

ANALYSIS OF THE RELATIONSHIP BETWEEN INFLATION AND INDIRECT REAL ESTATE INVESTMENTS IN NIGERIA

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Abstract

The study aims at investigating the relationship between inflation and securitized real estate investments in Nigeria with a view to providing information for informed investment decisions. The timeframe for the study covers between 2007 and 2016. Population for the study comprised all securitized real estate companies in Nigeria. Data for the study were collected from the databases of the aforementioned companies. The data comprised share prices and dividends of the respective companies as well as inflation rates. The data were analyzed by means of descriptive and inferential statistical tools. Findings from the study revealed that the return profile of REITs and non REITs equities in Nigeria had some level of volatility, with the non REITs outperforming the REITs investment asset (the highest returns obtained from REITs investment was 5.43%, while the highest returns for the non REITs was 41.79%). Inflation was seen to be mostly in double digits and had kept increasing throughout the study period, ranging between 4.37 and 18.45. The study suggested a perverse hedging characteristics for all the securitized real estate investments. Findings from the study can be useful for investment forecast and investment decisions as regards the type of asset to include in an investor's portfolio, taking to consideration the influence of inflation on such asset(s).

Keywords: *inflation, investments, real estate, risk, volatility.*

1. Introduction

The influence of inflation on investment returns of various asset classes have remained a primary challenge to investors. Previous studies have shown that during periods of inflation, some investment assets were observed to underperform, some co-moved at the same rate with inflation, others outperformed specified benchmarks, while others provided negative return values (Arnason and Persson, 2012; Dabara, Tinufa, Soladoye,

Ebenezer and Omotehinshe, 2018). Analysis of specific investment assets in respect of their response to inflation is very important as this will guide investors in making informed investment decisions. The major theory underpinning the relationship between inflation and investment returns is the Fama and Schwert (1977) theory on inflation hedging. The debate on inflation and investment returns pioneered by Fama and Schwert (1977) have produced an extensive literature. Studies that made up such literature includes investigations of the inflation hedging characteristics of asset classes such as: investments in real estate, REITs (Real Estate Investment Trusts), gold, stocks, commodities, bonds, antiques, equities, and shares among others (Dabara, Ogunba and Araloyin, 2015). The results of these studies have shown a varying pattern, indicating that there is no consensus on the hedging characteristics of various asset classes in different parts of the world.

An asset is said to be a hedge against inflation if it provides certain degree of protection against a rise in the general level of prices of goods and services in an economy (Arnasosn and Persson, 2012). Nigeria is presented in this paper as a case study of an African emerging country where the property market is opaque with a high degree of property market immaturity and dearth of literature on hedging capabilities of indirect investments in real estate for prospective investors' consideration.

In the real estate sector, investors have the option of investing in either direct or indirect real estate investment assets (Blau, Nguyen and Whitby, 2015; Ankeli, Dabara, Oyediran, Guyimu and Oladimeji, 2015). Investments in direct real estate assets implies the acquisition and management of physical properties such as residential and commercial buildings (Lee and Ting, 2009). Investments in indirect real estate on the other hand, denotes investing in a product whose performance is based on some measure of property performance; this includes buying shares or equities in a publicly quoted REITs or non REITs listed property companies (Kim, 2009, Li and Chow, 2015). Unlike investments in direct real estate assets, which were observed to be hampered by its need for huge capital outlay and maintenance cost; the indirect form of investment in real estate was rather seen to be characterized by a more flexible financial requirement which accommodates different categories of investors irrespective of their financial capabilities. Furthermore, it was observed to have been providing

an encouraging investment returns that makes them very attractive to investors (Devos, Ong and Speiler, 2016).

In Nigeria currently, there exist three REITs companies namely: Skye shelter fund REITs, Union Homes REITs and UPDC REITs. Similarly there is only one listed non REITs property company which is the UACN Property Development Company. These companies are listed on the Nigerian Stock Exchange (NSE) with a combined market capitalization of about ₦72,050,847,955 which is equivalent to \$234,693,316 (Dabara, et al. 2018).

In global markets, real estate investment asset classes are perceived to be good hedges against inflation (Dabara, 2014). This assertion was tested by studies such as Leung (2010); Lee (2012) and Dabara (2015) among others. Findings from these studies were observed to be divergent and conflicting. Some specific studies conducted in African property markets included Akinsomi, Kola, Ndlovu and Motloung (2016) which investigated the performance of the broad based black economic empowerment (BBBEE) of both listed and delisted property firms in South Africa. The study found that Black Economic Empowerment (BEE) compliant firms outperformed the non-BEE compliant firms with respect to both returns and risk performance. In the same vein, Ntuli and Akinsomi (2017) found that South African REITs are good return-enhancers. In Nigeria, relevant performance studies on real estate investments included the studies carried out by Odu (2011), Ogunba (2013) and Dabara and Ogunba (2019) among others. However, no study so far to the best of the authors' knowledge have looked at the relationship between inflation and indirect real estate investments. This study attempted to fill this observed gap in literature. Hence, the aim of the study is to examine the relationship between inflation and indirect real estate investments in Nigeria with a view to providing information for local and international portfolio investment decision making. The specific objectives of the study are to examine the return profile of REITs and non REITs equities investments in Nigeria within the study period; determine the inflation trend in the study area and analyze the relationship between inflation and indirect real estate investments in the study area.

