Original Paper

Capital Market Development and Inflation in Nigeria

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Abstract

This study examined the impact of inflation and capital market development in Nigeria. The ultimate objective of the study is centered on an empirical investigation of inflation and its impact on the growth of the Nigerian capital market, and also the trend of inflation and capital market development in Nigeria. In order to achieve these objectives, the study used tables and graphs to examine the trend of inflation and capital market development in Nigeria. Augmented Dickey Fuller unit root test was used to check the behavior of data, and the ARDL bound test was used to check if variables are cointegrated. Post estimation test which includes the serial correlation, heteroskedasticity and the histogram normality test was also conducted. Data were collected from secondary sources, such as central bank of Nigeria statistical bulletin and the world development indicator. The unit root test revealed that the financial sector, financial intermediaries and interest rate were stationary at levels but exchange rate, inflation, government spending and trade openness became stationary after the first difference. Empirical findings confirmed that there is a statistically significant long- and short-run negative effect of inflation on capital market development. On the contrary, economic growth has a statistically significant long- and short-run positive impact on capital market performance. In addition, results confirmed that there is positive support of the previous financial sector policies on capital market performance in the current period.

1. Introduction

Ordinarily, inflation is regarded as a cognizance factor, in other words if economic growth is to be achieved you may have to spend and when you spend inflation rate increases. At times inflation may be referred to as a 'necessary evil' in an economy. According to economic theories it is agreed that certain percentage of inflation is needed for financial development such as the capital market. There is no way an economy can grow without money, for development to happen in the capital market, money should be earned. Some percentage of inflation is needed to achieve development in the capital market because, for capital market development to be achieved there must be an increase in expenditure and an increase in expenditure also will lead to inflation. But despite the fact that inflation has been rising in Nigeria, i.e., expenditure has been rising, yet the capital market development is not noticeable in Nigeria.

According to Afolabi (1998), he posits that a tolerable rate of inflation is essential in an economy. Also, some studies have found a positive relationship between inflation and capital market development, a case in which higher permanent inflation leads to higher real economic activity, where higher inflation has no effect on real interest rates (Mundell, 1963; Tobin, 1965; English, 1999). The increase in interest rate can either be detrimental or favorable depending on the type of market involved. For the Capital Market, an increase in interest rate leads to decrease in bond prices which makes bonds and other securities attractive, leading to an increase in real activities in the capital market, while on the other hand, a decrease in interest rate pushes up the prices of bonds and other financial instruments, thereby discouraging investors, leading to reduction in purchases of these instruments, result being that, the general activities in the capital market is adversely affected. For the Money Market, an increase in the level of interest rate leads to a decrease in investment, which in turn reduces employment of the factors of production, also leading to fall in general activities, the flow of money follows suit. While on the other hand, a fall in interest rates leads to an increase in investment, which leads to increase in employment of the factors of production, heading to the increase of output, which also increases exchange of goods and services, leading to increased aggregate consumption and a rise in general

financial activities. This favorable and detrimental effect of inflation is required for the stability of both markets.

The detrimental effects are however most pronounced and compromise a decrease in the real value of money as well as other monetary variables over time. As a result uncertainty over future inflation rate may discourage savings and investments, and if inflation rates rise quickly, there may be shortages of goods and services as consumers begin to hoard out of anxiety that prices may increase in the future. According to Geetha *et al.* (2011), financial theorists believe that there are both direct and indirect aftermaths of inflation in every sector of the economy ranging from investment, exchange rates, interest rates, unemployment, stock markets, etc. These theorists concluded that inflation and stock markets share a very close relationship, and hence, the rate of inflation influences the stock market risk and volatility. By setting the inflation rate at a particular rate, it also bothers on the economists to determine the cost and benefit that accrues to the both markets upon manipulation of the inflation rate, and thus, compare and contrast the cost and the benefit that accrues, that is, having known that a reasonably high rate of inflation is favorable to the capital market and detrimental to the money market, and in the flip, a reasonably low rate of inflation is favorable to the money market and detrimental to the capital market, it then bothers the economist to examine the cost of high rates of inflation to the money market in comparison to the benefit it accrues to the capital market. And also, examine the cost of low rates on inflation to the capital market in comparison to the benefit it accrues to the money market.

