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## THE JOINT IMPACT OF STOCK MARKET AND CORRUPTION ON ECONOMIC GROWTH AND DEVELOPMENT IN NIGERIA: EVIDENCE FROM COINTEGRATION AND VECM ANALYSIS

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### Abstract

This paper studies the effect of capital market on economic growth in the presence of corruption in the Nigerian context. We employed the use of cointegration and Vector Error Correction Model (VECM). We find out that both corruption and capital market has long run association with economic development in Nigeria but has no short run relationship. This simply means that there is short run gain and long run pain for the Nigerian economy if corruption and capital market are not checked and well regulated respectively in Nigeria. We therefore recommend that government should strengthen the anti-graft agencies and equip them technologically and make them independent, educate the public on the problems associated with corrupt practices and the economic implication especially through the capital market and encourage local investors to invest in the capital market to improve liquidity and profitability of the Nigerian capital market.

*Keywords:* Corruption, Capital market, Co-integration, Vector Error Correction

### 1. INTRODUCTION

Development financing continues to be a big challenge, but some hope is emerging for African countries. The size of the resources

needed to lift countries out of poverty by 2020 or 2030 continues to increase. Some estimates put the resources needed at over \$200 billion a year for energy, irrigation, roads and rail; while there are also similar

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figures required for improvements in health, education and social protection (Songwe, 2013).

Access to capital markets is one recent phenomenon on the African continent that is being facilitated by the Federal Reserve's quantitative easing policy of injecting money into the U.S. economy, and this phenomenon is gaining steam. Between November 2008 and September 2013, the Fed purchased approximately \$3.5 trillion in bank debt, mortgage-backed securities and Treasury notes (Evans, 2013). As a result, the market was flooded with excess liquidity and unprecedented low interest rates suppressing returns in the U.S. and other developed markets. Investors have turned to emerging and frontier markets for better yields. The response has been strong from sub-Saharan African countries.

On the other hand, corruption is a global phenomenon found in all countries - but evidence shows it harms developing countries more than the developed economies, stifles economic growth and diverts desperately needed funds from education, healthcare and other public services. An estimated one trillion US dollars get siphoned off through bribes every year according to the World Bank.

"Corruption is a global threat. It is a serious roadblock to economic development," said the Executive Director of the United Nations Office on Drugs and Crime (UNODC), Yury Fedotov. "Corruption aggravates inequality and injustice, and undermines stability, especially in the world's most vulnerable regions."

The General Assembly has also recognized that corruption is a barrier to development and diverts resources away from poverty-eradication efforts and

sustainable development and has urged States which have not yet done so to ratify and accede to the United Nations convention Against Corruption (UNCAC).

Corruption is not just a problem in government. The private sector suffers too, where corruption erodes corporate identity, undermines confidence between business partners and can destroy the reputation of once-trusted companies. The contribution of the private sector in fighting corruption is essential. Shortage of accumulated capital for investment and developmental purposes has been identified as one of the major obstacles to the economic growth of many developing countries, including Nigeria. In order to enhance economic growth and development, capital formation and accumulation through mobilisation of domestic savings must be seen as a strategic imperative.

It is an acclaimed fact that Nigeria is richly endowed in terms of human, natural and financial resources, but the tragedy is that due to the twin issue of poor leadership and corruption, these resources are being frittered away.

The preceding arguments and anecdotes illustrate the significant role financial markets play in allowing spillovers and linkages associated with economic growth and development to materialize. Furthermore, to the extent that financial market fosters growth and development of corporations through mergers and acquisitions, it is not just easy availability and accessibility of capitals but also well-functioning stock markets matters. Well-functioning stock markets, by increasing the spectrum of sources of finance for entrepreneurs, play an important role in creating linkages between domestic and foreign investors.

One can conjecture that the extent of development of financial institutions may be a decisive factor in determining whether foreign firms operate in isolated enclaves with no links whatsoever with the domestic economy (beyond hiring labor). Or, whether they become the catalysts for technology transfers and other benefits that economists have long argued these firms should be.