The remainder of the paper is structured as follows: Section 2 provides a brief literature review, section 3 presents the methodology adopted for this study, section 4, presents and discusses the results obtain from the study and section 5 concludes the study.

2. Literature Review

In an effort to address their concerns, investors and researchers all over the world are re-examining the capacity of various asset classes to offer inflation hedge, should inflation become problematic. Hence, vast literature investigated the inflation hedging characteristics of various asset classes in both developed and developing economies. The earliest empirical study on the relationships of asset returns and inflation was carried out by Fama and Schwert (1977). This forms the theoretical base upon which subsequent studies in this field were anchored. The authors examined the extent to which various assets were hedges against inflation rates between 1953 and 1971 in the US. The authors used the Ordinary Least Square regression model to analyze the inflation hedging characteristics of these assets. Findings from this study showed that private residential real estate was a complete hedge against inflation in the study area.

Most subsequent studies have followed the Fama and Schwert (1977) model with various modifications. In Nigeria for example, Bello (2005) carried out a comparative analysis of the inflation-hedging attributes of residential investments in real estate, ordinary shares and naira denominated deposits between 1996 and 2002. Findings from the study showed that real estate investment does not hedge against inflation in Nigeria. In another Nigerian study conducted by Odu (2011), it was shown that there were variations in the hedging capacities of office property types in Victoria Island and Ikeja. In Dabara (2014, 2015) findings indicated that in Akure, commercial properties provided perverse inflation hedge while in Gombe, residential properties provided a partial hedge against inflation. These findings are congruent with similar study conducted by Dabara, Uwaezuoke, Omotehinshe, Lawal and Ebenezer (2018). All these Nigerian studies focused on direct real estate investments, none considered indirect real estate investments.

Terahni, Zarei and Parirokh (2012) investigated the short term and long-term inflation hedging effectiveness of direct real estate investments in some countries in emerging economies. The study employed the co-integration model for data analysis. Findings from the study showed that the Third World Countries of emerging economies' small and medium size residential property, provides an effective hedge against inflation. The study also revealed that residential properties in Third World Countries have been a better short term and long term inflation hedge than stock and time deposit. Similar results were found in a study conducted in Malaysia

by Newell and Osmadi (2010). However, in studies conducted in developed economies, there seems to be no consensus as regard the inflation hedging capacities of real estate investments. For example in China, Zhou and Clements (2010) found that Chinese real estate was not an effective inflation hedging asset. Arnason and Persson (2012) found similar results in Sweden. Contrary to the aforementioned, Park and Bang (2012) found that Korean commercial real estate serves as both short and long-run inflation hedge. Other studies includes: Chiang and Tang (2008) which focused on real estate investments in China; similarly the study of Newell, Wu, Chau and Wong (2010) focused on Hong kong' real estate. The results of these studies have shown a varying pattern which are not congruent with each other.

However, certain gaps were observed to exist in the aforementioned studies: First, most of the studies were conducted in developed economies such as the US, Canada, Sweden etc. The emerging property markets of developing economies like Nigeria possesses great investment opportunities for property investors and accordingly deserve in-depth studies of the hedging capability of its real estate investments to assist prospective investors. Second, it was observed that most of the studies were carried out on investment in direct real estate asset classes such as residential and commercial properties, REITs and other listed real estate equities from emerging African markets which are equally important and profitable to investors, have hitherto been notably under investigated. Third, the time frames for which most of the studies were carried out needs to be updated due to the fact that inflation is a time related phenomenon; hence an updating of the time frames for such time series studies is imperative. It is necessary to continuously update the time period of this kind of study to reflect the current market situation due to the dynamism associated with both inflation and the real property market. Finally, in Nigeria dearth of literature in this field is particularly amplified; this presents a compelling motivation for this study.

3. Methodology

This study followed the Fama and Schwert (1977) model of analyzing the relationship between real estate returns and inflation. However, the study improved on prior Nigerian studies such as Bello (2005), Odu (2011) and Oluwasegun and Dabara (2013) by first testing for the stationarity of the data set used and focusing on a hitherto unconsidered major real estate

assets classes (REITs and non REITs listed real estate equities) in Nigeria. The population for the study comprised all securitized real estate companies in Nigeria namely Skye Shelter Fund REITs, Union Home REITs, UPDC REITs and UACN Property Company. The data required for the study were data on share prices and dividends of the selected asset classes as well as data on inflation between 2007 and 2016. The data on share prices and dividends were sourced from the databases and quarterly reports of the Skye Shelter fund REITs, Union Homes REITs, UPDC REITs, and UACN Property Development Company respectively. The data on inflation was obtained from the quarterly reports of the Nigerian National Bureau of Statistics. The data obtained were treated as follows: first, the data on share prices and dividends were used to calculate the income, capital and total or holding period returns from investments in both the REITs and non REITs assets in Nigeria.

