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DOI: <https://doi.org/10.53555/eijbms.v7i3.122>

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## MEASURING PERFORMANCE OF RISK-RETURN IN RESIDENTIAL AND COMMERCIAL REAL ESTATE INVESTMENTS IN SOUTH-SOUTH, NIGERIA

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### Abstract:-

*The study measures the risk-return performance of residential and commercial real estate investments in South-South, Nigeria from 2009 to 2018. The study adopted the survey research design and purposive sampling technique was used to select estate surveying and valuation firms. Data was analysed using mean total returns, standard deviation and analysis of variance. The test of the first hypothesis indicates that residential real estate investment in Port Harcourt has the highest mean total return and performed better than Calabar and Uyo and implies that total returns of residential real estate investments are significantly different in the study area. For commercial property, Uyo outperformed that of Calabar and Port Harcourt in terms of return. The second hypothesis results indicate that location of property is a significant determinant of risk. The result shows that the mean risk in Port Harcourt for residential real estate investment is significantly different from the risk in Calabar and Uyo. This implies that there is significant difference between risks of residential properties in the study area. For commercial property investment risk, the result shows the risks of investment in offices are higher than shops. For location, Uyo commercial properties produced the highest risk.*

**Keywords:** - Real Estate, Investment, Return, Risk, Performance

## 1.0 INTRODUCTION

Property investors are usually interested in ascertaining the performance of prospective investment before taking investment decisions. They need information on returns and risk of different assets so as to take decisions on whether the assets have positive return potentials, risk reduction potentials, diversification potentials, risk adjusted returns, inflation – hedging potentials and other types of investment indicators. Risk is the uncertainty that an investment will earn its expected rate of return. Each investment carries a risk of loss. The higher the potential returns, the higher the risk. Every investor in the real estate sector requires a good return from his/her investment and also minimising risk. As the number of investors in the real estate sector increases, they require a strategic balance in their expected returns and risk to be associated with their choice of investment (Ayodele & Olaleye, 2015). Arising from the impact of the recent economic recession in Nigeria in which real estate sector was one of the most affected sector of the economy, there is need to measure the investment performance in the real estate sector in order to determine the return from the real estate investment and the level of risk associated with such investment. Generally, investment decisions are guided by risk characteristics and return characteristics (Akinsola, 2012).

Every investment decision invariably involves a trade-off between risk and return; therefore investors informed decisions with respect to the risk-return strategies of real estate investments will guarantee healthy income and capital returns as well as a hedge against inflation (Chandra, 2008). Diala (2016) noted that there is inherent uncertainty about future returns and risk complexities of residential and commercial property investments; hence real estate investors should first ascertain the risk-return characteristics of such investments before committing their investment funds. The study of performance of real estate investment, whether residential or commercial, is very important at this time when emphasis is on investment performance analysis in many parts of the world. This is even more important in Nigeria where only few studies have been carried out on the level of performance achieved by real estate investment (Oyewole, 2013).

The study of risk-return performance of residential and commercial real estate investments is very essential to all investors in the real estate sector. The impact of the on-going changes in the global and local economy on the performance of real estate investments highlights the need for its careful consideration in the investment decision making process. In Nigeria, as in developed and emerging countries, decisions are often made to invest in property with the primary objective of achieving the necessary level of financial return. Risk has been seen as a common feature of all forms of investment in many urban centres in Nigeria. One fundamental problem of real estate investment is how investment decisions can be taken without determining the extent of risk involved in the envisaged project. Thus, many rational investors do not take any investment decisions without a careful examination, identification and assessment of the expected risk elements. According to Nwokenkwo (2014), an investment is considered risky because the investor is unsure of the actual returns which he will realize from his investment. The degree of variability of the actual return from the estimated return of investment as well as the possibility of loss of capital reflects the risk elements of investment (Ubom, 2010). This clearly indicated that where the degree of variability is higher, the risk involved in the investment is certainly higher and vice versa. It is on this back drop that this paper seeks to measure performance of riskreturn in residential and commercial real estate investments in South-South, Nigeria.

## 2.0 Literature Review

Several studies have been carried out on the performance of real estate investments and comparing it with other investments either in stocks, shares and bonds. These studies have been conducted both in the developed countries and developing countries including Nigeria. These studies mostly in United States or United Kingdom examined the performance of real estate investments from different perspectives.