It is noted that for developing countries with high levels of reserve requirements, high rates of inflation can serve as a significant tax on banks (Boyd & Champ, 2003). Inflation also results to uncertainty and financial frictions, which makes the financial system inefficient in allocating resources (Huybens & Smith, 1998). English (1999), states that higher inflation rate encourages households to substitute purchased transaction services for money balances, thereby boosting the financial sector. In this way, inflation may have a positive impact on financial institution development. Other researchers such as King and Levine (1993), Beck and Levine (2004), Beck, et al. (2000), etc. employing various techniques reaches varying conclusions as regards to the effect of inflation on the development of financial institutions. But similarly, what really determines the effect of inflation on the financial markets depends on the initial level of inflation of the economy. Considering the initial level of inflation in Nigeria economy, since 1980, and the rise and fall in rate of inflation, what has been the resultant effects on the capital market? Bruno and Easterly (1995) discovered that a number of economies have experienced sustained initial level of inflation at 20% to 30%, and also incurred a further rise in inflation, but did not pose any adverse effect or threat on the economy. Why? As such, this study attempts to study the trend of rise and fall of inflation considering the initial rates of inflation, and its effect on the capital market development.

2. Literature Review

The link between inflation, capital market development and economic growth has received great attention in both theoretical and empirical studies in recent studies. This is initiated by the different empirical findings reported. In this section, a number of empirical works relating to the relationship between inflation and capital market development. Huybens and Smith (1998-1999), presented a monetary growth model in which commercial banks and secondary capital markets play a crucial allocation function. Their workings suggest that real activity, the volume of bank lending activity, and the volume of trading equity in markets are strongly correlated. At the same time, inflation and capital market activities are strongly negatively correlated (in the long-run). The same can be said about inflation and the real rate of return of equity. They also found that inflation and real activity are negatively correlated in the long-run, particularly for economies with relatively high rate of inflation.

Lee and Wong (2005) applied a threshold regression model to examine the existence of inflation threshold effects in the relationship between the financial sector development and economic growth for Taiwan and Japan. Their findings suggests that financial institution development may promote economic growth when inflation rate is low and moderate. Khan et al. (2001) used a large cross country sample to assess the impact of various variables such as GDP per capita, the share of public consumption in GDP, the degree of openness and inflation rate on financial activity. They also found support for the existence of threshold level of inflation which lies in the range of 36% a year depending

on the specific measure of financial depth utilized. They found that an increase in inflation had a weak positive effect when initial rate of inflation is low and a negative effect at initially high inflation rate.

English (1999), used cross-sectional data to examine the impact of inflation rate on the financial sector's size. He provided empirical evidence that inflation has positive effect on financial sector development. According to English, a higher rate of inflation leads households to substitute purchased transactions services for money balances, thereby boosting the size of the financial services sector. Boyd et al.(2001) tried to assess empirically the impact of sustained inflation rate on financial sector performance. They found that these impacts were significant negative. Rousseau and Wachtel (2002) used a rolling regression technique to examine the interactions between financial sector development and inflation that affect economic growth for 84 countries. They discovered that financial depth has a significant positive effect on growth only when inflation falls below a threshold of about 6% to 8%. The result also showed that inflation had a negative effect on financial depth when the five-year average inflation rate was below about 15% to 20%.

Haslag and Koo (1999) have found a positive relationship between inflation and financial repression and financial system becomes less developed as inflation rate increases. Boyd and Champ (2003) used cross-country tests to investigate the relationship between inflation and financial institutions performance. They provided an empirical result that inflation was negatively associated with banking industry size, real returns on financial assets and bank profitability. They also indicated that there is positive relationships between assets return volatility and inflation. Finally, they suggested that inflation hurt economic growth through declining financial sector development. Kim et al. (2010) applied Pooled Mean Group Estimator method developed by Pesaran and Shin (1998) to investigate the short-run and long-run impact of inflation on financial institution development for 87 countries covering the period of 1965-2005. Their findings confirmed that inflation has a positive impact on financial institutions development in short-run but a negative impact in the long-run.

Dong-Hyeonkimand and Shu-Chin Lin (2010) used Shane and Smith's ARDL approach to investigate the long-run and short-run relationship between inflation and financial sector development for 87 countries covering the period 1960-2005. The study used three variables of credit to private sector, cash debt and assets of the bank as a proxy of financial development. There result also indicated that there is a negative long-run relationship between inflation and financial sector development but for the short-run relationship was positive. However, when the data were split to different income or inflation groups, these results can be observed only in low-income or low inflation countries. Keho (2009) used Bound testing approach developed by Pesaran (2001) and Granger causality test introduced by Toda and Yamamoto (1995) to analyze the long run and casual relationship inflation and the financial sector performance in seven countries of the West African Economic and Monetary Union (UEMOA). He discovered no evidence of long run relation between these two variables for six countries but in one country. He also discovered that financial sector development caused inflation in five countries with the reverse causality detected in only two countries.