The income return is expressed as follows

$$IR_t = \frac{NI_t}{CV_{t-1}} \quad (1)$$

Where:

- IR_t = income return for period t
- NI_t = Net income received in period t (dividend)
- CV_{t-1} = CV at the end of period t-1 (Share prices)

The capital return is expressed as

$$CR_t = \frac{CV_t - CV_{t-1}}{CV_{t-1}} \quad (2)$$

Where:

- CR_t = Capital return for period t (Share prices)
- CV_t = CV at the end of measurement period (Share prices)
- CV_{t-1} = CV at the start of period t-1 (Share prices)

The total return is expressed as

$$TR_t = \frac{NI_t + (CV_t - CV_{t-1})}{CV_{t-1}} \quad (3)$$

TR_t = Total return

CV_{t-1} = Capital value of N-REITs at the beginning (Share prices)

CV_t = Capital value of N-REITs at the end (Share prices)

NI_t = Income of N-REITs received during the holding period

Second, data on inflation rates and holding period returns of the selected investment assets were analyzed by means of trend analysis. Third, an initial test for the stationarity properties of the data sets using the Kwiatkowski-Phillips-Schmidt-Schin (KPSS) as well as the Philip-Perron (PP) was undertaken. This was important so as to avoid spurious results in subsequent analysis and to efficiently capture the relationship between the variables.

Fourth, following the determination of the stationarity of the data sets, the dependent variable (returns on both REITs and non REITs listed properties in the study area) was regressed against the independent variable (inflation rates in the study area) using the Fama and Schwert (1977) regression model to determine the inflation hedging characteristics of investment asset classes under consideration.

The regression equation is expressed as:

$$R_{jt} = \alpha_j + \beta_j E(\Delta_t | \phi_{t-1}) + \gamma_j [\Delta_t - E(\Delta_t | \phi_{t-1})] + \varepsilon_{jt} \quad (4)$$

Where:

R_{jt} is the nominal return (could be measured in income return or capital return term) on real estate type j from period t-1 to t;

α_j is the intercept term in the regression model, it reflects the real return on real estate type j from period t-1 to t;

β_j is the slope coefficients for expected inflation for real estate type j with respect to income return or capital return;

$E(\Delta_t | \phi_{t-1})$ is best estimation of the expected value of inflation rate in time t Δ_t based on the information set available up to time t-1, denoted as ϕ_{t-1} ;

Δ_t is the true value of observed inflation rate from period t-1 to t;

γ_j is the slope coefficients for unexpected inflation for real estate type j with respect to income return or capital return;

$\Delta_t - E(\Delta_t | \phi_{t-1})$ is used to measure shocks after acknowledgement of true inflation rate Δ_t , or rather the unexpected or unanticipated inflation rate, which is known in time t;

ε_{jt} is the error term for return of real estate type j from period t-1 to t.

4. Results and Discussions

This section presents the results and discussions of results obtained for the study. Table 1 shows the real estate companies listed on the Nigerian Stock Exchange. This is made up of both REITs and non REITs companies.

From Table 1 below, it was shown that the UACN property company (the only non REIT real estate company listed on the Nigerian Stock Exchange) was the first indirect real estate company established in Nigeria in the year 1991. It also has the highest number of shares as well as the highest market capitalization (\$98,422,231) when compared to others. The Skye Shelter REITs was the first REIT Company to be established in Nigeria (in the year 2007) however, it has the lowest market capitalization (\$6,514,658). The sector has a combined market capitalization of about \$234,693,316. This is quite small when compared to the market capitalization of similar real estate equities listed on the stock exchange of most developed economies such as the US, UK, Germany etc (Dabara, et al. 2018). This is not surprising as the Nigerian real estate equity sector is still new and the real estate asset class is trying to gain grounds in the stock exchange. The situation is slightly different in South Africa which presents a more robust listed real estate equities than Nigeria as confirmed by studies carried out by Akinsomi, et al. (2016).

Table 1: Real estate companies listed on the Nigerian Stock Exchange

Property Type	Company	Year of Commencement	Number of Shares	Share Price Per Unit	Market Capitalization
Non REITs	UACN	1991	1,718,749,995	₦17.58 (\$0.06)	₦30,215,624,912 (\$98,422,231)
	Skye Shelter REITs	2007	20,000,000	₦100 (\$0.33)	₦2,000,000,000 (\$6,514,658)
REITs	Union Homes REITs	2008	250,019,781	₦47.59 (\$0.16)	₦11,898,441,378 (\$38,757,138)
	UPDC REITs	2013	2,668,269,500	₦10.49 (\$0.03)	₦27,936,781,665 (\$90,999,289)
	Total		4,657,039,276	₦175.64 (\$0.57)	₦72,050,847,955 (\$234,693,316)
	Mean		1,164,259,819	₦43.91 (\$0.14)	₦18,012,711,989 (\$58,673,329)