Newell and Hsu (2007) study examined the performance of retail property in the Australian market between 1995 and 2005 using both public and private retail property. On a risk-adjusted basis, the study found that public and private retail properties have substantial risk-adjusted returns. Risk-adjusted performance analysis was used to assess the added value of retail property in a mix-asset portfolio, with the portfolio diversification benefits of retail property also assessed. The study found that retail property and retail Listed Property Trusts (LPTs) have delivered substantial risk-adjusted returns and portfolio diversification benefits between 1995 and 2005. The retail property sub-sectors of retail property type, size and region have different performance characteristics, particularly highlighting the substantial role of geographic diversification as the most effective portfolio diversification strategy for retail property investors. Direct retail property and retail LPTs were also identified to have different performance characteristics each contributing significantly to an institutional property investment strategy. Newell, Chau and Wong (2009) conducted a study on the significance of Chinese commercial property in an Asian property portfolio. The study assessed the significance and performance of the China commercial property market compared to six developed and emerging commercial property markets in Asia from 1998 to 2007 for both direct and indirect property. To assess the added value of China commercial property in a Pan-Asia portfolio, the risk-adjusted performance analysis was employed. The portfolio diversification benefits of China commercial property were also assessed. In assessing the dynamics of China commercial property, sub-period analysis was used. The findings from the study show that China commercial property market has significantly enhanced performance and diversification benefits in recent years. The study shows clear diversification benefits produced by the China commercial property in a pan-Asia property fund context. The findings from this study further indicates that the benefits of a Pan-Asia property investment strategy by international property investors as well as key benefits and added value of including China commercial property in a Pan-Asia property investment strategy is necessary.

Olaleye (2000) examined portfolio management and performance of property portfolio in Lagos. The study showed that portfolio in Ikeja performed better in terms of their mean return when compared with the free risk rate for the same period while Portfolio in Yaba performed below the investor's target rate. Bello (2003) compared the performance of residential property investment and investment in securities from 1996 – 2000. This study found that property underperformed ordinary shares in terms of internal rate of return and risk adjusted measures. He noted that residential property investment is more secured than investment in ordinary shares. In a study to examine the investment performance and listed property and construction companies relative to stock on the Nigerian stock market, Amidu & Aluko (2006) showed that stock outperformed both property and Construction Company stocks on a risk-adjusted basis. Oyewole (2006) study examined direct and indirect property investments in Lagos and compared the performance of eight direct listed property companies and UACN property development company shares from 1999 – 2004. The study used relative importance index, coefficient of variation and Sharpe ratio in estimating mean return, risk adjusted return, income appreciation and capital appreciation. The study revealed that indirect property performed better in terms of rate of return in absolute term and in capital growth, direct property performed better in terms of risk adjusted return.

Mfam & Kalu (2012) study examined the analysis of risk in direct residential and commercial real estate investments in Calabar over a period of 17 years. The result from the study shows that mean returns at the sectorial levels of residential and commercial real estate are at 23% and 23.83% respectively and 11.27% and 10.06% respectively for the associated risk. The study also reveals that there is a significant difference in total risk between the residential and commercial sectors with the total risk in the residential sector being significantly higher than that of the commercial sector. Finally, the study shows commercial sector performed better than the residential sector in terms of risk and return. Oyewole (2013) conducted a study on a comparative analysis of residential and retail commercial property investment performance in Ilorin from 2000 – 2011 focusing on average return, risk adjusted return, income growth and capital appreciation. The result of his study indicates that retail commercial property investments performed better than residential property investments with a mean annual return of 14.2% as against 11.8%. On the basis of risk adjusted return, the study reveals that commercial property investments performed also better than residential property investment with a sharp index of 1.11 as against 0.55. Comparing income and capital growth, commercial property investments performance was also higher than residential during the period of measurement. The study concluded that while both residential and commercial property investments performed well with positive mean returns and risk adjusted returns, commercial property outperformed residential property investment.

