THE DIVERSIFICATION AND INFLATION-HEDGING POTENTIALS OF DIRECT AND INDIRECT REAL ESTATE INVESTMENTS IN NIGERIA

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PURPOSE: This study aims at examining the diversification and inflation-hedging potentials of both direct and indirect real estate investments in Nigeria from 2005 to 2014 this is with a view to providing information for investment decisions.

DESIGN/METHODOLOGY/APPROACH: Secondary data on rental/capital values of direct real estate investments covering an average total of 1,587 residential properties was obtained from the records of 5 Estate Surveying and Valuation Firms in Gombe. Similarly, the dividend and share prices of the indirect real estate investment were also collected from the data bank of the Nigerian stock exchange. These data were subsequently translated to holding period returns. Furthermore, secondary data with respect to the Nigerian Consumer Price Index (CPI) which was used as a proxy for actual inflation for the study was collected from the National Bureau of Statistics (NBS). These data groups were used to calculate the asset and portfolio returns as well as the asset and portfolio risks of the selected assets. Furthermore, both descriptive and inferential statistics were used to determine the diversification and inflation-hedging potentials of the selected investment assets. This involved the use of weighted means, Pearson Product Moment Correlation and the Ordinary Least Square Regression.

FINDINGS: The study revealed that investment in direct property provided the highest returns (22.48%) as well as the highest level of risk (8.71548%) over the study period. The study further showed that only the direct property investment demonstrated the existence of diversification potential. Similarly, among the two selected asset classes only direct property showed complete inflation-hedging potential with beta 0.082, while indirect property showed a beta of -0.126, suggesting a perverse hedging characteristics.

PRACTICAL IMPLICATIONS: Diversification and Inflation-hedging potentials of investment asset classes is of particular interest to investors. The results of this study can be useful for investment forecasts as well as investment decisions on asset types to include in portfolios as a measure for protecting investors' earnings from erosion by inflation and a means of enjoying diversification benefits thereby improving the performance of the investment portfolio.

ORIGINALITY/VALUE: Research work on the subject of diversification and inflation-hedging in Nigeria were majorly conducted in isolation. This study expanded the scope of the diversification and inflation-hedging literature by empirically investigating both investment indicators in a comparative context.

Keywords: Diversification, Hedge, Inflation, Investment, Portfolio.

Introduction

An essential aspect usually considered by rational investors in the investment sector, is good decision-making with regards to investment of their funds. Shrewd investors often seek to invest in assets that have reliable degree of certainty in protecting the purchasing power of investors' funds, as well as the provision of a continuous stream of positive rate of returns with minimal risk (Dabara, 2015). This can be achieved when investors make informed decisions with regards to the diversification potentials as well as the inflation-hedging potentials of the asset class in question (Olaleye, 2011; Ogunba, Abiyomi & Dugeri, 2013).

Koen & Monique (2010) posited that an investment can be defined as 'expenditure in cash or its equivalent during one or more time periods in anticipation of enjoying a net inflow of cash or its equivalent in some future time period or periods'. In line with the foregoing, Fatoki, Okubena & Herbst (2010) asserted that investment asset be it physical (such as real estate) or financial (such as stocks, bonds, equities etc) need to be properly evaluated before committing investment funds to such investment asset(s). This is necessary due to the fact that investment resources are limited. Since funds for investments are in limited supply, it is obvious that choices from competing alternative investment assets have to be made. This could be achieved by evaluating the individual merits of each of these assets (Dabara, Ankeli, Odewande, Guyimu, & Adeleke, 2014). Doing so is capable of facilitating the identification of asset classes that performs relatively better than others (Ballantine & Stray, 1998; Fatoki et al, 2010). It has been observed that globally, there is a preference for real estate investments whether in direct real estate investments, which involves investment in physical and tangible properties (eg. Commercial properties, residential properties etc) or indirect real estate investments, which involves investment in securitized real estate (eg. Real Estate Investment Trust) quoted in the capital market. This is more so in an emerging market like Nigeria, where there is generally lack of market data for real estate transactions. Similarly, the Nigerian Real Estate Investment Trust (NREITs) which was started about a decade ago is still emerging and gradually evolving. Hence it was observed that there is an evidence of both property market immaturity and lack of relevant data for both direct and indirect properties in the Nigerian property market.

Furthermore, in the investment circle, it has been observed that during periods of inflation, certain investment assets' purchasing power gets eroded, while some assets provides negative returns characteristics and high level of risk (Odu, 2011; Fraundorf, 2012; Akinsola, 2012; Dabara, 2014). Hence, investors need to first ascertain the hedging potential of an asset class as well as its diversification potential before investing in such asset(s) to avoid loss. It is common knowledge that inflation could erode the value of investors' funds by the devaluation of the purchasing power of assets used as investments (Payton, 2011). Similarly, inflation can greatly impact on the risk-return characteristics or diversification potential of an investment asset class (Mughees, 2010). It is therefore necessary for investors to be conversant with reliable and up-to-date information with regards to diversification and inflation as it relates to investments, most especially in an emerging property market like Nigeria. This could guide investors in making informed investment decisions. In the light of

the foregoing, and to adequately tackle their fears, it became imperative for investors and researchers to from time to time keep re-examining the ability of different types of asset classes to provide both diversification benefits and inflation-hedge.

