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SENSITIVITY OF REAL ESTATE INVESTMENT RETURN TO MARKET RETURN INDEX: THE CASE OF NIGERIAN REAL ESTATE INVESTMENT TRUSTS

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Abstract: The level of sensitivity of every investment option to a market index is crucial to investors. Sensitivity analysis of individual or a set of returns on investments to market return index predicts the reaction of the investment(s) to changes in the market index; informs investors of prospective performance of different investments types; as well as assists the investors in making appropriate decisions on investment selections. This paper assessed how sensitive indirect real estate investments in Nigeria were to market index. The three companies whose asset returns were considered in this study were real estate investment trusts listed in the Nigerian Stock Exchange. The data used in this study were sourced from annual reports of the listed companies, and reports of the Nigerian Stock Exchange. The beta coefficients were used to determine the sensitivity of the selected stocks to market return index. The study found a very low and insignificant beta coefficient among various real estate investments and market return index. Hence, there is no relationship between the market return index and the returns on the Real Estate Investment Trusts listed in the Nigerian Stock Exchange.

Keywords: *Market index, real estate investment, real estate investment trusts, returns, sensitivity analysis*.

INTRODUCTION

Isaac (1998) defined investment as an asset that produces income or capital growth, which will convert to income during or at the end of the asset life. It involves the sacrifice of something in the present (not only economic resources) with the prospect of obtaining benefits in the future. Investments in real estate primarily can be executed in two forms – one way is direct ownership of leasehold properties, and ownership of property units in Real Estate Investment Trusts (REITs) (Scarrett, 2008; Wyatt, 2013). REITs are special purpose vehicles/companies usually listed in a stock exchange. These companies own income-yielding real estate, and investors can purchase shares derived from the ownership of that real estate. According to Oreagba (2010), REITs use the pooled capital of many investors to purchase and manage income property and/or mortgage loans.

It is believed that REITs would follow the behaviour of the investment market where they operate. Thus, it is of benefit to the real estate investor that the predictors of indirect real estate investment returns be identified, as well as the degree of

responsiveness of real estate investments to those predictors. Accordingly, the importance of the stock market in predicting investment returns or performance was revealed by Morck *et al*. (1990) who noted that the ability of stock returns, referred to as market return index, to predict investment was a well-established fact. The market index is a metric that tracks the performance of a group of stocks. This index is designed to indicate the overall performance of the stock market. Thus, the opinion of Morck *et al*. (1990) seems rooted in strong logic, since an aggregate of the totality of the stock performance should ordinarily show the direction of the performance of the individual stocks listed in the market.

Sensitivity refers to the prediction of a change in a dependent variable due to a unit change in an independent variable. Therefore, Hargitay and Yu (1993) noted that sensitivity analysis in the investment analysis space was the process of exploration of the change in the projected outcome of the investment resulting from the change in one of the factors of the project. This factor is seen to influence the outcome of the investment.

Globally, there are various studies (Chen and Tzang, 1988; Morck *et al*. 1990; Giliberto, 1990; Mueller and Pauley, 1995; Eichholtz and Hartzell, 1996; Allen, Madura and Springer, 2000; Oyenga, 2013) on the sensitivity of real estate investment returns. The studies have focused on examining the sensitivity of real estate investment returns to market variables, such as stock market (market index), short- & long-term interest rates.

Despite the abundance of studies on the sensitivity of real estate investment returns globally, a few or no studies have been carried out in Nigeria. A few studies (Emele and Umeh, 2013; Olanrele, Said, Daud and Ab Majid, 2015; Ekemode and Oyewole, 2017) focused on performance and diversification benefits of REITs relative to other investment options. For example, Aro-Gordon, Bashir, Abdulsalam and Abdullahi (2014) focused on the relationship between Nigerian REITs (Skye-Shelter) and market return index.

Hence, the gap identified in these studies is the absence of enquiry into the sensitivity of real estate investments to a unit change in market return index. The present study is therefore concerned with examining the sensitivity of total returns of REITs to growth in market return index of Nigeria. The focus on REITs, as opposed to other forms of real estate investments, is because they are the class of real estate investments that are traded on the stock market.

1. STOCK MARKET AND REAL ESTATE INVESTMENTS

According to investopedia.com, the stock market refers to the collection of markets and exchanges where regular activities of buying, selling, and issuance of shares of publicly held companies take place. Oyenga (2013) viewed the stock market as a liquid market where cash flows can be generated quickly as opposed to the real estate market. The stock market is often viewed as a measure or index of the macroeconomic situation of a country (Hautcoeur, 2006).

