Causal Relationship of N-REITs Dividend Yield and Money Market Indicators: A Case study of Skye Shelter REIT

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Abstract

Purpose: This paper examines the relationship between Nigeria equity real estate investment trusts (REITs), with focus on Nigeria First REIT (Skye Shelter) and money market indicators (MMI), such as Treasury bill (TBR), Prime lending rate (PLR), Currency-in-Circulation (CIC), injection to corporate private sector (CPS) and Broad Money Supply to the economy (BMS) in the period 2008-2016 in an attempt to document the statistical significance of the indicators on N-REITs dividend returns.

Design/Methodology/Approach- Quarterly data on dividend returns of Skye Shelter REIT were used as proxy for listed N-REITs return, while data on MMI were extracted from published Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) bulletins from 2008-2016. The study deployed Augmented Dickey-Fuller test statistic (ADF t-statistic) to test for unit root and stationarity status of deterministic trend in the data collected. The degree of association, the existence of co-integration and the test for statistical significance between N-REITs and MMI were conducted by correlation analysis, Johansen Co-Integration Test and granger causality test of VAR and VECM respectively.

Finding: At p-value <0.05; the data passed the ADF t-test using Schwarz information criterion (SIC) at 1st Difference indicating stationary data series as required for granger causality model, while Trace and Max-Eigen statistics indicate co-integration confirming a long term relationship among the variables. The predicted granger causality analysis of an insignificant long term

causal relationship and a short run significant causal relationship between N-REITs returns and MMI were confirmed.

Practical implications: Information on MMI indicators simulates caution signal and provide informed decision for investors in the Nigeria real estate sector. The study is important to investment analysts and capital market players.

Originality/Value: This study is first to investigate the causal relationship of money market indicators and N-REITs returns. Whereas, previous studies examined the performance of indirect property investment including REITs, effects of macro-economic factors on REITs and MMI in isolation.

Keywords: REITs, Dividend, Money Markets indicators, Causality.

1. Introduction

Real estate sector is recognised as one of the major contributing sector to nation's wealth. The economic importance of this accounts for about 54 per cent of global financial wealth (Oreagba, 2010). The positioning of the industry as the sixth largest sector of the economy is attested to by its growth rate at 8.7 per cent which is attracting high net worth individuals to invest 25 per cent of their assets in real estate compared to a high limit of 18 per cent investment in equities and other instruments (NBS, 2016). However, the introduction of real estate investment trust (REIT) to Nigeria property market is one of the key achievement recorded in21st century in the country's real estate sector. The publicly-traded REITs structure is designed similar to mutual fund i.e. the REITs companies pool funds from investors by issuing share (unit-holdings) through an Initial Public Offering (IPO) on the stock exchange and invest 75% of the funds on income-producing property such as residential apartment, commercial/retail properties, office buildings, recreational facilities, hospital facilities etc. Ninety Five percent (95%) of profit before tax is shared as a dividend among the investors as return on their investment (Chan *et al*. 2003; Zurich 2006; Olanrele, Said &Daud. 2015).

Chandrashekaran (1999) and Olanrele *et al.* (2015) observed that, REITs offer investors a lower cost of transaction, accessibility, liquidity and corporate governance and diversification benefits. Crowe and Krisbergh (2010) added

that, market data related to REITs provide up-to-date information, transparency and real-time pricing mechanism used in determine the true market value of real estate related asset in property market. Hudson-Wilson, Fabozzi and Gordon (2003) and Lee and Stevenson (2006) were of the opinion that, in dynamic asset allocation strategies, REITs stocks tend to achieved superior risk and return profiles and possessed element of consistency in portfolio optimisation either to minimize risk or to maximise returns. Kin and Jang (2012) concluded that, even during the financial crisis and abysmal economic state, REITs stand the chance of performing relatively better in the stock market. So far, three (3)listed REITs have been operating in Nigeria. The first equity type of REITs, Skye Shelter was launched by Skye Bank on Nigerian Stock Exchange (NSE) in 2007, followed by Union Homes hybrid REITs in 2008 and UPDC REITs (equity) in year 2013. The REITs company pool funds together from interested investors and invest 70% of the funds in real estate related assets ranging from residential apartment, commercial/retail properties, office buildings, recreational facilities, hospital facilities etc.

