Portfolio Diversification of Nigerian REIT: Evidence from an African Real Estate Market

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Abstract

This study examines REITs' risk-adjusted performance and diversification benefits in an emerging African property market (Nigeria). The data on the quarterly returns of N-REIT, the Nigerian Federal Government Bonds (FGB), and the stock market's All-Share Index (ASI) were obtained and analysed to reveal their risk-adjusted performance and diversification benefit. Two mean-variance portfolios were developed to assess N-REITs' effect in the mixed asset portfolio. While the first portfolio was unconstrained, the second was constrained to a maximum of 5%. According to the study findings, N-REIT demonstrated superior performance to the other assets. The examination of the unconstrained portfolio showed that increasing the allocation of N-REITs up to 28% had both return and risk reduction effects. An examination of the constrained portfolio showed that with an increased allocation to N-REITs from 0.00% to 0.05%, portfolio risk and return reduced from 2.78% to 2.59% and 12.49% to 10.93%, respectively. Comparing the two portfolios based on the return risk ratios, showed that including N-REIT beyond the 5% threshold might not yield optimal portfolio performance. This study can be a valuable resource for investors seeking to make well-informed investment decisions, particularly in emerging markets such as Africa.

Keywords: Asset allocation, diversification, investment decisions, N-REIT, risk-adjusted performance.

Introduction

Typical to every rational investor, is the drive to earn profits by ensuring the optimal combination of assets within mixed-asset portfolios. However, investors have been increasingly concerned about understanding the performance and optimal combination of investment assets, especially real estate assets. Bredin (2007) noted that a significant concern to investors is the investment performance of the array of investment alternatives. Hence, investors need to understand the risk-return performance and the diversification benefits of investment assets to make informed investment decisions. Understanding the risk-returns characteristics and the optimal asset combination strategies will enhance the predictability of asset and portfolio performance, thereby ensuring optimal investment decisions (Li, Fong & Chong, 2017; Lin, Cho & Lee, 2019). The

concept of asset combination is intuitively evident in most investment decisions. Asset combination is geared towards reducing portfolio volatility while enhancing returns. Real estate has established its position as a strategic asset class within a diversified portfolio. This is due to its effectiveness in diversifying risks within a mixed-asset portfolio, along with other notable advantages (Higgins & Ng, 2009; Ayodele & Olaleye, 2016). Empirical evidence suggests that the diversification benefits of real estate assets enhance the overall performance of mixed-asset portfolios. This was clearly portrayed in an earlier study conducted in South Africa by Ntuli & Akinsomi (2017) where REITs were shown as return-enhancers in a mixed asset portfolio.

Extant studies have submitted that real estate asset forms a significant part of investors' portfolio. Hoesli (2002) noted that the performance of real estate assets, either as an independent asset or in a portfolio mix, will be of concern to investors. This concern becomes more compelling in emerging economies as emerging markets are bedeviled with a high rate of fluctuations and volatilities as opposed to the developed markets with somewhat stable and predictable macroeconomic indices (Ayodele & Olaleye, 2021). Thus, understanding the investment performance and diversification benefit of indirect real estate assets becomes germane to all categories of real estate investors.

Investors' decisions must involve a complete understanding of the investment markets and prevalent scenarios, risk-return performance and diversification benefits of investment assets; especially when considering asset combinations. This will help to determine the commonality between assets within the portfolio, which according to Olaleye & Ekemode (2014), is an essential consideration for investors before venturing into a mixed-asset combination. Thus, understanding real estate assets' investment performance and diversification benefits would enhance optimal investment decisions. This information would be beneficial to both domestic and international investors who are interested in incorporating investment assets such as REIT into their investment portfolios.

Information on the behaviour of REIT investment in a mixed asset portfolio is essential to investors. Such information can guide shrewd investors who wish to grow their investment portfolios. There are several empirical studies conducted on REIT as a singular investment vehicle and in combination with other investment assets across the global real estate markets. The available research in this field covers REIT returns, REIT risk-adjusted performance and its inflation-hedging capabilities, among others, especially in markets of developed countries (Daniel, 2022). Some of the studies conducted on REIT include a study undertaken by Newell & Osmadi (2009) on the Islamic REIT in Malaysia. In Europe, Marzuki & Newell (2019) examined the performance of REIT in the Belgium market. The authors of the study also examined the growth and performance of REITs in Ireland (Marzuki & Newell, 2019). Similar studies were also conducted in Australia (Liang & Dong, 2019) and the US (Koelbl, 2020), among others. It has, however, been observed that there is a dearth of literature in this field concerning emerging markets, particularly Africa. The scanty literature of African origin majorly focused on the issue of REIT return

performance and investment uncertainties (Ntuli and Akinsomi, 2017; Akinsomi et al., 2018; Daniel, 2022). To the best of the authors' knowledge, apart from the study conducted in South Africa by Ntuli and Akinsomi (2017), no other previous African studies have explored the diversification benefits of African REITs within a mixed-asset portfolio. Furthermore, a substantial amount of literature on the subject of diversification was observed to be primarily focused on direct real estate (Ojo et al., 2022).