In terms of the relationship between the stock market behaviour and the performance of stocks listed therein, the Capital Asset Pricing Model (CAPM)

suggests that the expected excess stock return depends on its sensitivity to the expected market return. Beta is the measure of this sensitivity, with beta being (1.0) when the stock returns behave identically to the stock market portfolio returns over time (Khalil, 2013). Thus, the sensitivity of real estate investments to market index gives information on how real estate investments interact with the stock markets. Investors will like to have information on how their investments interact with the general market climate. Thus, the stock market indices have become the focus of interest of different groups of people, especially investors (to which real estate investors belongs) seeking the right mix for their portfolio (Hautcoeur, 2006). Studies, for example, by Giliberto (1990) established that stock and bond market movements heavily influenced equity real estate investment trust performance, but had a relatively minor effect on un-securitized real estate returns as measured by the Russell-NCREIF Property Index.

Estimation of Beta

The concept of beta evolved from the Capital Asset Pricing Model. It describes the relationship between investment returns and the market return index. Beta determines the sensitivity of a particular investment to changes in market return index (Chandra, 2008). It provides information on the sensitivity of each asset to the happenings in the market in a linear relationship format $R_i = \alpha + \beta_i \check{R}_M + e_i$, where R_i – represents the return of the investment; α – represents risk-free rate/constant for all asset (or intercept); β_i – represents the beta coefficient/slope; $\check{R}_M$ – represents the market return index; e_i – represents the error term.

Implications of Beta Values

The beta value of +1 implies that a one per cent change in the market return index would cause exactly a one per cent change in the investment return. It indicates that the investment moves in tandem with the market index.

A beta value of +2 implies that a one per cent change in the market return index would cause a 2 per cent change in the investment return indicating that the investment return is more volatile. When there is a decline of 15 per cent in the market return index, the investment with a beta of 2 would produce a negative return of 30 per cent. Investments of beta values above one are said to be very aggressive, while lower beta values less than one are said to be non-aggressive. Investment with a beta value being less than one has a moderate beta value telling us that the sensitivity of investment to expected changes in the market index is at the same magnitude to that change. Negative beta values indicate that the stock return moves in the opposite direction to the market return. Investment with a negative beta of −1 would provide a return of 5 per cent if the market return declines by 5 per cent.

2. OVERVIEW OF REIT PERFORMANCE

Hoesli and Lizieri (2007) opined that the performance of REITs could be explained in terms of their operational success, which was revealed in the profitability to the investors. The study noted that returns on REITs were derived from dividend yield and share price appreciation of the REITs. The study also revealed that REITs markets proved to be extremely successful in the United States of America, Australia, and in the emerging REIT markets in Asia and Europe.

Chan, Erickson and Wang (2003) found out that REITs outperformed the stock market at a specific period with a risk-adjusted return, while they underperformed the stock market in the long run. The study noted that the unstable performance trend was traced to the unstable property market behaviour and cyclical periods. Nevertheless, this is not the case for Nigerian REITs. Olanrele, Said and Daud (2015) showed that REITs in Nigeria underperformed, which was a deviation from the strong performance of REITs in other markets such as the Unites States of America, Europe and Asia. They attributed this underperformance to low capitalisation. Their findings were validated by the study of Dabara, Tinufa, Soladoye, Ebenezer and Omotehinse (2018), who also observed a low level of the financial structure of Nigerian REITs.

3. STUDIES ON SENSITIVITY OF REAL ESTATE INVESTMENTS

Presently, many studies on the sensitivity of real estate investments are foreign-based to Nigeria, with preponderance towards the United States of America. One study is that of Chen, and Tzang (1988) who examined whether REITs in the United States of America were sensitive to changes in short-term and long-term interest rates. The study found that REITs were sensitive to only changes in the long-term interest rates in the period of 1973–1979, but from 1980 to 1985, REITs were sensitive to changes in both short-term and long-term rates. Results of the study suggested that the sources of interest rate sensitivity were different for equity and mortgage REITs. Furthermore, equity REITs were sensitive to changes in expected inflation, whereas mortgage REITs were sensitive to both changes in expected inflation and changes in the actual inflation.

For example, in their study Mueller and Pauley (1995) examined the effect of interest rate movement on prices of REITs in the United States of America. The study hypothesized that interest rates would be the influencing factor behind changes in prices of REITs. The study determined the correlation values and regression betas of the variables (interest rates and prices of REITs) and found that changes in interest rates affected REIT prices, though noting that the relationship was very complex, and there might be other factors affecting REIT prices.