Dabara, Ankeli, Odewande, Guyimu & Adegbile (2014) compared risk-return characteristics of office and shop property investments in Osogbo. The study used data collected to estimate income, capital and total returns on commercial property investments in Osogbo. The study adopted the descriptive statistics to determine the return on the assets and risk through weighted means, percentages and standard deviations. The study found that investments in commercial properties in the study area provided a continuous positive rate of returns ranging from 3.12% and 34.35% while the risk ranged between 1.50% and 10.11%. Ayodele & Olaleye (2015) study examined risk adjusted performance of public real estate and other assets in the Nigerian investment market using a downside risk perspective. The study which analyzed quarterly returns from 2000 – 2013 showed that property stock underperformed other asset class except shares in terms of return while other assets outperformed listed property stock on risk basis based on the downside risk values. When they compared the excess returns to risk measured by the Sortino ratio, the study revealed that shares followed by listed property stocks underperformed other assets while debentures outperformed other assets. The study further showed that the standard deviation measure underestimated the risk inherent with most assets by margins as high as 91% even though a test for statistical significance of the results found that there is no differences between the standard deviation measure and the downside measure.

Ade (2015) examined performance evaluation of residential real estate properties in Ado Ekiti from 2008 to 2014. The study undertook a survey of rental and capital values of properties in the GRA, Ajilosun, Ajebandele, Basiri, Adebayo and Housing Oke Ila based on interviews with some estate managers. From the survey the rental and capital values and returns on investment of flats in the selected areas were established for the period under study. The findings from the study show that residential property investment in GRA, Adebayo and Ajilosun produced the highest rental and capital value growth. On the other hand, residential property investment in Ajebandele, Basiri and Housing Oke Ila showed lower returns. The study concluded that the returns from investment on flats in Basiri and Adebayo showed a remarkable increase in the last three years when compared with other areas. Ogunleye (2015) focused on the analysis of investment performance of residential property in government housing estates in Akure. The study compared the investment performance of residential properties in Ijapo and Alagbaka Housing Estates which are Government Residential Areas (GRA) in Akure. The study aimed at identifying the types of residential properties, examine the growth in rental value and identify the kind of trends residential property values follow in these two neighbourhoods over a ten year period from 2005 – 2014. The study showed that residential property values experienced a continuous increase during the period under study. The result of the study reveals that the rate of investment in Alagbaka is higher compared to its counterpart as the result for the different categories of residential properties confirmed that Alagbaka has higher mean rental values as against Ijapo. The study concluded that there is no statistically significant difference between the two locations.

On a study on evaluation of risk of residential and commercial real estate investments in Nigeria, Diala (2016) analyzed the risk and returns characteristics of residential and commercial investments in Nigeria using Abuja and Port Harcourt

property markets with the aim to identify the property class and markets that give the variability in returns. The study analyzed data using the Arithmetic Mean Return (AMR), Standard Deviation (SD) and Coefficient of Variation (CV). The study found that residential and commercial real estate investments produced good returns and at the same time showed wide variability in returns. The study concluded that residential and commercial property investments in Nigeria produced good returns but is very risky investments as shown in their wide variability in returns. The study recommended that prospective investors in the real estate market should take into consideration the risk-return characteristics of the various categories of real estate so as to ensure informed investment decision. Mfam, Kalu & Igwe-Kalu (2017) conducted a study which analyzed the co-movement of direct commercial and residential real estate investment returns in South Eastern Nigeria from 2000 – 2013. The study collected data from firms in eight cities using judgment sampling technique with a sample size of 100 residential and commercial properties in each city. At the city level, the study showed that Calabar and Onitsha produced the maximum (22.15%) and minimum (12.5%) mean returns respectively on commercial real estate investment while Owerri and Awka produced maximum (19.42%) and minimum (8.54%) mean returns on residential real estate investment. At the regional level, commercial sector produced higher (16.62%) mean returns than residential sector (14.93%). The study found that at the regional level, the correlation produced a low positive co-movement though significant. All positive and negative correlations at city and regional levels can contribute effectively to the construction of portfolios that will increase returns and reduce risk because there is no strong or perfect positive co-movement. The study concluded that commercial real estate investment outperformed residential real estate investments at both city and regional level.