Ogunba et al. (2021) and Daniel (2022) argue that findings from these studies cannot be easily generalized due to several factors, such as diversity in asset types, geographical locations, and the maturity level of the market where the asset is located. Loo et al. (2016, p. 231) also highlight additional reasons, including "variations in asset management structure, geographic limitations on underlying assets, real estate development allowances, restrictions on leveraging, and dividend pay-out requirements". These factors contribute to the complexity and uniqueness of each market, making it challenging to draw broad conclusions. Furthermore, the behaviour of securitised real estate, such as REIT and direct real estate investments, differ considerably, hence the need to look at their performances and diversification benefits separately.

In a global investment landscape characterized by the pursuit of optimal asset combinations and risk management, the integration of real estate investment trusts (REITs) within mixed-asset portfolios remains a pertinent topic of investigation. While existing research has illuminated the performance and diversification attributes of REITs across various markets, there remains a conspicuous gap in the exploration of this phenomenon within the context of emerging African economies. Notably, the limited body of work hailing from the African continent primarily spotlights South Africa, leaving the unique characteristics of other African markets, particularly Nigeria, unexamined. The absence of comprehensive research delving into the diversification dynamics of Nigerian REITs underscores the urgency of this inquiry.

Distinct economic, regulatory, and market forces set Nigeria apart from South Africa, thereby warranting an in-depth investigation into this underexplored territory. The Nigerian real estate landscape is characterized by its own intricacies, encompassing a range of factors including market maturity, regulatory frameworks, political dynamics, and macroeconomic stability. These unique elements interact to shape the investment behaviour and risk-return profiles of Nigerian REITs in ways that may deviate from the trends observed in South Africa.

Through a meticulous analysis of Nigeria's distinct economic and market landscape, this study aspires to uncover invaluable insights into the behaviour of Nigerian REITs within diversified investment portfolios. By doing so, it contributes significantly to the enrichment of academic literature while equipping investors, both domestic and international, with a more nuanced understanding of the potential benefits and challenges posed by incorporating Nigerian REITs into their investment strategies.

Hence, this article contributes to the international REIT literature by providing empirically validated data on the risk-adjusted and diversification benefits of an emerging market REIT (specifically N-REIT) within the context of the emerging African REIT market. Specifically, the study aims to examine the diversification advantages of N-REITs when added to mixed portfolios. The research questions addressed in the study are as follows: What is the risk-adjusted performance of N-REITs during the study period, and do N-REITs offer diversification benefits in a mixed asset portfolio? The article is structured as follows: Section 2 provides a review of related literature; Section 3, outlines the methodology employed in the study, Section 4 presents the empirical results and discussion of findings, and Section 5 provides the conclusion.

Literature Review

Since its inception in the United States in 1960, Real Estate Investment Trusts (REIT) have proven to be a viable and profitable platform for a wide range of investors. The US REIT market has great dominance over other markets globally. Worldwide, over forty (40) countries have introduced REIT regimes in their respective real estate markets (with over 800 active REITs). The global REIT market is a substantial industry, with a market capitalization exceeding $2 trillion, as reported by EPRA (2022). Notable REIT markets include Australia, Japan, and the United Kingdom (EPRA 2022). Marzuki and Newell (2020) highlight that emerging markets account for approximately 5% of the global REIT, with over 230 REITs and a combined market capitalization of approximately $100.3 billion (EPRA, 2022). However, within the emerging markets, Africa appears to be lagging behind. South Africa stands out as the frontrunner in the region, having about 30 REITs and a market capitalization of around $22 billion. Additionally, South Africa is the only African REIT market that qualifies as "transparent" in the JLL & LaSalle Global Transparency Index (JLL & LaSalle, 2022). The REIT market in Nigeria holds prominence as the second biggest market in Africa, established in 2007, and having a market capitalization of approximately $215 million (EPRA, 2022).

Understanding the performance of Real Estate Investment Trusts (REITs) and their potential for delivering risk-adjusted returns has become a pivotal concern for investors and researchers alike. Extensive academic inquiry has been dedicated to comprehending the intricacies of REITs' performance across diverse markets, although the emerging African REIT market offers a relatively underexplored landscape for investigation.

Performance Evaluation Methodologies and the Emerging Market Dynamics

The evaluation of REIT performance has been a focal point in empirical research, and scholars have utilized various methodologies to capture their risk-return profiles. A prevalent metric for gauging performance is total returns, comprising capital appreciation and dividend yield. This metric, employed by previous studies, provides a comprehensive assessment of REITs' contribution to an investment portfolio (Liang & Dong, 2019; Koelbl, 2020).

Furthermore, risk-adjusted metrics such as the Sharpe ratio and Jensen's alpha have been utilized to contextualize returns within the framework of risk exposure. The Sharpe ratio, which measures the excess return per unit of risk, allows for the comparison of REITs against other asset classes, offering insights into whether their returns compensate for their inherent riskiness (Ayodele & Olaleye, 2016). Jensen's alpha, an extension of the Capital Asset Pricing Model (CAPM), assesses an asset's risk-adjusted performance by evaluating its returns in relation to its systematic risk (Li, Fong & Chong, 2017).

The study's focus on N-REITs within the emerging African REIT market is particularly salient given the distinct dynamics characterizing emerging economies. Emerging markets, compared to their developed counterparts, are often marked by greater macroeconomic volatility, regulatory uncertainties, and a higher degree of sensitivity to global economic fluctuations (Ogunba et al., 2021). Daniel's observation (2022) regarding the importance of understanding investment performance resonates deeply within the context of emerging markets. Investors in these markets are confronted with a unique set of challenges stemming from market volatility and structural deficiencies, underscoring the need for tailored analyses of REIT performance (Daniel, 2022). The exploration of N-REITs' risk-adjusted performance within the intricate fabric of the African REIT market is poised to unveil insights into their behaviour in this distinct market environment.