Eichholtz and Hartzell (1996) broadened the scope of focus by examining the relationship between property share returns and stock market of three countries, namely: the United States of America, the United Kingdom and Canada. The study found that there was a strong but different nature/degree of relationship between property share returns and the stock market in all three countries. According to the

study, amongst the three countries, the property share returns of the United States of America possessed the least beta value (sensitivity) to the stock market. The beta and coefficient of determination values for the relationship between property share returns and stock market in the three countries was as follows: in Canada – 1.23 & 0.26; in the United Kingdom – 1.09 & 0.62, and the United States of America – 0.73 & 0.43. The study concluded that the causes of differences in property share betas across countries were unclear.

The conclusion of Eichholtz and Hartzell (1996) somewhat agrees with that of Mueller and Pauley (1995) that the causes of differences in property share betas are unclear. This study is very important because it reaffirmed the findings about the sensitivity of property investments to market index.

Allen, Madura and Springer (2000) examined the sensitivity of REITs in the United States of America to test for a relationship between REIT returns and stock market and interest rate changes. The study tested whether the sensitivity of REIT returns to the stock market and interest rate changes was influenced by REIT characteristics such as asset structure, financial leverage, management strategy, and degree of specialization in the REIT portfolios. The study used the S&P 500 Composite Index as a proxy to market return index and used a 10-year yield on constant maturity Treasury securities and a one-year yield on constant maturity Treasury securities as proxies for long- and short-term interest rate. The results of the study suggested a significant and positive relationship between changes in stock market returns and non-equity REIT return. While there is an insignificant market beta coefficient for equity REITs, the findings of the study imply that there is a high sensitivity of non-equity REITs to change in market returns, which means that an increase in the market returns will lead to an increase in the non-equity REIT returns and vice versa. Also, there is a low sensitivity of equity REIT returns to change in market returns.

Research on the sensitivity of real estate investments is not focused solely on the United States of America and Europe. Other studies focused on other parts of the world, such as Africa, include the study by Oyenga (2013), who examined the relationship between real estate investment returns and the stock market returns in Kenya. The study compared the indices of both the stock and real estate markets in the period of 2008–2012. The study used the Nairobi Stock Exchange 20 share index as a proxy for the stock market returns and Hass property index as a proxy for the real estate data (due to the absence of REITs). The data collected was analysed using regression analysis and Pearson's correlation coefficient; control variables that were introduced in the models were inflation rates and interest rates. These tests enabled the study to determine the nature and extent of the relationship between the two variables (stock market and real estate index). The results of the study suggested that there was a relationship between stock market returns and real estate investment returns when there were no control variables in the model, but there was greater impact and relationship when there were controls introduced in the models.

Aro-Gordon, Bashir, Abdulsalam and Abdullahi (2014) examined the performance between Nigerian REITs and market returns. Skye shelter REIT

returns and prices were used as a proxy for Nigerian REITs, while market price earnings ratio was used as a proxy for market returns. The period of coverage adopted by the study was four years (from 2008 to 2011). The study found that there was no significant correlation between REITs and market returns with a very low coefficient of determination of (0.122). Furthermore, the study also found that the beta value of the REITs to market returns was 3.54, which was far >1. The implication of the findings of Aro-Gordon *et al*. (2014) is that the REITs are highly sensitive to growth in market returns, as a unit change in the market returns will lead to a more than three times change in the REITs, in the same direction of the market returns. Nevertheless, due to the small sample size used (one REIT) and the small period of coverage (less than five years), one can call into question the statistical significance of the findings of the study.

4. DESIGN, METHODOLOGY AND DATA

The data used in this study were sourced from the annual reports of REITs listed in the Nigerian Stock Exchange – SFS Reits (formerly Skye Shelter Reits), Union Homes Reits and UPDC Reits. The data include the dividend and share price of REITs, which served as input in determining the total returns for the securities. The returns formula for the real estate investment trust securities:

$$R_t = \frac{P_i - P_0 + D_i}{P_0} \ , \tag{1}$$

where

R_t – represents return in period t;
P_i – represents the price of the shares at the end of the period;
P_0 – represents the price of the shares at the beginning of the period;
D_i – represents the dividend(s) received in the period t.

The All Share Index was sourced from the annual reports of the Nigerian Stock Exchange (NSE), and it served as input for market return index. The returns formula for the market index:

$$R_t = \frac{P_i - P_0}{P_0}, \tag{2}$$

where

R_t – represents market return index in period t;
P_i – represents All Share Index at the end of the period;
P_0 – represents All Share Index at the beginning of the period.