Source: Databases of Skye Shelter REITs, Union Homes REITs, UACN and UPDC REITs, Estate Intel Database and quarterly reports and accounts of the respective companies

Table 2 presents the quarterly dividends and share prices of all the companies. The quarterly share prices of the Skye Shelter Fund REITs ranged between ₦96.84 (\$0.32) and ₦118.79 (\$0.39) while the quarterly dividends ranged between ₦1.02 (\$0.003) and ₦1.79 (\$0.006) within the study period. For the Union Homes REITs, its quarterly share prices ranged between ₦45.55 (\$0.15) and ₦50.95 (\$0.17) while its quarterly dividends ranged between ₦0.19 (\$0.0006) and ₦1.00 (\$0.0033) within the study period. Similarly, the UPDC REITs' quarterly share prices ranged between ₦9.03 (\$0.03) and ₦10.00 (\$0.033), and its dividends ranged between ₦0.06 (\$0.0002) and ₦0.11 (\$0.0004) within the study period. For the UACN property company, its quarterly share prices ranged between ₦9.99 (\$0.033) and ₦25.67 (\$0.084), while its dividend ranged between ₦0.12 (\$0.0004) and ₦1 (\$0.003).

Table 3 presents the quarterly income returns for the companies. The income returns of the investment assets were observed to have kept fluctuating within the study period. For example the income returns for the Skye Shelter Fund REITs indicated that in the first quarter of 2008, 1.2% income return was realized, this decreased to 1.0% in the last three quarters of that investment year. The highest income return for the company was obtained in 2015 (1.8%) from the first to the fourth quarter of that year.

Table 2: Quarterly data on the share prices and dividends on the both REITs and non REITs listed companies in Nigeria

Year	Quarter	Skye Shelter Fund REITs		Union Homes REITs		UPDC REITs		UACN	
		Share Price (₦)	Dividend (₦)	Share Price (₦)	Dividend (₦)	Share Price (₦)	Dividend (₦)	Share Price (₦)	Dividend (₦)
2007	Q1	100.00	-	-	-	-	-	17.23	0.12
	Q2	100.00	-	-	-	-	-	24.31	0.12
	Q3	100.00	-	-	-	-	-	22.48	0.12
	Q4	100.00	-	-	-	-	-	21.11	0.12
2008	Q1	115.12	1.16	50.00	-	-	-	24.74	0.19
	Q2	117.49	1.16	50.00	-	-	-	25.32	0.19
	Q3	118.79	1.16	50.00	-	-	-	25.67	0.19
	Q4	118.28	1.16	50.00	-	-	-	24.31	0.19
2009	Q1	108.00	1.75	50.00	1.00	-	-	18.2	0.13
	Q2	103.00	1.75	50.00	1.00	-	-	19.47	0.13
	Q3	105.00	1.75	50.00	1.00	-	-	16.29	0.13
	Q4	96.84	1.75	50.00	1.00	-	-	20.19	0.13
2010	Q1	100.00	1.60	50.75	0.19	-	-	20.59	0.14
	Q2	100.00	1.60	50.85	0.19	-	-	22.83	0.14
	Q3	98.69	1.60	50.85	0.19	-	-	19.86	0.14
	Q4	99.51	1.60	50.95	0.19	-	-	17.41	0.14
2011	Q1	99.51	1.01	50.00	0.57	-	-	17.01	0.16
	Q2	99.51	1.01	50.00	0.57	-	-	17.25	0.16
	Q3	97.80	1.01	50.00	0.57	-	-	18.18	0.16
	Q4	97.38	1.01	50.00	0.57	-	-	12.13	0.16
	Q1	100.00	1.25	50.00	0.53	-	-	11.57	0.18

Year	Skye Shelter Fund REITs		Union Homes REITs		UPDC REITs		UACN		
	Share Price (¥)	Dividend (¥)	Share Price (¥)	Dividend (¥)	Share Price (¥)	Dividend (¥)	Share Price (¥)	Dividend (¥)	
2012	Q2	100.00	1.25	50.00	0.53	-	10.54	0.18	
	Q3	100.00	1.25	50.00	0.53	-	9.99	0.18	
	Q4	100.00	1.25	50.00	0.53	-	11.18	0.18	
	Q1	100.00	1.31	50.00	-	10.00	-	15.34	0.18
2013	Q2	100.00	1.31	50.00	-	10.00	-	15.42	0.18
	Q3	100.00	1.31	50.00	-	10.00	-	15.95	0.18
	Q4	100.00	1.31	50.00	-	10.00	-	17.82	0.18
	Q1	99.68	1.45	50.00	-	10.00	0.08	20.15	0.13
2014	Q2	98.72	1.45	48.55	-	9.48	0.08	20.01	0.13
	Q3	98.05	1.45	47.9	-	9.49	0.08	19.56	0.13
	Q4	97.79	1.45	47.71	-	9.03	0.08	19.9	0.13
	Q1	100.00	1.79	45.55	-	9.78	0.11	15.34	0.18
2015	Q2	100.00	1.79	45.55	-	9.60	0.11	15.42	0.18
	Q3	100.00	1.79	45.55	-	9.79	0.11	15.95	0.18
	Q4	100.00	1.79	45.55	-	9.95	0.11	17.82	0.18
	Q1	100.00	-	50.00	-	10.00	0.06	17.01	0.16
2016	Q2	100.00	-	50.00	-	10.00	0.06	17.25	0.16
	Q3	100.00	-	50.00	-	10.00	0.06	25	1.75
	Q4	100.00	-	50.00	-	10.00	0.06	25	1