Exploring the persistence of REIT performance across various market conditions has also garnered scholarly attention. Research examining the persistence of returns, such as the autocorrelation of performance over time, can shed light on whether high-performing REITs sustain their outperformance or revert to the mean. This phenomenon, referred to as the "winner's curse," is particularly relevant in emerging markets where market inefficiencies and informational asymmetry may exacerbate the risk of overpaying for outperforming assets (Loo et al., 2016).

Market efficiency, as a critical factor influencing REIT performance, manifests differently in emerging markets due to the prevalence of information asymmetry and limited investor protection mechanisms (Ojo, et al., 2022). An examination of the extent to which African REIT markets adhere to market efficiency theories is vital for understanding how N-REITs' risk-adjusted performance aligns with market expectations.

In light of the above considerations, the investigation into the risk-adjusted performance of N-REITs holds significant implications for both investors and policymakers. As investors seek to optimize their risk-return profiles, insights into N-REITs' performance can guide allocation decisions. Policymakers, on the other hand, can utilize findings to fine-tune regulatory frameworks and investor protection measures, fostering a more conducive environment for REIT investment.

Diversification Benefits of REITs

The exploration of diversification benefits is paramount in understanding the potential advantages that REITs offer within mixed-asset portfolios. Diversification, a cornerstone of modern portfolio theory, seeks to mitigate risk by combining assets with dissimilar return patterns (Zhu, 2008). REITs, due to their unique characteristics and the nature of real estate as an asset class, have garnered substantial attention as potential diversification tools. The concept of diversification traces its origins to Harry Markowitz's pioneering work on portfolio theory. Markowitz's seminal contribution highlighted that by combining uncorrelated or negatively correlated assets, investors could achieve a reduction in portfolio risk without necessarily sacrificing returns. This theory laid the groundwork for the inclusion of assets like REITs in investment portfolios, as their returns exhibit varying degrees of correlation with traditional equity and fixed-income assets (Ayodele & Olaleye, 2016).

REITs, as securitized real estate investments, introduce a unique dimension to diversification. Real estate, characterized by its distinct risk-return profile, can offer valuable diversification benefits when combined with more traditional asset classes (Ntuli & Akinsomi, 2017). The inclusion of N-REITs within mixed portfolios can offer insights into the extent to which they contribute to diversification in the context of the African REIT market.

The potential of real estate, including REITs, to enhance diversification has been a central focus of academic inquiry. Researchers have emphasized real estate's ability to reduce portfolio volatility, enhance returns, and mitigate downside risk, particularly during periods of economic uncertainty (Ntuli & Akinsomi, 2007; Daniel, 2022). Real estate's unique attributes, such as low correlation with traditional asset classes, can contribute to improved risk-adjusted returns in mixed portfolios (Lin, Cho & Lee, 2019).

The work of Ntuli & Akinsomi (2017) in the South African context underscored REITs' role as return-enhancers in mixed-asset portfolios. However, as this study shifts its focus to Nigerian REITs, it raises the question of whether the diversification benefits observed in the South African context hold true for N-REITs within the African REIT market. The potential differences in economic conditions, regulatory frameworks, and market dynamics between these two African economies could result in varying diversification effects.

Emerging Market Dynamics and Market-Specific Factors

The shift from developed to emerging markets introduces a realm of distinctive dynamics and market-specific factors that significantly influence the performance and behaviour of REITs. The context of emerging African markets adds layers of complexity to the examination of N-REITs' risk-adjusted performance and diversification benefits.

Emerging markets, including African economies, are often characterized by heightened levels of market volatility, stemming from factors such as political instability, currency fluctuations, and

less mature financial systems. This volatility, while potentially introducing higher returns, also entails elevated risks that must be carefully considered when assessing N-REITs' risk-adjusted performance (Ogunba et al., 2021). Moreover, regulatory uncertainties within emerging markets can contribute to increased market frictions and information asymmetry. Regulatory changes and shifts in investor protection mechanisms can impact investor sentiment and asset valuation, thereby influencing N-REITs' performance dynamics (Daniel, 2022). Consequently, the exploration of N-REITs' risk-adjusted performance requires an intricate analysis that accounts for the idiosyncrasies of these emerging market environments.

Information asymmetry, a hallmark of emerging markets, can significantly affect the performance and behaviour of financial assets, including REITs. The dearth of transparent and reliable information can impede efficient pricing and lead to market inefficiencies. In such contexts, the risk-adjusted performance of N-REITs can deviate from expectations due to the prevalence of information asymmetry and the lack of robust investor protection mechanisms (Olaleye & Ekemode. 2014; Ojo, et al. 202).

Market-specific regulations and institutional structures play a crucial role in shaping REIT behaviour. The African REIT market, including Nigeria, is characterized by its own regulatory framework that governs the creation, operation, and oversight of REITs. The degree of regulatory alignment with international standards, as well as the robustness of regulatory enforcement, can influence N-REITs' performance and behaviour (Daniel, 2022).

African Market-Specific Factors

The examination of diversification benefits in the African REIT market necessitates consideration of market-specific factors. Emerging markets, including African economies, have unique economic and regulatory characteristics that can influence diversification outcomes. The scarcity of comprehensive research within the African REIT context underscores the novelty and importance of investigating N-REITs' diversification benefits.