The money market under the regulation of the country's monetary policy as dictated by the Central Bank is central to both debt and equity finance of capital project like REITs. Central Bank of Nigeria identified money market indicators (MMI) to comprise the Central Bank indicative rate, monetary policy rate, Treasury bill, Broad money supply, Currency in circulation and other short term interest rates of the financial market which include inter-bank call rate, savings, and other fixed deposit and lending rates. Broad money supply comprises of savings and time deposit (quasi money) while narrow money supply refers to as currency in circulation includes non-bank public and demand deposits. In addition, the net domestic credit (NDC) is the banking system credit to the economy and consists of loans and advances given by the Central Bank as well as deposit money bonds to the economic agents, and credits to government and private sector.

The relevance of money market instruments and policies to securitised investment in stock exchange markets has been a subject of interest in a number of papers in recent years. Rigobon and Sack (2004) and Bernanke and Kuttner (2005) discovered that, the sharp response of asset prices, and in particular REITs to fluctuations of money market components have been a source of disturbance to investor analysts and policymakers. Bredin, O'Reilly and Stevenson, (2006) opined that changes in aggregate monetary policy have effect on general economic activity, the rate of changes tends to influence the

value of the underlying portfolio and the rental income of property both in the direct and indirect real estate investment market. Changes in Nigerian economic climate have consequences on business cycles especially the stock market demand research attention. It has been observed that no similar investigation has been carried out in Nigeria despite the 13 years of REIT establishment. Therefore, this study analysed the causal relation between the N-REIT and the MMI.

2. Related Empirical Studies

Literature had been flooded with the analyses of REITs performance, its associated benefits and inter-relationship with capital, stock and general investment markets especially in developed countries. Hardin and Hill (2008); Hamzah and Rozali (2010); Newell *et al*, (2013); Ong, Teh and MP (2011) studies to mention but a few have documented the relatively outstanding performance of REITs in United States, United Kingdom, Australia, Canada, France. In Asia REITs market, Newell and Osmadi (2009) and Rozman, *et al.* (2015) appraised the performance of REITs either as a market-mix asset or property portfolio and they concluded that, REITs stand out as superior property investment vehicles. Pham (2013) stressed that REITs market has proved extremely successful. This is the reflection of substantial widespread of REITs globally with sharp increase in global REITs market capitalisation from US$734b in 2010 to US$1.7t in 2016 (EPRA, 2016).

On the investigation of relationships between REIT markets and other markets, early studies such as Jaffe and Mandelker (1976), Fama and Schwert (1977), Nelson (1976), Geske and Roll (1983), Chen *et al.*, (1986), and Mukherjee and Naka (1995) have documented the interdependence of aggregate economic outlook and stock market. For instance, Firth (1979) concluded that stock holdings possesses effective hedge against inflation. Fama and Gibbons (1982), and Marshall (1992) added that the hedge-against inflationary attribute characterised with sock holdings has cause the investor to shift from holding cash to investing in stock and bonds. On the other hand, Swanson *et al.*, (2002) find that REIT returns are more sensitive to the maturity rate spread between short- and long-term Treasuries than to the credit rate spread between commercial bonds and Treasuries. Islam (2003) discovered that, macroeconomic variables showed statistically significant relationship with stock exchange returns, while REITs offers a better diversification to common

stock (Bhuyan, Kuhle, Al-Deehani & Mahmood, 2015). In Canada, Kryzanowski and Tcherednitchenko (2007) regressed equity REITs returns on secondary market to reveal some sensitive market factors. The study found that, REITs showed greater sensitivity to interest rate than other factors.

