INVESTMENT PERFORMANCE AND INTEGRATION ANALYSIS OF INDIRECT REAL ESTATE AND OTHER LISTED ASSETS:

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Abstract

Purpose: This study examined the investment performance and level of integration between indirect real estate and other listed investment assets in the Nigerian property market. This is to determine the assets' performance and the long-run relationship between the assets thereby establishing the diversification benefits of combining these assets in a mixed-asset portfolio in an emerging African market.

Design/Methodology/Approach: The data collected comprised quarterly returns on the indirect real estate asset and the other listed investments for the period of January 2009 to December 2020. The other listed investment assets were the five major sectorial indexes in the Nigerian Stock Exchange (NSE) market which are NSE Banking, NSE Oil and Gas, NSE Industrial, NSE Insurance and NSE Consumer. The indices of these sectors were obtained from the daily list of the NSE. While the investment performance of the assets was analysed using holding period return, standard deviation, return-risk ratio and correlation analysis, the Augmented Dickey-Fuller (ADF) and Johansson integration tests were employed in analyzing the level of integration between the assets.

Findings: The results revealed that while indirect real estate outperformed other listed assets in terms of returns, it only outperformed three of the listed assets in terms of risk. The return-risk ratio showed that indirect real estate outperformed other listed assets. The study established a high level of integration between indirect real estate assets and other listed investment assets. This indicates that the assets have long-run convergence and have similar reactions to market fundamentals. This study concluded that given the high level of

integration of indirect real estate assets and other listed investment assets, investors should not consider the combination of these assets in an investment portfolio as they will bring little or no diversification benefit in the long run.

Practical Implications: The paper implied that the inclusion of indirect real estate assets and other listed investment assets in a domestic portfolio could be expected to yield little or no diversification benefit.

Originality/value: The paper represents one of the few attempts to determine the long-run relationship between indirect real estate assets and other listed assets from an emerging market perspective.

Keywords: integration, real estate asset, diversification benefits, performance analysis, return-risk analysis

1.0. Introduction

Diversification is one of the strategic means adopted by investors and portfolio managers who are considering the combination of investment assets in a portfolio. However, underlining the optimal combination of assets in a portfolio is the understanding of the relationship and similarity between investment assets. To this end, the relationship between real estate asset and other investment assets have been of concern to both practitioners and academics (Chen et al., 2019). The understanding of the relationships between real estate assets and other investment assets has become important to institutional investors owing to the need to reduce investment risk and enhance optimal returns through asset diversification. Extant studies such as Newell and Webb (1998), Corgel et al. (1998) and Hoesli et al. (2002) have posited that in making diversification choices, investors show some measure of preference for real estate assets, relative to other investment types, owing to its superlative investment performance.

Property investment had often been more of a direct investment in real estate assets (Amidu et al., 2007), which was quite capital intensive. However, with the emergence of the security market, and the need to circumvent the capital-intensive attribute of the direct real estate asset, investors have looked into the indirect real estate asset as a more liquid means of investing in the real estate asset class (Lizieri and Satchell 1997). Indirect real estate assets are

property listed shares or real estate investment trusts (REITs) which are publicly traded in the capital market and backed up by direct investment in real estate assets. Ownership of indirect real estate assets is passive as different from direct ownership interests in direct real estate. Thus, the increasing preference for indirect real estate assets through listed/securitised properties and REITs is predicated on the expectation that the indirect real estate assets will behave synonymously like the underlying direct real estate asset being traded, and not like the stock market. Investors have thus considered the combination of indirect real estate assets with other listed investment assets in a portfolio to maximize profit at considerable risk levels (Yunus, 2013). However, where investors aim to reduce their risk exposure and enhance investment returns, there is the need to understand the long-run relationship between indirect real estate assets and other investment assets. One major strategy to achieve risk reduction and return enhancement in a portfolio is to combine segmented investment assets. Thus, of concern to investors is the determination of the level of integration or otherwise of investment assets. This concern becomes amplified given that extant studies (Cauchie and Hoesli, 2006; Liow, 2010; Olaleye and Ekemode, 2014) have found some measure of communality between indirect real estate assets and other investment assets.