Source: Online data base of the Skye Shelter Fund REITs, Union Homes REITs, UACN and UPDC REITs

Note: Q1 = First quarter, Q2 = Second quarter, Q3 = Third quarter, Q4 = Fourth quarter

Table 3: Quarterly income returns of REITs and non REITs listed companies in Nigeria

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2007	Q1	-	-	-	0
	Q2	0.0	-	-	0.69
	Q3	0.0	-	-	0.49
	Q4	0.0	-	-	0.53
2008	Q1	1.2	-	-	0.9
	Q2	1.0	0.0	-	0.77
	Q3	1.0	0.0	-	0.75
	Q4	1.0	0.0	-	0.74
2009	Q1	1.5	2.0	-	0.54
	Q2	1.6	2.0	-	0.71
	Q3	1.7	2.0	-	0.67
	Q4	1.7	2.0	-	0.8
2010	Q1	1.7	0.4	-	0.69
	Q2	1.6	0.4	-	0.68
	Q3	1.6	0.4	-	0.61
	Q4	1.6	0.4	-	0.71
2011	Q1	1.0	1.1	-	0.92
	Q2	1.0	1.1	-	0.94
	Q3	1.0	1.1	-	0.93
	Q4	1.0	1.1	-	0.88
2012	Q1	1.3	1.1	-	1.34
	Q2	1.3	1.1	-	1.56
	Q3	1.3	1.1	-	1.71
	Q4	1.3	1.1	-	1.8
2013	Q1	1.3	0.0	-	1.61
	Q2	1.3	0.0	0.0	1.17
	Q3	1.3	0.0	0.0	1.67
	Q4	1.3	0.0	0.0	1.13
2014	Q1	1.5	0.0	0.8	0.73
	Q2	1.5	0.0	0.8	0.65
	Q3	1.5	0.0	0.8	0.81
	Q4	1.5	0.0	0.8	0.76

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2015	Q1	1.8	0.0	1.2	1.61
	Q2	1.8	0.0	1.1	1.17
	Q3	1.8	0.0	1.1	1.67
	Q4	1.8	0.0	1.1	1.13
2016	Q1	0.0	0.0	0.6	0.92
	Q2	0.0	0.0	0.6	0.94
	Q3	0.0	0.0	0.6	8.68
	Q4	0.0	0.0	0.6	4.0

Source: Analysis of survey data

Note: Q1 = First quarter, Q2 = Second quarter, Q3 = Third quarter, Q4 = Fourth quarter

Table 4 shows that the highest capital return was obtained in the first quarter of 2013 (37.21%) by the UACN company and the least was obtained in 2007 (-41.09%) by the same company. For the Union Homes REITs company, it had its highest capital return in the first quarter of 2016 (9.8%) and the least in the first quarter of 2015 (-4.5%). The UPDC REIT Company had its highest capital returns in the first quarter of 2015 (8.3%) and the least in second quarter of 2014 (-5.2%). Generally the capital returns of the N-REIT Companies were observed to be low and even negative in some cases.

Table 4: Quarterly capital returns of REITs and non REITs listed companies in Nigeria

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2007	Q1	-	-	-	0
	Q2	0.0	-	-	41.09
	Q3	0.0	-	-	-7.53
	Q4	0.0	-	-	-6.09
2008	Q1	15.1	-	-	17.2
	Q2	20.6	0.0	-	2.24
	Q3	01.1	0.0	-	1.38

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
	Q4	-0.4	0.0	-	-5.3
					-
	Q1	-8.7	0.0	-	25.13
	Q2	-4.6	0.0	-	6.98
					-
2009	Q3	1.9	0.0	-	16.33
	Q4	-7.8	0.0	-	23.94
					-
	Q1	3.3	1.5	-	1.98
	Q2	0.0	0.2	-	10.88
					-
2010	Q3	-1.3	0.0	-	13.01
					-
	Q4	0.8	0.2	-	12.34
					-
	Q1	0.0	1.9	-	-2.3
	Q2	0.0	0.0	-	1.41
2011	Q3	-1.7	0.0	-	5.39
					-
	Q4	-0.4	0.0	-	31.08
					-
	Q1	2.7	0.0	-	-7.66
	Q2	0.0	0.0	-	-8.9
2012	Q3	0.0	0.0	-	-5.22
	Q4	0.0	0.0	-	11.91
					-
	Q1	0.0	0.0	-	37.21
	Q2	0.0	0.0	0.0	0.52
2013	Q3	0.0	0.0	0.0	3.44
	Q4	0.0	0.0	0.0	11.72
					-
	Q1	-0.3	0.0	0.0	13