Nittayagasetwat and Buranasiri (2012) checked the sensitivity of returns on REITs to information on interest rate of bond and stock market returns in US capital market and the study showed that REITs return were insignificantly sensitive to bond and stock information on their interest. Fei, Ding and Deng (2008) correlated REITs return and common stock between January, 1987 and May, 2008 and discovered the evidence of conditional volatility exist between REITs returns and common stock. Chui *et al.*, (2003) study on cross section of expected REITs returns of pre-and-post 1990 concluded that, REITs returns were predominantly affected by market momentums in both periods. The study on macroeconomic determinants of REITs by Mai'n *et al.*, (2016) revealed that REITs showed positive relationship with market capitalization, interest rate and inflation rate. Similarly, Astrious and Bogiazi (2013) discovered that positive correlation exits between REITs returns and general stock market. Loo, Annuar and Ramakrishan (2016) concluded that emerging REITs markets are more sensitive to macroeconomic variables changes than the established REITs markets i.e. US REITs, UK REITs etc.

Feng *et. al.* (2016) examined three Asian economy climates (Japan, Singapore and China). The study assessed the consequences of macroeconomic factors on REITs returns. The study detected unidirectional relationship between shifts in inflation rate and REITs returns in Japan and Singapore. Similarly in Malaysia, Azwani, Azmin and Shariff (2016) investigated the interaction between REITs performance and macroeconomic variables. The authors assessed four macroeconomic indicators. They are unemployment rates, interest rates, exchange rates and gross domestic product and found statistically significant relationship between REITs performance and all the four macroeconomic variables. Lu and Glascock (2015) studied macroeconomic effects on liquidity and found that inflation rate and crude oil price proved to be statistically significant on the performance of REIT liquidity.

Prominent in the studies of REITs in the Sub-Sahara African emerging REIT markets is South Africa REIT (SA-REIT) market. Akinsomi (2017) investigated the behavioural perspective of the investors to speculation in gold markets and its impact on SA-REIT market, the study found that higher

speculation in gold market backs the crowding to sell by investors in the emerging SA-REIT market. The speculative activities in the gold market have market fundamental evidences that motivate investors' behaviour in developing REIT market. Ntuli and Akinsomi (2017) found REIT as a return booster in a mixed asset portfolio suggesting that REIT is a necessary enhancer of portfolio return. The Broad Based Black Economic Empowerment (BBBEE) policy in South Africa is an economic policy that can drive the money market as well as investment return and decision. The study of the impact of BBBEE on listed and non-listed property firms in South Africa revealed that BEE compliant firms have higher return than non-compliant firms (Akinsomi, 2016). In Nigeria, empirical studies have shown that, the performance of real estate investment market is sensitive to economic outlook of any country (Ojetunde, 2013; Nzalu, 2013; Oyewole and Ajayi, 2014; Dabara, 2015). For instance, Oni, Emoh and Ijasan (2011) found that, inter-bank call rate (IBCR), monetary policy rate (MPR) and inflation (INF) were the major principal components influencing the real estate investment. Diala, Kalu and Igwe-Kalu (2016) discovered positive insignificant relationship between changes in exchange rate and returns on commercial property in Nigeria. Dabara (2015) revealed that, returns on residential property are sensitive to increasing different inflationary categories (actual, expected and unexpected) at varying degree. Oyewole and Ajayi (2013) study on the influence of macroeconomic factors on the performance of office property identified GDP, Interest rate, and employment rate as most significant but the study did not consider REITs market. Daud*et al*. (2012) concluded that any factor that affects property income will affect REIT dividend yield. Olanrele, Adegunle and Fateye (2017) in a study of the macroeconomic determinants of REIT dividend return in Nigeria added global oil prices and currency exchange rate (against US$) with significant influences of the added variables in different direction. Past studies have limited investigation to general macroeconomic factors with a view of capital market in focus, this present study therefore considers the money market indicators as variables of interest towards REIT dividend performance.

3. Empirical Methodology

Different econometric analysis methods are available to investigate causal relationship between and among variables on interest. Nittayagasetwat and Buranasiri (2012) used CIR model to check sensitivity of bond coupon to stock market return; Fei, Ding and Dang (2008) adopted MGARCH; Main et al

(2015) and Kryzonowski &Tcherednitvhenko (2007) employed regression model in their studies. The current study deployed Granger causality (G-Causal) model as a reliable econometric model for casual relationship, a form of regression to confirm the existence of the relationship and their statistical significance. Prior to analysing the causal effects, the study conducted series of tests for the dataset to ensure there reliability for prediction as required by Granger Causality Model (Granger, 1992; Engel and Granger, 1987). The tests are normality test, model fitness test while co-integration test were tested to check the time dynamic of the relationship.