Conclusions from extant literature have turned out mixed outcomes indicating that the extent of integration varies over time and across different economies. Despite these series of studies, the assessment of the integration of indirect real estate assets with other investment assets across markets remains important for investors and portfolio managers interested in asset combination and diversification. In addition, the bulk of the extant literature are from the developed markets, with varying investment indices, as such, the results obtained from these studies cannot explain what is obtainable in an emerging African market like Nigeria.

To this end, this paper assessed the level of integration of indirect real estate assets and the five major sectorial indexes in the Nigeria Stock Exchange (NSE). This study is important as it provides analytical information to both international and domestic investors who wish to explore the advantage of the growing internalization of the real estate market and as such intends to integrate indirect real estate assets with the five major sectorial indexes of the NSE market. Also, this study provides information to portfolio managers on the long-run characteristics of indirect real estate assets as this will enhance their decision-making process when forming portfolios that may include indirect real estate assets.

2.0. Literature Review

Various studies have assessed the level of integration between indirect real estate assets and other investment assets. Liow (2004) submitted that there is a long-term correlation between prices for all stocks (including land stock) and property prices. Previous studies such as Liu et al. (1990) have previously found that the stock market is integrated with the securitized property market in the US. The study also found, however, that the stock market was segmented from the US commercial real estate market. In another analysis, Myer and Webb (1993) analysed the relationship between retail shares and property shares in the United States. The result showed that the retail stocks and indirect property influenced each other. Li and Wang (1995) studied whether the listed property market has been separated from the stock market. The study found that integration exist between the indirect real estate and the US stock market. Eicholthz and Hartzell (1996) examined the relationship between property stock and equities in the USA, United Kingdom and Canada. The results established the existence of a strong relationship between listed assets and property shares.

In addition, in UK, Lizieri and Satchell (1997) while investigating the relationship between the indirect real estate returns and the total equity market returns found a strong correlation between the indirect real estate returns and other stock returns. Glascock, Lu, and So (2000) examined the relationship and convergence between REITs, non-real assets and bonds. The study found that REITs and stocks have similar behaviour but are less cointegrated with bonds. In Hong Kong, Tse (2001) found that stock price changes were influenced by unexpected changes in residential and office buildings in Hong Kong. Clayton and MacKinnon (2001) found that listed property is very closely linked to other listed assets. Also, Kim (2004) identified a longstanding and contemporary connection between wholesale prices and indirect real estate asset prices in Singapore. Westerheide (2006) examined the performance and relationship of equity assets in eight advanced economies between 1990 and 2004 with other groups of real estate property assets. The results showed that returns of property shares and non-property shares were integrated.

Also, Hoesli (2007) studied the relationships between property shares, non-property and direct property assets across sixteen countries over a 15-year period. The result showed that the returns on property shares were positively related to non-property assets but were segmented from bond earnings. Liow (2010) revealed a high level of integration between that real estate securities and non-real estate equities at the local market level while equity real estate, global stocks and global real estate securities had a low convergence relationship.

Yunus (2013) found that each property stock was co-integrated with the stock market. Olaleye and Ekemode (2014) examined the integration of real estate equity and non-real estate equity. The study found that listed stock property and common stock were integrated. Similarly, Olaleye and Ekemode (2016) examined the convergence between direct and indirect property investment in Nigeria. The study showed that listed property shares outperformed direct property assets on a risk-adjusted basis.