Previous research works in the field of inflation-hedging in both developed and developing economies included the investigation of the inflation-hedging capacities of: direct investments in real estate, indirect investments in real estate (REITs), investments in stocks, bonds, equities, commodities, gold, and shares among others (Fama & Schwert 1977; Bello, 2005; Zhou & Clements 2010; Omotor, 2010; Odu, 2011; Akinsola, 2012, Park & Bangs 2012; Oluwasegun & Dabara 2013, Ogunba, et al, 2013; Dabara, 2014; Dabara, 2015). Findings from these studies have shown a varying pattern, indicating lack of consensus on the ability of various asset classes to hedge against inflation. Specifically, the inflation-hedging performance of real estate was particularly observed to have divergent results across different inflation components (actual, expected and unexpected) as well as real estate types (commercial, residential, industrial, agricultural etc) even in the same country (Oluwasegun & Dabara 2013). Dabara, et al. (2014) asserted that regardless of the different findings presented by researchers all over the world on the performance of real estate vis-à-vis inflation, there are good reasons which could motivate investors to invest in real properties. Such reasons could be connected to the risk-return profiles of the asset class in question as it relates to diversification benefits. The risk-return characteristics of specifically direct real estate investments, was found to provide a buffer through annualized cash flows in a recent study conducted in Southwestern Nigeria by Dabara (2014).

The aim of this study is to analyze in a comparative context the relationships between direct and indirect real estates' investment returns and inflation as well as its risk/return characteristics with a view to determining their inflation-hedging and diversification potentials in the Nigerian property market. The study intends to address the following questions: What were the risk-return characteristics of the selected investment assets in Nigeria from 2005 to 2014? Do the selected investment assets in question possess diversification potentials? And what is the inflation hedging-performance of investments in the selected assets in Nigeria within the study period? The remaining part of this study is presented as follows: section two presents literature review, section three presents the methodological approach adopted for the study, the result/discussion was presented in section four, while section five presented summary of findings, policy implication and conclusion.

2. Literature Review

Related Literature on Inflation-Hedging

The earliest study on the relationships between asset returns and inflation was carried out by Fama & Schwert (1977) in the US. Fama & Schwert (1977) examined the extent to which various assets (US stocks, human capital US treasury bills, bonds, and residential real estate) were hedges against the expected and unexpected components of inflation rates between 1953 and 1971. The authors used conventional Ordinary Least Square (OLS) regression model to analyze the relationships between

the selected asset returns and inflation. The US Consumer Price Index (CPI) was used as a proxy for actual inflation rate in the study. Similarly, the US Treasury bill rates were also used as a proxy for the expected inflation rates. Findings from this study revealed that residential properties were a complete hedge against inflation; Human capital was a partial hedge, while stocks provided a perverse hedge against inflation. However, the study did not test for the stationarity properties of the data sets used; recent studies such as Dabara (2015) posited that analysis of such data could be open to spurious regression results.

Mei-ling (2003) examined the inflation-hedging capacities of hotel investments in Hong Kong between 1980 and 2000. Mei-ling (2003) used a valuation based index for hotel returns data in the study area. In this study, both Fama & Schwert's, regression model and Johensen's cointegration models where used to test the hedging capability of hotel investments in Hong Kong. The results from this study suggested that investments in hotel properties provided hedge against only the expected component on inflation.

Bello (2005) carried out a comparative analysis of the inflation-hedging capacities of direct real estate investments in Nigeria. This study also considered investments in ordinary shares and naira denominated deposits in the study area between 1996 and 2002. The Nigerian CPI was used as a proxy for actual inflation, similarly, the Nigerian three months T-Bill rates were used as a proxy for expected inflation while the difference between the two was calculated to determine the unexpected component of inflation. Regression model was used in the analysis of data for the study. Findings from the study showed that ordinary shares outperformed Naira denominated time deposits within the study period. Similarly the study suggested that real estate investment does not hedge against actual inflation.