The Ordinary Least Square Regression method was adopted in this study to determine the sensitivity of the returns on the real estate investments to changes in market return index. The equation is as follows:

$$y = a + bx + e, \tag{3}$$

where

y – represents the dependent variable, i.e., the estimated value of y for a given *x* (in this case, the total returns from the investment);

a – represents the intercept or constant; a is that value of y when *x* equals zero;

x – represents the independent variable (market return index in this case);

b – represents the unstandardized beta. This tells us the sensitivity of variable *y* (returns on real estate investment) to a unit change in variable *x* (market return index), i.e., it tells the extent of change in the value of *y* when *x* changes by one unit;

e – represents the error term or unexplained variance, i.e., how much of variation in the dependent variable is not explained by the unit change in the independent variables. It is determined by $(1- r^2)$, where r^2 (coefficient of determination) is the square of the correlation coefficient (*r*).

The formulas for *b* and *a* are as follows:

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - \left(\sum x\right)^2}; \tag{4}$$

$$a = \frac{\sum y - b\sum x}{n}. \tag{5}$$

5. DATA PRESENTATION AND ANALYSIS

Table 1 presents the market index as well as the dividend and share price of selected REIT stocks listed on the Nigerian Stock Exchange. The All Share Index of the Nigerian Stock Exchange was used as a proxy for market index. This practice was established in previous related studies (Eichholtz and Hartzell, 1996; Allen, Madura and Springer, 2000) due to the absence of a defined property market index. It should also be noted that Union Homes REITs commenced operations in 2008, while UPDC REITs commenced operations in 2013. Thus, the data for the preceding years 2007 and 2007 to 2012, respectively, are not available.

Table 2 presents the market return index and total returns for the selected REITs. One can observe that there are outliers as well as fluctuations in the market return index and total returns for the real estate investments, which is an indication of market volatility. This observation aligns with the findings of Lu and Mei (1999) that property investment returns in emerging markets are volatile. A study by JLL and Stanbic IBTC Bank in 2018 noted that the REIT market in Nigeria was underdeveloped and underutilised with a paltry number of REITs and a low capitalisation value. There is a possibility that these findings by JLL and Stanbic IBTC Bank may have led to the poor and fluctuating returns observed.

A high degree of fluctuations and the presence of outliers in the market return index, according to Khalil (2013), are indicative of global economic boom and bust experienced by the stock market.

Table 1. Market Index, Dividend and Price of Selected Real Estate Investment Trust Stocks

Year	**Market Index**	**SFS REITs**		**Union Homes REITs**		**UPDC REITs**	
		Dividend, ₦	Price, ₦	Dividend, ₦	Price, ₦	Dividend, ₦	Price, ₦
2007	48,773.30	0	100	N/A	N/A	N/A	N/A
2008	50 424.70	4.65	117.42	0	50	N/A	N/A
2009	23 091.55	7	103.21	4.01	50	N/A	N/A
2010	24 775.59	6.4	99.55	0.75	50.85	N/A	N/A
2011	23 453.28	4.04	98.55	2.27	50	N/A	N/A
2012	23 466.75	5	100	2.41	50	N/A	N/A
2013	36 198.48	5.25	100	2.41	50	0	10
2014	36 540.28	5.8	98.56	2.13	48.54	0.31	9.5
2015	28 642.25	7.15	100	0	45.55	0.43	9.78
2016	26 874.62	7	100	0	45.22	0.23	10
2017	38 243.19	8	100	0.75	45.22	0.34	10
2018	37 286.11	7	95	0.0175	45.2	0.57	6.6
2019	28 880.63	7	87.5	0.0175	42.2	0.58	5.26

Source: NSE, Annual Financial Statements of SFS REITs, Union Homes REITs and UPDC REITs

Table 2. Market Return Index and Total Returns for Selected Real Estate Investments

Period	**Market Index returns**	**SFS REITs**	**Union Homes REITs**	**UPDC REITs**
2008	3.39	22.07	N/A	N/A
2009	−54.21	−6.14	8.02	N/A
2010	7.29	2.65	3.20	N/A
2011	−5.34	3.05	2.79	N/A
2012	0.06	6.54	4.82	N/A
2013	54.25	5.25	4.82	N/A
2014	0.94	4.36	1.34	−1.90
2015	−21.61	8.72	−6.16	7.47
2016	−6.17	7.00	−0.72	4.60
2017	42.30	8.00	1.66	3.40
2018	−2.50	2.00	-0.01	−28.30
2019	−22.50	−0.53	−6.6	−11.52