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2014	Q2	-1.0	-2.9	-5.2	12.9
	Q3	-0.8	-1.3	0.1	12.54
	Q4	-0.3	-0.4	-4.9	13.03
2015	Q1	2.3	-4.5	8.2	37.20
	Q2	0.0	0.0	-1.8	0.52
	Q3	0.0	0.0	2.0	3.44
	Q4	0.0	0.0	1.6	11.72
2016	Q1	0.0	9.8	0.5	-2.3
	Q2	0.0	0.0	0.0	1.41
	Q3	0.0	0.0	0.0	25
	Q4	0.0	0.0	0.0	0.0

Source: Analysis of survey data

Note: Q1 = First quarter, Q2 = Second quarter, Q3 = Third quarter, Q4 = Fourth quarter

Table 5 shows that the highest return obtained by the Skye Shelter Fund REITs was in the second quarter of 2008 (21.6%) while the least was in the first quarter of 2009 (-7.1). The Union Homes REITs had its highest return in first quarter of 2011 (3.0%) and had its least return in the first quarter of 2015 (-4.5%). The UPDC REIT Company had its highest return in the first quarter of 2015 (9.4%) and its least return was obtained in the second quarter of 2014 (-4.1). Similarly, UACN company had its highest returns in the second quarter of 2007 (41.79%) and its least returns in the fourth quarter of 2011 (-30.2%). It was observed that the holding period returns obtained from the companies were generally low.

Table 5: Quarterly holding period returns of REITs and non REITs listed companies in Nigeria

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2007	Q1	-	-	-	0.0
	Q2	0.0	-	-	41.79
	Q3	0.0	-	-	-7.03
	Q4	0.0	-	-	-5.56
2008	Q1	16.1	-	-	18.1
	Q2	21.6	-	-	3.11
	Q3	2.1	-	-	2.13
	Q4	0.6	-	-	-4.56
2009	Q1	-7.1	2.0	-	-24.6
	Q2	-2.9	2.0	-	7.69
	Q3	3.6	2.0	-	-15.67
	Q4	-6.1	2.0	-	24.74
2010	Q1	4.9	1.9	-	2.68
	Q2	1.6	0.6	-	11.56
	Q3	0.3	0.4	-	-12.4
	Q4	2.4	0.6	-	-11.63
2011	Q1	0.1	3.0	-	-1.38
	Q2	0.1	1.1	-	2.35
	Q3	-0.7	1.1	-	6.32
	Q4	0.6	1.1	-	-30.2
2012	Q1	4.0	1.1	-	-6.23
	Q2	1.3	1.1	-	-7.35
	Q3	1.3	1.1	-	-3.51
	Q4	1.3	1.1	-	13.71
2013	Q1	1.3	0.0	-	38.82
	Q2	1.3	0.0	0.0	1.7
	Q3	1.3	0.0	0.0	4.6
	Q4	1.3	0.0	0.0	12.85

Year		Skye Shelter Fund REITs	Union Homes REITs	UPDC REITs	UACN
2014	Q1	1.2	0.0	0.8	13.81
	Q2	0.5	-2.9	-4.4	13.4
	Q3	0.7	-1.3	0.9	13.35
	Q4	1.2	-0.4	-4.1	13.79
2015	Q1	4.1	-4.5	9.4	38.82
	Q2	1.8	0.0	-0.7	1.7
	Q3	1.8	0.0	3.1	4.6
	Q4	1.8	0.0	2.7	12.85
2016	Q1	0.0	9.8	1.1	-1.38
	Q2	0.0	0.0	0.6	2.35
	Q3	0.0	0.0	0.6	32.75
	Q4	0.0	0.0	0.6	4.0

Source: Analysis of survey data

Note: Q1 = First quarter, Q2 = Second quarter, Q3 = Third quarter, Q4 = Fourth quarter

Table 6 shows that the highest returns obtained from REITs investment was 5.43% in the first quarter of 2008, while the least was -2.27 obtained in the second quarter of 2014. The non REITs investment had its highest returns in the first quarter of 2007 (41.79%), the least was -24.6% obtained in the first quarter of 2009. The figures in Table 6 revealed that the non REITs asset outperformed the REITs asset in the study area within the study period. Inflation was seen to be high and had kept increasing within the study period. Inflation rates within the study period ranged between 4.37 and 18.45.

The trend analysis in Figure 1 showed that for non REITs real estate investments, there was a high level of volatility for its returns as indicated by its trend line. The smoothed trend lines indicated a consistent and steady decrease for both REITs and non REITs returns within the study period. A future forecast with respect to both returns and inflation indicated continues steady increase for inflation and decrease for returns of both REITs and non REITs real estate investments returns. The level of reliability of the trend and accuracy of the forecast as determined by the R^2 value (which is the coefficient of determination) for inflation and returns in the

study is as follows: 82.18% for inflation, 75.13% for non REITs asset and 84.35% for REITs assets.