In a more recent studies carried out in the Northern part of Nigeria, Dabara (2015) investigated the relationships between residential real estate's returns and inflation in Gombe metropolis. In line with earlier studies such as Ogunba, et al, (2013), the Nigerian CPI was used as a proxy for actual inflation, the Nigerian 90-day Treasury bill rates were also used as a proxy for expected inflation and the difference between the two components was computed to derive the unexpected inflation rates for the study period. The methodology adopted involved the determination of the stationarity status of the data sets used; similarly the Ordinary Least Square regression model was also used. Findings from this study showed that investments in residential real estate in the study area provided a partial hedge vis-à-vis actual inflation component; a complete hedge vis-à-vis the expected inflation component and a perverse hedge vis-à-vis the unexpected inflation component. However, the study solely focused on residential real estate ignoring other investment assets such as shares, bonds, equity etc. A comparison between these different asset types could provide a more robust research work.

Related Literature on Diversification

The diversification potentials of various investment assets have been evaluated in both developed and developing economies. Mueller, Pauley & Morrill (1994) investigated the effect of including Real Estate Investment Trusts (REITs) in a mixed-assets

portfolio. The study showed the diversification potentials of REITs in a mixed asset portfolio from 1976 to 1993. The research method employed in the study involved using correlation analysis and coveriances. Findings from the study showed that REITs was positively correlated with small-cap stocks.

In Nigeria, Olaleye (2003) investigated the investment performance of real estate portfolio in the city of Lagos. Results from this study showed that real estate portfolio in Ikeja, Lagos suggested a better performance with respect to means returns in comparison to the risk free rate. This study expanded the literature in this field by showing the naïve diversification approach of portfolio diversification as it relates to the Nigerian property market.

Amidu, Aluko, Nuhu & Saibu (2008) examined the investment performance of real estate security in comparison to selected investment assets in Nigeria. The authors used the annual open and closing market prices of shares and dividend of selected listed companies as well as the Nigerian All Share Index (ASI); Consumer Price Index (CPI) and the 90-days Treasury Bill Rates covering the study period (1999-2005). The data obtained were analyzed using risk-adjusted measures, descriptive and regression statistical models. Findings from the study suggested that real estate performed better than stock.

In Malaysia, Lee (2008) carried out an investigation which compared Malaysian property shares and REITs covering a period from1991 to 2006. Results from the study revealed that property shares do not provide diversification benefits. Similarly, it does not also provide portfolio return enhancement. However, Real Estate Investment Trusts (REITs) showed both diversification benefits and also portfolio return enhancements.

Olaleye (2011) investigated the diversification benefits an investor is likely to achieve when adding listed property stock to domestic mixed asset portfolios in South African property market. The author used quarterly returns obtained from property listed stock, the all share index, as well as all bond and 90 day Treasury bill rates covering a period from 1999 to 2009. The statistical tools used in analysis of data for the study included: standard deviation, coefficient of variation, correlation coefficient and Markowitz's mean variance. Results from the study suggested that real estate provided a better return profile than stock.

3. Research Method

This study utilized secondary data with respect to average rental and capital values of investments in direct real estate (residential properties) in Gombe as well as data on dividend and share prices of indirect property (Real Estate Investment Trust) obtained from the Nigerian Stock Exchange (NSE). Similarly, coupon for Treasury bills from 2005 to 2014 were also obtained and used in the study. The study period was limited to the time frame from 2005 to 2014 due to unavailability of data for direct property investments in the study area before 2005. With the exception of data on direct real estate which was obtained from the records of 5 estate surveying and val-

uation firms in Gombe (Gombe in Nigeria have only 5 practicing Estate Firms, therefore, a total enumeration of all the firms was carried out), all other data was obtained from the database of the NSE.

A structured questionnaire was designed in such a way as to elicit for information on the average capital and rental values of residential properties consisting of flats/bungalows (per square meter) in Sabon Layi, Jekadafari, Checheniya, Harwagana and Tunfure areas of Gombe metropolis from 2005 to 2014. These data were collected from branch managers who are registered estate surveyors and valuers, through a total enumeration survey of all the 5 private practicing Estate firms in Gombe (this is because the Estate Surveyors and Valuers are the only professionals in Nigeria that are empowered by the law i.e Decree No 24 of 1975 to determine the value of properties and their interest). The 5 estate surveying and valuation firms in Gombe have a combined minimum average total of 1,587 residential properties in the management portfolios of all the estate firms (for each year within the study period respectively). The study period was arrived at after a pilot survey revealed that the managers of most of the firms do not have data for residential properties in the study area before 2005. The rental and capital values used in the study were arrived at by calculating for each year respectively, the aggregate total averages of all the respondents' responses in the study area per meter square.

Similarly, the dividend and share prices of the indirect real estate investment (NREITs) were also collected from the data bank of the Nigerian stock exchange covering the study period. These data were subsequently translated to holding period returns. Furthermore, the data with regards to the Nigerian Consumer Price Index (CPI) used as a proxy for actual inflation was obtained from the National Bureau of Statistics (NBS). These data groups were used to calculate the asset and portfolio returns as well as the asset and portfolio risks of the two asset classes. Furthermore, inferential and descriptive statistics were used to determine the diversification as well as the inflation-hedging potentials of the asset classes in question. This involved the use of weighted means, Pearson Product Moment Correlation and the Ordinary Least Square Regression.

