciation of Naira to ensure that the exchange rate is stabilized. Also, Government should aim to take the leap to improve economic growth. Lastly, Investors should invest in stocks when the inflation rate is on the rise because stocks are still a good hedge against inflation over the long term.

Keywords: Exchange Rate, Gross Domestic Product Growth Rate, Inflation Rate, Macroeconomic Variables, Stock Market Liquidity.

1. Introduction

Stock market is an important institution in any country and it is of great concern to investors, stakeholders and the government. It is part of the broader market referred to as financial market that deals in exchange of securities issued by publicly quoted companies and the government. The provision of liquidity is an important role played by any thriving stock market in a country's economy. In this way, the stock market provides investors with an efficient mechanism to liquidate their investments in securities as and when they want (Pan & Mishra, 2018).

Macroeconomic variables have systematic effects on stock market liquidity; this is because asset prices depend on their exposure to the fundamental variables describing the economy. Any systematic variable that affects the economy at the same time affects the return of a single stock, and consequently the stock market returns as a whole. Macroeconomic variables such as interest rates, inflation rate, gross domestic growth rate and exchange rates are examples of systematic risk; these factors influence all companies to some degree and it is important to understand and identify the risk factors that affect the stock market's liquidity in emerging economies such as Nigeria (Hillier et al., 2010).

This study has carefully selected macroeconomic variables that have underlying relationship with stock market liquidity; the selected macroeconomic variables are exchange rate, GDP growth and inflation rate. Specifically, exchange rate has an effect on the country's stock market liquidity because if the exchange rate decreases, it reduces the value of the weak currency and negatively affects liquidity of the stock market (Phylaktis & Ravazzolo, 2005), whereas, an increase in stock prices attracts more investors who buy more local currency which lead to local currency appreciation.

Meanwhile, economic growth can affect stock market liquidity because the decisions of market players are directly or indirectly influenced by overall economic conditions of the country. In periods of economic downturn, there is an increase in liquidity demand because traders are focused on

liquidating their positions across various securities, and the supply of liquidity decreases due to funding constraints imposed by liquidity suppliers (Karolyi et al., 2009).

Whereas, inflation is a state in the economy of a country, when there is a persistent rise in aggregate level of price of goods as well as services. Repetitive price increase erodes the purchasing power of money and other financial assets with fixed values creating serious economic distortions and uncertainty. With increase in inflation, every sector of the economy is affected. Inflation and stock market have a very close association. If there is inflation, stock markets are the worst affected (Jepkemei, 2017).

However, research on the relationship between real economic activity and the stock market in developing countries, such as Latin American, Eastern Europe, Middle Eastern, and South Asian countries, is still ongoing. The growing theoretical literature in these areas has also witnessed increasing empirical testing and validation but most of these empirical studies have been for advanced economies and only few have studied emerging and developing countries like Nigeria. Obviously, there exists scope, methodological and findings gaps in many of the studies reviewed. In particular, it is noted that the scope of most previous studies was limited to same or similar geographical regions. Thus, this study intends to fill a number of these gaps by investigating the influence of macroeconomic variables on stock market liquidity for the period 1985 to 2021.

Studies on macroeconomic variables and stock market liquidity in Nigeria like Ayopo et al. (2016); Nkoro and Uko, (2016); Izunobi et al. (2017); Ditimi and Ifeoluwa (2018); Okechukwu et al. (2019); Azeez and Olanrewaju (2020) have employed GARCH technique of analysis while this current study employs error correction mechanism since the objective of this study is not to test for volatility of the stock market. This has created a methodological gap in research.

Considering the past studies reviewed within and outside Africa context, the following research gaps were established. Most reviewed studies majorly focused on the link between macroeconomic variables and stock market liquidity, by employing market capitalisation to measure stock market liquidity, this serves as variable measurement gap. Based on these existing research gaps and inconclusive findings within and outside African context, this current study is motivated to examine the effect of selected macroeconomic variables on stock market liquidity in Nigeria.

The main objective of this study is to examine the effect of selected macroeconomic variables on stock market liquidity in the Nigerian capital market. Other specific objectives are to:

i. Examine the effect of exchange rate on stock market liquidity in Nigeria.
ii. Determine the effect of GDP growth rate on stock market liquidity in Nigeria.
iii. Assess the effect of inflation rate on stock market liquidity in Nigeria.

The following hypotheses are formulated to achieve the objectives of this study;

H_{01}: Exchange rate has no significant effect on stock market liquidity in Nigeria.