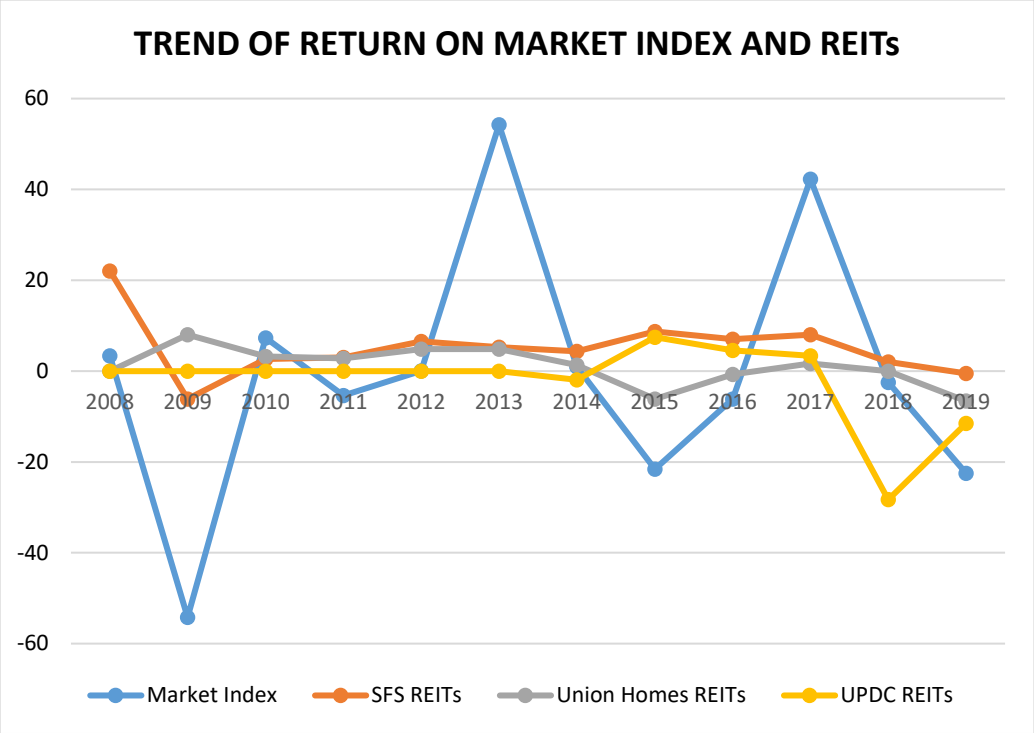

Fig. 1. Trend of returns on indirect real estate investment and market index.

Table 3 presents the results of the regression analysis for each of the selected REIT.

Table 3. Sensitivity of the Investment Returns to Growth in the Market Index

Investment	**α**	**β**	***r***	r^2	$e = 1 - r^2$	**Sensitivity**
SFS REIT	0.053	0.095	0.358	0.16	0.84	Low Sensitivity
Union Homes	0.012	0.023	0.153	0.023	0.977	Low Sensitivity
UPDC REIT	−0.047	0.083	0.147	0.026	0.974	Low Sensitivity

A unit change in market return index will lead to an insignificant (0.095) change in returns on SFS REITs. For Union Homes REITs, a unit change in market return index will lead to an insignificant (0.023) change in returns. Finally, for UPDC REITs, a unit change in market return index will only cause a 0.083 change in returns.

From the foregoing, the results of the real estate investments showed very low beta values when regressed against the market return index. Also, the investments showed low correlation values, low values of the coefficient of determination and very high error margins.

The results of the analysis suggest that there is low sensitivity of real estate investment returns to changes in market return index. This is due to very low beta values observed in the regression analysis. The implication is that the returns on the real estate investments hardly respond to a change in market return index. Thus,

growth or decline in the market return index will not be statistically able to predict or cause growth or decline in real estate investment outcomes. This result disagrees with results of related studies (Chen and Tzang, 1988; Mueller and Pauley, 1995; Eichholtz and Hartzell, 1996; Allen, Madura and Springer, 2000; Oyenga, 2013). All these studies revealed to a certain extent that real estate investment returns are sensitive to growth in market return index.

CONCLUSION AND RECOMMENDATION

The present study examined the sensitivity of total returns of real estate investment returns in Nigeria to changes in market return index. The returns of the selected REITs showed a very low sensitivity to changes in market return index. Thus, the nature of the relationship between the market return index and the real estate investments cannot be credibly gauged due to very low beta values observed in the regression analysis. For that reason, the study concludes that changes in market return index will not predict changes in real estate investment returns in Nigeria.

Consequently, the study recommends that investors be wary of low sensitivity of real estate investment returns to changes in market return index and should consider other factors when attempting to predict changes in real estate investment returns.

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