Ntuli and Akinsomi (2017) found that though stocks outperformed REITs on the risk-adjusted return basis, REITs however, had a higher return enhancing capacity when included in a mixed asset portfolio. Ramjee (2017) found that South African listed property assets were less volatile than the overall stock market. The study found that listed property stocks behaved synonymously like the bonds and not the equity market where they are being traded. Sebate (2019) found that equities outperformed REITs on a risk-adjusted basis. However, REITs exhibited a low correlation with bonds and thus could offer some diversification benefits when combined in a portfolio of bonds. Dabara et al. (2019) found the same level of volatility in the performance of REITs and non-REITs equities. Though the non-REITs assets outperformed the REITs. Arora et al. (2019) found that economic variables such as money supply, inflation rate, GDP and exchange rate are significant predictors of REITs returns. Tiryaki and Tiryaki (2019) noted that listed assets are positively impacted in the short run by exchange rate, consumer price index and changes in industrial production. Ndunda et al. (2020) revealed that listed equities have a weak positive relationship with macroeconomic variables such as inflation rate, exchange rate and GDP. Olanrele et al. (2021) submitted that REITS performance in the short-run was significantly influenced by macroeconomic variables in the Nigerian market. Akinsomi et al. (2021) examined the linkages between BRICS-listed property stocks and REITs markets in the US, Australia and the UK. The study found evidence of cointegration between the assets. Chirchir (2021) examined the determinants of the performance of African REITs. The study found that while inflation, liquidity and interest rate do not significantly impact the performance of REITs, GDP leverage, firms' size and firms' age significantly impacted the performance of African REITs.

Contrary to the submissions of previous studies agreeing to the integration of real estate assets with equities, studies such as Geltner (1990), Ross and Zisler (1991) and Ramjee (2017) argued that indirect real estate and stock markets were largely segmented. Okunev and Wilson (1997) also established a weak nonlinear relationship between the overall stock market and the securitized real estate market using the non-linear mean stock reversion pricing model. Yang and Ye (2010) while studying the indirect real estate and common stock

return discovered that Chinese indirect real estate assets and common stock returns are not integrated. Also, Sharma and Bakshi (2019) revealed that real estate risk has a positive association with the DPR of selected real estate firms. Nguyen and Razali (2020) established that listed property stock companies in Indonesia had poor risk-adjusted performance compared to other stock companies. The study further established that Indonesian listed property companies had low correlations with bonds and stocks which suggested some levels of diversification potential for stock and bond investors.

Summarily, while most of the studies above established that the real estate and listed investment assets are integrated, a few others argued that there is a weak relationship between indirect real estate and the stock market. A few other studies, such as Yang and Ye (2010) found no relationship between indirect real estate assets and common stock. However, there are two major gaps. The first is the dearth of studies focused on African emerging markets and the other is the predominance of foreign studies concerning the subject matter. Thus, given that the behaviour of indirect real estate could be market-dependent, it is expected that studies investigating the level of integration between indirect real estate and other investment assets in an emerging market context be examined. Hence, this study seeks to answer the following research questions:

i.   what is the investment performance of, and correlation between, indirect real estate and other listed investment assets in the Nigerian property market?
ii.   what is the level of integration between indirect real estate and other listed investment assets in the Nigerian property market?

3.0.   The Nigerian Capital Market and the Indirect Real Estate Sector

The capital market activities commenced in 1946 with the issuance of the first development stock of £300,000 by the Colonial Administration in Nigeria. Sequel to this, the Nigerian Stock Exchange came into existence in the year 1960 as Lagos Stock Exchange but started trading in 1961 with three equities, ten industrial loans and six Federal Government bonds making a total of nineteen listings. The transformation of the Lagos Stock Exchange to the Nigeria Stock Exchange (NSE) and the subsequent development of the NSE has made it an important market in Nigeria and beyond with over 200 listings and a total market capitalization of NGN28.26 trillion as of January 2020. In addition to this, the market has over the years experienced

significant foreign investments from multinationals and institutional investors among others. Without a doubt, the trading system in the NSE market has experienced tremendous transformation, especially with the removal of restrictions on capital inflows, and electronic clearing.

Consequently, given the rapid developments in the NSE market, there has been significant improvement in the real estate sector owing to the inclusion and domination by multinational and corporate shareholders. This has led to the inclusion of property assets into the capital market. This began with the listing of UACN Property Development Company in 1998, Union Homes Hybrid REITs in 2006 and Skye Shelter Fund in 2008 and UPDC REITs in 2013. The existence of these indirect real estate companies has eased the investment in indirect real estate assets as investors do not need a huge capital to invest in indirect real estate assets.