H_{02}: GDP growth rate has no significant effect on stock market liquidity in Nigeria.

H_{03}: Inflation rate has no significant effect on stock market liquidity in Nigeria.

The study focuses on the effect of selected macroeconomic variables on stock market liquidity in Nigeria. The study utilized time series secondary data over the periods of thirty seven (37) years covering 1985 to 2021.

The paper is structured into five sections. Following this introduction, section two is concerned with literature review. Section three discussed the methodology adopted for the study; section four discussed the data analysis and results, while section five provides the conclusions and recommendations.

2. Literature Review

2.1 Conceptual Issues

Macroeconomic Variables: Macroeconomics is a branch of economics dealing with the performance, structure, behavior, and decision-making of an economy as whole. This includes national, regional, and global economies. Macroeconomics is the aggregate indicators of economy such as GDP, unemployment rates, price indices, and the interrelations among the different sectors of the economy which helps to better understand how the whole economy functions. Macroeconomic variables indicate prosperity of any economy and they decide the destiny of investments. These study proxy macroeconomic variables with exchange rate, GDP growth rate and inflation rate.

Exchange Rate: 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. Exchange rate shows a nation's effectiveness in global markets. Foreign exchange rate among different currencies explains how important one currency worth is in relation of the other, that is, the value of a foreign nation's currency in relation to the home nation's currency (Mapenda, 2010).

GDP Growth Rate: Baye and Jansen (2006) defined economic growth as the rate of change in real output. The economic growth rate is usually stated as percentage change on an annual basis. Aretis (2007) explains economic growth to involve the expansion on real output per capita and per worker over time. This, they emphasized, must be a sustained or steady increases in real output per capital. Moreover, Bay and Jansen posited that gross domestic product (GDP), the most commonly used measure of nominal output, is the total naira value of all final goods and services produced in the economy is one year.

Inflation Rate: Inflation could be defined as a continuing rise in prices as measured by an index such as the consumer price index (CPI) or by the implicit price deflator for Gross National Product (Asogu, 2009). Ojo (2000) viewed inflation as a general and persistent increase in the prices of goods and services in an economy. It could also be seen as continuing increase in the general price level. Inflation rate is measured as the percentage change in the consumer price index.

Stock Market Liquidity: According to Omet (2011), liquidity is the ability to trade financial securities easily and at a low cost. This definition sees liquidity as the market's ability to absorb large amount of trades without causing excessive price movements. In addition, liquid markets are characterized by narrow bid and ask spreads. This means that transactions are carried out in a cost effective manner.

On the other hand, Bokpin (2013) defined liquidity as the easiness to trade, in order words, investors do not lose access to their savings for the duration of the investment project because they can easily, quickly and cheaply, sell their stake in the company. This study proxy stock market liquidity with turnover ratio, turnover ratio equals the total value of shares traded to market capitilization. It is a measure of the value of securities transactions relative to the size of the securities market.

2.2 Empirical Review

Exchange Rate and Stock Market Liquidity

Toda and Yamamoto Granger causality was applied by Kamande (2015) to investigate the macroeconomic variables and stock market return in Nairobi securities exchange. The study showed that exchange rate contributes greatly and significantly to volatility of stock returns at Nairobi securities exchange. Suriani et al. (2015) investigated the relationship between the stock market and exchange market of Pakistan for the period of 2004 to 2009. The findings of the study indicated that there is no relationship exists between exchange rate and stock price and both the variables are independent of each other.

The volatilities of exchange rate and inflation were calculated using standard GARCH (1,1) models by Nkoro and Uko (2016) to investigate the relationship between exchange rate and inflation volatility and stock prices volatility in Nigeria, using time series data from 1986-2012. The findings of the study showed that there is a negative relationship between stock market prices volatility and exchange rate volatility in Nigeria. The study did not include GDP growth rate as components of macroeconomic variables; this macroeconomic variable was

adequately captured in this present study. Adekunle et al. (2016) investigated the impact of macroeconomic variables on capital market growth for the period between 1985 and 2013. The Regression analysis results revealed that exchange rate has no significant effect on stock market growth. The study did not include GDP growth rate as components of macroeconomic variables, this current study included it.

