AN ERROR CORRECTION REPRESENTATION OF MARKET LIQUIDITY – ECONOMIC GROWTH NEXUS IN NIGERIA: A RECENT EXPERIENCE

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ABSTRACT

The study examines the relationship between market liquidity and economic growth in Nigeria over the period of 1987-2012 using time series data. The starting point of our analysis was to check for the time series properties of the underlying data using the Augmented Dickey Fuller (ADF) and the Engle-Granger procedure. The existence of non-stationarity and co-integration were established which necessitated an ECM for the analysis. But first, the popular Granger-Causality Test was conducted to ascertain whether Market Liquidity Granger-causes Economic Growth or vice-versa. The empirical result from the Granger causality test indicates that market liquidity does not granger-cause GDP; neither does GDP granger-cause market liquidity. From the result, Market Liquidity captured by its proxies of Turn-over Ratio, Market Capitalization and Private Sector Credit are statistically significant in explaining GDP. Based on the findings, we suggest the monetary authorities should focus on policies that will develop financial infrastructure that will ensure macroeconomic stability under which economic agents can make decisions that promote rapid financial market development and subsequent capital market performance. The problem of low awareness about the operations of the capital markets in the economy can be reduced by educating the populace about the opportunities available in the market.

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Keywords: Market liquidity, Turn-over ratio, Trading volumes, Economic growth.

Contribution/Originality

The study is one of the very few which have investigated the market liquidity-economic growth nexus in Nigeria in recent time and contributes the first logical analysis of an Error Correction representation of the phenomena making it different in methodology and in scope.

1. INTRODUCTION

Theoretical underpinning stipulates that for growth to evolve in any contemporary emerging economy, adequate investment is a sine qua non. This investment in turn requires long-term funding/capital – a scenario which is only possible if the financial markets are highly developed. By providing heterogeneous products which enable economic agents to cope with uncertainties through hedging, pooling, sharing, and pricing risks, these financial markets as observed by Kremlin and Vlagaskovic (2010) significantly affect economic growth by transforming savings into

investment. In Africa, the market is highly illiquid, with very low trading volumes and turnover ratios. This has serious implications for economic activities, as Levine and Zervos (1998) observed that, high market liquidity reduces risk through risk sharing, which encourages saving and investment. Therefore, low liquidity implies limited opportunities for transforming illiquid assets into liquid assets, which can hitherto constrain economic activity.

Liquidity broadly defined, is the ease and speed with which agents can convert assets into purchasing power at agreed prices (Levine and Zervos, 1998). To undertake this conversion, there are associated risks technically nomenclated "liquidity risks" which arise due to uncertainties in converting assets into a medium of exchange. These uncertainties in turn, result from information asymmetries and transaction costs which inhibit liquidity and intensify liquidity risk. A liquid capital market is thus a market where it is relatively cheap and easy to trade financial instruments and enable firms have permanent access to the capital invested by initial shareholders with low level of uncertainty about the timing and settlement of the transaction. Since most high-return projects require long-term commitment of capital, since savers find it puzzling to give up control of their savings for long period, if the financial system does not augment the liquidity of long term investments, less investment is likely to occur in high-return projects. In other words, to ensure higher economic growth, greater market liquidity and efficiency in service delivery is indispensable. This is why the Nigerian Stock Exchange, according to Central Bank of Nigeria (2007) commenced operation on its Trade Alert, Trade Guarantee Fund Scheme and its e-Business Platform/internet portal in the year 2000.

That is not all. It has been opined in some quarters that the effect of market liquidity is ambiguous (Blide, 1993). Thus, contrary to the syntheses above, savings rate may rise or fall as market liquidity rises. As exhumed by Jappelli and Ragona (1994) among others, in a model with physical capital externalities, saving rates could fall enough, so that growth actually decelerates with greater liquidity by reducing the incentives of shareholders to undertake the costly task of monitoring managers (Sleifer and Vishny, 1986). It is on the background of the disparity in the determination of liquidity risk by different forces as it affects economic growth that necessitated this research to investigate the nature of the relationship between market liquidity and economic growth in Nigeria and ascertain if market liquidity contribute to economic growth in Nigeria.

2. MATERIALS AND METHODS

2.1. The Model

The study employs the popular Granger causality test suggested by Granger (Engle and Granger, 1987) where an unrestricted equation with lags of a particular variable is estimated and then the joint significance of each variable is tested. To do this, we specify two equations with economic growth and market liquidity as dependent and their respectively j lags as independent variables as follows:

$$GDPt = \sum_{j=1}^{n} \alpha jMLQ_{t-j} + \sum_{j=1}^{n} \beta jGDP_{j-i} + U_{it} \ldots \ldots (1a)$$

$$MLQ_t = \sum_{j=1}^{n} \alpha jMLQ_{t-j} + \sum_{j=1}^{n} \beta jGDP_{t-j} + U_{2t} \ldots \ldots (1b)$$

Where:

GDP = Economic Growth proxied by Gross Domestic Product

MLQ = Market Liquidity proxied by Turn-Over Ratio.