Thus, investment in the indirect real estate assets in the Nigeria investment market is an investment in Listed Property Stock (LPS) and/or Real Estate Investment Trusts (REITs). While LPS consists of only UACN Property Development Company, the REITs are made up of 3 companies; Skye Shelter Fund, Union Homes hybrid REITs and UPDC REITs. These indirect real estate assets have a total market capitalization of NGN39.63billion (Union Homes Hybrid REITs - NGN9.15billion, Skye Shelter Fund - NGN1.54billion, UPDC REITs - NGN10.01 and UACN Property Development Company - NGN18.93) as of May 2022. These indirect real estate companies pool resources from corporate/institutional, multinationals and individual investors through initial public offerings, and sales of shares and invest the same into direct real estate assets through the acquisition and development of properties in prime locations across the country. The predominant form of investment is the commercial and residential properties for medium and high-income earners.

4.0. Data and Methodology

The study utilized secondary data for the study, this comprises the average quarterly share prices of the indirect real estate assets and the five sectoral indexes of the Nigeria Stock Exchange (NSE). These data were obtained from the daily price list of the NSE, covering Q1 of 2009 to Q4 of 2020. Quarterly opening and closing prices of the listed assets were employed in determining the quarterly mean return and risk of the investment assets

To evaluate the assets performance in terms of return and risk during the period under study,

holding period return and standard deviation were employed.
While the holding period is given as:

$$\text{Hpr} = \frac{I_n + (P_{n+1} - P_n)}{P_n} \quad \text{.............................. (1)}$$

where HPr is the holding period return, Pn is the price of share/ capital value of the asset at the beginning, Pn+1 is the price of share/capital value of the asset at the end, and In is the dividend of share/ income of asset received during the holding period.

The standard deviation which measures the deviation of the asset's quarterly returns was used to determine the risk level of the investment assets. The standard deviation is given as:

$$\text{SD} = \sqrt{\sum_i^n \frac{\sum_{i=0}^n (x_i - \bar{x})^2}{n}} \quad \text{........................... (2)}$$

where SD is the standard deviation based on the quarterly series of returns, is mean return, xi is the individual observation, and n is the number of observations.

The return-risk ratio and correlation among the asset pairs were also analysed. Given that the individual results obtained from the return and risk analyses might not present a holistic guide towards determining an individual asset's performance, the return-risk ratio presents a clearer basis for assessing the performance of the assets. The decision rule is that the higher the return risk ratio, the better the performance of the asset, and vice-versa. The correlation analysis gives an insight into the possibility of co-movements between the pair of assets. This preliminary analysis was further investigated/validated using the cointegration analysis.

Thus, having obtained and analysed the data on the average quarterly returns of the indirect real estate asset and the five major sectorial indexes of the NSE making use of holding period return, standard deviation, return risk ratio and the correlation analysis, the study further tested for the level of integration of the investment asset classes.

To test for the level of integration, at first, the Augmented Dickey-Fuller (ADF) test was employed to determine the unit root. The testing procedure for the ADF test is presented in the model:

$$\Delta yt = \alpha + \beta t + \gamma yt - 1 + \delta 1 \Delta yt - 1 + \square + \delta p - 1 \Delta yt - p + 1 + \varepsilon t \text{ .... (3)}$$

where α is a constant, β is the coefficient on a time trend and p is the lag order of the autoregressive process.

Also, this test is used to determine if the investment returns were stationary or non-stationary. To determine the stationarity of the data series, two hypotheses were set:

H0 = The data series (investment returns) are non-stationary (has unit root)
H1 = The data series (investment returns) are stationary (has no unit root)

The critical value was set at 5%. After the unit root test had been conducted, the Akaike information criterion (AIC) and Schwartz information criterion (SIC) were used to determine the order of the variables. The Akaike information criterion (AIC) and Schwartz information criterion (SIC) are given as thus:

AIC = T In (residual sum of squares) + 2n .... (4)
SIC = T In (residual sum of squares) + n In (T) .... (5)

Where n is the number of parameters estimated and T is the number of usable observations. The least of the lags was subsequently used for the analysis of the cointegration (Johansen Cointegration) test, in determining the existence or otherwise of a long-run relationship between listed real estate assets and other investment assets. The data series were found to be stationary at the first difference. The study adopted trace statistics in carrying out the Johansen co-integration and the outcomes were ranked. By ranking, the co-integration analysis showed different levels of co-integration relations. Thus, the rank (r) of zero implies no co-integration relationship. A rank is one implies one co-integration relationship and so on. This is mathematically denoted as r = k, where r is the rank and k is a constant.