Ogunba et al. (2021) and Daniel (2022) have contended that the generalizability of findings across diverse markets is challenged by factors such as regulatory variations, market maturity, and geographic limitations. African economies, characterized by a diverse range of macroeconomic indicators, regulatory environments, and investor protection mechanisms, necessitate an examination of N-REITs' diversification potential within this specific market milieu.

The investigation into the diversification benefits of N-REITs holds considerable implications for investors, portfolio managers, and policymakers. Investors seeking to optimize their portfolios can benefit from insights into the degree to which N-REITs contribute to diversification, particularly in an emerging market context. Portfolio managers can utilize these findings to tailor their asset allocation strategies, accounting for the potential diversification benefits offered by N-REITs.

Moreover, the outcomes of this investigation can guide policymakers in shaping regulatory frameworks and incentives to foster REIT development and investment within the African context. By understanding the diversification attributes of N-REITs, policymakers can create an

environment that encourages the integration of these instruments into investment portfolios, thereby contributing to the overall development of the African REIT market.

African REIT Market

The African REIT market remains an underexplored terrain within the broader realm of international real estate research. While studies have emerged focusing on specific African countries, such as the study by Ntuli & Akinsomi (2017) in South Africa, there exists a conspicuous research gap surrounding the diversification benefits of African REITs within mixed-asset portfolios. This section elucidates the novelty and significance of investigating N-REITs' behavior and performance within the African REIT market.

Previous studies conducted in the African REIT context have primarily centered on return performance, investment uncertainties, and macroeconomic factors (Ntuli and Akinsomi, 2017; Akinsomi et al., 2018; Daniel, 2022). However, the exploration of how N-REITs contribute to portfolio diversification remains a relatively uncharted territory. The analysis of N-REITs' diversification benefits is integral in comprehending their potential for risk reduction and enhanced risk-adjusted returns within mixed portfolios.

The dearth of comprehensive research on N-REITs' diversification benefits signifies a significant gap in the existing body of knowledge. This study, by delving into this specific aspect, is poised to contribute pioneering insights into the African REIT landscape, offering investors and practitioners a more holistic understanding of N-REITs' behaviour within diversified portfolios.

African economies are characterized by their own unique economic, regulatory, and political dynamics that distinguish them from their global counterparts. While some research has been undertaken in specific African countries, such as South Africa, the broader African REIT market remains relatively unexplored in terms of its diversification attributes.

The disparities in regulatory frameworks, market maturity, investor protection mechanisms, and property rights across African countries introduce nuances that can significantly impact N-REITs' behaviour and performance within diversified portfolios. The study's focus on the Nigerian REIT market, distinct from the South African context, is poised to unravel insights that can only be gleaned from a more extensive exploration of African market-specific factors.

The exploration of N-REITs' diversification benefits has direct implications for investment practitioners seeking to optimize their portfolios in the African context. The findings of this study can guide investment decisions by providing empirical evidence of N-REITs' role in enhancing risk-adjusted returns and reducing portfolio volatility. Portfolio managers, armed with insights into the diversification benefits of N-REITs, can construct more robust and resilient investment portfolios.

Moreover, policymakers, regulators, and market participants can benefit from the outcomes of this study. By understanding the nuances of N-REITs' behaviour and their potential contributions to

diversified portfolios, policymakers can formulate regulatory measures that foster a conducive environment for REIT development and investment in African markets. Additionally, the study's findings can inform market participants about the potential advantages of integrating N-REITs into their investment strategies.

Nigerian REIT Landscape

The inception of Real Estate Investment Trusts (REITs) in Nigeria commenced with the introduction of the Skye Shelter Fund in 2007, accompanied by an initial capitalization of approximately $6.5 million. Officially listed on the Nigerian Stock Exchange (NSE) on February 28th, 2008, it marked the advent of REITs in the Nigerian market. The subsequent addition of the Union Homes REIT in 2008, with a market capitalization of around $40.8 million, expanded the landscape. The most recent addition, the UPDC REIT, was introduced in 2013, carrying a market capitalization of about $87.2 million. Cumulatively, these three active N-REITs constitute an aggregate market capitalization of approximately $134.6 million and are mainly operating in the residential and commercial real estate sectors (Daniel, 2022). The current share prices of the aforementioned REITs as at August 2023 are N83.80; N36.60 and N3.65 for the Sky Shelter Fund, Union Homes and UPDC REITs respectively.

Nigeria, often referred to as the "giant of Africa," possesses a significant population of approximately 200 million people and is recognized for its rapidly growing economy. However, according to JLL & LaSalle Global Transparency Index (2022), Nigeria is classified in the "low transparency tier" having a composite score of 3.60, making it the 60th when ranked globally. Daniel (2022) suggests that the Nigerian property market has consistently attracted capital inflows over the past decade from different categories of investors. The establishment of N-REIT was aimed to expand the investment opportunities available in the Nigerian real estate sector. However, there is a lack of information regarding N-REITs, which has motivated the authors of this article to address this identified gap.