Tiryaki et al. (2017) investigated the causal relationship between selected macroeconomic variables and the stock returns in Turkey using ARDL methodology for the period of 2003-2016. The signs of industrial production index, consumer price index, current account to export ratio, real effective exchange rate, S&P500 and World Oil Price Index are statistically significant. Amata (2017) examined the direct relationship between selected macro-economic variables namely; interest rates, inflation rate, foreign exchange rate, gross domestic product, and stock market volatility from 2001 to 2014. The study found that exchange rate granger cause stock market volatility both in the short run and long run in Kenya.

Tsaurai (2018) explored the determinants of stock market development in emerging markets from 1994 to 2014. FDI, savings, economic growth, trade openness, exchange rates, banking sector development and stock market liquidity to a larger extent had a positive impact on stock market development in emerging markets. Megaravalli and Sampagnaro (2018) examined the long-run and the short-run relationship between India, China and Japanese stock markets and key macroeconomic variables such as exchange rates and inflation proxied by consumer price index. Data spanning the period from 2008 to 2016 has been used. The findings showed that exchange rate has a positive and significant long-run effect on stock markets.

By using the ECM approach to co-integration, Rehnan et al. (2019) analysed the exchange rate and stock price in the context of South Asian countries. The data has been taken from 2007 to 2016. The empirical outcomes showed that there is no form of association between exchange rate and stock price in Pakistan and India. In a recent study conducted by Zahidul Islam et al. (2020) examined the long-run relationship between stock market indices in Bangladesh using exchange rate, domestic credit provided by banks, industrial production index, and crude oil price in the presence of structural breaks. The study used data from 2009 to 2017 and applied ARDL bounds testing approach. Moreover, exchange rate has a significant positive impact on stock prices for both stock exchanges. Rusdiyanto et al. (2020) examined the effect of macroeconomic variables on stock prices. Macroeconomic variables are measured by the Rupiah exchange rate against the US Dollar, Bank Indonesia interest rates, inflation, data obtained from financial statements of banking companies. The results of this study indicated that the Rupiah Exchange Rate against the US Dollar has a positive influence on stock prices.

Economic Growth and Stock Market Liquidity

The study that was conducted by Ul Islam and Habib (2015) investigated the impact of macroeconomic variables on Indian stock market. The study applied OLS method over a period from 2005 to 2015. Economic growth is not significantly affecting stock returns. Ayopo et al. (2016) examined the relationship between macroeconomic variable volatility and stock market return using exponential GARCH estimation techniques to analysis data sourced on the Nigerian economy from 1985 to 2013. The result showed that stock prices respond significantly to innovations in RGDP. Similarly, Giri and Joshi (2017) examined the relationship between stock price and a set of macroeconomic variables for Indian economy using annual data from 1979 to 2014. The long run relationship is examined by implementing the ARDL bounds testing approach to co-integration. Evidence suggested that economic growth influences stock prices positively. The VECM result indicates that short run and long run unidirectional causality running from economic growth and FDI to stock prices in India.

Aggarwal and Saqib (2017) investigated the impact of selected macroeconomic variables on Indian stock market. The time period examined is 2001-2016. It was found that nifty 50 index is significantly affected by US GDP. For instance, Ditimi and Ifeoluwa (2018) empirically showcase the nexus

between macroeconomic fundamentals and stock prices in Nigeria. The method used for the study was the EGARCH technique to estimate the influence of the selected macroeconomic fundamentals on stock prices. Volatility was captured by using quarterly data and estimated using GARCH (1,1) respectively. It was found that GDP was positively correlated to stock prices.

Ditimi et al. (2018) investigated the relationship between macroeconomic fundamentals and stock prices in Nigeria using data spanning from 1980 to 2016. The results revealed that real GDP is a leading indicator that stimulates stock prices in the long and short run. The study did not include inflation rate as one of the macroeconomic variables, and inflation rate is an important determinants of stock market liquidity, and it is one of the key macroeconomic indicators used to analyze the economic conditions of a country. Using the ARDL approach, Mungadi et al. (2019) examined the effect of selected macroeconomic variables on stock performance in Nigeria for the periods of 1983 to 2018. The study found that GDP growth rate has an insignificant effect on stock performances. The study did not include inflation rate and exchange rate as part of the macroeconomic variables, while this current study included these macroeconomic variables.

Inflation Rate and Stock Market Liquidity

Rasmiah and Rasmiah (2016) investigated the connection between macroeconomic variables and stock liquidity in Jordan for the period 2012 to 2016 and reported negative link between consumer price index proxy for inflation and turnover ratio surrogate for stock liquidity. The opposite is the case when international investors off-load and repatriates their investments. Ndunda (2016) examined the effect of macroeconomic factors on the equity market performance of Nairobi Securities Exchange. The relationship between the Equity Market Performance and the macro-economic factors was positive. However, the study results established that Inflation rate were statistically insignificant.