Despite this rather obvious role of the capital markets, the literature seems to have ignored the impact of capital market in economic growth and development in the face of corruption altogether. In fact, the role of not just corruption but other factors, such as potential shortages of skills, knowledge, and infrastructure in developing countries, have been neglected in the development literature. This paper will strive to provide a justification and contribution to the existing literature by looking at the joint effect of capital market contribution to economic growth and development in the presence of corruption in Nigeria.

## 2. LITERATURE REVIEW

Capital market performance, corruption and economic growth have attracted attention in recent year as a result of their central role in the economic development debate. The links between them, on the one hand and direction of association on the other, still remain subject to further analysis across countries. Capital markets are the complex of institutions and mechanisms through which long-term funds with maturity of 5 years and above are pooled and made available to business, governments, individual, and instruments already outstanding are transferred. As in the case of the money market, the capital markets are

local, regional, and national in scope, (Bekaert, 1993). Adamu and Sanni (2005), examine the roles of the stock market on Nigeria's economic growth, using Granger-causality test and regression analysis. They found out that there exist a unidirectional causality between GDP growth and market turnover. They also observed a positive and significant relationship between GDP growth and market turnover ratios. Ezeoha et al. (2009), assert that stock market development promotes domestic private investment growth and that the stock market development has not been able to encourage the flow of foreign private investment into Nigeria. Mondher et al. (2013), using Autoregressive Distributive Lag (ARDL) cointegration approach in their study of macroeconomic factors on stock exchange prices. Their result shows different result from one country to another. The result shows that USA stock exchange prices was most affected by financial crises in 2007; Japanese stock exchange prices slump after 1990 and China's stock exchange prices is least affected by financial crises of 2007. Eze and Nwankwo, (2013) use the cointegration and Vector Error Correction Model (VECM) to study the impact of Nigerian capital market instability on the growth of the economy, their findings reveal that capital market reform significantly influences the rate of economic growth and that there is a long-run relationship between capital market reform and economic growth in Nigeria.

On the issue of corruption, researchers have emphasized the importance of the effects of corruption on economic growth and development from the theoretical and empirical perspectives (e.g., Adewale, 2011; Egunjobi, 2013; Glaeser & Saks, 2006; Mo, 2001; Nageri et al., 2013, etc). Svensson (2005), reported a negative relation between

corruption and country wealth factors like GDP indicating that the higher level of corruption, the higher the level of poverty. Nageri et al. (2013) assert that Corruption Perception Index (CPI), a proxy for corruption, negatively affects economic development in Nigeria. They also find out that Corruption Rank (CR) of Nigeria and Relative Corruption Ranking (RCR) of Nigeria among countries under particular corruption review is statistically significantly negatively affecting the economic growth and development of Nigeria. Adewale (2011) undertook an empirical investigation of the relationship between a numbers of economic variables in Nigeria. After testing for stationarity and co integration properties of the variables, later estimates the econometric parameters of the variables finds out that corruption index, external debt and unemployment is negatively affecting GDP. This implies that the result is consistent with the hypothesis that corruption retards growth and that corruption has a crowding-out effect on growth. Mo (2001) studies corruption and economic growth using OLS estimates, finds out that 1% increase in the level of corruption leads to 0.72% reduction in the growth rate, and that the most important channel through which corruption affects economic growth is political instability. Dridi (2013) using simultaneous equations to examine the effects of corruption on various economic growth determinant variables such as per capital GDP, political instability and some dummy variables suggest that the transmission channel of the negative effect of corruption on economic growth is through the impact of human capital and political instability. Mauro (1995) in his study of corruption and growth asserts that the impact of corruption on growth is largely due to its effect on investment which seems to support

the idea that other economic growth variables serves as the transmission channel of corruption on growth in an economy. Egunjobi (2013), also studies the impact of corruption on economic growth in Nigeria using annual data between the periods 1980-2009, the result shows that corruption per worker have negative effect on output per worker directly and indirectly on foreign private investment, expenditure on education and capital expenditure per worker. The study also shows that there is a causal relationship running from output per worker to corruption per worker.

### 3. EMPIRICAL METHODOLOGY

In this study, we adopted the statistical method of multiple regression technique. Data was sourced from the World Bank and Transparency International reports. The sample covers a period from 1996 – 2012.