3.1 Normality Test

Normality test is conducted to check if the distributions of a dataset are normal. The study deployed Jarque-Bera test. The test measures the significant difference of the skewness and kurtosis for the series with those from the normal distribution. The statistic is computed as

Skewness (SK)

$$E(R_{i,t} - \mu)^3 / \sigma^3$$

Kurtosis (KUR)

$$E(R_{i,t} - \mu)^4 / \sigma^4 .$$

Where μ is the mean and σ is the Standard Deviation

Jarque-Bera test

$$T[SK^2 / 6 + (KUR - 3)^2 / 24],$$

Null Hypothesis will be rejected if calculated Jarque-Bera statistical test is lower than the critical value of 5.99 (for small size sample) and p-value is more than 5% confidence level

3.2 Model Fitness Test

To ensure the reliability of the independent variables (MMI) employed in the prediction of variable explained (REITs dividend returns), the study conducted model fitness test for the dataset. The tests are multicollinearity test, unit root test and lag length criteria selection test.

3.2.1 Multicollinearity Test

The MMI include monetary policy rate (MPR), Treasury bill rate (TBR), inter-bank call rate (IBCR), savings deposit rate (SDR), net domestic credit (NDC), credit to private sector (CPS), Reserve (Base) Money (BsM), currency in circulation (CIC), broad money supply (BMS), bank reserves (BRs), currency outside banks (CoB), demand deposit (DdD), Quasi money (QuM), and prime lending rate (PLR) (Central Bank of Nigeria, 2016). However, in order to prevent sever autocorrelation among the independent variables, multicollinearity test was carried out and MMI such PLR, CIC, CPS, BMS and TBR were isolated for analysis. These variables were selected because they feature more on similar previous studies in other markets and data is available at the time of this investigation.

3.2.2 Unit root Test

The study deployed Augmented Dickey-Fuller test statistic (ADF t-statistic) test to conduct the unit root test for the independent variables in order to identify the degree of integration and ensure the series are stationary. Dickey and Fuller, (1979) expressed the hypothesis testing in Augmented Dickey-Fuller test statistic (ADF) model as theses:

$$y_t = \alpha\, y_{t-1} + x_t\, \delta + \epsilon_t$$

Null Hypothesis (H_0): Series has a Unit Root (Non Stationary);

Alternative Hypothesis (H_1): Series does not has a Unit Root (Stationary)

Condition for Acceptance or Rejection:

The null hypothesis (H_0) of a unit root is rejected in favour of the stationary alternative in each case if the test statistic is more negative than the critical value OR the probability is less than 5% (i.e. 0.05 levels)

3.2.3*Schwarz information criterion (SIC) Lag Length Selection*

The predictive power of granger causality, largely depend and influence by lag length structure (Asghar and Abid, 2007). Schwarz (1978) expressed the Schwarz information criterion (SIC) lag length selection criterion as follows:

$$SIC = n\ln(\sigma^2) + n^{-1}p\ln(n)$$

3.3 Co-integration Test.

Co-integration test shows the forms (short or long) relationship existing between variables. The study deployed Johansen Co-integration test to conduct time dynamic relationship between the dependent and independents variables. Johansen Co-integration test conducts two tests: Trace statistics and Max-Eigen Statistics. They are computed as follows ((Johansem, 1985)

Trace Rank Test

$$\Delta RE_t = \gamma_1 + \sum_{i=1}^{n} \Phi_1 \Delta RE_{t-i} + \sum_{i=1}^{n} \Gamma_1 \Delta X_{t-i} + \delta_1 (RE_{t-1} - \beta X_{t-1} - \alpha) + \varepsilon_{3t}$$

Max-Eigen Ranks Test

$$\Delta X_t = \gamma_2 + \sum_{i=1}^{n} \Phi_2 \Delta RE_{t-i} + \sum_{i=1}^{n} \Gamma_2 \Delta X_{t-i} + \delta_2 (RE_{t-1} - \beta X_{t-1} - \alpha) + \varepsilon_{4t}$$

The Hypothesis testing is given as
H_0: there is no co-integration relationship
H_1: there is co-integration relationship
Null hypothesis (H_0) is rejected if the probability value of null hypothesis is less than 5% and the Trace/Max-Eigen statistics is more than critical value at 0.05 level of significance.

