

# Do REITs Hedge against Inflation? Evidence from an African Emerging Market

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**Purpose** - This study examines how returns on Nigerian REIT (N-REIT) behave in relation to inflation changes from 2008 to 2019 to provide information for investment decisions.

**Design/Methodology/Approach** – Eleven years monthly return data from 2008 to 2019 were collected from databases and annual reports of the three active REITs in Nigeria. Inflation rates covering the study period were collected from the Central Bank of Nigeria's database. The authors adopt the Fama and Schwert model, an extension of the Fisher hypothesis, to test N-REIT's inflation-hedging capability.

**Findings** –The empirical results suggest that N-REIT has perverse hedging-characteristics (poor inflation hedges) across all inflation exposures (actual, expected, and unexpected). The Engle-Granger causality tests conducted corroborates these results.

**Practical Implication** - This study reveals the peculiar nature of Nigerian REITs in relation to inflation, which could have profound investment implication for domestic and foreign investors.

**Originality/Value** - This study is one of the first to empirically analyse the inflation-hedging characteristics of REITs in the second-largest African REIT market (N-REIT).

**Keywords:** Emerging economies, inflation-hedge, investment, real estate, returns, risk.

## 1. INTRODUCTION

Information on the behaviour of REIT returns against inflation is important to investors as this can help guide them to protect their funds against inflation risk. Specifically, unravelling the relationship between REIT return and inflation has been a major concern to both investors and researchers worldwide. This is because inflation can erode the purchasing power of investors' investment funds. Hence, rational investors are careful not to expose their investment funds to erosion by inflation. There are several theoretical and empirical studies on Real Estate Investment Trust (REIT) in terms of its returns, risk-adjusted and diversification performance in especially developed economies (Lin *et al.*, 2019; Salisu *et al.*, 2020). However, there is a dearth of literature on the inflation-hedging characteristics of African REITs. Previous real estate-related studies which examined inflation-hedging characteristics focus on direct real estate, example include Taderera and Akinsomi (2020), where commercial real

estate was found to provide perverse hedging characteristics in the short run (in South Africa), while retail and industrial property types provided a good hedge against inflation in the long run. Other similar studies focused primarily residential and commercial properties, and are mostly concentrated on REIT markets of developed economies such as the US, UK, etc. Findings from such studies cannot be generalised for various reasons. According to Loo *et al.* (2016 p. 231), such reasons could include differences in "asset management structure, geographical restriction of underlying assets, real estate development allowance, gearing restriction as well as dividend pay-out requirement". Furthermore, it was observed that the peculiarities associated with the structure, conduct and performance of individual REIT markets could also explain why findings from one REIT market might not reflect the others (Dabara *et al.*, 2015; Dabara and Ogunba, 2019). These assertions are particularly true for REIT markets of emerging economies, such as the Nigerian REIT (N-REIT) market in Africa.

Hence, this study examines the inflation-hedging characteristics of N-REITs, with a view to providing information for investment decisions. Besides, the study determines whether there is a causal relationship between returns on N-REIT and inflation. Research papers on the inflation-hedging attributes of REITs in African emerging markets are rare. This paper contributes to knowledge in this field by investigating the correlation in terms of causality between returns on N-REIT and different exposures of inflation in Nigeria. The Nigerian REIT is increasingly prominent and significant in the African REIT market block, being the number two REIT market after South Africa. This study extended the frontier of knowledge by testing the Fisher hypothesis (extended by Fama and Schwert, 1977) on an emerging REIT market. Information from this study can be beneficial to domestic and foreign investors, as it will guide them in making informed investment decisions to protect their funds against inflation risks.

Since its creation in the US (in 1960), REIT has provided a viable and profitable platform for diverse categories of investors. From a global perspective, about 35 countries have adopted the REIT regime (having over 800 REITs) and over \$2 trillion in market capitalisation (EPRA, 2020; Parker, 2020). According to Marzuki and Newell (2020), about 5% of the global REIT is accounted for by REITs in emerging markets. Nations in developed economies (notably the US, Japan, and Australia) have significantly developed their REIT markets to matured and established stages over the past decades.