Bahloul et al. (2017) assessed the impact of stock market return and various macroeconomic variables including inflation rate, short-term interest rate. The empirical results for the period 2002 to 2014 showed that both developed and emerging Islamic stock indices are influenced by conventional stock indices returns and money supply for both the low and high volatility regimes. However, the other macroeconomic variables did not explain the dynamics of Islamic stock indices especially in the high volatility regime.

Al-Abbadi and Abdul-Khaliq (2017) investigated the relationship between inflation rate and stock market performance in Jordan using ECM in the time period between 1978 and 2015. There is short and long run relationship as indicated by the statistically significant coefficient in the ECM. Also based on impulse response the study found that any positive shock in trading value makes an increase in GDP deflator. On the other hand a positive shock of GDP deflator does not create an important impact on trading value. Aanchal (2017) investigated the impact of macroeconomic variables on Indian Stock Market. The study used data from 2004 to 2015. Empirical results of the study showed there were no cause and effect relationship between Indian stock market and the five variables studied, and lastly, it is found that there exists a positive correlation between Indian stock market and inflation.

Harcourt (2017) investigated the impact of selected macroeconomic variables which includes inflation, prime lending rate, foreign exchange rate and real GDP on the performance of the Nigerian capital market. Data covering the period between 1986 and 2009 were used. The study showed that the high rising inflation rate in Nigeria impacts negatively on the performance of the stock market. The study that was conducted by Izunobi et al. (2017) employed the GARCH (1,1) and E-GARCH model techniques to establish that three macroeconomic variables interest rate, inflation rate and stock market return are volatile using data from 1995-2014. It was established that inflation rate was volatile. Inflation rate was also found to have significant impact on stock market returns volatility.

Innocent et al. (2018) analyzed the effects of exchange rate, GDP growth rate, inflation and interest rate on stock market performance measured by market capitalization. The study used data for a

period of 6 years. The findings indicated that inflation is negatively significant in affecting stock market performance while interest rate is negatively insignificant. Hamidi et al. (2018) examined the relationship between macroeconomics variables and Malaysia Stock Market Index. The study applied Johansen procedure and VECM for symmetric co-integration. Using data spanning from 1990 to 2015, the findings showed the presence of the long-run relationship between Malaysia Stock Market Index and the macroeconomics variable such as industrial production index, inflation rate, exchange rate and money supply.

John (2018) examined the macroeconomic determinants of stock market performance in Nigeria using data spanning 1981 to 2016 obtained from CBN Statistical Bulletin. The OLS regression results showed that inflation rate has no statistically significant effect on stock market performance in Nigeria. Igbinosa and Uhunwangho (2019) examined macro-economic aggregates variables and stock market liquidity in African markets for the period 2006 to 2016. The results revealed that macroeconomic aggregate variables significantly explained stock market liquidity in Africa. The forces that account for stock market liquidity are money supply, inflation, exchange rate and credit to private sector. Azeez and Obalade (2019) examined macroeconomic determinant of stock market development in Nigeria for the period of 1981 to 2017. The study employed the ARDL bound testing technique to investigate the long run and short run relationship between stock market development and GDP, banking sector development, stock market liquidity, foreign direct investment, inflation rate and savings rate. The result of the study showed that inflation rate which measures macroeconomic stability has significant effect on stock market development.

In a recent study conducted by Anthony (2020) examined the impact of selected macroeconomic variables on stock market development and banking system liquidity in Nigeria using data from 1986 to 2018. It was found that inflation had negative impact on stock market development. In a recent study conducted by Azeez and Olanrewaju (2020) examined the impact of macroeconomic variables such as exchange rate, gross domestic product, inflation and interest rate on stock market prices in Nigeria using data covering the period 1989 to 2018. The econometric technique employed in the research is the GARCH model. The study found that stock price is more responsive to their lag values than the variables of exchange rates, GDP, inflation and Interest rate.

2.3 Theoretical Framework

Efficient Market Hypothesis

The efficient market hypothesis (EMH) was propounded by Fama in 1970. It states that the asset prices promptly reflect all available information such that abnormal profits cannot be produced regardless of the investment strategies utilized. The theory assumes that stock market prices should embrace all information at any point in time. Fama (1970) distinguished between three forms of market efficiency based upon the level of information used by the market: weak form, semi-strong, and strong form market efficiency.