3.4 Granger Causality Model

Given two stationary time series $X = \{X(t)\}_{t\epsilon Z,}$ and $Y = \{Y(t)\}_{t\epsilon Z}$ with the following information sets:

(i) I*(t), the set of all information in the universe up to time t, and
(ii) I*−X(t), the set of all information in the universe excluding X up to time t.
X is defined to Granger cause Y if

$$₱ [Y (t + 1) \epsilon A[I^*(t)] \neq ₱[Y (t + 1) \epsilon A[I^*_{-X} (t)]$$

3.4 Study Formulated Hypothesis

Previous studies had reported low performance of Nigeria REIT and some predictive studies of REIT performance carried out to analyse the factors that influences the N-REIT performance such as internal or economic factors of Size, NAV, FFO, Leverage among others and external factors of government policy, infrastructures, social unrest (Olanrele et al, 2014, Olanrele, 2016). Other studies have analysed the effect of macroeconomic factors on REIT return in across the REIT markets and in particular in Nigeria (Olanrele et al, 2017). In an attempt to unravel the low performance of N-REIT contrary to REIT market reports from other REIT Regimes, the current study intends to break down government policy and other macroeconomic factors which could affect money market and in turn have implication on REIT market. Some of the MMI that have been reported in other markets that are mentioned earlier in this paper were selected in respect of Nigeria REIT market. The formulated hypothesis to confirm the statistical significant relationship between N-REITs Dividend Yield and MMI are:

Null Hypothesis (H_o): There is no significant cause effect of MMIs on N-REIT Dividend Yield.

Alternative Hypothesis (H_1): There is no significant cause effect of MMIs on N-REIT Dividend Yield.

The null hypothesis (H_o) will be rejected in favour of alternative (H_1) in each case if the probability value is greater than 5% confidence level.

3.5 Description of Data and Model Specification

Dependent Variable(Y) comprises dividend yield of Skye shelter REITs over the study period (2008-2017).

Independents Variables (X) money market indicators include Treasury bill rate (3-month), prime lending rate, currency in circulation, corporate private sector and broad money supply as common in similar previous studies.

4 Results and Discussion

4.1 Normality of Data Distribution

The summary of test and analysis for Normality ADF-Unit Root Test, Vector Auto Regression and Vector Error Correction is presented in Table 1.Descriptive statistics of the normality test for the quarterly data series over the study period (2008-2016) was performed using skewness, kurtosis and Jarque-Bera tests. Analysis of skewness which measure the asymmetry distribution of data series around the mean showed that, SKR and TBR were negatively skewed having -0.2315 and -0.2745 value respectively. These imply that, more of the values in SKR and TBR dataset are lower than their mean value. On the other hand, indicators such as BMS, CIC, CPS and PLR have long-right tail (positively skewed) meaning that the dataset have more values higher than their mean values. However, the values of negative or positive skewness associated with the dataset were lesser than the critical value of standard error (± 1.96) which indicates that the dataset have not violated the assumption of normality. Kurtosis measures the peak or flatness of the series distribution. All the data series exhibited leptokurtic nature of data distributions around the mean value (peak) suggesting that frequency of the distribution is high for all the values. Jarque-Bera statistical test for the dataset confirmed the normally distribution of the data over the study period having the calculated values for all the variables lower than the critical value (5.99) for small sample size and the insignificant probability values ($p>0.05$). This showed that the data are normally distributed. The study inferred that the judgement emanating from the series will be unbiased and reliable.