#### 3.1. Model specification

The model used for this research, in its functional form is express as:

$$GDP = F (MCAP, CPI) \quad (1)$$

where GDP is the Gross Domestic Product of the Nigerian economy, MCAP is the total market Capitalisation of the Nigerian Stock Exchange, CPI is the Corruption Perception Index on Nigeria.

The econometric form is written as:

$$GDP = \beta_0 + \beta_1 MCAP + \beta_2 CPI + \mu \quad (2)$$

where  $\beta_1$  and  $\beta_2$  represent the coefficients of the independent variables respectively.

The multivariate co-integrating regression model is given by:

$$\Delta X_t = \sum_{i=1}^n \alpha_i \Delta X_{t-i} + \alpha X_{t-1} + e_t \tag{3}$$

where  $X_t$  is the vector of Gross Domestic Products, Market Capitalisation and Corruption Perception Index respectively.  $\Delta$  is the symbol of difference operator,  $e_t$  is a vector of the residuals.  $\alpha_i$  is the short run parameter while  $\alpha$  is the long run parameter, both measures the short and long run adjustment to changes in the vector of the variables.  $\alpha X_{t-1}$  is the Error Correction Term.  $\alpha$  can be factor into two separate matrices of  $a$  and  $b$  such that  $\alpha = ab$ . Where  $a$  is the vector of co-integrating parameter, while  $b$  is the vector of error-correction coefficient, measuring the speed of convergence to the long run steady state.

The VECM model is given as:

$$\Delta SP_t = \sum_{i=1}^n \beta_1 \Delta GDP_{t-1} + \sum_{i=1}^n \beta_2 \Delta MCAP_{t-1} + \sum_{i=1}^n \beta_3 \Delta CPI_{t-1} + \beta_4 ECT_{t-1} + \mu \tag{4}$$

where  $\beta_1, \beta_2, \beta_3$ , represents the coefficients

of the variables respectively,  $ECT_{t-1}$  is the Error Correction Term (derived from the co-integrating regression of the variables),  $\mu$  is the residuals. This is one lag VECM model.

### 3.2. Methods of data analysis

In this study, we employ the quantitative tools of data analysis which are; the Augmented Dickey-Fuller (ADF) unit root test for stationarity, followed by co-integration regression to determine if the variables have a long-term or equilibrium relationship. The Vector Error Correction Mechanism (VECM) will then be used to determine the short run disequilibrium adjustment. The VECM model will be tested for adequacy by the residuals diagnostic tests of normality, ARCH test, heteroscedasticity test and serial correlation test.

## 4. DATA ANALYSIS AND FINDINGS

### 4.1. Unit root test

The unit root test was conducted on the entire three (3) variable's data used for this research. The test adopted is the Augmented Dickey Fuller (ADF) and the results are shown below:

*Table 1. (a) Unit root test of CPI at levels*

Null Hypothesis: CPI has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.006713	0.0556

*Table 1.(b) Unit root test of CPI at first difference*

Null Hypothesis: D(CPI) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.135889	0.0002

From the table above, it can be deduced that CPI has unit root at level as shown in table 1(a) but at first difference in table 1(b) (D(CPI)) CPI does not have unit root. stationary but when converted to first difference, they become stationary. This is the pre-condition for co-integration test, that is, the variables are integrated of the same

*Table 2.(a) Unit root test of GDP at levels*

Null Hypothesis: GDP has a unit root		
Exogenous: Constant		
Lag Length: 1 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	1.760942	0.9991

*Table 2.(b) Unit root test of GDP at first difference*

Null Hypothesis: D(GDP) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.339062	0.0008

A look at the table 2 (a and b) above also reveals that GDP data has unit root at level but after converting it to first difference (D(GDP)) it does not have unit root.

Table 3(a) also shows that MCAP data has unit root at level but after converting to first difference from table 3(b) (D(MCAP)) it does not have unit root.

Therefore, it shows that all the three (3) variables at their original figures are not

order. We therefore proceed to the co-integration test to obtain the number of co-integrating equation.