'Y' in the equation represents returns in the study area while 'X' represent the year selected for the desired analysis. From the analysis above, it can be inferred that the returns for both REITs and non REITs have a steady and consistent slight decrease over the study period and this decrease is likely to be maintained over the next three years as seen from the predictive trend lines. While inflation rates have a steady and consistent increase over the study period and this increase is likely to be maintained over the next three years as seen from the predictive trend lines. The implication of this is that as inflation increases, returns from indirect real estate investments in the study area decreases. This findings is not congruent with the relationship between direct real estate investments in the same study area. Studies such as Akpan and Ogunba (2015) and Dabara (2015) found that returns from direct investments in real estate in Nigeria increases as inflation increases.

Table 6: Quarterly holding period returns of REITs and non REITs industries and inflation rates in Nigeria

Year		Holding Period Return f N-REITs (%)	Holding Period Return (%) Of UACN	Inflation Rate in Nigeria
2007	Q1	0	0	6.77
	Q2	0	41.79	5.07
	Q3	0	-7.03	4.37
	Q4	0	-5.56	5.47
2008	Q1	5.43	18.1	8.13
	Q2	1.02	3.11	9.97
	Q3	0.69	2.13	13.13
	Q4	0.18	-4.56	14.87
2009	Q1	-1.74	-24.6	14.33
	Q2	-0.34	7.69	12.57
	Q3	1.88	-15.67	10.83
	Q4	-1.37	24.74	12.63
	Q1	2.27	2.68	14.93

2010	Q2	0.79	11.56	14
	Q3	0.2	-12.4	13.43
	Q4	1.01	-11.63	12.67
2011	Q1	0.09	-1.38	12
	Q2	0.72	2.35	11.3
	Q3	0.15	6.32	9.73
	Q4	0.58	-30.2	10.43
2012	Q1	1.68	-6.23	12.2
	Q2	0.77	-7.35	12.83
	Q3	0.77	-3.51	11.93
	Q4	0.77	13.71	12
2013	Q1	0.44	38.82	9.03
	Q2	0.44	1.7	8.83
	Q3	0.44	4.6	8.3
	Q4	0.44	12.85	7.9
2014	Q1	0.64	13.81	7.83
	Q2	-2.27	13.07	8,03
	Q3	0.13	12.85	8.3
	Q4	-1.48	4.6	8
2015	Q1	4.54	1.7	8.37
	Q2	0.84	2.35	8.97
	Q3	1.64	6.32	9.3
	Q4	1.62	32.75	9.41
2016	Q1	0.27	18.1	11.26
	Q2	0.2	3.11	15.26
	Q3	0.2	2.13	17.53
	Q4	0.2	4.1	18.45

Source: Analysis of survey data

Note: Q1 = First quarter, Q2 = Second quarter, Q3 = Third quarter, Q4 = Fourth quarter