Methods

The Data

The study collected secondary data from various sources, including annual reports and online databases of the respective REIT companies in Nigeria (Sky Shelter Fund, Union Homes and UPDC). Relevant data obtained were the share prices and dividends from the respective companies which were subsequently used to compute the holding period returns of the investment. The 90-day T-Bills data and the Nigerian Federal Government's 5-year Bond (FGB) were obtained from the database of Nigeria's Central Bank. The All-Share Index (ASI) data were sourced from the Nigerian Stock Exchange database. The study period spanned from 2008 to 2019, chosen based on data availability.

Risk-Adjusted Performance Analysis

The data were used to calculate the holding period returns for the investment assets during the study period. Additionally, risk-adjusted returns were calculated to assess the performance of the assets. The holding period return, which measures the actual rate of return achieved from an investment over a specific period was used because it considers changes in dividends and the capital appreciation or depreciation of the investment. To measure the risk-adjusted returns of N- the investments, several metrics were employed, including the return-risk ratio, the coefficient of variation, and the Sharpe Ratio. These metrics refine the investment's return by considering the level of risk associated with generating that return over the investment period.

Trend Analysis

In this study, trend analysis was employed to visually depict trends in the datasets utilized, aiding in the analysis of future predictions. Trendlines were plotted to show the pattern or trend more clearly, and the moving average of these trendlines was applied to smoothen out data fluctuations. The R2 value, also known as the coefficient of determination, was utilized to assess the reliability and accuracy of the trend and forecast or predictions. An R2 value close to 1 indicates a highly accurate trendline. Additionally, least square linear regression equations were generated to make predictions on return values.

Unit Root Analysis

To evaluate the stationarity properties of the datasets used in this study, a unit root test was performed. The unit root analysis employed the Philip-Perron (PP) model, which is particularly suitable for testing short time-series datasets, as suggested by previous research (Arltova & Fedorova, 2016). The PP test statistics were computed using a model that includes both a trend and an intercept, providing insights into the order of integration (I (0)) of the data series.

Diversification Analysis

The study employed mean-variance portfolio optimization to construct a three-asset portfolio. This approach utilizes historical return data, risk measures, and correlation coefficients among the assets. The objective is to find the optimal allocation of assets that maximizes expected returns while minimizing portfolio risk. By considering the historical performance, risk levels, and the interrelationships between the assets, the mean-variance portfolio optimization helps in creating an efficient portfolio that balances risk and return. Two portfolios were subsequently developed to assess the benefits of N-REITs' inclusion in the mixed assets portfolio. In the first portfolio, all the assets were not constrained to any limit. However, in the second portfolio, N-REIT was constrained to a maximum of 5% allocation.

Findings

To obtain the return-risk performance of the selected assets, first, the Holding period return (HPR) of the assets were obtained. The study obtained the necessary Treasury Bill (T-Bill) rates for the specified study period from the Central Bank of Nigeria database. These rates were collected to analyse and incorporate the risk-free rate of return into the investment analysis and calculations. By using the T-Bill rates from the Central Bank of Nigeria, the study ensured the inclusion of accurate and reliable data for assessing the risk-adjusted returns and performance of the investment assets. All the datasets obtained were first subjected to a unit root test to ascertain the stationarity characteristics of the dataset.

Table 1 Phillips-Perron unit root test on the performance of N-REITs

			ASI	FGB	REITS
	With Constant	t-Statistic	-11.2615	-2.4282	-11.6745
		Prob.	*0.0000*	*0.1359*	*0.0000*
			***	n0	***
At Level	With Constant & Trend	t-Statistic	-11.2624	-2.807	-11.961
		Prob.	*0.0000*	*0.1973*	*0.0000*
			***	n0	***
	Without Constant & Trend	t-Statistic	-11.294	-0.3667	-11.4096
		Prob.	*0.0000*	*0.5510*	*0.0000*
			***	n0	***
			d(ASI)	d(FGB)	d(REITS)
	With Constant	t-Statistic	-59.9734	-10.9406	-45.1815
		Prob.	*0.0001*	*0.0000*	*0.0001*
			***	***	***
At First Difference	With Constant & Trend	t-Statistic	-58.1839	-10.9319	-47.186

	Prob.	0.0001	0.0000	0.0001
		***	***	***
Without Constant & Trend	t-Statistic	-60.4079	-10.9846	-45.5952
	Prob.	0.0000	0.0000	0.0000
		***	***	***

Notes

Null Hypothesis: the variable has a unit root

a: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1% and (no) Not Significant

b: Lag Length based on SIC

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

Table 1 displays the results of the unit root test, which was conducted to assess the stationarity properties of the datasets utilized in the study. The Philip-Perron (PP) model was employed for the unit root analysis, as it is suitable for testing short time-series datasets, as suggested by previous studies like Arltova & Fedorova (2016). The PP test statistics were calculated using a model that incorporates both a trend and an intercept, and they indicate the order of integration (I(0)) of the data series. The findings revealed that all the datasets exhibited statistically significant stationarity at the first difference. Therefore, the null hypothesis (Ho) of a unit root (non-stationarity) can be rejected for all the data series. This implies that the data series are stationary after taking the first difference, and they are integrated of order I(0) (not integrated). The significance level for the stationary series was established at the 1% critical values.