Furthermore, to determine the integration between the returns of real estate assets and other listed investment assets, a hypothesis was developed and this is given as:
H0 = There is no co-integration between listed real estate and other listed assets.
H1 = There is co-integration between listed real estate and other listed assets.

5.0. Analysis and Results

The results of the analysis are presented in two sub-sections. The first sub-section reports the results of the descriptive statistics of the assets' quarterly returns and the correlation analysis between the pairs of assets. The results of the co-integration analysis are reported in the

second sub-section.

5.1.   Descriptive Statistics and Correlation Analysis of Assets Returns

An examination of the descriptive analysis as presented in Table 1 shows that indirect real estate outperformed most other assets on a mean return basis. Where indirect real estate had a mean return of 4.84, NSE insurance was the least performing asset with a mean return of -2.91. the results also showed that while NSE banking and NSE Oil and Gas has positive mean returns of 1.23 and 0.09 respectively, NSE Consumer and NSE industrial had negative mean returns of -0.01 and -2.50 respectively.

The results of the assets risk level as measured by the standard deviation showed that the least risky of the assets were NSE Industrial, and NSE Consumer, followed by indirect real estate. These have standard deviation values of 2.45, 3.43 and 5.10 respectively. The findings showed that NSE Banking was the riskiest of the assets with a standard deviation value of 14.28. NSE Oil and Gas and NSE insurance have respective mean values of 13.29 and 10.51.

Table 1. Descriptive and Correlation Analysis of Assets Returns

| | Descriptive Statistics | | | | | | Correlation Analysis | | | | |
Asset Classes	Mean	S.D	Return/Risk Ratio	Max	Mini	IRE	NSE Banking	NSE Consumer	NSE Industrial	NSE Oil & Gas	NSE Insurance
IRE	4.84(1)	5.10(3)	0.95(1)	9.26	0.72	1.000	-0.313	0.652	-0.648	0.136	0.245
NSE Banking	1.23(2)	14.28(6)	0.09(2)	19.94	-8.79		1.000	-0.011	0.046	0.242	0.151
NSE Consumer	-0.01(4)	3.34(2)	0.00(4)	3.41	-1.69			1.000	-0.563	-0.005	0.386
NSE Industrial	-2.50(5)	2.45(1)	-1.02(6)	3.21	-31.80				1.000	-0.263	-0.166
NSE Oil & Gas	0.09(3)	13.29(5)	0.01(3)	14.22	-12.08					1.000	0.228
NSE Insurance	-2.91(6)	10.51(4)	-0.28(5)	6.77	-17.49						1.000

* rank of assets is shown in parenthesis

A clearer performance of the assets as given by the return risk ratio showed that indirect real estate outperformed other assets with a return risk ratio of 0.95. this is followed by NSE banking (0.09) and NSE Oil and Gas (0.01). While NSE Consumer had a return risk ratio of 0.00, the two least performing assets were NSE Insurance (-0.28) and NSE Industrial (-1.02).

The result suggests that indirect real estate assets outperformed other listed investment assets for the period under study. This result corresponds to the result of the study by Chen and Mills (2006) which established that equity real estate asset yields a high rate of return than other listed investment assets. Similarly, Hoesli and Lekander (2008) and Rahmann and Woolston (2011) also established in their various studies that indirect real estate return was higher than other listed stock returns. Likewise, Olaleye and Ekemode (2014) established that real estate equity assets outperformed non-real estate equity based on returns. The results

however contradict the findings of Ayodele et al. (2016) which found that indirect real estate underperformed investment assets in the Nigerian property market based on returns and return-risk ratio.