Countries of emerging economies, primarily Africa, on the other hand, are just beginning to accept and introduce REITs into their respective real estate investment space and are all at the nascent stage of development (see Table 1). Notably are South Africa, Ghana, Kenya and Nigeria (Dabara and Ogunba, 2020).

**Table 1:** REIT in the African continent

Country	Year of establishment	Number of active REITs	Market capitalization (USD)	Primary sector
Ghana	1994	1	12.6 million	Residential/commercial
Nigeria	2007	3	136 million	Residential/commercial
Tanzania	2011	1	40 million	Residential
South Africa	2013	32	22 billion	Residential/commercial
Kenya	2013	1	35.5 million	Commercial
Rwanda	2013	1	29 million	Residential/commercial
Morocco	2015	1	n/a	Commercial

Source: Author's compilation from Kruger-levy & Dauskardt (2017), EPRA (2020) and Dabara (2021)

Despite being a new investment vehicle in the African continent, REITs are adjudged to be essential growth stimulants to the region's foreign and domestic investors' capital deployment in the real estate markets (Marzuki and Newell, 2019). This has stimulated research interest in REIT, which have translated to several empirical studies targeted at examining the investment dynamics associated with REIT at the global, regional and national levels (Parker, 2009; Li *et al.*, 2017; Reddy and Wong, 2018). Some empirical evidence suggests that direct real estate are good hedges against inflation (Hoesli *et al.*, 2008; Dabara, *et al.*, 2012; Larsen and Mcqueen, 1995; Taderera and Akinsomi, 2020). However, the question of whether financial assets backed by direct real estate assets, such as REIT, also behaves like their underlying assets concerning inflation easily comes to mind. This is because the operations of N-REIT in the capital market differs from its operations in the direct real estate market. It has been observed that N-REIT hardly trades in the capital market for a very long time now, this is further impacted by the double digits inflation experienced in Nigeria over the years. Nigerian inflation rate has been higher than most African countries, it even exceeded 17% in 2017 to date and there is no hope of significant decrease in the nearest future. It has been fluctuating and has been unsteady for quite some time now thereby affecting the economy grossly. Within the study period, inflation rates in Nigeria ranged between 9.97% and 18.45% with most of the rates being in the double digits range. At the moment, inflation rates have decreased a bit to 17.75% as at June 2021. The high inflation situation in the country has grossly impacted most sectors of the economy including the real estate sector which are all prone to the risk of inflation.

Hence, the study examines the inflation-hedging characteristics of N-REIT to provide information for investment decisions. The study seeks to answer the following research question: Is there any relations between returns on N-REIT and inflation, and if yes, what is the nature and significance of the relations? The paper's remaining part is structured as follows: the next section (2) presents the review of relevant literature; section 3 presents the theoretical framework and methodology adopted for the study. Section 4 presents the empirical results and discussion, while section 5 presents the implications of findings and conclusion.

## **2. LITERATURE REVIEW AND THEORETICAL MODEL**

### **2.1 REITs and Inflation in Developed Economies**

The REIT in developed economies is observed to present more developed, established, and matured markets (EPRA, 2020). Studies that examine the relationship between REIT returns and inflation have divergent findings. For instance, Park *et al.* (1990), using the Fama and Schwert (1977) regression model, found that REIT behaves like other stocks about its relationship with inflation. That is, it provides a perverse hedging characteristic. Similar results were found when Larsen and McQueen (1995) examined the correlation between inflation and REITs, direct real estate, and gold in the US. However, Salisu *et al.* (2020) found contradictory results, and they posited that US REIT were good inflation-hedges before and after the GFC (Global Financial Crisis). In Germany, Obereiner and Kurzrock (2012) found that G-REIT provides perverse hedges in relation to expected and unexpected inflation exposures. Liu (2009) found a different result in the Hong Kong REIT market, where a complete hedge was recorded in the short run but showed perverse hedging characteristics in the long run. Similar results were found in the UK REIT market (Hoesli *et al.*, 2008). In Switzerland, REIT was a complete hedge concerning the expected inflation exposure but perverse with the unexpected inflation exposure component. In a recent study Akinsomi (2020) found that the COVID-19 pandemic significantly impacts on the performance of REIT.