The weak form of the EMH stresses that asset prices today incorporate all relevant past information such as past asset prices, security dividends, and trading volume. Knowing the past behaviour of stock prices provides no indication of future stock prices. Weak-form market efficiency exists when current prices fully reflect all historical price information, such that prices automatically adjust to information changes without lags.

The semi-strong form of the EMH states that current asset prices fully reflect all available public information. Public information includes not only information about an asset's past price, but includes all information related to the company's performance, expectations regarding macroeconomic factors, and any other relevant public information such as GDP, inflation rate and the exchange rate. The strong forms of efficiency, however, exist when prices reflect both public and private information about earnings, book values, investment opportunities (Stoll, 2000). The strong form of the EMH requires that asset prices fully incorporate more than past and public information.

3. Methodology

This study adopted the *ex post facto* research design, in which all the data presented and analyzed in this research have been published before by the original collector, the Central Bank of Nigeria in its Statistical Bulletin. The independent variables are exchange rate, GDP growth rate and inflation rate while the dependent variable is stock market turnover ratio as proxy for stock market liquidity. The Autoregressive Distributed Lag regression technique is used to analyze the data. The study utilized Autoregressive Distributed Lag regression to assess the effect of selected macroeconomic variables on stock market liquidity in Nigeria. Autoregressive Distributed Lag regression technique is used to analyze this study because ARDL approach has the advantage that it does not require all variables to be 1(1) as the Johansen framework and it is still applicable if there are 1(0) and 1(1) variables in the data set. There may be either integrated first order 1(1) or 1(0), the short-run and long-run coefficients of the model are estimated simultaneously.

The ARDL model of this study is specified as:

$$\Delta STML_{t-i} = \alpha_0 + \sum_{g=1}^{k-1} \_i STML\_\_i\_h$$

$$= 1\hat{}k - 1 \;\; a_{2i}\Delta EXCR_{t-i} + \sum_{i=1}^{k-1} a\_3i\Delta GDPR_{t-i} + \sum_{j=1}^{k-1} a\_4i\Delta INFR_{t-i}$$

$$+ a_5 STML_{t-i} + a_6 EXCR_{t-i} + a_7 GDPR_{t-i} + a_8 INFR_{t-i} + \mu_t$$

α_1, α_2, α_3, and α_4 examine the short run dynamic relationship while α_5, α_6, α_7, and α_8 investigate the long-run relationship between dependent variable and independent variables. The lag length or order of the variables was selected by using Akaike Information Criteria (AIC). The AIC is often preferred as it gives the heaviest penalties for loss of degree of freedom (Ogwumike & Ofoegbu, 2012). AIC also imposes a larger penalty for additional coefficients.

Since co-integration was established among the variables, the study proceeded to examine the long run effect and the short run dynamics using the Error Correction Term (ECT) equation as follows;

$$\Delta STML_{t-i} = \alpha_0 + \sum_{g=1}^{k-1} \_i STML\_\_i\_h = 1\hat{}k - 1 \;\; a_{2i}\Delta EXCR_{t-i} + \sum_{i=1}^{k-1} a\_3i\Delta GDPR_{t-i} + \sum_{j=1}^{k-1} a\_4i\Delta INFR_{t-i} + ECT_{t-1} + \varepsilon_t$$

Where;

STML = Stock Market Liquidity

EXCR= Exchange Rate

GDPR= Gross Domestic Product Growth Rate

INFR= Inflation Rate

Δ = Difference Operator

Σ = summation

ECT_{t-1} = lagged Error Correction Term and

ε_t =Error Term

4. Results and Discussion

Table 1: Descriptive Statistics

	STML	EXCR	GDPR	INFR
Mean	6.506389	121.2206	4.297778	19.01778
Median	6.205000	119.4700	4.430000	19.34500
Maximum	17.56000	381.0000	15.33000	36.09000
Minimum	1.020000	0.890000	-2.040000	9.000000
Std. Dev.	3.563158	99.81370	3.850542	6.530228
Jarque-Bera	3.178528	4.431589	1.687879	1.341315
Probability	0.204076	0.109067	0.430013	0.511372
Observations	37	37	37	37

Source: E-view 10 Output, 2021.