Naceur and Ghazouani (2005) made use of time series data from 11MENA region countries and applied GMM methodology to examine the impacts of inflation rate on the financial sector performance. Their results indicated that inflationhad a negative and significant impact on the financial institution development, but there was no evidence of thresholds. They showed that a marginal increase of inflation was harmless to stock market performance and banking sector development regardless the rate of inflation.

In a related single country study which examined inflation and financial institution development relation, Bittencourt (2011) initially used time series data and then panel time series data to examine the impact of inflation on financial institution development in Brazil covering the period of 1985-2004. The results confirmed that inflation had detrimental effects on financial institution development. Furthermore, Wahid et al. (2011), Odhiambo (2012) and Ozturk and Karagoz (2012) used the ARDL bounds testing approach and Error Correction Model (ECM) to investigate the impact of inflation on the performance of the financial sector. Their results indicated that the relationship between inflation and financial institution development was negative in the short-run and long-run, confirming that inflation reduced the efficiency of the financial sector performance.

3. Methodology

Research Design

This aspect of the paper contains the research methods that will be employed to achieve the aims and objectives of the study. These measures are used for data collection to acquire knowledge on the perception of participants and make an influence by comparing the findings obtained through diverse instruments. This study is stated into phases which includes; the theoretical framework, model specification, definition of variables, method of data analysis and the expected contribution to general knowledge.

Theoretical Framework

Although this study is not one which has a direct relationship between its variables, and so will have its backing from different theories within the scope of the study. For the purpose of this study, we shall be applying the theory of Demand-Pull inflation and the financial intermediation theory.

Model Specification

To acquire knowledge of the research objectives of this study, the model for this study is based in line with the adapted conceptual framework. This study utilized the annual data on financial institution development proxy by credit to the private sector as percentage of GDP (FD); inflation rate was measured by Consumer Price Index (CPI). Two control variables were added to the model: Real Gross Domestic Product (GDP) which measures real activity in the economy and total trade as percentage of GDP.

Using the model specified by Santos (Inflation and Financial Institution Performance: The case of Nigeria) the model is specified as follows:

$$Y=f(X) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

Where Y= Financial development

X= Inflation

Introducing other variables that have been identified in the literature as determinants or factors that affect the dependent variable;

$Y= f(FDt, INF, RGDP, GOVT, TOPN)$

$Y=\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$

In its stochastic form, the model is specified as:

$Y= \beta_0 + \beta_1(FD) + \beta_2(INF) + \beta_3(RGDP) + \beta_4(GOVT) + \beta_5(TOPN) + \varepsilon$

Where:

Y =   capital market Development Proxied by Market Capitalization as a share of GDP

FDt = Ratio of credits provided by financial intermediaries to the private sector to GDP

INF =   Inflation Rate

RGDP =   Real Gross Domestic Product

GOVT =   Total Government Spending

TOPN =   Trade Openness measured as the ratio of the sum of export and import to GDP

β_0 =   Intercept of the regression equation

β_1, β_2 =   Co-efficient of the slope of the Independent variable

ε =   The Error Term

Sources of Data

The data used for this research work are mainly secondary data on market capitalization as a share of GDP, inflation, trade openness and government expenditure which was sourced from the Central Bank of Nigeria statistical bulletin 2018.

Method of Data Analysis

The method or technique of data analysis employed in this research work is based on the specific objective of the study. To achieve objective two (2) which is to examine the trend of inflation on financial institution development in Nigeria, this study will employ appropriate econometric technique. This same technique is applicable to objective one (1) also whose objective is to examine the effect of inflation on financial institution performance in Nigeria.