Furthermore, inflation data required for the study was obtained from the records of the Nigerian National Bureau of Statistics (NBS). In line with previous studies such as Ogunba, et al. (2013) and Dabara (2015), this study also used actual inflation rates (derived from the Nigerian Consumer Price Index which is computed by the NBS).

Two statistical approaches were applied in this study. The first approach was the descriptive statistics while the second was the inferential statistics. The parametric interval and ratio scales were used to measure rental/capital values as well as the dividend and share prices of the selected investment assets in Nigeria for the period from 2005 and 2014. The data were treated as follows:

First, the rental/capital values of investment in direct properties as well as the dividend and share prices of the indirect property were all accordingly calculated to obtain their respective holding period returns using Equation 1.

The Holding Period Return is expressed as

$$r = \frac{P_1 - P_0 + a_1}{P_0} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where
r = Total Return
P_0 = Capital value of direct property at the beginning
P_1 = Capital value of direct property at the end
a_1 = Income of direct property received during the holding period

From the foregoing, the holding period returns of each asset class were obtained. Consequently, the portfolio returns of a combination of all the asset returns were also calculated using Equation 2.

The Portfolio Return is expressed as

$$R_P = \sum wR_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where:
R_p =Return of the portfolio
W = the proportion of investment in each asset
R_i= return on each asset

Second, the risk characteristics (asset risk and portfolio risk) of the selected assets were also calculated. Standard deviation was used as a measure of a portfolio's volatility (risk), that is, systematic plus unsystematic risk. For single assets, it was calculated by measuring the difference between asset's periodic returns and its mean return covering the same period of time. The riskier an asset's returns becomes, the greater the standard deviation. The asset risk for each of the selected assets was calculated using Equation 3.

The Asset Risk is expressed as

$$\textbf{\textit{Asset risk}} = \sqrt{\frac{\sum(x_i - x)^2}{N}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:
x_i = the asset periodic returns,
x = the mean return and
N = the number of observations

The portfolio risk was calculated using Equation 4. To determine this, the standard deviations of all the selected assets were calculated. Similarly, the proportions of investment funds allocated to each asset i.e 0.167 were determined and the coefficient of correlation between the assets (using the Pearson Moment Product Correlation) was calculated.

The portfolio risk is expressed as

$$Portfolio\ Risk = \sqrt{\sum (P_a X P_b X S_a X S_b X C_{ab})} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where:
P_a = the proportion of asset A,
P_b = the proportion of asset B,
S_a = the standard deviation of asset A,
S_b = the standard deviation of asset B and
C_{ab} = the correlation coefficient of assets A and B.

For a two asset portfolio, this translates to

$$\sqrt{\{(P_a \text{ x } P_a \text{ x } S_a \text{ x } S_a \text{ x } C_{aa}) + (P_b \text{x } P_b \text{ x } S_b \text{ x } S_b \text{ x } C_{bb}) + (P_a \text{ x } P_b \text{ x } S_a \text{ x } S_b \text{ x } C_{ab}) + (P_b \text{ x } P_a \text{ x } S_b \text{ x } S_a \text{ x } C_{ab})\}} \ldots\ldots (5)$$

was used in the determination of the expected returns from all the selected assets; this was done so as to determine the diversification potentials of the selected asset classes.

The CAPM is expressed as

$$R = R_t + B_p (R_m - R_t) \ldots\ldots\ldots\ldots (6)$$

Where:
R = Expected asset/portfolio discount rate allowing for risk
R_t = the risk free rate of return usually taken as the yield on gilt edged securities
R_m = Ratio of return on the market portfolio
B_p = the measure of the riskiness or volatility (sensitivity) of the asset or portfolio related to the riskiness of investing in a portfolio consisting of all risky assets in the market.

The B_p is expressed as

$$B_p = \frac{(S_a \times C_{am})}{S_m} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where:
S_a = the Standard deviation of returns of the individual asset or portfolio
C_{am} = Correlation coefficient between the return of the asset or portfolio and the portfolio return.
S_m = the standard deviation of returns in the portfolio.

Fourth, the diversification potentials of the selected assets were determined using Alpha. This is obtained by subtracting the expected returns (as calculated using Equation 6) from the selected asset returns accordingly.