Table 1: Summary of Tests and Analysis (Normality, ADF, VAR & VEC)

MMI	Normality Test			ADF-URT		VAR		VECM	
	Skewness	Kurtosis	Jarque-Bera	Level	1st Diff	Estimate	Chi-Square	Estimate	Chi-Square
CIC	0.1156	2.4043	0.6125	-0.2099	-4.7099*	0.11060	0.0756	-0.6273	0.3935
CPS	0.0544	1.8577	1.9751	-0.4374	-4.7099*	-1.63899	11.7484*	0.2947	0.8687
PLR	0.6720	3.2330	2.7917	-3.9472*	-4.6019*	-2.58374	16.5885*	-2.1400	4.5798
TBR	-0.2745	2.1806	1.4592	-1.5110	-4.7652*	3.35830	34.7776*	0.6241	0.3895
BMS	0.2856	1.9600	2.1120	0.7153	-6.0667*	0.90652	3.3716	0.3553	0.1262
SKYE	-0.2315	1.7700	2.5189						
Adjusted R^2						0.955620(95.56%)		0.543928 (54.39%)	

4.2 Data Screening and Model Fitness

The multicollinearity test (Table 2) showed that, the highest (absolute) correlation coefficient among the independent variables (MMI) is 0.8224 (82.24%) which exist between BMS and CIC. The confident valued is lower than the critical value of 0.9 0r 90% and above. This implies that the independent variables have no sever correlation issue which may adversely affect their predictive power and reliability of their probability value by making significant variables insignificant. The Augmented Dickey-Fuller test statistic (ADF t-statistic) unit root test (Table 1) revealed that PLR with p-vale (0.047) less than 5% confidence level and t-statistics value (-3.9472) less than critical value (-2.9484) implies the rejection of Null Hypothesis of unit root and accept the alternative hypothesis indicating that PLR is stationary at level (I0). Other MMI such as CIC, CPS, TBR and BMS were stationary at 1st difference with their probability (0.0001, 0.0006, 0.0005 and 0.0000 respectively) less than

0.05 level of confidence and their t-statistics (-4.7099, -4.7010, -4.7652 and -6.0667 respectively) higher than the critical value of –2.9511 implying the rejection of null hypothesis of unit root and accept the alternative hypothesis. Therefore, MMI (explanatory variables) passed the multicollinearity and unit root tests which show the suitability of the explanatory variable power to of the dependent variable (MMI) to confirm the causal relation and their statistical significance.

Table 2: Multicollinearity Test of Independent Variables (MMI)

	X_1	X_2	X_3	X_4	X_5
X_1	1.0000				
X_2	0.8224	1.0000			
X_3	0.7771	0.7989	1.0000		
X_4	-0.1097	-0.1796	-0.0462	1.0000	
X_5	0.4717	0.5645	0.5512	-0.4239	1.0000

X_1: BMS; X_2:CIC; X_3: CPS; X_4: PLR; X_5: TBR
Sever correlation at 90% and above

4.3 Co-integration of REITs Dividend returns and MMI

Table 3 presented the time dynamic relationship of REITs dividend return and MMI. The Trace statistics (t-stats) showed that, at most, three (3) number of co-integration exist among REITs dividend return and MMI having the hypothesised None*, At most 1* and At most 2* with their t-stats of 120.8278, 72.64862 and 50.18463 respectively more than critical value (95.75366, 69.81889 and 47.85613) and probability value less than 5% confidence level. By effect, it donates the rejection of the null hypothesis of no co-integration and accepts the alternative hypothesis.The complementary analysis of Max-Eigen statistics showed that, at most, one (1) number of co-integration exists among REITs dividend returns and MMI. The hypothesized None* Max-Eigen value of 48.17914 is more than the critical value of40.07757 with significant probability value ($p<0.05$) indicating rejection of null hypothesis of no co-integration rather accepts the alternative hypothesis. The Johansen co-integration test of Trace and Max-Eigen statistics conducted confirmed that, short and long term dynamic relationship exist between REITs dividend returns and the MMI

Table 5: Johansen co-integration test

Hypothesized No. of CE(s)	Trace Rank Test			Maxi-Eigen Rank Test		
	t-Stats	**CV (0.05)**	**P-Value**	**M-E Stats**	**CV (0.05)**	**P-Value**
None	120.8278	95.75366	0.0003	48.17914	40.07757	0.0050
At most 1	72.64862	69.81889	0.0292	22.46399	33.87687	0.5717
At most 2	50.18463	47.85613	0.0297	21.33066	27.58434	0.2567
At most 3	28.85397	29.79707	0.0639	17.51178	21.13162	0.1492
At most 4	11.34219	15.49471	0.1913	11.26784	14.26460	0.1413
At most 5	0.074343	3.841466	0.7851	0.074343	3.841466	0.7851