The result of the causal relationship of REIT returns, real activity, monetary policy and inflation, using investment error correction model in the US, indicated that REIT returns manifest spurious inflation hedge contrary to Fisherian theory (Glascock *et al.*, 2002). In the earlier opinion of Lu and So (2001), the use of a vector error correction model indicated that inflation does not granger-cause REITs returns, but REITs returns reflect changes in monetary policy. However, in the context of macro-economic variables, there existed a proxy negative relationship. For instance, in the UK, the use of Markov-switching model variants in the analysis of the impact of monetary policy on the REIT market indicated that the monetary policy environment triggered changes in terms of boom and bust market (Fatnassi *et al.*, 2014), similar findings were observed in Singapore and Japan (Fang *et al.*, 2016). When inflation is separated and classified, equity REIT returns rise in response to both increases and decreases in inflation, using a pooled estimation methodology (Simpson *et al.*, 2007).

### **2.2 REITs and Inflation in Emerging Economies**

There are presently about 225 REITs in emerging markets, with about \$100.3 billion in market capitalisation, which contributes approximately 5% of global REITs (EPRA, 2020). The African continent seems to be lagging in terms of REIT markets (Olarenle *et al.*, 2019). South Africa appears to be ahead of other countries in the region (with 32 REITs). It has a total market capitalisation of about \$22 billion, making it the largest in the global emerging REIT market (EPRA, 2020). Furthermore, it is the only African country classified as transparent on the JLL and LaSalle Global Transparency Index, with a composite score of 2.37, ranking number 24 in the world (JLL and LaSalle, 2020). Concerning Emerging REIT markets, Lee and Lee (2014) pointed out that there was no evidence of REITs' inflation hedging capability in emerging REIT markets. Edionwe and Ogunba (2017) asserted that REITs in emerging markets do not hedge against inflation, thereby agreeing with Lee and Lee's earlier submissions. However, Aik (2012) found that Malaysian REIT effectively hedges against the eroding power of inflation. Similarly, in Turkey, Erol and Tirtiroglu (2008) found a positive correlation in relation to

returns on Turkish REIT and the expected as well as the unexpected inflation rates. These results show that findings on the correlation between REIT and inflation exposures in emerging markets are mixed.

### 2.3 REITs in Nigeria

The Nigerian REIT (N-REIT) was established in 2007, with the Skye Shelter Fund REIT being the pioneering company. It was created on July 23rd, 2007, and was officially listed on the Nigerian Stock Exchange (NSE) on February 28th, 2008. It has a market capitalisation of about \$6.5 million. The Union Homes REIT was established in 2008, with a market capitalisation of approximately \$40.8 million, while the UPDC REIT got established in 2013 with a market capitalisation of about \$87.2 million. The N-REIT market has a combined market capitalisation of about \$136 million and is modelled after the US REIT in terms of regulatory structure (see Tables 2 and 3).

**Table 2:** REIT in Nigeria

Company	Year of Commencement	Number of Shares	Share Price Per Unit	Market Capitalisation	Primary sector	Number of Properties	Location
Skye Shelter REITs	2007	20,000,000	₦100 (\$0.33)	₦2,000,000,000 (\$6,514,658)	Residential	12	Lagos and Abuja
Union Homes REITs	2008	250,019,781	₦47.59 (\$0.16)	₦11,898,441,378 (\$38,757,138)	Residential/commercial	23	Lagos and Abuja
UPDC REITs	2013	2,668,269,500	₦10.49 (\$0.03)	₦27,936,781,665 (\$90,999,289)	Residential/commercial	14	Lagos, Abuja, Port Harcourt, Kaduna and Aba
Total		2,938,289,281	₦158.08 (\$0.52)	₦41,835,223,043 (\$136,271,085)		49	
Mean		979,429,760	₦52.69 (\$0.17)	₦13,945,074,348 (\$45,423,695)			

Source: Dabara (2021)