Alpha is expressed as

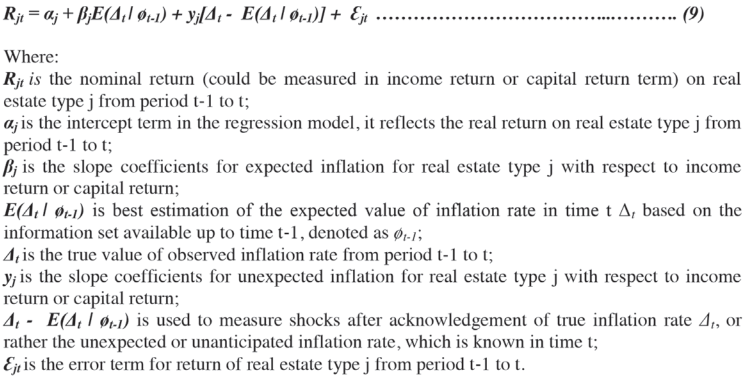
$$\boldsymbol{Alpha = R_p - R_e} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .. (\mathbf{8})$$

Where:
R_p = Asset returns and
R_e = expected returns

***Decision rule**:* The Alpha in this study measures the relative value-added provided by an asset manager when compared to a market index, given a portfolio's market risk. A positive alpha shows an additional return obtained by an investor as a reward for taking certain degree of risk. This suggests that such asset have diversification potential. In the same vein, a negative alpha suggests that a portfolio provided a return that is not up to the expected return. Such assets does not provide diversification potential.

Finally, the inflation-hedging potential of the selected assets were determined using the Fama & Schwert (1977) regression model.

The regression equation is expressed as:



$$R_{jt} = \alpha_j + \beta_j E(\Delta_t / \phi_{t-1}) + y_j[\Delta_t - E(\Delta_t / \phi_{t-1})] + \mathcal{E}_{jt} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots . (9)$$

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;
y_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;
$\mathcal{E}_{jt}$ is the error term for return of real estate type j from period t-1 to t.

Decision rule: The decision rule for β is as follows: An asset is a complete hedge against inflation if the value of β is not significantly less than 1. An asset is a partial hedge against inflation if the value of β is significantly less than 1. An asset has zero hedge against inflation if the value of β is not significantly different from zero. An asset has a perverse hedge against inflation if the value of β is negative.

4. Results and Discussion

This section presented the results from analysis of data obtained for the study and subsequently discussed the results accordingly. First, the rental/capital values of direct property investments as well as the dividends and share prices of the indirect property investments were used to calculate the holding period returns (using equation 1) obtained from the study area from 2005 to 2014, this was presented in Table 1. Similarly, the risk profile of the asset class in question was also presented and analyzed. Second, the diversification potential of the selected assets were determined and presented accordingly. Third, regression results which revealed the inflation-hedging potentials of the selected asset classes were presented. Finally, the section concluded with a comparative analysis of the diversification and inflation-hedging potentials of the selected asset classes.

Table 1 presents the Holding Period Returns which invariably revealed the asset returns of the selected investments. These were calculated from the rental/capital values of direct property investments (investment in residential property in the study area) as well as the dividend and share prices of the indirect property investments (investment in NREITs) using Equation 1.

Table 1: Holding Period Returns for the selected assets (Asset Returns)

YEAR	DIRECT PROPERTY	INDIRECT PROPERTY	WEIGHTED MEAN
2005	32.1	9.7	20.90
2006	38.8	2.5	20.65
2007	26.4	5.6	16.00
2008	16.3	9.2	12.75
2009	10.9	-1.6	4.65
2010	17.6	4.7	11.15
2011	18.9	9.3	14.60
2012	21.1	1.7	11.40
2013	27.9	-2.7	12.60
2014	13.8	1.3	7.55
WEIGHTED MEAN	**22.48**	**3.97**	**13.23**

Source: Calculated from rental/ capital values of direct real estate investments (residential properties in Gombe) as well the dividend and share prices of the indirect property investments (NREITs), 2015

$$R_{jt} = \alpha_j + \beta_j E(\Delta_t \mid \phi_{t-1}) + y_j[\Delta_t - E(\Delta_t \mid \phi_{t-1})] + \varepsilon_{jt} \quad \ldots\ldots (9)$$

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;

$E(\Delta_t \mid \phi_{t-1})$ 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;

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

$\Delta_t - E(\Delta_t \mid \phi_{t-1})$ 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.

From Table 1 a comparative analysis of the two selected asset classes revealed that investments in direct property (residential properties in Gombe) yielded the highest returns within the study period (in the year 2006 i.e 38.8% returns on investment), the highest return obtained from the indirect property investment (NREITs) was 9.7% returns on investments recorded in the year 2005. By the same token the yearly holding period returns of the combination of the two assets showed that the highest

combined returns was obtained in the year 2005 (20.90% returns on investments). The weighted mean of the holding period returns obtained for both the direct and the indirect property investments over the study period were 22.48% and 3.97% returns on investments respectively. This suggests that the direct property investments provide higher returns. It was also observed that contrary to what was seen from the direct property investments, the indirect property investments provided negative returns in the year 2009 and 2013.

Table 2 presents the portfolio returns of the selected assets within the study period. In line with Markowitz model, an assumption on an equal weight of 0.167 was used for all the selected assets. The portfolio returns was calculated using Equation 2.