Table 2: Descriptive statistics

	Minimum	Maximum	Sum	Mean	Std. Deviation
REITS	-29.68	17.43	99.34	0.69	4.24
FGB	4	16.99	1798.44	12.49	2.78
ASI	-30.64	38.2	-35.78	-0.25	7.69

The results in Table 2 offer some understanding of the nature of the dataset in the form of the minimum and maximum values, means and standard deviations. The trend analysis is presented in Figure 1 below.
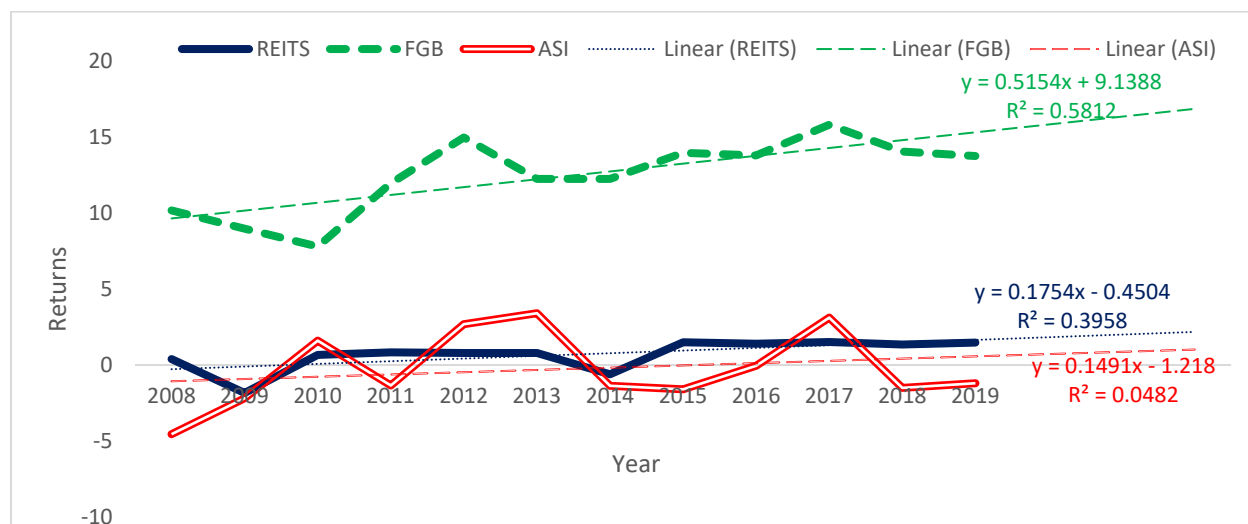

Figure 1: Trend analysis of holding period return on N-REITs, FGB & ASI

From the trendlines in Figure 1, it becomes evident that the asset classes depicted in the trendlines experienced relatively low volatility in their respective returns. However, the All-Share Index (ASI) exhibited a higher level of volatility in comparison to other assets. The smoothed trendlines indicate a slight yet consistent and steady increase in the returns provided by all the assets. Examining the five-year forecast period (2020 to 2024), it is apparent that the forecasted returns display a slightly consistent and steady upward trend throughout the projected years. However, it's important to note that these are forecasts and are subject to potential uncertainties. The reliability of the trends and the accuracy of the forecasts, as determined by the R2 value, are as follows: 58.128% for the FGB, 4.82% for the ASI, and 39.58% for the REITs. These values suggest varying reliability and accuracy in predicting future returns for the respective assets. Additionally, the least square regression equation employed in the analysis can be utilized to make predictions beyond the timeframe covered in this study, offering potential insights for future periods.

Table 3: Return-Risk performance

Assets	Total Return	Total Risk	Return Risk Ratio	Coefficient of Variation	Sharpe Ratio
REITs	0.69	4.24	0.23	6.14	-2.05
FGB	12.49	2.78	4.49	0.22	1.13
ASI	-0.25	7.69	-0.08	-30.8	-2.25
Mean	4.31	4.90	1.55	-8.13	-1.06

Based on the findings presented in Table 3, several observations were made. Firstly, the Federal Government Bonds (FGB) demonstrated the highest return of 12.49% with the lowest level of risk at 2.78. On the other hand, Real Estate Investment Trusts (REITs) provided the second-best return at 0.69% with a risk level of 4.24. The All-Share Index (ASI) exhibited the lowest return of -0.25% with the highest level of risk at 7.69.

In terms of risk-adjusted measures, the FGB showed a return-risk ratio of 4.49, a coefficient of variation of 0.22, and a Sharpe ratio of 1.13. In contrast, the N-REITs had a return-risk ratio of 0.23, a coefficient of variation of 6.14, and a Sharpe ratio of -2.05. The ASI had a return-risk ratio of -0.08, a coefficient of variation of -30.8, and a Sharpe ratio of -2.25. The mean return values obtained within the study's time frame were 4.31, 4.90, 1.55, -8.13, and -1.06 for total return, total risk, return-risk ratio, coefficient of variation, and Sharpe ratio, respectively. Notably, the N-REITs had positive but relatively low return values.

These findings have important implications for domestic and foreign investors, emphasizing the need for a comprehensive evaluation of the potential returns and risks associated with investing in REITs. It is crucial for investors to exercise caution and conduct thorough analysis before making investment decisions in the REIT market. By considering both returns and risks, investors can make more informed choices and align their investment strategies with risk tolerance levels and financial goals. While REITs offer the opportunity for attractive returns, it is equally important to assess the inherent risks involved in the real estate market and the specific dynamics of each REIT. Investors have varying risk tolerance levels due to differences in risk aversion, and this should be considered when making investment decisions. It is interesting to note that the findings in this study contradict those from other REIT industries in emerging markets like South Africa and

Malaysia (Zhu, 2008; Aik, 2012; Naido, 2014). This indicate that the observed performance of REIT in Nigeria is not necessarily representative of a general phenomenon in emerging markets, but that results can vary significantly across different emerging market contexts. It is essential to recognize that the dynamics and characteristics of each market, including factors such as regulatory frameworks, economic conditions, and investor preferences, can contribute to the unique performance of REITs in a specific country or region. Therefore, the findings of this study highlight the need to consider the specific context and market conditions when analysing the performance of REITs in different regions, as generalizations based on other emerging markets may not hold true in all cases.