The decision rule is to accept the null hypotheses if the F-calculated is less than the F-critical and reject if otherwise at 5% level of significance. That is to say, we will accept the null hypothesis that market liquidity does not granger-cause GDP if F-calculated is less than the F-critical. Also, in the second hypothesis, we accept the null

hypothesis that GDP does not granger-cause market liquidity if the F-calculated is less than the F-critical and reject if otherwise at 5% level of significance and vice-versa.

Next,drawing inspirations from the literature and guarded by the objective, a Model of Market Liquidity and Economic Growth in Nigeria is specified as follows:

$$GDP = f(MCT, TOV, PSC, FCI, U_t \dots \dots (2)$$

Where: GDP = Real Growth Domestic Product

MCT =   Market Capitalization

TOV = Turnover Ratio

PSC = Private Sector Credit

FCI = Foreign Capital Inflow

Assuming a linear relationship between the variables and using the expected signs, the mathematical equation of the above function transforms to:

$$GDP = \pi_0 + \pi_1 MCT + \pi_2 TOV + \pi_3 PSC + \pi_4 FCI + \mu_t \dots (3)$$

2.2. Estimation Procedure

It has been observed that results emanating from most macroeconomic variables are likely to be spurious if the time series properties are not examined. Consequently, prior to estimation, basic tests will be conducted as precaution. The first step of this analysis is to investigate the existence of non-stationarity using ADF test (Iyoha and Ekanem, 2002) given by the following of equation:

$$\Delta Y_t = \beta_1 + \beta_{2t} + \delta Y_{t-1} + \alpha_1 \sum_{i=1}^{m} \Delta Y_{t-1} + et \dots \dots (4)$$

Where:

ΔY_t = the change in the logarithm of the time series.

ΔY_{t-1} = the lagged values of the dependent variables

m = chosen to eliminate the autocorrelation

In the above if $\delta = 0$, there is evidence of unit root. Where any variable is found to be non-stationary, it will be differenced. Similarly, the Engle-Granger procedure would be applied to check for the presence or otherwise of long-term relationship. If the residual is stationary, then a long run relationship is established among the variables. Thus we shall introduce the Error Correction Model to account for the speed of adjustment thus:

$$GDP_t = \beta_0 + \beta_1 \sum_{i=0}^{n} MCT_t + \dots + \beta_4 \sum_{i=0}^{n} FCI_t + \beta_t \mu_{t-i} + \mu_{It} \dots (5) \text{ Where;}$$

$\beta_1 u_{t-1}$ = Error Correction Representation

β_1 = Coefficient measuring the degree of error corrected

2.3. The Dataset/Analytic Software

The data for this study was obtained from the CBN (2013) and the International Financial Statistics (IFS) (2010) among others and spans the period 1987-2012. The Microsoft Excel will be used to enter the data and transported via Lotus wks123 to Pc-Give (version 8.0) where they will be analyzed using the OLS.

3. PRESENTATION AND ANALYSIS OF RESULTS

3.1. Result from Unit Roots and Co-Integration Tests

Using Augmented Dickey–Fuller (ADF) test for the equation, we have table A below:

Table-A. Unit Roots Test ADF-test

Variable	DGDP	DMCT	DTOV	DPSC	DFCI
Level	1.1920	1.8765	-1.6898	-1.3534	-1.0744
1st Difference	-4.8231**	-2.9382**	-7.1667**	6.2838**	5.1020**
2nd Difference	,,	,,	,,	,,	,,

NB** indicate significance at the 5% level.

Source: Authors' computation using Pc-Give (version 8.0) via OLS.. The data sourced from CBN (2013) and the IFS (2010) were

keyed into Microsoft Excel and transported via Lotus wks123 to Pc-Give

The test shows that all the variables are integrated of order one. Given this unit root property, we implemented the Engle-Granger co-integration test where the linear combination of GDP (the dependent variable) and all the explanatory variables are run in their level forms without the intercept. The result is displayed in table B below:

Table-B. Result from Co-Integration Test for the Residuals

	t-adf	Lag	Critical value
Residual 1	-1.3599	2	-1.952
Residual 2	-1.0565	1	"
Residual 3	-0.9093	0	"

Source: Authors' computation copied from Pc-Give (version 8.0). The data sourced from CBN (2013) and the IFS (2010) were

keyed into Microsoft Excel and transported via Lotus wks123 to Pc-Give

From the table, none of the t-adf exceeds the critical value (-1.952) at the 5% level. The result shows the presence of co integration because the residual obtained from the linear combination of the variables were stationary while the series generating the residual are not stationary. Due to this technical error, an Error Correction Model (ECM) which will help to correct most of the errors inherent in the model becomes indispensable.