#### 4.2. Co-integration test

We used the Johansen co-integration test to determine the number of co-integrating equation and the long-run associationship between GDP, MCAP and CPI in Nigeria.

*Table 3.(a) Unit root test of MCAP at levels*

Null Hypothesis: MCAP has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.375228	0.5675

*Table 3.(b) Unit root test of MCAP at first difference*

Null Hypothesis: D(MCAP) has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=3)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.629943	0.0029

*Table 4. Trace test of Co-integration*

Date: 12/15/14 Time: 11:53  
 Sample (adjusted): 1998 2012  
 Included observations: 15 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: GDP MCAP CPI  
 Lags interval (in first differences): 1 to 1

## Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.762863	36.62812	29.79707	0.0070
At most 1	0.593326	15.04136	15.49471	0.0584
At most 2	0.097886	1.545223	3.841466	0.2138

Table 4 is the Trace statistics which indicates that there is at least one (1) co-integrating equation between GDP, MCAP and CPI in Nigeria at 5%. Meaning that, they (the variables) move together in the long run.

Under the Max-Eigen statistics as shown above (table 5), it indicates that there is at least one co-integrating equation between the variables GDP, MCAP and CPI in Nigeria.

Hence, the two co-integrating statistics used namely the Trace statistics and Max-Eigen statistics shows that the three Variables: GDP, MCAP and CPI has long-run associationship. Therefore when the variables are co-integrated we can run the Vector Error Correction Model (VECM).

### 4.3. Vector Error Correction Model (VECM)

The model provided below shows the VECM equation and the co-integrating equation of the model as provided by eviews

7 software and the coefficients of the variables (MCAP and CPI) in explaining GDP in Nigeria.

Table 6(a) shows the co-integrating equation between GDP, MCAP and CPI in Nigeria which represents the long run estimates of the joint relationship between these variables. While table 6(b) is the error correction estimates that corrects the disequilibrium in the variables in the short run. The first figures are the coefficients, the first figures in parentheses ( ) are the standard error and the second parentheses [ ] is the T value. It should be noted that there is no P value to determine the significance of the coefficient then we have to determine the P value which is provided below.

Table 7 shows the Vector Error Correction Model (VECM) with the coefficients as C(1), C(2), C(3), C(4) and C(5). C(1) is the coefficient of the co-integrating equation, C(5) is the constant while C(2), C(3) and C(4) are the coefficient of one (1) period lag

*Table 5. Max-Eigen test of Co-integration*

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.762863	21.58676	21.13162	0.0431
At most 1	0.593326	13.49614	14.26460	0.0659
At most 2	0.097886	1.545223	3.841466	0.2138

Table 6.(a) Co-integration Equation

Vector Error Correction Estimates	
Date: 12/15/14 Time: 12:36	
Sample (adjusted): 1998 2012	
Included observations: 15 after adjustments	
Standard errors in ( ) & t-statistics in [ ]	
Cointegrating Eq:	CointEq1
GDP(-1)	1.000000
MCAP(-1)	-13.93043 (2.56760) [-5.42547]
CPI(-1)	27.75521 (11.3371) [ 2.44817]
C	-288.1859

Table 6. (b) Vector Error Correction Estimates

Error Correction:	D(GDP)
CointEq1	-0.077675 (0.03456) [-2.24733]
D(GDP(-1))	-0.521800 (0.25021) [-2.08548]
D(MCAP(-1))	-0.467451 (0.41191) [-1.13482]
D(CPI(-1))	0.784092 (1.03801) [ 0.75538]
C	20.78214 (6.49404) [ 3.20019]

of GDP, MCAP and CPI respectively.

Looking at C(1) as the coefficient of the co-integrating equation, it is negative and

significant, this validates the long run associationship between GDP, MCAP and CPI. Meaning that, there is long run relationship between GDP, MCAP and CPI in Nigeria. In the short run, C(3) and C(4) are the coefficient of one period lag of MCAP and CPI respectively but they are not significant, even after carrying out the coefficient diagnostic test of C(3) and C(4) individually and jointly, we still accept the null hypothesis in the short run. Meaning that, there is no short run causality running from MCAP and CPI to GDP either individually or jointly.