The findings of this study were also observed not to be a global REIT market phenomenon, as the results also disagree with studies conducted in REIT markets of developed nations such as the US (Jackson, 2008), where REITs were seen to perform well. Neither was it a time-frame phenomenon as REITs industries of Germany, Malaysia and the UK (which started the same time with Nigeria, i.e. in 2007) were observed to have performed better within the same time frame of this study. Therefore, these findings suggest that the performance of REITs is not universally consistent across emerging markets, developed nations, or specific time frames.

Effects of N-REIT in the mixed asset portfolio

The study examined the effect of N-REIT in a mixed asset portfolio under two scenarios. The first portfolio developed was unconstrained. For the second portfolio, while N-REIT was constrained to a maximum of 5% allocation, the other assets were not constrained. The constraints on N-REIT were set based on the maximum allowable limits set for pension fund portfolio managers in Nigeria to expose their assets to real estate. This perhaps owes to the peculiar market volatility and the infantile nature of Nigeria's indirect real estate assets.

The examination of the unconstrained portfolio (see Figure 2) shows that increasing allocation to N-REITs up to 28% allocation had both return and risk reduction effects. While portfolio return decreased from 12.49% to 8.85%, portfolio risk reduced from 2.78% to 2.41%. An examination of the return-risk ratio showed a corresponding decrease from 4.49% to 3.67%. Further, increase in the percentage allocation to N-REIT
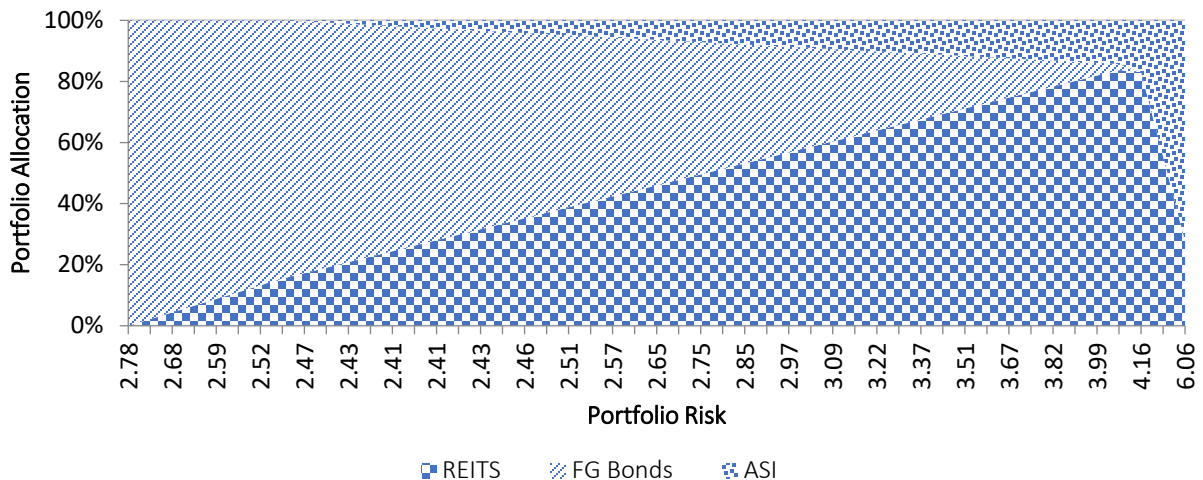
Figure 2: N-REITS Unconstrained Portfolio Asset