The result of the correlation analysis shows that indirect real estate had a negative correlation with NSE Banking (r = -0.313), and NSE Industrial (r = -0.648). This implies that there is a possibility of an inverse relationship which should encourage diversification benefits. The results also show that indirect real estate had a positive relationship with other listed assets; NSE Consumer (r = 0.652), NSE Oil and Gas (r = 0.136), and NSE Insurance (r = 0.245). This positive relationship suggests the existence of a co-movement between the pair of assets. As such, combining these pairs of assets in a mixed-asset portfolio might be expected to yield diversification benefits. However, while the correlation analysis presents only an indicative response of the co-movements, there is a need to analyse the level of integration of indirect real estate assets with other listed investment assets. The results are presented in the subsequent sections.

5.2. The Integration of Real Estate Assets and Other Listed Investment Assets

As earlier stated, to determine the integration of indirect real estate assets and the other listed investment assets, the Johansen Co-integration test was used. However, before using the Johansen Co-integration test the Unit Root Test was used as a pre-estimation test to determine whether the data were stationary or non-stationary. The results of the Unit Root Test are presented in Table 2.

Table 2 - Unit Root Test Using ADF Test

Variable	At Level	First Difference	Critical Value (5%)	Remarks
NSE Consumer	-1.308189	-6.262662	-2.926622	First-order integration
NSE Banking	-2.068274	-6.310065	-2.928142	First-order integration
NSE Oli and Gas	-1.653544	-6.396407	-2.926622	First-order integration
NSE Insurance	-1.41772	-5.325452	-2.926622	First-order integration
NSE Industrial	-2.851243	-8.084358	-2.928142	First-order integration
IRE	-0.724411	- 4.049911	-2.933158	First-order integration

5.3. Result of the Unit Root Test
The test was carried out using the Augmented Dickey-Fuller (ADF) test procedure. The optimal lag was selected using the AIC information criteria. The ADF test value as shown in Table 2 reveals that the test values (-1.308, -2.068, -1.654, -1.418, -2.851, -0.724) for NSE Consumer, NSE Banking, NSE Oli and Gas, NSE Insurance, NSE Industrial and IRE respectively were greater than there corresponding critical values (-2.927, -2.928, -2.927, -2.926, -2.928, -2.933) at 5%.

This implies that all the variables were not stationary at level and as such, the data series had no unit roots. Subsequently, the data series were subjected to further differencing. At first difference (Table 2), it was found that all the variable test values (-6.263, -6.310, -6.396, -5.325, -8.084 and – 4.050) for NSE Consumer, NSE Banking, NSE Oli and Gas, NSE Insurance, NSE Industrial and IRE were lesser than their corresponding critical values (-2.927, -2.928, -2.927, -2.926, -2.928, -2.933) of first-order of integration and this implies that the variables were stationary at first difference as such the data series had a unit root. More so, the variables were of the same order and this informed the test of co-integration using the Johansen co-integration test.

5.4.   Johansen Cointegrating Test

The result of the unit root test shows that the variables are stationary at first difference; therefore, it becomes necessary to determine the long-run relationship among the variables. Cointegration is said to exist when a group of variables are individually integrated and are of the same order, as such, they have at least one linear combination (Lee et al., 1993). Cointegration explains the existence of a long-run relationship between variables. One major technique of measuring cointegration is Johansen's cointegration technique (Utkulu, 1994), and it has been considered to be advantageous over other techniques because of its ability to estimate more than one cointegration (Khalifa and Sakka, 2004). Thus, the Johansen co-integration was adopted in investigating the level of integration between the indirect real estate assets and the other listed investment assets such as NSE Banking, NSE Consumer, NSE Industrial, NSE oil and gas and NSE Insurance sector, having discovered that the variables were not stationary at level. The study adopts Trace test statistics to analyze the Johansen co-integration test. The outcomes are presented in Table 3.