At 5% confidence Level

4.4. Causality Relationship of REITs Dividend Returns and MMI

Predictions of granger causality model for short and long term relationship were conducted using Vector Autoregression (VAR) model and Vector Error Correction Model (VECM) (Table 1). For short run analysis, MMI such as TBR, PLR and CPS with p<5% confidence level can granger cause N-REITs dividend returns while CIC and BMS having p>5% cannot granger cause N-REITs dividend returns in the VAR model. The VAR analysis indicates that, money market indicators such as Treasure bill, prime lending rate and injection to corporate private sector have statistical significant explanatory power to the prediction of variance in the performance of N-REITs dividend returns. VECM model for long run analysis (Tables 10-12 in the appendix) revealed that, PLR can granger cause N-REITs dividend returns having p-value (3.24%) less than 5% confidence level while other MMI such as TBR, CIC, CPS, and BMS with p-values more that 5% confidence level cannot granger cause N-REITs dividend returns in the VECM. By effect it implies that, there is a significant long-variance relationship between prime lending rate and N-REITs dividend returns.

The Johansen co-integration test result by both Trace and Max-Eigen values in Table 3 shows a co-integration between REIT return and MMI suggesting that previous time series data (values) of the MMIs can predict significantly the REIT dividend return in both short term and long term. This finding agrees with Swanson et al. (2002, Chui et al. (2003 and Mai'n et al. (2016). The causality test using VAR analysis indicate significant prediction power of MMIs (TBR, PLR & CPS) on REIT dividend return, the same way stock exchange return can be significantly predicted by macroeconomic variables as

reported by Islam (2003), Loo et al. (2016) and Olanrele et al. (2017). The finding of REIT return being significantly related to TBR corroborates similar relationship to bond coupon rate reported by Nittayagosetwat and Buranasiri (2012) and Astrious and Bogiazi (2013). The sensitivity of REIT return to PLR agreed with Kryzanowski and Tcherednitchenko (2007) who found REIT sensitive to interest rate as corroborated by Mai'n et al (2016). The result further show an insignificant causal relationship of REIT return by CIC and BMS suggest an insignificant effect of inflation on REIT return contrary to Mai'n et al. (2016) and Oni et al. (2011) but in agreement with Firth (1979), Fama& Gibbons (1988) and Marshall (1992). The VECM indication of PLR Granger causal relation with REIT return also support Chue et al. (2003), Kryzanowski and Tcherednitchenko (2007) and Mai'n et al. (2016).

5. Conclusions

The study is the first to consider Money Market Indicators predictive effect on REIT dividend return in Nigeria adopting the Co-integration test and Granger causality test. The Johansen co-integration test confirm the presence of REIT return prediction of MMI both in the short run (through Trace) and long run (using Max-Eigen values).VAR analysis revealed that 3 MMIs (TBR, PLR and CPS) have significant predictive power on REIT dividend return – a short run effect, while the VECM indicates that at least one MMI (PLR) have a significant predictive power of REIT return in the long run.The VAR model summary (Table 9) showed statistically significant ($p<0.05$) of short-variance relationship with 95.56% contribution to variance in the prediction. The standard error of the predictive model is low (20.59%) indicating a good predictive model (see tables 7-9 in the appendix). Summary of the model (Table 12) has p-value of 72.24% which is far above confidence level of 5% and contributed 54.39% to variance in the prediction. The study deduces that, there is no statistical significant relationship between N-REITs dividend returns and MMI in the long run. The standard error of the predictive model is low (20.36%) indicating a good predictive model. The study concludes that the MMI have both short run and long run effect in determining the REIT dividend return in Nigeria.