Table 2: Portfolio Return of the asset classes

ASSET	ASSET RETURNS	WEIGHT (EQUAL WEIGHT ASSUMED)	PORTFOLIO RETURN OF THE SELECTED ASSETS (ΣWRI)
Direct Property	22.48	0.167	3.76
Indirect Property	3.97	0.167	0.66
Portfolio Return	4.42		

Source: Calculated from asset returns and assumed weight of the selected assets, 2015.

From Table 2, direct property has the best portfolio return (3.76%), when compared with the indirect property (0.66%). The portfolio returns for the combination of the selected assets within the study period was 4.42%. The direct property was seen to have great positive impact on the portfolio return.

Table 3 presented the yearly portfolio returns of all the asset classes combined. This was calculated using Equation 2.

Table 3: Yearly Portfolio Return of the two asset classes combined

YEAR	WEIGHT (EQUAL WEIGHT ASSUMED)	ASSET RETURNS FOR THE SELECTED ASSETS	YEARLY PORTFOLIO RETURNS ΣWRI
2005	0.167	8.22	8.387
2006	0.167	9.02	9.187
2007	0.167	6.97	7.137
2008	0.167	8.5	8.667
2009	0.167	0.95	1.117
2010	0.167	4.73	4.897
2011	0.167	6.42	6.587
2012	0.167	4.72	4.887
2013	0.167	1.03	1.197
2014	0.167	8.05	8.217
Weighted Portfolio Return for investment period	6.028		

Source: Calculated from asset returns and assumed weight of the selected assets, 2015.

From Table 3, 2002 had the best portfolio return (9.187%) followed closely by 2008, 2005 and 2014 with returns of 8.667%, 8.378% and 8.217% respectively. The least returns was obtained in the year 2005 (1.117%).

Table 4 presented the asset and portfolio risks over the investment period. The asset risk was calculated using Equation 3 (this involve calculation of the standard deviation of the holding period returns over the investment period), while the portfolio risk was calculated using Equation 4. In calculating the portfolio risk of all the combined assets in the portfolio, the Markowitz model was used assuming equal weight of 0.167 for all the selected investment assets, and using Treasury bills (for the study period) as a risk free asset in the portfolio. This was determined to be10.97%.

Table 4: Assets and portfolio risks over the investment period

ASSET	NO. OF YEARS	MINIMUM RETURNS	MAXIMUM RETURNS	WEIGHTED AVERAGE RETURNS	STD. DEVIATION
Direct Property	10	10.9	38.8	22.48	8.72
Indirect Property	10	-2.7	9.7	3.97	4.49
Portfolio Risk for the investment period	10.52				

Source: Authors analysis of collated data, 2015.

Table 4, showed the minimum, maximum and weighted average returns of the selected asset classes. The maximum returns over the investment period were provided by direct property (38.8%) while the minimum return was provided by the indirect property investment (3.97%). Similarly, the direct property investments showed the highest weighted average returns (22.48%) In the same vein, direct property has the highest level of risk (8.72%). The portfolio risk was seen to be 10.52% which is higher than the individual asset risk respectively. It was observed that the higher the returns of an investment the higher the risk and vice versa.

Table 5 presented the diversification potentials of the selected asset classes using Equations 6 and 8. The expected returns was calculated using the CAPM model, this was subsequently used in the determination of the diversification potential of the selected assets using Alpha.

Table 5: Diversification potentials of the selected asset classes

ASSET TYPE	ASSET RETURN	EXPECTED ASSET RETURN (CAPM)	ALPHA (ASSET RETURN MINUS EXPECTED RETURN)	DIVERSIFICATION POTENTIAL
Direct Property	22.48	13.04	9.44	Asset return higher than expected return: diversification potential exists
Indirect Property	3.97	12.67	-8.7	Asset return lower than expected return: diversification potential does not exist

Source: Authors analysis of collated data, 2015.

From Table 5, only the direct property investments demonstrated the existence of diversification potentials (by showing a positive alpha of 9.44%, while all the direct property investment showed a negative alpha, implying that the asset does not provide diversification potential).

Table 6 presented the Actual Inflation rates for the study period and the asset returns used in the regression analysis to determine the inflation-hedging potentials of the asset classes.

Table 6: Actual Inflation rates and holding period returns of selected assets

YEAR	Actual Inflation	Holding Period Returns of Selected Assets	
		DIRECT PROPERTY	INDIRECT PROPERTY
2005	17.90	32.1	9.7
2006	8.20	38.8	2.5
2007	5.40	26.4	5.6
2008	11.60	16.3	9.2
2009	12.50	10.9	-1.6
2010	13.70	17.6	4.7
2011	10.80	19.9	9.3
2012	12.20	21.1	1.7
2013	8.70	27.9	-2.7
2014	8.10	13.8	1.3

Source: National Bureau of Statistics and Author's survey, 2015.