4. Results and Discussions

Descriptive Statistics

This study commenced its empirical analysis by checking for the descriptive characteristics of data used in the model. The results of the descriptive statistics are shown in the Table 1 below. In the table, it was revealed that exchange rate (EXR) has the highest mean value i.e., 100.3672, while interest rate (INT) has the lowest mean value i.e., 0.307633. The descriptive statistics also showed that government spending (GOVT) has the highest median value i.e., 94.16150, while interest rate (INT) has the lowest median value i.e., 4.310292. The standard deviation showed that exchange rate is most volatile variable (93.66422), showing that the observation from exchange rate is far from the sample mean while log of trade openness (TOPN) is the least volatility variable (0.515305) showing the observation is close to the sample mean. The skewness statistics showed that two (2) variables government spending (GOVT) and interest rate (INT) are negatively skewed, while other variables such as market capitalization as a share of GDP (MCAP), credits by financial intermediaries to private sector (FD), inflation (INF), real gross domestic product (RGDP), log of trade openness (TOPN) and exchange rate (EXR) are positively skewed. The Jarque-Bera statistic accepted the null hypothesis of normal distribution for four (4) variables market capitalization as a share of GDP (MCAP), credits by financial intermediaries to private sector (FD), inflation (INF) and interest rate (INT) at 5% level of significance and rejected the null hypothesis of normal distribution for four (4) variables, real gross domestic product (RGDP), government spending (GOVT), log of trade openness (TOPN) and exchange rate (EXR).

Table 1. Descriptive Statistics

	MCAP	FD	INF	RGDP	GOVT	LINTOPN	INT	EXR
Mean	13.53077	9.143295	19.15290	2.40E+11	94.13759	25.37952	0.307633	100.3672
Median	7.100000	8.152684	12.55500	1.68E+11	94.16150	25.15595	4.310292	92.52840
Maximum	59.00000	19.60353	72.83600	4.77E+11	105.5820	26.19797	18.18000	307.0000
Minimum	3.300000	4.948032	5.388000	1.07E+11	76.94907	24.70572	-65.85715	0.593800
Std.Dev.	11.71563	3.545742	17.16529	1.29E+11	6.051746	0.515305	14.60655	93.66422
Skewness	1.815618	1.208734	1.780107	0.702564	-0.642564	0.364620	-2.633592	0.827276
Kurtosis	7.127554	4.078280	4.966857	1.930168	3.567599	1.606629	12.25136	2.971393
Jarque-Bera	49.11168	11.38611	26.88342	5.068256	3.207299	4.019070	184.1628	4.449832
Probability	0.000000	0.003369	0.000001	0.079331	0.201161	0.134051	0.000000	0.108076
Sum	527.7000	356.5885	746.9630	9.38E+12	3671.366	989.8011	11.99770	3914.322
Sum Sq. Dev.	5215.723	477.7468	11196.59	6.30E+23	1391.698	10.09050	8107.346	333373.5
Observations	39	39	39	39	39	39	39	39

Source: Authors Computation, 2023

Under the correlation test, we conduct the test to ascertain the degree of relationship that exists between the dependent variable and the independent variables. The relationships among the studied variables depicted in the model were tested using correlation matrix and the result presented below:

Table 2. Correlation

	MCAP	FD	INF	RGDP	GOVT	LINTOPN	INT	EXR
MCAP	1	0.741572	-0.366248	0.646863	0.075939	0.702591	0.321565	0.572142
FD	0.741572	1	-0.309610	0.743628	0.175854	0.775708	0.421755	0.646755
INF	-0.366248	-0.309610	1	-0.343449	-0.110701	-0.349707	-0.508711	-0.298869
RGDP	0.646863	0.743628	-0.343449	1	0.219511	0.985972	0.388502	0.911308
GOVT	0.075939	0.175854	-0.110701	0.219511	1	0.141463	0.016401	0.244305
LINTOPN	0.702591	0.775708	-0.349707	0.985972	0.141463	1	0.401388	0.903964
INT	0.321565	0.421755	-0.508711	0.388502	0.016401	0.401388	1	0.349014
EXR	0.572142	0.646755	-0.298869	0.911308	0.244305	0.903964	0.349014	1

Source: Authors computation using EViews 10 2022 Note: ** denote 5% critical values

From the correlation result above, it is observed that there exists negative correlation between market capitalization (MCAP) and one (1) variable i.e., inflation (INF) indicating the absence of multicollinearity, however other variables such as credits by financial intermediaries to private sector (FD), real gross domestic product (RGDP), government spending (GOVT), log of trade openness (TOPN), interest rate (INT) and exchange rate (EXR) have positive correlation with MCAP during the period under review.