In summary, our findings reveal that MCAP and CPI jointly affect GDP in the long run but not in the short run in the case of Nigeria.

#### 4.4. Diagnostic checking

A diagnostic check is appropriate in order to establish whether the model can be accepted for policy formulation or not, in other words, to know if the model so developed has a problem or not. As been pointed out earlier, the residuals diagnostic checking criteria is adopted for this research which includes the Heteroscedasticity test, normality test, etc.

Table 7. Vector Error Correction Model

Dependent Variable: D(GDP)				
Method: Least Squares				
Date: 12/15/14 Time: 13:04				
Sample (adjusted): 1998 2012				
Included observations: 15 after adjustments				
D(GDP) = C(1)*( GDP(-1) - 13.9304270167*MCAP(-1) + 27.7552108604				
*CPI(-1) - 288.185924093 ) + C(2)*D(GDP(-1)) + C(3)*D(MCAP(-1)) +				
C(4)*D(CPI(-1)) + C(5)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.077675	0.034563	-2.247326	0.0484
C(2)	-0.521800	0.250206	-2.085482	0.0636
C(3)	-0.467451	0.411915	-1.134823	0.2829
C(4)	0.784092	1.038008	0.755381	0.4674
C(5)	20.78214	6.494042	3.200185	0.0095



Table 8. Heteroscedasticity/ARCH test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	4.016537	Prob. F(6,8)	0.0372
Obs*R-squared	11.26159	Prob. Chi-Square(6)	0.0806
Scaled explained SS	3.551398	Prob. Chi-Square(6)	0.7371
Heteroskedasticity Test: ARCH			
F-statistic	0.030700	Prob. F(1,12)	0.8638
Obs*R-squared	0.035725	Prob. Chi-Square(1)	0.8501

4.4.1. Heteroscedasticity test

Checking for the heteroscedasticity test in the model, using the Breuch-Pagan-Godfrey test reveals that we should accept the null hypothesis that the residual is homoscedasticity which is desirable. In the same vein, checking for the ARCH effect we also finds out that we should accept the null hypothesis that the residual has no ARCH effect, which is also desirable.

4.4.2. Serial correlation test

Looking at the Breusch-Godfrey serial correlation LM test as presented in table 9, it also shows that we should accept the null hypothesis that the residuals are not serially correlated and this is also desirable for a good model.

4.4.3. Normality test

Looking at the Jarque-Bera normality test as produced in the figure 1, under the null hypothesis that the residual are normally distributed, the P value of the JB statistics is high, we accept the null hypothesis that the residual are normally distributed which is a desirable outcome for the model.

5. SUMMARY, CONCLUSSION AND RECOMMENDATIONS

This study reveals that market capitalization, corruption perception index and gross domestic products in Nigeria have long run relationship. Market capitalization and corruption perception index are joint predictor of gross domestic product, though

Table 9. Serial Correlation test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.089413	Prob. F(2,8)	0.9154
Obs*R-squared	0.327966	Prob. Chi-Square(2)	0.8488

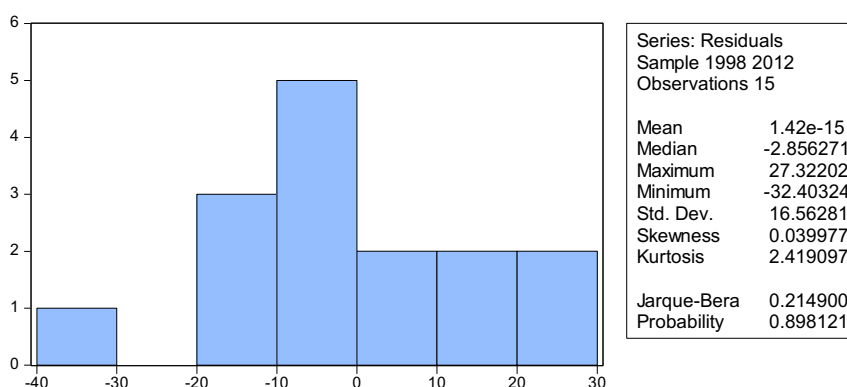


Figure 1. Normality test

insignificantly in the short run but significantly in the long run.