**Table 3:** Regulatory structure of N-REIT compared with SA-REIT

<b>Regulatory requirements/procedures</b>	<b>N-REIT</b>	<b>SA-REIT</b>
Year of commencement	2007	2013
Management	Internal Management	Internal and external
Minimum Capitalisation	NGN1bn (US\$5m)	R300 million (\$19.7 million)
Property Investment	At least 75% on real estate assets for close end and 0% on real estate assets for open-end	At least 75% in real estate
Overseas Investment	No	Yes
Property Development	Yes, only for inclusion in portfolio	Yes
Distribution	At least 90%	At least 75%
Capital gain tax	Exempted	Exempted
5/50 rule of ownership	Applicable	Not applicable
Unit Holder	Minimum of 100	No restriction
Market transparency	Low transparent tier	Transparent tier
Listing	Nigerian Stock Exchange (NSE)	Johannesburg Stock Exchange (JSE)
Regulatory body	Securities and Exchange Commission (SEC)	JSE
Legislation	Investment and Securities Act (ISA) 2007	Section 25BB of the Income Tax Act
Risk monitoring committee	Not mandatory	Mandatory
Debt profile	Not applicable	below 60% of gross asset value
transferability of shares	Transferable	Transferable
Market capitalisation	\$136 million	\$22 billion

Source: Dabara (2021)

Nigeria is the most populous nation on the African continent, with approximately 200 million people. It is believed to be among the fastest-growing economies found on the African continent, with one of the largest property markets. The recent JLL and LaSalle Global Transparency Index put Nigeria at the low transparency tier, with a composite score of 3.74 and ranking number 68 globally (JLL and LaSalle, 2020). Regardless, the Nigerian property market is robust and flourishing (most especially the commercial and residential property types). This has attracted a consistent, steady capital inflow within the last decade from pension funds, investment managers, and individual investors as a result of the demand-pull dynamics (occasioned by the urban population explosion in major cities like Lagos, Abuja, Kano and Port-Harcourt). Part of this substantial property market is the Nigerian REIT market (the second largest REIT market in Africa, after South African REIT market), modelled after the US REIT. The N-REIT (which is still in its nascent stage) was created to extend the investment horizon in the Nigerian real estate investment space in terms of enhanced returns, ease of transaction, flexibility, and liquidity. However, there seems to be a dearth of information concerning N-REITs, regardless, that it could provide a global investment universe for both domestic and foreign investors. This has stimulated the researchers' motivation for this study.

Therefore, this present paper contributes to the international REIT literature by providing information on the inflation-hedging characteristics in the context of African REIT (specifically, Nigerian REIT), which is generally lacking. Findings from the study could be a helpful guide for investment stimulation/decisions. The study results have revealed the peculiar nature of Nigerian REITs; both individual and institutional investors (foreign and domestic) can use this information for informed investment decisions within the context of REIT in emerging economies (specifically, Nigeria).

### **3. THEORETICAL MODEL**

#### **3.1 Modelling Hedging Against Inflation: The Fisher Hypothesis and the Fama and Schwert (1977) Model**

The primary theoretical model employed by researchers in relation to the inflation-hedging characteristics of investment vehicles is the model proposed by Fama and Schwert (1977). Fama and Schwert's model is an extension of the Fisher (1930) hypothesis which states that "real interest rates depend on nominal rates and inflation, such that nominal rates, less inflation, result in real interest rates". Following Fisher's ideas, Fama and Schwert extended the Fisher model to include the unexpected inflation exposure in addition to the initial actual and expected components. Their theory states that "expected nominal return on properties is the sum of real return, expected inflation, and unexpected inflation".

Thus, in the Fama and Schwert' model, the "relationship between the nominal interest rate, expected real return, expected inflation rate and the unexpected inflation rate" was formulated. Fama and Schwert used the Consumer Price Index (CPI) as a proxy for the actual inflation rate, which was congruent to Fisher's development theory. They used the economic variable such as short time interest rate (the 90 days Treasury bills) for the expected inflation rate component. At the same time, the difference between the former and the latter was used to estimate the unexpected component of the inflation rate. The limitation and shortcoming of the Fama and Schwert's model is that spurious results could be obtained since the model did not analyse for stationarity status of the dataset used. This present study adopts Fama and Schwert's model to determine the inflation-hedging characteristics of N-REIT. But however improved on the model by first carrying out stationarity test on the dataset used by means of the Philip-Perron (PP) unit root analyses. We made an inference which states that "inflation hedging is the ability of an asset to protect against erosion by an increase in prices". This attribute is present in an asset if the asset's nominal return has a positive correlation with inflation exposures, which can be assessed against the actual, expected and unexpected inflation exposures.