Table 6 showed the actual inflation in Nigeria (using the Nigerian CPI as a proxy) from 2005 to 2014. The Actual inflation is measured as the rate of change in the Nigerian Consumer Price Index on an annual basis. The annual inflation rate maintained a double digit in 2005 however, in 2006 the inflation figure dipped to a single digit and the single digit was maintained in 2007. However, the inflation figures soar up to double digits again in 2008 and despite all measures to bring it back to a single digit, the inflation figures remained in the double digit figures to 2012. In 2013 and 2014 the inflation figures came back to single digits. Inflation in Nigeria is seen to be high within the study period. The inflation rates were regressed against the holding period returns of the selected assets.

Table 7 presented the regression results of the relationships between the holding period returns of the selected assets and actual inflation for the study period. Equation 9 was used to carry out the analysis.

Table 7: Inflation-hedging potential of the selected assets within the study period

ASSET TYPE	**CONSTANT**	**STANDARDIZED COEFFICIENT**	**R SQUARE**	**TYPE OF HEDGE**
		Beta		
Direct Property	20.173	0.082	0.007	Complete Hedge
Indirect Property	5.791	-0.126	0.016	Perverse Hedge

Source: Analysis of Survey data, 2015.

From Table 7, direct property investment, showed complete inflation-hedging potentials with positive betas of 0.082 while indirect property investment showed perverse hedging behavior with negative beta of -0.126.

The diversification and inflation-hedging potentials of the selected assets was compared as presented in Table 8.

Table 8: Comparison of the diversification and inflation-hedging potentials of the selected assets

Asset Type	Diversification Potential	Inflation-Hedging Potential	Remark
Direct Property	diversification potential exists	Complete Hedge	has both diversification and inflation-hedging potentials
Indirect Property	diversification potential does not exist	Perverse Hedge	no diversification and inflation-hedging potentials

Source: Analysis of Survey data, 2015.

From Table 8 among the selected assets, only the direct property investment has both diversification and inflation-hedging potentials while the indirect property investment has neither diversification nor inflation-hedging potentials.

5. Summary of Findings, Implication and Conclusion

This study examined the diversification and inflation-hedging potentials of both direct and indirect property investments in Nigeria from 2005 and 2014. The study revealed the risk – return characteristics of the selected assets. The study demonstrated that the higher the returns from an investment asset, the higher the inherent risk from the investment. For example investment in direct property demonstrated highest returns (22.48%) as well as highest level of risk (8.72%) in the investment portfolio. The study further showed that only the direct property investment demonstrated the existence of both diversification and inflation-hedging potentials while the indirect property investment had neither diversification nor inflation-hedging potentials. This study has implications for investors (individual and institutional) who might want to invest in the Nigerian property market. Findings from this study could be used by potential investors to make decisions on the type or types of assets to include or exclude from their investment portfolios. Similarly it could provide information that will serve as guide to investors which in turn could help them in making decisions that will prevent the value of investors' earnings from being eroded by

inflation. In addition investors could gain from the diversification benefits of assets with diversification potentials. The result will also be a good and updated reference for academics and researchers in studying the Nigerian property market.

In conclusion investors who have interest in investing in the Nigerian property market should consider including direct real estate investment in their mixed asset portfolios. This could improve the risk-return profiles of such portfolios, as well as the provision of investment benefits from both diversification and inflation-hedging potentials as demonstrated by this study.

References

Akinsola, B. N. (2012). Comparative analysis of commercial property and stock-market investments in Nigeria. World Academy of Science, Engineering and Technology (70), 1143-1151, Retrieved from https://www.waset.org/journals/waset/v70/v70-212.pdf

Amidu, A., Aluko, B. T., Nuhu, M., & Saibu, M. O. (2008). Real estate security and other investment assets: A comparison of investment characteristics in the Nigerian stock markets. Journal of Property Investment & Finance, 26(2), 151 – 161. Retrieved from http://www.emeraldinsight.com/journals.htm?issn=1463-578X&volume=26&issue=2&articleid=1714031&show=pdf

Ballantine J. & Stray S. (1998). Financial appraisal and the ICT investment decision making process. Journal of Information Technology, 14, pp. 3-15.

Bello, M. O. (2005). The inflation hedging characteristics of Nigerian residential property investment. Journal of Property Research and Construction. 1(1), 40-52.