Table 1 shows the mean of stock market liquidity, exchange rate, GDP growth rate and inflation rate. The mean of stock market liquidity is 6.506389; exchange rate is 121.2206; GDP growth rate is 4.297778 while that of inflation rate is 19.01778. The Jarque-Bera probability value of stock market liquidity, exchange rate, GDP growth rate and inflation rate are 0.204076, 0.109067, 0.430013, 0.511372 respectively, these values are higher than 0.05, showing that they are normally distributed.

4.1 Stationarity Test

Table 2: Augmented Dickey-Fuller Unit Root Test

LEVEL			FIRST DIFFERENCE			
Variables	ADF Test Statistic	Critical Value @ 5%	ADF Test Statistic	Critical Value @ 5%	Max Lag	Order of Integration
STML	-3.348589	-3.544284	-8.518377	-3.548490	1	1(1)
EXCR	-0.790367	-3.544284	-5.258994	-3.548490	1	1(1)
GDPR	-1.977263	-3.548490	-4.734268	-3.562882	1	1(1)
INFR	-3.725835	-3.544284			1	1(0)

Source: E-view 10 Output, 2021.

At level, STML, EXCR and GDPR are not stationary because their absolute value of the ADF test statistic of -3.348589, -0.790367, -1.977263 are less than the critical values of -3.544284, -3.544284 and -3.548490 at 5% level of significance respectively. After first difference, STML, EXCR and GDPR became stationary as their ADF test statistics values of -8.518377, -5.258994, and -4.734268 become greater than their critical value of -3.548490, -3.548490 and -3.562882 at 5% level of significance. It is also observed that INFR is stationary at level because the ADF test statistics of -3.725835 is more than critical value of -3.544284 at 5% level of significance.

4.2 Lag Order Selection Criteria

Table 3: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-467.3872	NA	30023413	28.56892	28.75032	28.62996
1	-402.0273	110.9138*	1521654.*	25.57741*	26.48439*	25.88258*
2	-393.1692	12.88448	2459311.	26.01025	27.64281	26.55956
3	-383.9008	11.23443	4184274.	26.41823	28.77636	27.21167

Source: E-view 10 Output, 2021.

Table 3 above shows that Akaike Information Criterion (AIC) has the lowest value of 25.57741 at lag 1.

Table 4: ARDL-Cointegration Test Results

Wald Test (ARDL Long Run Equilibrium Condition)

Test Statistic	Value	Signif.	I(0)	I(1)
F-Statistics	6.344469	10%	2.72	3.77
K	3	5%	3.23	4.35
		1%	4.29	5.61

Source: E-view 10 Output, 2021.

The Tables above presents the result of the ARDL bound test approach to Co-integration. The result revealed that there is presence of co-integration among the variables. The f-statistics value of

6.344469 is greater than the lower bound value of 3.23 and upper bound values of 4.35 at 5% level of significance. Hence, there is a sufficient proof of the presence of a long-run equilibrium relationship between selected macroeconomic variables and stock market liquidity in Nigeria between 1985 and 2020. The result thus shows that the selected macroeconomic variables have long run relationship with stock market liquidity in Nigeria within the period under study.

4.3 Model Evaluation and Statistical Test of Hypothesis

Table 5: ARDL Error Correction Regression

ECM Regression				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.481036	1.155298	3.013107	0.0064
D(STML(-1))	-0.009678	0.217403	-0.044518	0.9649
D(EXCR)	0.009155	0.021647	0.422906	0.6765
D(EXCR(-1))	-0.034543	0.023811	-1.450712	0.1610
D(GDPR)	0.293120	0.146744	1.997493	0.0583
D(GDPR(-1))	-0.019085	0.142412	-0.134012	0.8946
D(INFR)	-0.080566	0.106203	-0.758608	0.4561
D(INFR(-1))	0.079749	0.104545	0.762814	0.4537
Ecm(-1)	-0.773482	0.241991	-3.196324	0.0042
R-squared	0.443468	Mean dependent var		0.094118
Adjusted R-squared	0.265377	S.D. dependent var		3.166356
S.E. of regression	2.713888	Akaike info criterion		5.056569
Sum squared resid	184.1298	Schwarz criterion		5.460606
Log likelihood	-76.96167	Hannan-Quinn criter.		5.194357
F-statistic	2.490127	Durbin-Watson stat		2.069805
Prob(F-statistic)	0.038663			

Source: E-view 10 Output, 2021.