### **4. METHODOLOGY**

#### **4.1 The Data**

We obtain a secondary dataset for the Nigerian REIT market, which comprise specific monthly data from databases (Investing.com and cashcraft stockbroker website) and annual reports of the three active REITs in Nigeria. Inflation rates covering the study period were also collected from the Central Bank of Nigeria's database. The study period covers from 2008 to 2019 due to data constraints. We consider this time-frame adequate for the study in line with

other studies conducted on small REIT markets such as Malaysian Islamic REIT (Newell and Osmadi, 2009) and Irish REIT (Marzuki *et al.*, 2019). The study utilised data collected from all three existing and active N-REIT companies to provide the true picture of the REIT industry in Nigeria. The N-REIT shares are traded daily on the Nigerian Stock Exchange (NSE). The monthly data on share prices and dividends were sourced from the respective REIT company's annual reports, journals and online databases such as the Investing.com and cashcraft stockbroker website. The monthly data on both the Consumer Price Index (CPI) and the Nigerian 90-day Treasury bill rates were collected from the CBN database (Central Bank of Nigeria).

## 4.2 Statistical Analysis

First, the monthly share prices and dividends of the N-REIT companies collected for the study were subsequently used to calculate the Holding Period Returns (HPR) on N-REIT. At the moment, Nigeria does not have an index for N-REIT, hence the authors created one using the Holding Period Returns which was calculated using the following formula below

$$HPR_t = \frac{NI_t + (CV_t - CV_{t-1})}{CV_{t-1}}$$

HPR<sub>t</sub> = Holding Period Return

CV<sub>t-1</sub> = Capital value of N-REITs at the beginning (Share prices)

CV<sub>t</sub> = Capital value of N-REITs at the end (Share prices)

NI<sub>t</sub> = Income of N-REITs received during the holding period (Dividend)

Second, the Philip-Perron (PP) unit root analyses were used to test the null hypothesis of a unit root on the HPR and inflation rates for this study; this was to test for the stationarity or otherwise of the datasets. Third, monthly data on the Nigerian CPI was estimated as actual inflation (AI). The expected inflation (EI) was derived from the 90-day Treasury bill rates, while the difference between the former and the latter was estimated as the unexpected component of inflation (UEI). While the expected inflation gets priced into the market, the unexpected inflation acts as a source of volatility to the market. Fourth, N-REIT's inflation-hedging characteristics were derived through the Fama and Schwert' (1977) model. Finally, the Granger Causality Test was conducted to examine a causal relationship pattern in a uni-directional or bi-directional way between N-REIT returns and inflation exposures.

## 5. RESULTS AND DISCUSSION

Table 4 presents the results from the Philip-Perron (PP) stationarity test conducted. The PP test-statistics are integrated of order I(0), computed with constant, with constant and trend, and without constant and trend. The results presented in Table IV suggests that all the datasets are statistically significant at 1<sup>st</sup> Difference without constant and trend. Therefore, we can reject Ho for all the datasets. This could be interpreted to mean that the datasets are all stationary at 1<sup>st</sup> difference (significant at 1% critical values) and are integrated of order I(0).



**Table 4:** Phillips-Perron unit root test on N-REIT returns and inflation rates

			N-REIT	AI	EI	UEI
	With Constant	t-Statistic	-11.675	-2.496	-3.3554	-2.8455
		Prob.	0.0000	0.1186	0.0142	0.0546
		Sig.	***	n0	**	*
At Level	With Constant and Trend	t-Statistic	-11.961	-2.295	-3.6786	-2.8841
		Prob.	0.0000	0.4336	0.027	0.1708
		Sig.	***	n0	**	n0
	Without Constant and Trend	t-Statistic	-11.41	-0.007	-1.1568	-2.2491
		Prob.	0.000	0.6787	0.2248	0.0241
		Sig.	***	n0	n0	**
			<b>d(REITS)</b>	<b>d(AI)</b>	<b>d(EI)</b>	<b>d(UEI)</b>
	With Constant	t-Statistic	-45.182	-2.6946	-17.495	-16.288
		Prob.	0.0001	0.0774	0.0000	0.0000
		Sig.	***	*	***	***
At First Difference	With Constant and Trend	t-Statistic	-47.186	-2.8662	-17.444	-16.231
		Prob.	0.0001	0.1767	0.0000	0.0000
		Sig.	***	n0	***	***
	Without Constant and Trend	t-Statistic	-45.595	-2.6634	-17.561	-16.316
		Prob.	0.0000	0.0079	0.0000	0.0000
		Sig.	***	***	***	***