The result showed that at rank = 0, the value of the Trace statistics was 136.52 with a corresponding critical value at a 5% significance level of 95.75. Since the critical value was lower than the Trace Statistic value at the 5% level, the null hypothesis of no co-integration was rejected. This suggested that there was a co-integration or long-run relationship between the indirect real estate assets and other listed investment assets. The result also suggests that both the real estate assets and the other listed investment assets comove in the long run. The findings imply both react to the same market factors and most often moved in the same direction for long-run convergence. Hence, no diversification benefit when the assets are combined in a mixed-asset portfolio

Table 3: Trace Statistics Test

Unrestricted Cointegration Rank Test			
Variables: IRE, NSE INDUSTRIAL, NSE INSURANCE, NSE OIL AND GAS, NSE BANKING AND NSE CONSUMER			
Hypothesized No. of CE(s) for Trace Statistic	Trace Statistic	0.05 Critical Value	Prob.**
None * R=0	136.5154	95.75366	0.0000
At most 1 *R=1	89.33693	69.81889	0.0007
At most 2 * R=2	56.04027	47.85613	0.0071
At most 3 * R=3	33.32248	29.79707	0.0188
At most 4* R=4	19.76068	15.49471	0.0107
At most 5* R=5	6.925179	3.841466	0.0085
*denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Trace test indicates 6 co-integrating equations at the 0.05 level			

Also, at rank = 1, the table 3 shows that the Trace Statistics value of 89.34 was greater than its corresponding critical value at a 5 per cent significant level of 69.82. The result indicates that there was co-integration between indirect real estate assets and other listed investment assets. This means that the indirect real estate asset just like the result above is co-integrated with other listed investment assets. It means that indirect real estate assets and other listed investments have a long-run relationship and as such, the assets comove and react to the same market fundamentals. The result is similar to the result in r = 2 in which the Trace Statistic of 56.04 was higher than its corresponding critical value of 47.86.

In rank 3 and rank 4 the Trace Statistic values in rank 3 and 4 were 33.32 and 19.76 respectively which were greater than their corresponding critical values of 29.80 and 15.50 respectively. It means that indirect real estate asset was co-integrated with other listed investment assets and as such, the assets have similar behaviours to market factors. The result is similar to what was obtainable in rank 5 as the Trace Statistics value of 6.93 was greater than its corresponding critical value of 3.84.

The above results, therefore, mean that indirect real estate assets and other listed investment

assets are highly integrated. In other words, there is an existence of a long-run relationship between indirect real estate assets and other listed investment assets. Furthermore, the results indicate that indirect real estate assets behaved more like the five sectorial index assets considered. This further implies that little or no diversification benefits could be obtained when an indirect real estate asset is combined with other listed investment assets in a portfolio. This result correlates with studies like Liu, Hartzell, Greig and Grisson (1990) which established that the stock market was integrated with the securitized property market in the US. Furthermore, Glascock, Lu and So (2000) established that REITs and listed stocks were integrated and had similar behaviour. Also, Liow (2010) revealed a high level of integration between real estate securities and non-real estate equities. Similarly, Olaleye and Ekemode (2014) found out that real estate equity was integrated with common stock otherwise known as non-real estate equity.

6.0. Conclusion

The study determined the performance and level of integration of indirect real estate assets and other listed investment assets. Results based on the return-risk analysis showed that indirect real estate assets outperformed other listed investment assets, indirect real estate also showed a strong positive correlation with most of the misted assets, suggesting the potential for minimal diversification benefits. Further analysis to test for the level of integration using the Johansen Cointegration Test showed that the indirect real estate asset and other listed investment assets are highly integrated. This means that the indirect real estate asset and other listed investment assets comove in the long run which indicates that the combination of these assets in an investment portfolio will bring little or no diversification benefit. The results corroborate the findings of extant studies establishing co-movements between indirect real estate assets and other listed assets. The foregoing suggests that indirect real estate behaves synonymously like the stock market where it is being traded and not like the underlying physical properties being traded. It might thus be expected that investment characteristics for which the direct real estate asset is known might not be readily admissible as investment characteristics of the indirect real estate assets. Hence, the diversification attributes of real estate assets might need to be examined from the perspective of the investment asset, that is, whether direct or indirect real estate assets.

On this note, the finding in this study has implications for the investors and other participants in the Nigerian investment market. The study, therefore, recommends that investors should

not consider the combination of indirect real estate and other listed investment assets in an investment portfolio as the assets have little or no long-run diversification benefit. This means that none of the other listed investment assets could be a close substitute for indirect real estate assets when affected by market fundamentals. This result implies that combining the indirect real estate and the other listed investment assets in a portfolio mars the investor's motive of maximizing profit in the long run.

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