An examination of the constrained portfolio (see Figure 3) shows that with an increased allocation to N-REITs from 0.00% to 0.05%, portfolio risk and return reduced from 2.78% to 2.59% and 12.49% to 10.93%, respectively. The return risk ratio also decreased from 4.49% to 4.21%. A comparison of the two portfolios (constrained and unconstrained) based on the return risk ratios showed that including N-REITs beyond the 5% threshold might not yield optimal portfolio performance. However, an examination of the weightage of other assets in the portfolio suggests that the effectiveness of the N-REITs in the portfolio also depends on the percentage allocation to other assets. This, thus, imply that the return and risk characteristics of the other constituent assets and the investment objectives could significantly influence the portfolio strategy to be adopted. In comparison, the South African Market showed that the inclusion of REITs in a mixed asset portfolio provided return enhancement (Ntuli & Akinsomi, 2017).
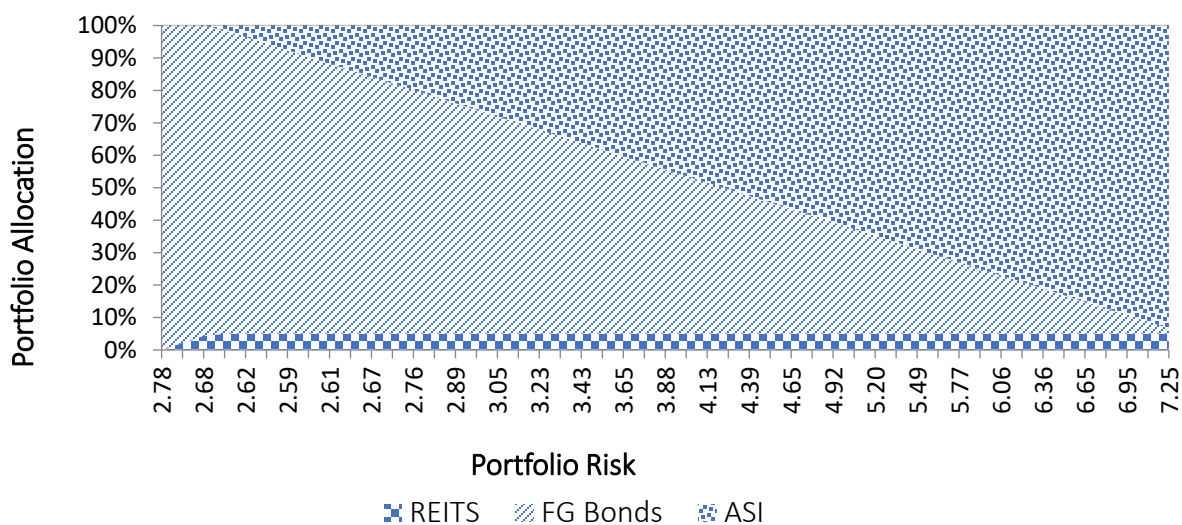

Figure 3: N-REITS Constrained Portfolio Asset

Conclusion

REITs play a crucial role in providing liquidity to property markets globally, particularly in emerging economies. This investment vehicle offers investors an opportunity to participate in the real estate sector without directly acquiring physical properties or investing in non-listed property funds. The present study examined the diversification benefits of REITs within the context of an emerging economy. By exploring the effects of an emerging market REIT in a mixed asset

portfolio, the study aimed to enhance understanding of the dynamics and implications of including REITs in investment portfolios.

The results of this study revealed that the returns on the various asset classes were relatively stable. The small but persistent and steady rise observed in all asset returns will likely be sustained over the next five years (2019 to 2024). N- REIT have provided the second-best overall return (0.69 per cent) and are the second-riskiest asset, with a risk level of 4.24 over the last twelve years. Despite having positive return values, N-REITs' performance is found to be lower compared to REITs from other emerging markets.

Furthermore, the return risk ratios showed that including N-REIT above the 5% threshold did not result in optimal portfolio efficiency. The study also discovered evidence that the attributes (percentage allocation, risk and return profile) of the constituent assets affects N-REIT's efficacy. A comparison of the two portfolios (constrained and unconstrained) based on the return risk ratios showed that including N-REIT beyond the 5% threshold might not yield optimal portfolio performance. However, examining the weightage of other assets in the portfolio suggests that the effectiveness of N-REIT in the portfolio also depends on the percentage allocation to other assets. This thus implies that the return and risk characteristics of the other constituent assets and the investment objectives could significantly influence the portfolio strategy to be adopted. As a result, the return and risk characteristics of the other constituent assets and the investment goals will substantially impact the portfolio strategy chosen.

Based on the empirical analysis conducted in this study, it was found that N-REIT, as a listed property investment scheme, have a positive impact on a mixed-asset portfolio, contributing to the risk-return characteristics of the overall portfolio. These findings provide valuable insights for both domestic and foreign investors, as well as institutional and retail investors, enabling them to make more informed and realistic property investment decisions within the context of N-REIT. The introduction of the REIT regime has played a significant role in enabling emerging property markets, including Nigeria, to fully unlock the investment potential of their real estate assets. N-REIT have provided a viable avenue for investors to participate in the property market without direct ownership or investment in non-listed property funds. This has contributed to increased liquidity and efficiency in the property market, attracting capital inflows from various investor categories.

To further strengthen investor confidence and trust in the N-REIT market, it is crucial for public administration at all levels to prioritize initiatives aimed at improving institutional and economic standards in Nigeria. This includes enhancing regulatory frameworks, ensuring transparency and disclosure requirements, and fostering an environment conducive to sustainable growth and development of the REIT market. By reinforcing investor trust and improving the overall investment climate, Nigeria can continue to harness the full potential of N-REIT and attract both

domestic and foreign investors seeking to diversify their portfolios and participate in the promising real estate sector.

It is important to acknowledge the limitations of this study. One significant limitation is the relatively small number of observations in the dataset, which was constrained by data availability. This is primarily due to the nascent stage of the REIT market in Nigeria compared to more established markets like the United States and the United Kingdom. As a result, there is limited historical data on N-REIT, which may impact the robustness and generalizability of the findings. With time, and as the Nigerian market matures, a more comprehensive dataset encompassing a larger timeframe would provide a more robust and comprehensive understanding of the dynamics and performance of the REIT market in Nigeria.

Future research could focus on expanding the dataset by including more years of data as they become available. It is crucial for researchers and market participants to recognize the evolving nature of the Nigerian REIT market and continue to gather and analyse data as it becomes available. This will contribute to a deeper understanding of the market's performance, facilitate better decision-making, and foster the development of a robust and transparent REIT market in Nigeria. Additionally, incorporating data from other emerging markets with well-established REIT markets could provide valuable insights and comparisons.

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