**Notes**

a: Null Hypothesis: the variable has a unit root

b: (\*)Significant at the 10%; (\*\*)Significant at the 5%; (\*\*\*) Significant at the 1% and (no) Not Significant

c: Lag Length based on SIC

d: Probability based on MacKinnon (1996) one-sided p-values.

e: AI is actual inflation rate, EI is expected inflation rate and UEI is unexpected inflation rate

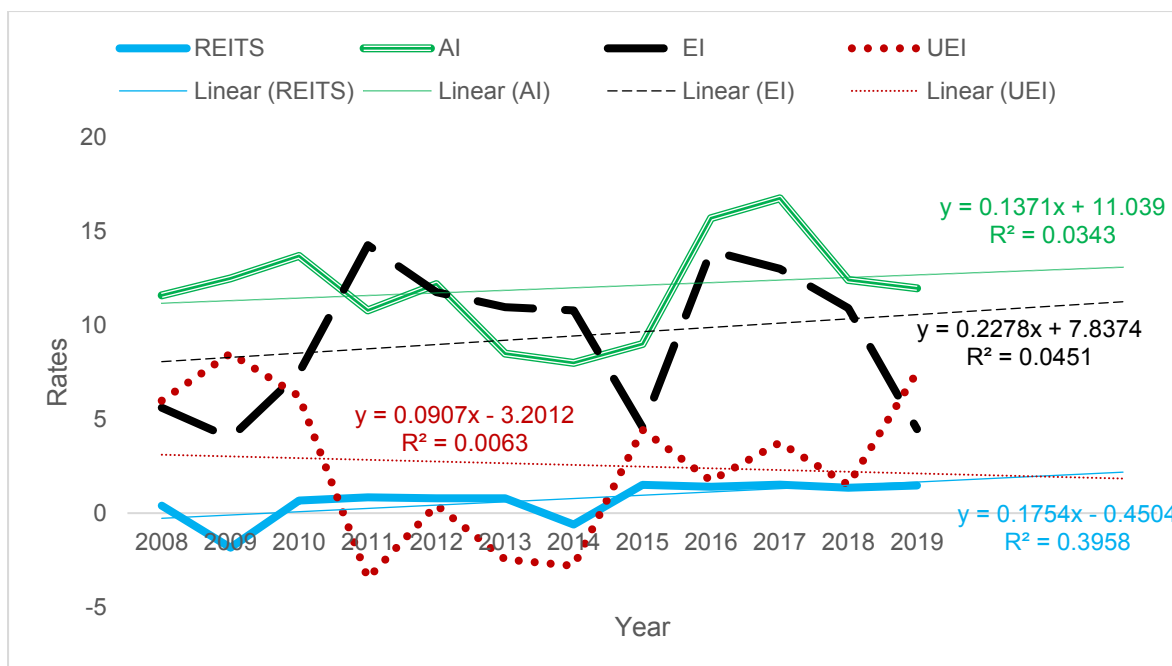
Table 5 presents the minimum, maximum, mean and standard deviation of the monthly data on the HPR of N-REIT as well as inflation exposures. The returns obtained from N-REIT had a mean value of 0.69% with a standard deviation (indicating the level of risk) of 4.24. The mean and standard deviation values for the actual, expected and unexpected inflation rates were: 11.60 and 2.81; 9.37 and 3.66; and 2.61 and 4.12. The return value provided by N-REIT was observed to be positive but relatively low. When compared to REIT industries of other countries that started in the same year with Nigeria (2007), such as the UK, Malaysia and Germany, it was observed that the later provided better return values than Nigerian REIT (Dabara and Ogunba, 2020; Dabara, 2021). This result implies that N-REIT's performance cannot be generalised, neither can it be presented as a time-based phenomenon; other REIT industries (e.g. the U.K and Malaysia) performed better within the same time-frame. For the inflation components, it was observed that the actual inflation and the expected inflation