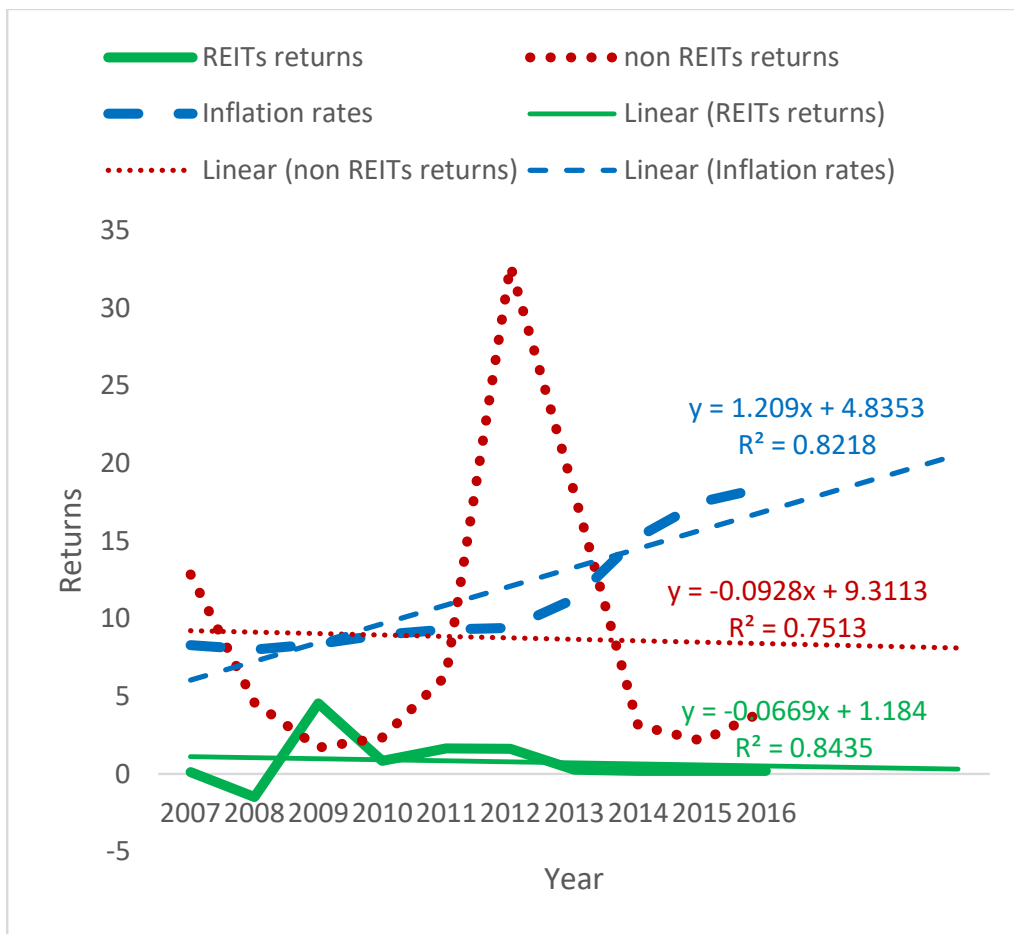


Figure 1: Trend analysis of REITs/non REITs returns and inflation rates in Nigeria from 2007 to 2016

The computed KPSS and PP test-statistics as seen in Table 7 below are integrated of order I(1). The computed unit root test indicated stationary series with respect to the data used some at first differencing while others are after second differencing accordingly. It was observed that the KPSS and PP statistics were smaller than the critical values - "tau" at 10%, 5%, and 1% significant levels respectively; therefore we can reject Ho for the variables. This means that the data series are all stationary series at 10%, 5% and 1% significant levels and are integrated of order I(0) at first and second differencing accordingly.

Table 7: Unit root analysis

Unit root test	REITs returns	non REITs returns	Inflation rates
KPSS Statistics	0.184361**	0.215458***	0.235293**
1% Critical Value	0.739	0.739	0.739
5% Critical Value	0.463	0.463	0.463
10% Critical Value	0.347	0.347	0.347
PP Statistics	-2.56094***	2.84645**	2.495929**
1% Critical Value	-3.0074	5.11981	5.11981
5% Critical Value	-2.0212	3.5196	3.5196
10% Critical Value	-1.5973	2.89842	2.89842

Source: Analysis of survey data, 2019

Note: * = stationary at level

** = stationary at first differencing

*** = stationary at second differencing

From Table 8, the results shows negative Beta coefficients for both REITs and non REITs indirect investments in the study area indicated by a beta coefficient of - 0.127 and -0.225 for REITs and non REITs asset classes respectively. This indicates perverse hedging characteristics for all the property types. The proportion of explained variance as measured by adjusted R-Square which indicates the variation in property returns explained by inflation was seen to be 1.6% in REITs and 5.1% in non REITs investment assets. This shows that there may be other factors influencing the returns on indirect investments in real estate rather than inflation. Dabara, Omotehinshe, Chiwuzie, Asa and Soladoye (2018) suggested that financial structure, market structure and other investment parameters can greatly impact on indirect investment assets classes. The findings of this study refuted the result obtained from earlier studies conducted in the US by Fama & Schwert (1977) and in Korea by Park and Bang (2012), similarly it refutes the findings of the study conducted in some third world countries by Terahni et al. (2012) which concluded that real estate provides complete hedge against inflation. However, the study was found to be congruent with the findings of Bello (2005), Zhou and Clements (2010) and Arnasson and person (2012). The authors respectively found that real estate provides perverse hedges against actual inflation as seen in this study.

Table 8: Inflation Hedging Performance of investments in indirect real estate in Nigeria

Returns	Property Type	Constant	Standardized Coefficient Beta	R Square	Type of Hedge
Returns	Non REITS	20.01	-0.225	0.051	Perverse
	N-REITS	14.018	-0.127	0.016	Perverse

Source: Analysis of survey data, 2019

5. Conclusion

The study examined the impact of inflation on indirect real estate investments (both REITs and non REITs) in Nigeria. Findings from the study revealed that the return profile of REITs and non REITs equities in Nigeria had experienced some level of volatility with the non REITs outperforming the REITs investment asset. Inflation was seen to be mostly in double digits and had kept increasing throughout the study period ranging between 4.37 and 18.45. Analysis of the relationship between indirect real estate investment returns and inflation in the study area revealed negative Beta coefficients for both REITs and non REITs suggesting a perverse hedging characteristics. The findings of this study refuted the result obtained from earlier studies such as Fama and Schwert (1977), Park and Bang (2012) and Terahni, et al. (2012). However, the study was found to be congruent with the findings of studies such as Bello (2005), Zhou and Clements (2010) and Arnasson and person (2012). The conflict of results makes it obvious that inflation hedging capability varies from place to place and across investment assets even within the same country. Hence, the results of this study should not be generalized.

Nigeria is considered to be one of the fastest growing economies with divers' opportunities for investments in all ramifications. The result of this study can be useful for investment forecast and investment decisions as regards the type(s) of asset(s) to include in an investor's portfolio taking to

consideration the impact of inflation on such asset(s). The study is however limited by the number of companies considered (only four real estate companies are presently listed on the Nigerian Stock Exchange and all were considered in this study).

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