Dabara, I. D. (2015). The inflation-hedging performance and risk-return characteristics of residential property investments in Gombe, Nigeria. Advances in Research Journal. 3(1), 71-83. Retrieved from http://www.sciencedomain.org/abstract.php?iid=645&id=31&aid=6249#.VDgdp1f_afU

Dabara, I. D. (2014). Inflation correlation with commercial real estate' investment returns in Akure, Nigeria. Journal of Scientific Research and Report. 3(23), 2996-3015. Retrieved from http://www.sciencedomain.org/abstract.php?iid=664&id=22&aid=6137#.VBytY1dbrt8

Dabara, I. D., Ankeli I. A., Odewande, A. G., Guyimu, J., & Adeleke, M. A. (2014). Comparative analysis of the risk-return characteristics of office and shop property investments in Osogbo, Nigeria. European Journal of Business and Management. 6(29), 177-186. Retrieved from http://www.iiste.org/Journals/index.php/EJBM/article/view/16091

Fama, E.F & Schwert, G.W. (1977). Asset returns and inflation, Journal of Financial Economics, 5(2), 115–146. Retrieved from http://schwert.ssb.rochester.edu/ari_jfe77a.pdf

Fatoki, O., Okubena, O. & Herbst, G. (2010). An investigation into the impact of investment appraisal techniques on the profitability of small manufacturing firms in the Nelson Mandela Bay Metropolitan Area, South Africa. African Journal of Business Management 4(7), 1274-1280. Retrieved from: http://www.academicjournals.org/ajbm/PDF/pdf2010/4July/Olawale%20et%20al%202.pdf

Fraundorf, S. (2012). The real assets alternative: An investor's guide. Retrieved from https://www.wilmingtontrust.com/repositories/wtc_sitecontent/PDF/Real_Assets_White_Paper_June_2012.pdf

Koen, M., Monique, S., Raf, H. (2010). Evaluation of the applicability of investment appraisal

techniques for assessing the business value of IS services. Retrieved from: https://lirias.kuleuven.be/bitstream/123456789/247210/1/KBI_0910.pdf

Lee, C. L. (2008). Securitized real estate in a mixed-asset portfolio: the case of Malaysia. Paper

presented at the 14th Pacific Rim Real Estate Society Conference, Kuala Lumpur, Malaysia.

Mei-ling, N. (2003). The performance and inflation-hedging characteristics of hotel

investment in Hong Kong. A Phd thesis submitted to the University of Hong Kong, retrieved from http://hdl.handle.net/10722/31234

Mueller, G., Pauley, K & Morrill, W. K. (1994). Should REITs be included in a mixed-asset

portfolio?. Real Estate Finance. 11(1), 23-28.

Mughees, S. (2010). The benefits and importance of commercial real estate.

Retrieved from http://mpra.ub.uni-muenchen.de/28268

Odu, T. (2011). Analysis of relative inflation hedging capacities of prime

commercial properties in Lagos. Global Journal of Human Social Science. 11(10) 42-51. Retrieved from: https://globaljournals.org/GJHSS_Volume11/8-An-Analysis-of-Relative-Inflation-Hedging-Capacities.pdf

Ogunba, O.A., Obiyomi, O. O. & Dugeri, T. (2013). The inflation hedging potential of commercial property investments in Ibadan, Nigeria In: Laryea, S. and Agyepong, S. (Eds) Procs 5th West Africa Built Environment Research (WABER) Conference, 12-14 August 2013, Accra, Ghana, 1101-1111.

Olaleye, A. (2003). Property portfolio diversification strategies: A review of the options. Ife

Journal of EDM, 5, 15-32.

Olaleye, A. (2011). The effects of adding real estate into mixed-asset portfolios in South Africa.

Journal of Financial Management of Property and Construction. 16(3), 272-282.

Oluwasegun, A. & Dabara, I. D. (2013). Inflation-hedging capability and risk-return

strategies of commercial real estate investments in Nigeria. Proceedings of African Regional Conference on Sustainable Development. 8(2), 54-68. February 11-14, 2013, Conference Centre, University of Lagos, Nigeria.

Omotor, D. G. (2010). Relationship between inflation and stock market returns: Evidence

from Nigeria. Journal of Applied Statistics 1(1), 11-15.

Park, Y. W. & Bang, D. W. (2012). Direct commercial real estate as an inflation

hedge: Korean evidence. Journal of Real Estate Portfolio Management, 18 (2), 187-203.

Payton, M. (2011). Is commercial real estate a hedge against inflation? Retrieved from:

http://tcasset.org/sites/default/files/tcam_iscommrehedgeagainstinflation.pdf

Steinke, C. (2011). Analysis of different dimensions for property allocation process

within real estate investment companies. A Master thesis submitted to KTH Royal Institute of Technology, KTH Architecture and the Build Environment, Department of Real Estate and Construction Management. Retrieved from http://www.kth.se/polopoly_fs/1.273432!/Menu/general/column-content/attachment/Steinke%20C%20Property%20allocation%20process%20within%20real%20estate%20investment.pdf

Zhou, X. & Clements, S. (2010). The inflation hedging ability of real estate in China.

Journal of Estate Portfolio Management, 16 (3), 267-277.