rates were somewhat high (with a mean of 11.60 and 9.37, respectively). However, the unexpected inflation rates were seen to be low (with a mean value of 2.61). The implication of these findings for domestic and foreign investors is that they need to weigh both returns and risk of N-REITs and the inflationary trend in the economy to guide their investment decisions. This is not farfetched as investors have varying risk tolerance levels due to their difference in risk averseness. The results found in this study disagree with findings from other REIT industries of emerging markets such as Malaysia (Aik, 2012), which suggests that this study's findings are not an emerging market phenomenon.

**Table 5:** Descriptive statistics

	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
N-REITS	-29.68	17.43	0.69	4.24
ACTUAL INFLATION	5.50	17.63	11.60	2.81
EXPECTED INFLATION	0	15.00	9.37	3.66
UNEXPECTED INFLATION	-3.47	7.51	2.61	4.12

Figure 1 shows that the HPR of N-REIT experienced low volatility, while the inflation rates experienced high volatility within the study period. The smoothed trendlines suggest a slight but consistent and steady increase in the HPR of N-REIT, as well as the actual and expected inflation rates. However, the unexpected inflation rate component reveals a slight and consistent decrease within the study period. The three-year forecast from 2020 to 2022 also suggests a slight, consistent and steady increase for HPR of N-REIT, actual inflation rates and the expected inflation rates throughout the forecasted years. The unexpected inflation rate forecast suggests a continuous decrease. The observed  $R^2$  values were as follows: 39.58%, 3.43%, 4.51%, and 6.3% for the HPR of REIT, actual, expected, and unexpected inflation rates, respectively. The results from Figure 1 shows the lack of volatility from N-REIT returns compared with the actual, expected and unexpected inflation rates. This certainly could be due to the limited trading and static nature of N-REITs in the capital market arising from low patronage. It is observed that perhaps, this low volatility could account for the result of the relationship between N-REIT and inflation in Nigeria.



**Figure 1:** Trend analysis of holding period return on N-REITs and inflation rates in Nigeria

The results of the monthly inflation-hedging test are presented in Table 6. The N-REIT Beta coefficient ( $\beta$ ) on actual inflation is -2.708 with a P-value of 0.359. The Beta coefficient on expected inflation is -3.208, with a P-value of 0.372, while for the unexpected inflation component is -3.703, with a P-value of 0.403. All the inflation exposures have negative  $\beta$ s, and all their P-values are not statistically significant at the 1%, 5% and 10% level of significance; hence, we accept the null hypothesis  $H_0$ . This indicates perverse hedging characteristics for all the inflation exposures, which means that N-REIT stockholders funds were not protected against the loss in the purchasing power that arise due to either actual, expected or unexpected inflation exposures. The proportion of explained variance as measured by adjusted R-Square indicates the variation in N-REIT returns explained by the inflation rates were 4.8%, 3.1% and 8.3% for the actual, expected and unexpected inflation exposures. This means that inflation, by itself, explains very little of the variation in N-REIT returns. It shows that there may be other factors influencing the changes in the N-REIT returns rather than inflation. (Dabara *et al.*, 2015) and (Dabara *et al.*, 2018) suggested that financial structure, market structure and other investment parameters can significantly impact indirect investment assets classes.

The findings of this study agree with and confirm the results of earlier studies conducted by Park *et al.* (1990), Larsen and McQueen (1995), Lee and Lee (2014) and Edionwe and Ogunba (2017). However, it should be noted that the Edionwe and Ogunba' study was a comparative study with a shorter timeframe. Hence, this present study covers larger timeframe covering a more recent transacted period. Thereby providing a current situation and a more recent picture of the investment asset in Nigeria. Furthermore, it should be noted also that the consistent double digits inflation rates in Nigeria as well as the minimal trading experienced and static nature of N-REIT's returns contributed in impacting the low returns obtained. This influences and makes the impact on inflation on N-REIT returns peculiar and more adverse than any in the global REIT market.