As expected, the lagged error correction term is negative, less than unity and statistically significant at 5 percent. The coefficient revealed that once there is disequilibrium in the system, it takes an average speed of 77% to adjust itself back towards long-run equilibrium level. This finding was collaborated by Bannerjee et al. (1998) who asserted that a highly significant lagged error correction terms proves the existence of long-run relationship between the variables and its ability to adjust from disequilibrium state towards equilibrium level.

The coefficient of determination (R-square), which was used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. It showed that 44 percent changes in stock market turnover ratio were collectively due to exchange rate, GDP growth rate and inflation rate while 56 percent unaccounted variations was captured by the white noise error term. The F-statistics which is used to examine the overall significance of regression model equally showed that the result is significant, as indicated by a high value of the *F*-statistic, 2.49 and it is significant at the 5.0 per cent level.

4.4 Post Estimation Diagnostics Tests

Table 6: Post Estimation Diagnostics Tests

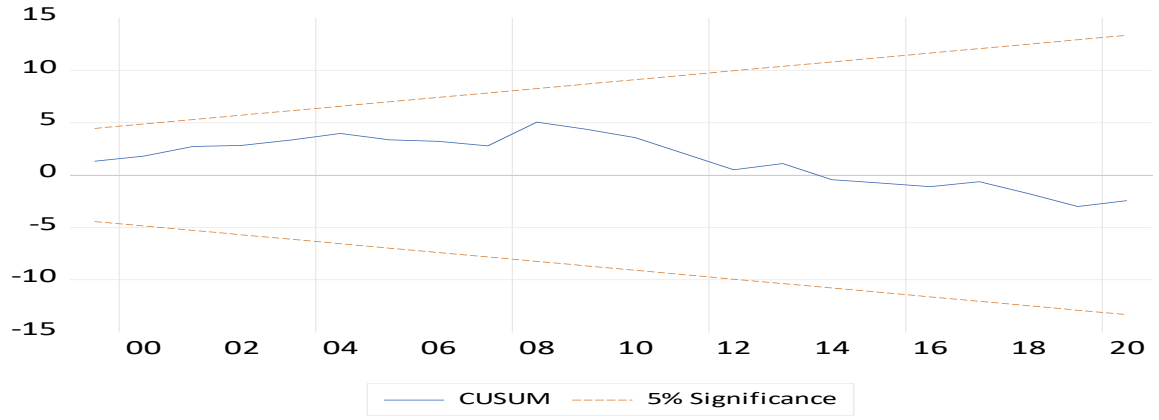
Test	P-Value
Heteroskedasticity Test	0.9436
Serial Correlation LM Test	0.2358
JB Normality Test	0.0845

Source: Author's Computation from E-view 10 Results, 2021.

The result as presented in the above table revealed that there were no evidences of heteroskedasticity, serial correlation, and the data are normally distributed in the estimated ARDL-ECM model have the *p-values* of 0.9436, 0.2358 and 0.0845 respectively. They were found to be greater than 0.05 level of significance.

4.5 Cusum Stability Tests

Figure 1: Cusum Stability Tests



The CUSUM stability tests in Figure 1 revealed that the model is stable and the regression equation is correctly specified as the plots of the charts lie within the critical bounds at 5% significant level.

4.6 Statistical Test of Hypothesis

The hypotheses formulated in this study were tested using Wald test (f-statistic) and *p*-value. The level of significance for the study is 5%, for a two tailed test. The Wald test computes a test statistic based on the unrestricted regression and tests for the joint significance of the coefficients. The Wald statistic measures how close the unrestricted estimates come to satisfying the restrictions under the null hypothesis. If the restrictions are in fact true, then the unrestricted estimates should come close to satisfying the restrictions.

Thus;

H_0: $\beta_0 = 0$ (Null hypothesis)

H_1: $\beta_1 \neq 0$ (Alternative hypothesis)

Table 7: Wald Test Results

Wald Test Statistics	Null Hypothesis	F-Statistic	P-Value
EXCR	C(3)=C(4)=0	-10.176315	0.0031
GDPR	C(5)=C(6)=0	0.761236	0.2198
INFR	C(7)=C(8)=0	8.871209	0.0121

Source: Author's Computation, 2021.

H_{01}: Exchange Rate has no significant impact on stock market liquidity in Nigeria.

From the Wald-test in table 7, the calculated f-value for exchange rate (EXCR) is -10.176315 and its probability value is 0.0031. Since the probability value is less than 0.05 at 5% level of significance, it thus falls in the rejection region and hence, we will reject the first null hypothesis (H_{01}). The result thus shows that exchange rate has a negative significant effect on stock market liquidity in Nigeria.