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Appendix

Table 4: Data Description and Model Specification

Variables	Coding Style
Nigeria Real Estate Investment Trust	N-REITs
Skye-Shelter REITs Dividend Returns	SKR
Treasury Bill Rate (3-Months (%))	TBR
Prime Lending Rate (%)	PLR
Currency-In-Circulation (₦)	CIC
Corporate Private Sector (₦)	CPS
Broad Money Supply (₦)	BMS

Table 5: Normality Test

	SKR	BMS	CIC	CPS	PLR	TBR
Mean	5.9610	14484.33	1423.764	13930.52	16.8398	8.8905
Median	5.8250	13774.16	1429.171	14727.53	16.6583	9.5000
Maximum	7.1500	23388.33	2179.174	22739.69	19.4233	14.7000
Minimum	4.0400	7948.369	891.8169	5964.327	14.883	1.7100
Std. Dev.	0.9710	4422.323	312.4762	4685.871	1.1135	3.6551
Skewness	-0.2315	0.285649	0.115624	0.054380	0.6720	-0.2745
Kurtosis	1.7700	1.959996	2.404323	1.857668	3.2333	2.1806
Jarque-Bera	2.5189	2.111986	0.612460	1.975125	2.7917	1.4592
Probability	0.2838	0.347847	0.736217	0.372483	0.2476	0.4820

*Jarque-Bera critical value for small sample size at 5% co**nfidence level is 5.99***

Table 6: Augmented Dickey-Fuller Unit Root Test *(Schwarz Information*

Series	No. of Obs.	Levels (5% Conf. Level)					1st Difference (5% Conf. Level)			
		Lag L	t-stats	Prob.	H_0		Lag L	t-stats	Prob.	H_0
CIC	35	4	-0.2098	0.9689	Accept		2	-4.7099	0.0001	Reject
CPS	35	0	-0.4374	0.8919	Accept		0	-4.7099	0.0006	Reject
PLR	33	2	-3.9472	0.0047	Reject		0	-4.6019	0.0008	Reject
TBR	35	0	-1.5110	0.5167	Accept		0	-4.7652	0.0005	Reject
BMS	35	0	0.7153	0.9908	Accept		0	-6.0667	0.0000	Reject

Criterion)

Critical Value at Level at is -2.9484 while at 1st Difference is -2.9511at 5% confidence level

Table 7: Vector Autoregression Estimates

Series	Co-efficient	Standard Error	t-Statistics
BMS	6.09E-05	6.7E-05	0.90652
CIC	3.96E-05	0.00036	0.11060
CPS	0.000105	6.4E-05	-1.63889
PLR	-0.128847	0.04987	-2.58374
TBR	0.074596	0.02221	3.35830

Table 8: Vector Autoregression(VAR) Model

Series	Chi-sq	Prob.
TBR	34.77762	0.0000
PLR	16.58851	0.0000
CIC	0.075610	0.7833
CPS	11.74842	0.0006
BMS	3.371558	0.0663
All	48.27293	0.0000

Dependent variable: SKR, 5% confidence level

Table 9: Model Summary

R-squared	0.963689	Mean dependent var	5.982279
Adjusted R-squared	0.955620	S.D. dependent var	0.977369
S.E. of regression	0.205899	Sum squared resid	1.144648
Durbin-Watson stat	1.283419		

Table 10: Vector Error Correction Estimates

Series	Co-efficient	Standard Error	t-Statistics
D(BMS)	2.17E-05	6.1E-05	0.35527
D(CIC)	-0.000234	0.00037	-0.62726
D(CPS)	2.31E-05	7.8E-05	0.29473
D(PLR)	-0.124506	0.05818	-2.14004
D(TBR)	0.014892	0.02386	0.62410

Table 11: Vector Error Correction Model

Series	Chi-sq	Prob.
D(TBR)	0.389498	0.5326
D(PLR)	4.579782	0.0324
D(CIC)	0.393453	0.5305
D(CPS)	0.086866	0.7682
D(BMS)	0.126219	0.7224
All	6.415365	0.7224

Dependent Variable: SKR, 5% confidence level

Table 12: Model Summary

R-squared	0.643694	Mean dependent var	0.036742
Adjusted R-squared	0.543928	S.D. dependent var	0.301541
S.E. of regression	0.203640	Sum squared resid	1.036729
Durbin-Watson stat	2.100937		