Udobi, Kalu, Elekwachi & Ozigbo (2017) conducted a study on the comparative analysis of the performance residential real estate investments in selected urban areas of Anambra state. The study was conducted in Onitsha and Awka and adopted the same method of analysis as in the above study. Comparing the returns of the two urban areas shows an annual mean return and geometric mean return of approximately 8.8% over the 24 years period while the risk of residential property investment in Awka was 29.2% and Onitsha was 26.3.% respectively. On the basis of risk, the study concluded that the risk associated with investment in residential property in Awka was higher than that of Onitsha and therefore, residential property investment in Onitsha is preferred to Awka which is slightly more risky than that of Onitsha. Wahab, Morenikeji, Adeogun & Shittu (2017) examined risk-return performance of residential property investment in Abuja with a view to determine the most performed market and the level of risk associated with each sector of the residential property market. The result of the descriptive analysis across the twelve markets showed that Gwarinpa 3 bedroom and 4 bedroom markets performed better than other locations and it is the least volatile markets at 35% and 43% respectively. The result of the study tested with ANOVA revealed that the bulk of significant differences in property returns were found in Maitama markets. The study concludes that returns from Gwarinpa markets are relatively stable and having the least risk per unit of 3 bedroom and 4 bedroom property investment with comparable average returns with other markets for any prudent investor.

Nissi, Odimegwu and Kalu (2018) study looks at performance measurement of low and high income real estate investments in South-Eastern Nigeria between 2000 and 2013. Their study analysed the performance of roomy tenements (residential) in the study areas by considering the returns and risks which shows Owerri having 20.2% return with 13.1% risk and 0.65 coefficient of variation. Enugu has 18.60% return with 9.60% risk and 0.51 coefficient of variation, Onitsha has 12.86% return with 7.87% risk and 0.61 coefficient of variation, Abakiliki has 11.3% return with 6.26% risk and 0.55 coefficient of variation and Aba has 10.4% return with 6.14% risk and 0.59 coefficient of variation. The authors noted that Enugu is the best performed city with 18.6% return, 9.6% risk and 0.51 coefficient of variation. This is followed by Abakiliki, Onitsha, Aba and last is Owerri. In the performance of shops in the study areas, Nissi et al (2018) study shows that Enugu has a return of 17.9%, a risk of 11.2% and 0.62 coefficient of variation, Onitsha has 16.63% return, 6.56% risk and 0.39 coefficient of variation, Aba has 11.60% return, 3.5% risk and 0.30 coefficient of variation, Abakiliki has a return of 11.40%, 6.70% risk and 0.50 coefficient of variation while Owerri has 24.0% return, 11.8% risk and 0.49 coefficient of variation. In this category, Aba performed best with 11.60% return, 3.5% risk and 0.30 coefficient of variation followed by Onitsha, Abakiliki, Owerri and Enugu last.

In the performance of high income real estate investments (3 bedrooms flat residential) in the study area, Enugu has the best performance with 9.80% return, 3.22% risk and 0.32 coefficient of variation. This is followed by Aba with 12.4% return, 3.61% risk and 0.29 coefficient of variation, Onitsha with 23.6% return, 6.20% risk and 0.26 coefficient of variation, Owerri with 8.79% return, 5.04% risk and 0.57 coefficient of variation and last is Abakiliki with 10.79% return, 8.23% risk and 0.76 coefficient of variation. For 3 bedroom office buildings, the performance shows that Aba has best performance with 9.3% return, 2.40% risk and 0.25 coefficient of variation. This is followed by Onitsha with 17.8% return, 5.14% risk and 0.29 coefficient of variation; Enugu with 11.30% return, 4.75% risk and 0.42 coefficient of variation, Owerri is forth with 9.07% return, 6.56% risk and 0.72 coefficient of variation and last is Abakiliki with 7.7% return, 7.10% risk and 0.92% coefficient of variation. The study concluded that for low and high income residential and commercial real estate investments in South-Eastern Nigeria, investors could be advised to invest in a roomy tenement and shop in Enugu and Aba respectively for low income investment. On the other hand, for high income residential and commercial real estate investments, investors would also be advised to invest in Enugu and Aba respectively.