The implication of this is that an increase in market capitalization can significantly increase gross domestic product which is supported by the findings of Osinubi and Amaghionyeodiwe (2003), Abu (2009), Ewah et al. (2009) and Okafor and Arowoshegbe (2011). In the same vein, an increase in corruption perception index which translates to reduction in corruption perception of Nigeria will lead to increase in gross domestic products in Nigeria. This finding is also in support of the findings of Aliyu and Elijah (2008), Dridi (2013) and Nageri et al. (2013). Therefore, the presence of corruption in the economy will tend to reduce the pace of the positive impact of capital market on the gross domestic product due to the negative impression of the presence of corruption in the corporate environment. Both local and foreign investors who have information about the immense potentials of the emerging economy and would want to participate in such an economy will not be too confident to stake their hard earned money in such an economy because of the perceived risk inherent in an economy with high corruption level. With this attitude of the investors there will not be enough liquidity in the capital market for investment purpose and there will not be any meaningful impact of the capital market on gross domestic product. Ewah et al. (2009) made it abundantly clear that although capital market exerts positive influence on economic growth, it has not contributed meaningfully (significantly) to the growth of the Nigerian economy (cited in Nwaolisa et al., 2013). One of the reasons that can be advanced is corruption.

All this assertions are not expected to manifest in the short run according to our

findings, but it will definitely crop-up in the long run if no meaningful policy is put together and rigorously implemented by the policy makers to stem the growth of corruption and to enable the expected positive impact of the capital market reflect on the gross domestic product.

In conclusion, despite the perceived economic gains expected from capital market activities, the shortcomings observed in corruption level has made it impossible for the Nigerian gross domestic product to profit from the capital market activities due to shortage of liquidity, low level of confidence coupled with high risk and low return among other factors. Thus, the paper indicates that there is positive economic potentials in the capital market but the government, policy makers, regulatory authority and the participant must jointly and rigorously pursue growth in gross domestic product via capital market and stem the increasing tide of corruption in the economy.

As a result of the findings in this paper, the following recommendations were provided;

The government is advised to strengthen the anti-graft agencies, equip them technologically and make them independent of government and politicians. This will enable them to perform their functions without prejudice or influence, and will not be seen as a witch hunting agencies of the government. Educate the public on the problems associated with corrupt practices and the economic implication especially through the capital market. This the government can do by encouraging and practicing freedom of press and information.

## ЗАЈЕДНИЧКИ УТИЦАЈ БЕРЗЕ И КОРУПЦИЈЕ НА ПОКАЗАТЕЉЕ ЕКОНОМСКОГ РАСТА У НИГЕРИЈИ: ДОКАЗИ ДОБИЈЕНИ ПРИМЕНОМ КОИНТЕГРАЦИЈЕ И “VECM” АНАЛИЗЕ

**Ibraheem Kamaldeen Nageri, Ibraheem Sherifdeen Nageri, Abdullateef Amin**

### Izvod

У овом раду је проучаван утицај ефекта берзе капитала на економски раст, уз присуство корупције, у контексту Нигерије. У анализи је коришћена коинтеграција и примена методе “Vector Error Correction Model (VECM)”. Резултати су показали да корупција и берза капитала имају дугорочну повезаност са економским развојем Нигерије али да немају краткорочну међусобну везу. Тиме се једноставно може рећи да предстоји краткорочни добитак али дугорочна криза нигеријске економије, уколико се корупција и тржиште капитала не контролишу и регулишу исправно у овој земљи. Аутори потом предлажу да власт треба да ојача рад контролних агенција и да их додатно опреми савременим технологијама, како би их учинила независним. Такође, да едукује јавност везано за проблеме корупције у пракси, као и са економским импликацијама, посебно преко тржишта капитала. Поред тога, предлаже се подстицање локалних инвеститора који би инвестирали на тржишту капитала како би се побољшала ликвидност и профитабилност Нигеријске берзе капитала.

*Кључне речи:* Корупција, Тржиште капитала, Коинтеграција, “VECM”

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