H_{02}: GDP growth rate has no significant effect on stock market liquidity in Nigeria.

From the Wald-test in table 7, the calculated f-value for GDP growth rate is 0.761236 and its probability value is 0.2198. Since the probability value is more

than 0.05 at 5% level of significance, we will accept the second null hypothesis (H_{02}). The result thus shows that GDP growth rate has no significant effect on stock market liquidity in Nigeria.

H_{03}: Inflation rate has no significant impact on stock market liquidity in Nigeria.

From the Wald-test in table 7 above, the calculated f-value for inflation rate (INFR) is 8.871209 and its probability value is 0.0121. Since the probability value is less than 0.05 at 5% level of significance, it thus falls in the rejection region and hence, we will reject the third null hypothesis (H_{03}). The result thus shows that inflation rate has a positive significant effect on stock market liquidity in Nigeria.

4.6 Discussion of Findings

The parameter estimate of exchange rate was found to have a negative significant effect with stock market liquidity within the period under study. It shows that for import dependent economy like Nigeria, currency depreciation puts an unfavorable impact on stock market liquidity and Nigeria is not an exception. Exchange rate was negative and significant; the implication is that increases in exchange rate leads to a depreciation of the local currency thereby causing a fall in stock market liquidity. This usually happens when people try to convert their Naira-denominated assets into foreign financial assets in a way to avoid losses from currency depreciation. From the above results, when dollar price rises, stock market performance is expected to fall. This finding is in line with what Nkoro and Uko (2016) found that exchange rate has significant negative effect on stock market liquidity in Nigeria.

The Wald test result on table 7 above revealed that Gross Domestic Growth Rate (GDPR) proxy for economic growth is positively related to stock market liquidity, indicating that as the economy improves, stock market becomes more liquid, though the result is not significant. This finding is in line with the empirical works of Ul Islam and Habib (2015); Giri and Joshi (2017); Ditimi and Ifeoluwa (2018).

Lastly, it is also evidence that inflation has positive influence on stock liquidity. The result implies that a rise in general price level enhance stock market liquidity. The result also indicates that inflation may result in increase in earnings of companies because of the high price of goods and service and this will boost the demand for stock at the exchange. The finding are in line with the works of Aanchal (2017); Izunobi et al. (2017).

5. Conclusion and Recommendations

The study concludes that macroeconomic variables have significant effect on stock market liquidity in Nigeria. Therefore, macroeconomic fundamental are responsible in explaining changes in stock market liquidity in Nigeria. This study made the following specific conclusions in line with the findings derived from this study;

i. The study specifically concludes that exchange rate significantly accounted for stock market liquidity, though the relationship between exchange rate and stock market liquidity is negative.
ii. Economic growth has positive relationship with stock market liquidity in Nigeria, though the influence of economic growth on stock market liquidity is not significant. It shows that increase in economic growth will help stock market liquidity and boost the investor's confidence. Higher economic activity implies higher expected profitability, which causes stock prices to rise.
iii. There is a positive relationship between inflation rate and stock market liquidity, a possible explanation for the positive relationship might be that if inflation is caused by increase in money supply, it would lower the rate of interest and investors would shift their cash holdings to stocks and bonds in order to maximize potential capital gains. The increase in demand would in turn raise stock prices. Increases in expected inflation may also signal a potential increase in real activity, production and hence higher stock returns.

The following recommendations are put forward by this study;

i. Government should put in place measures that will encourage appreciation of Naira to ensure that the exchange rate is stabilized. This is because empirical evidence from studies has shown that exchange rate affects stock liquidity negatively. Such measures could include increasing the productive capacity of the country. An economy with a high productive capacity may be able to maintain a reasonable exchange value for its currency because output can be increased within a short time in order to boost the level of export and foreign exchange earnings.

ii. A strong economic growth can play a significant contribution for the long term sustainable growth of the stock market. Government should aim to take the leap to improve economic growth, policy makers like Central bank of Nigeria must work on growth enhancing and stable economy as well as increasing the efficiency of capital market internal operating mechanism to help developing the stable stock market and thus helping the economic growth itself.

iii. Investors should invest in stocks when the inflation rate is on the rise because stocks are still a good hedge against inflation over the long term because, in theory, a company's revenue and earnings should grow at the same rate as inflation over the time.

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