3.2. Result from Granger-Causality Estimate

The results of the Granger-causality test between Market Liquidity and GDP is presented in table C below:

Table-C. Direction of Causality between GDP and MLQ

Null Hypothesis	F-value	F- tab	Decision
MLQ does not granger cause GDP	0.1306	1.57	Accept
GDP does not granger cause MLQ	1.2052	1.57	Accept

Source: Authors' interpretation of computed result as indicated in paragraph two of subsection 2.1

From the result, the F-calculated in the first hypothesis is 0.1306 while the F-critical is 1.57. Since the F-calculated is less than the F-critical at 5% level of significance, we accept the null hypothesis that market liquidity does not Granger-cause GDP. Similarly, in the second hypothesis, the F-critical exceeds the F-calculated thereby

necessitating the acceptance of the null hypothesis that GDP does not Granger-cause market liquidity. This finding implies a zero causal relationship between both variables.

3.3. Results from Modeling GDP by OLS

Having investigated the time series properties of the variables, we estimated the ECM by OLS. For simplicity, the result is presented in table D below:

Table-D. Estimated Model

Variable	Coefficient	t-value	PartRý
Constant	2.9044	1.5061	0.0702
DMCT	6.3811	3.7904	0.4403
DTOV	0.0445	2.8360	0.0191
DPSC	0.1208	-9.8236	0.2616
DFCI	-0.0963	-2.4918	0.0732
ECM_1	0.4147	-1.3522	0.1321

Rý=0.7104; F(5, 21)=24.15[0.0000]; DW=2.19; RSS=5.29

Source: Authors' computation copied from Pc-Give (version 8.0). The data sourced from CBN (2013) and the IFS (2010) were keyed into Microsoft Excel and transported via Lotus wks123 to Pc-Give

The table above can also be represented in a concise, compact form as:

$$GDP = 2.90 + 6.38MCT + 0.04TOV + 0.12PSC + 0.09FCI + 0.41ECM_{-1}...(*)$$

$$(3.79) \quad (2.84) \quad (-9.82) \quad (-1.35) \quad (-2.49)$$

From the result, the overall goodness of fit of the model is commendable. This is shown in the high R^2 value of 0.7104. This suggests that 71% of the variation in GDP is explained by all the explanatory variables taken together. The **F**–test is a joint test to ascertain if the R^2 is statistically significant. From the rule, **F**-calculated (5, 21)=24.15 exceeds **F**–critical of 2.77 at the 5% level. Thus, the **F**-statistics significantly affirmed the position of the R^2. The Durbin Watson test is employed to test for the presence or otherwise of autocorrelation. Using the rule of the thumb, if **DW**-statistics falls within the range of absolute value of two, there is no autocorrelation. However, if it exceeds or is less than the two, it implies the presence of autocorrelation. Given the **DW** value of 2.19, we conclude the presence of slight autocorrelation at 5% level of significance.

From the result above, the index of Market Capitalization possesses a positive sign and a robust coefficient of 6.38. Judging from the t-value of 3.79, the variable is statistically significant in explaining GDP in Nigeria. Thus, a unit increase in market capitalization brings about 6.38 units increase in economic growth all things being equal. Similarly, Private Sector Credit also possesses a positive sign and a coefficient of 0.12. From the result, the t-observed is 9.82 implying that the variable is statistically significant in explaining variations in GDP. Thus, other things being equal, a unit increase in Private Sector Credit to the economy brings about increases in GDP to the tune of 1.2units. Although, the estimated coefficient for Turn-over Ratio is fragile, the variable proves statistically significant in explaining GDP in Nigeria judging from the t-value. Thus, other things being equal, a unit increase in the variable leads to 0.04unit increases in GDP. The only variable employed for the study which fails to conform to apriori expectation is the Foreign Capital Inflow. The variable did not only fail in the expected positive relationship, it is also not statistically significant. The ECM component satisfied the standard regression assumptions and is also significant. The result which shows the speed of adjustment to long-run equilibrium indicates that at every regular interval, about 41 percent of the error encountered is corrected in the model.

4. SUMMARY, CONCLUSION AND RECOMMENDATION

The study examines the relationship between market liquidity and economic growth in Nigeria over the period of 1987-2012 using time series data. The stating point of our analysis was to check for the time series properties of the underlying data. Thus, unit roots and cointegration tests were conducted using Augmented Dickey Fuller (ADF) and the Engle-Granger procedure. The existence of non-stationarity and co-integration were established which necessitated an ECM for the analysis. But first, the popular Granger-Causality Test was conducted to ascertain whether Market Liquidity Granger-causes Economic Growth or vice-versa. The empirical result from the Granger causality test indicates that market liquidity does not granger-cause GDP; neither does GDP granger-cause market liquidity. This implies the complete absence of a causal relationship between both phenomena. The stage was set for the main regression. From the result, Market Liquidity captured by its proxies of Turn-over Ratio, Market Capitalization and Private Sector Credit are statistically significant in explaining GDP.

Based on the findings of the study, we suggest the monetary authorities should focus on policies that will develop financial infrastructure that will ensure macroeconomic stability under which economic agents can make decisions that promote rapid financial market development and subsequent capital market performance, since the back bone of a nation's economy centers on its financial system. Also, there is need to entrench a high level of transparency in all facets of the market as obtainable in the developed markets. Finally, the regulatory framework of the Nigerian financial market should be reviewed to attract public confidence for the market.

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