Unit Root Test

As a follow up of the outcome of the descriptive statistics of the variables, the researcher considered it necessary to check for the time series properties of the variables used. To check for these properties, the Augmented Dickey-Fuller (ADF) test was used and the result is presented in the Table below.

Table 3. Unit Root Test

	Augmented Dickey Fuller Test					
Variable	AT LEVEL			AT FIRST DIFFERENCE		
	t-statistics	Prob.Value	Status	t-statistics	Prob.Value	Status
MCAP			I (0)	-5.951197	0.0001	I (1)
FD			I (0)	-5.473485	0.0004	I (1)
INF	-3.793869	0.0276	I (0)			I (1)
RGDP	-5.855176	0.0001	I (0)			I (1)
GOVT			I (0)	-9.227371	0.0000	I (1)
LINTOPN			I (0)	-3.764123	0.0302	I (1)
INT	-5.642288	0.0002	I (0)			I (1)
EXR			I (0)	-7.746996	0.0000	I (1)

Source: Authors computation using EViews 10 2022 Note: ** denote 5% critical values.

The result from the unit root showed that some variables were stationary at level while some were not i.e., they are I (0) such as INF, RGDP and INT are stationary at level while MCAP, FD, GOVT, LINTOPN and EXR were not stationary at level however they became stationary after first differencing, therefore there is need to determine the long run relationship among the variables using ARDL bound test.

ARDL Bounds Test

Using the ARDL bound test the result below shows that with the assumption of strong exogeneity on all variables, the hypothesis of the existence of long run relationship is rejected at 5% significance level because the value of the F-Statistics for bound test model (2.32) is lower than the higher bound (3.21) and higher than the lower bound (2.17). therefore, this shows that there is no long-run relationship between the dependent variable (MCAP) and the independent variables (FD, INF, RGDP, GOVT, TOPN, INT, EXR).

Table 4. Bound Test

Test Statistics	Value	K
F-Statistics	2.32	7
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
5%	2.17	3.21

Source: Authors' Computation using E-views 10, 2022

Table 5. Short-run ARDL Regression Estimate

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-594.8396	425.5985	-1.397654	0.1736
D(INF)	-0.128663	0.024661	-1.359200	0.0153
D(RGDP)	-6.45E-11	5.91E-11	-1.090939	0.2849
D(LINTOPN)	24.83999	16.67561	1.489600	0.0479
D(INT)	-0.273431	0.187212	-1.460538	0.4457
D(EXR)	0.008537	0.027931	0.305649	0.7622
D(FD)	0.255774	0.859114	0.297718	0.7682
D(GOVT)	0.308279	0.009936	1.468441	0.0535
CointEq(-1)	-0.261624	0.050274	-5.204001	0.0000

R^2= 0.820792   Durbin – Watson = 2.148279

Adjusted R^2= 0.754419

Source: Authors' Computation, 2023

The short run estimation result above shows that three (3) variables significantly influence market capitalization (MCAP) in the short run i.e., inflation (INF), log of trade openness (LINTOPN) and government spending (GOVT). It is observed that INF have negative significant influence on MCAP in the short run, a 1% change in INF will give rise to a 13% change in MCAP. This result is inline with

the work of John et al (2018) in their work on the impact of inflation on financial sector performance in Nigeria, their result showed that inflation have negative significant influence on growth in both short and long run. From the table LINTOPN have positive significant influence on MCAP in the short run, a 1% change in LINTOPN will lead to a 24% change in MCAP, this result is in line with theoretical undermining.

GOVT also from the table have positive significant influence on MCAP in the short run, a 1% change in GOVT will lead to a 30% change in MCAP. Other variables such as FD, RGDP, INT and EXR have no significant influence on MCAP in the short run. The CointEq(-1) value which is -0.261624 shows that 26% short run disequilibrium will be adjusted to long run equilibrium, that is to say, it will take 2 years and 6months to adjust to long run equilibrium. The coefficient of multiple determination (R^2) also shows that 82% of variation in GDPG is explained by the explanatory variables while the remaining 18% is explained by factors not in the model. The Durbin – Watson statistics of 2.14 shows that the regression estimate is relatively free from the problem of serial correlation.

Post Estimation Analysis

Since the probability value is higher than 5% significant level, this indicates that the null hypothesis of serial correlation is rejected which implies that there is no serial correlation and the model is normally distributed.