**Table 6:** Inflation-hedging characteristics of N-REIT

Asset	Inflation component	Standardised Coefficients Beta	R Square	Sig.	Type of Hedge
N-REITs Returns	Actual inflation	-2.708	0.048	0.359	Perverse hedge
	Expected inflation	-3.208	0.031	0.372	Perverse hedge
	Unexpected inflation	-3.703	0.083	0.403	Perverse hedge

Table 7 presents the results of Granger Causality tests on both HPR of N-REIT and inflation rates. The results obtained indicate that there is no causality between N-REIT and inflation in the study area. This suggests that no significant relationships existed among the variables as shown by the P-values, which were not significant at either 1%, 5% or 10%. This means that inflation does not significantly affect or impacts the returns of N-REIT. This corroborates the earlier findings where the variation in N-REIT returns (as determined by Adjusted R-Square) explained by the inflation rates were 4.8%, 3.1% and 8.3% for the actual, expected and unexpected inflation exposures. This result in the N-REIT industry implies that an increase or decrease in any of the inflation exposures does not significantly change the HPR of N-REIT.

**Table 7:** Granger Causality tests of N-REIT and inflation rates

Null Hypothesis	F-Statistic	Prob.
AI does not Granger Cause N-REIT	2.28749	0.1054
N-REIT does not Granger Cause AI	0.16537	0.8478
EI does not Granger Cause N-REIT	0.46917	0.6265
N-REIT does not Granger Cause EI	0.17958	0.8358
UEI does not Granger Cause N-REIT	0.20447	0.8153
N-REIT does not Granger Cause UEI	0.29075	0.7482

## 6. PROPERTY INVESTMENT IMPLICATIONS AND CONCLUSION

Research papers concerning the inflation-hedging attributes of REITs in African emerging markets are not substantial. This paper contributes to knowledge in this field by investigating the causal relationship between returns on N-REIT and inflation exposures in Nigeria. The Nigerian REIT is increasingly prominent in the African region. Being one of the pioneering and very few active REIT markets in Africa, N-REIT provides an investment platform for domestic and foreign investors. This study extended the frontier of knowledge by testing the Fisher hypothesis (which was extended by Fama and Schwert (1977)). The test suggests that N-REIT has perverse hedging-characteristics (poor inflation hedges). The Engle-Granger causality tests conducted corroborates these results. These findings confirm the results of Park *et al.* (1990), Larsen and Mcqueen (1995), Lee and Lee (2014) and Edionwe and Ogunba (2017), which affirms that REITs are perverse hedges against inflation. This study results reveal the

peculiar nature of Nigerian REITs; the Nigerian REITs had experienced very low patronage over the years. There is hardly any trading on N-REITs in the capital market which makes it static over a long period of time. Consequently, providing low returns. Furthermore, the inflation rates in Nigeria has mostly been in double digits within the study period. However, the results of Granger Causality tests as well as the variation in N-REIT returns (as determined by Adjusted R-Square) explained by the inflation exposures suggests that there is no significant impact by inflation on N-REIT returns. This result in the N-REIT industry implies that an increase or decrease in any of the inflation exposures does not significantly change the HPR of N-REIT. The theoretical implication of this results is that contrary to the Fama and Schwert's assumptions that inflation significantly impacts on investments, N-REIT showed otherwise. The practical implication of this is that both individual and institutional investors (foreign and domestic) can use this information for informed investment decisions within the context of REIT markets in emerging economies of Africa, especially, Nigeria. This is not far-fetched as investors have varied risk tolerance levels due to their differences in risk averseness.

The way forward for N-REIT could be in changing its regulatory structure, like what was done in the Belgium REIT market (see Marzuki and Newell, 2019). The Nigerian government, the Nigerian Security Exchange Commission and Policymakers, as well as all stakeholders in the N-REIT industry should come up with innovative regulations and policies to encourage patronage of N-REIT and curb the minimal trading and the static nature of N-REIT. One way this can be done could be through creation of awareness of the inherent potentials in REITs. The N-REIT companies also can engage in advertisements, innovative research aiming at encouraging patronage, and provision of databases showing the performance of the asset to inform potential investors. The study is by no means without limitations. The study period was short due to data constraints; only three active REITs are available in the Nigerian REIT market. A longer timeframe and more active REITs could have presented a better picture of the market.

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