Table 6. Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.425382	Prob. F(1,26)	0.5200
Obs*R-squared	0.611704	Prob. Chi-Square(1)	0.4341

Source: Authors Computation, 2023

Since the probability value is higher than 5% significant level, this indicates that the null hypothesis of heteroskedasticity is rejected which implies that there is no heteroskedasticity and the model is normally distributed.

Table 7. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.436607	Prob. F(10,27)	0.2176
Obs*R-squared	13.19706	Prob. Chi-Square(10)	0.2129
Scaled explained SS	40.12441	Prob. Chi-Square(10)	0.3240

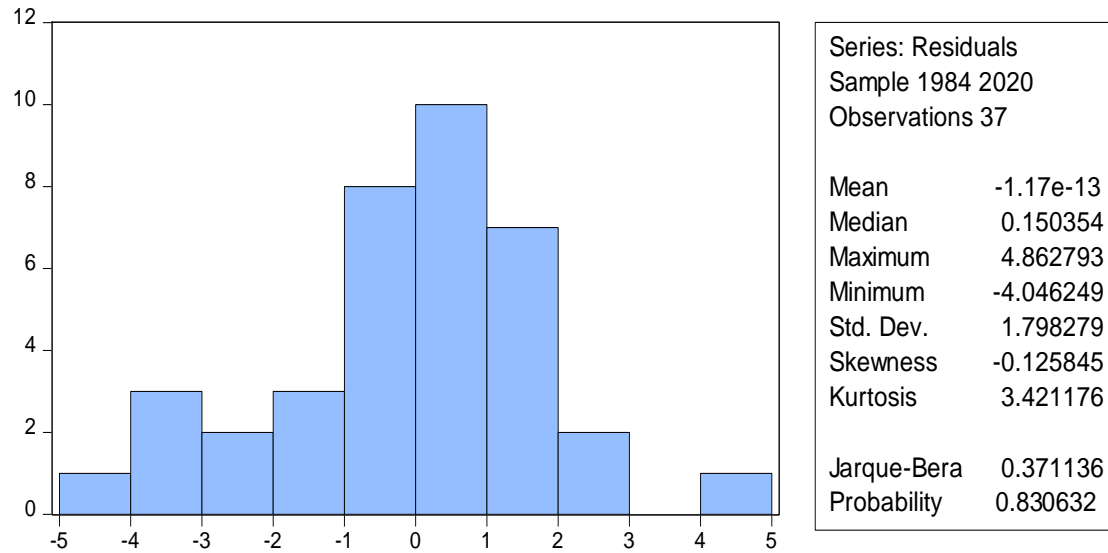*Source*: Authors' Computation, 2023

Figure 1. Histogram-Normality Test

Source: Authors' Computation,2023

From the diagram below it is observed that the probability value of Jarque-Bera is higher than 5% hence the hypothesis of normal distribution for residual cannot be rejected and the model is said to be normally distributed.

5. Conclusions

It is observed that INF have negative significant influence on MCAP in the short run, a 1% change in INF will give rise to a 13% change in MCAP. This result is in line with the work of John et al (2018) in their work on the impact of inflation on financial sector performance in Nigeria, their result showed that inflation have negative significant influence on growth in both short and long run. From the table LINTOPN have positive significant influence on MCAP in the short run, a 1% change in LINTOPN will lead to a 24% change in MCAP, this result is in line with theoretical undermining. GOVT also from the table have positive significant influence on MCAP in the short run, a 1% change in GOVT will lead to a 30% change in MCAP. Other variables such as FD, RGDP, INT and EXR have no significant influence on MCAP in the short run.

The CointEq(-1) value which is -0.261624 shows that 26% short run disequilibrium will be adjusted to long run equilibrium, that is to say, it will take 2 years and 6months to adjust to long run equilibrium. The coefficient of multiple determination (R^2) also shows that 82% of variation in GDPG is explained by the explanatory variables while the remaining 18% is explained by factors not in the model. The Durbin – Watson statistics of 2.14 shows that the regression estimate is relatively free from the problem of serial correlation.

The conclusion from the above is that inflation will negatively affect capital market development in Nigeria because as inflation rises, the marginal impact of inflation on capital market activity and stock market development diminishes rapidly. Also trade openness which indicates a country's trading activity with the outside world will boost the growth in the capital market in the short run, and an increase in government spending will boost development and growth also in the economy which will increase and boost development in the capital market in the short run.

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