The study of Awa and Anih (2018) assessed the performance of residential and commercial real estate investments diversification across different neighbourhoods in Aba. Their study showed that the differences in the neighbourhood

characteristics contributed to the variation in the rental and capital values trend of real estate investments in Aba. This was adduced from the performance of similar property across neighbourhoods which returned different values in different neighbourhoods. The study concluded that commercial real estate investments in Aba outperformed residential properties recording higher level of rental and capital values. Nwankwo, Kalu and Igwe-Kalu (2018) study compared and analysed the performance of residential real estate investment in South-Eastern Nigeria from 2000 to 2016. The study used two states out of five i.e. Owerri and Enugu and from each state, three locations were studied using bungalows, blocks of flats and detached houses on two floors. The study surveyed 136 estate surveyors and valuers in private practice who supplied data on annual rental and capital values of properties they managed. The yearly returns on investment were computed from the appraised capital values and annual rental values of the various types of residential properties between 2000 and 2016 in the study area using the holding period return. In the study, investment performance was computed by finding the risk-return ratio of various property investments. Risk was calculated by finding the standard deviation of the yearly returns from the holding period return. Results from the study indicate that in Enugu, 4 bedroom bungalow in Trans-Ekulu and block of 6 flats in Achara Layout had the best performance having the lowest risk-return relationship (covariance) of 0.421 while 5 bedroom detached house in Trans-Ekulu had the least performance with risk-return covariance of 0.69. In Owerri, 4 bedroom bungalows in Aladinma had the best performance having the lowest risk-return relationship (covariance) of 0.403 while 2 bedroom bungalows in Aladinma had the least performance with a risk-return covariance of 0.94. The study concluded by recommending that investors who invest in the study area should consider investing in 4 bedroom bungalow in Aladinma, Owerri or Trans-Ekulu and block of 6 flats in Achara Layout, Enugu. The study also noted that investors who have investments already in the study area should seek performance measurement of their investment to know if the set objectives are met.

Another study was that of Igwe-Kalu and Akpan (2019) who compared and analysed the returns on residential and commercial property investments in Kaduna metropolis from 2003 to 2015. The study used a population of 70 registered estate surveyors and valuers in Kaduna while 35 who were in operation during the time of the study constituted the sample size for the study and questionnaire was administered on them. The result from this study in Kaduna showed that commercial property investments performed better in terms of rental value growth and returns with 8.9 and 4.95 as against 8.52 and 4.0. Statistically, the study showed that there is a significant relationship between returns on residential and commercial property investments and their correlation coefficient is 0.7734. The study concluded that residential and commercial property investments should not be combined in a portfolio in Kaduna metropolis because their correlation coefficient is positive. Udobi, Onyejiaka and Nwozuzu (2019) analysed the performance of commercial and residential property investments in Onitsha metropolis within a period of nine (9) years (2007 – 2016). The study analysed annual returns, risk profile and risk return profile of commercial and residential properties. Data for this study was obtained from rental and capital values of commercial and residential properties within the period of nine (9) years from Estate Surveyors and Valuers in Onitsha. The data analysis was done through arithmetic mean return, geometric mean return, standard deviation and coefficient of variation. The findings from this study indicate that commercial property investment performed better than residential property investment for the period under study with annual return of 19% against 17% for residential property investment. In terms of risk profile, residential property investment performed better than commercial property investment with 11.34% of risk and 0.67% risk-return against 15.88% of risk and 0.84% risk-return for commercial property investment. The study concluded that a risk averse investor will prefer to invest in residential property than commercial property. On the other hand, a risk taker investor will prefer to invest in commercial property not minding the high risk involved in such investment. The study recommends a periodic review of portfolio performance analysis to help investors take good investment decisions.

Diala, Nissi and Ezema (2019) analysed the performance of commercial and residential real property investments in Enugu Urban from 2010 to 2017. The study compared commercial properties (shops and offices) and residential properties in Achara Layout, New Haven and Ogui Road with focus on yearly returns and risk. The study adopted the purposive sampling technique to select 40 unites of commercial and residential properties. Data was collected on rental and capital returns on the properties for the period of eight (8) years and obtained from Estate Surveying and Valuation firms. Data analysis was done using arithmetic mean return, standard deviation and coefficient of variation. Findings from the study show that residential property investment is less secure in Ogui Road with a corresponding return of 7.8%, 3.4% risk and 44.36% coefficient of variation. The findings from this study also show that residential property investment is more secure in New Haven than at Achara Layout with a return 7.19%, 2.83% risk and 39.86% coefficient of correlation. Residential properties were also seen to be less secure in Achara Layout with 9.4% return, 5.29% risk and 56.28% coefficient of variation. For commercial properties, office is more secure in New Haven with a return of 10.6%, 4.36% risk and 41.13% coefficient of variation. The study further indicates that commercial property investment performs better than residential properties in terms of returns and concluded that investors should access past performance of similar investment before embarking on any real estate investment of business.

### **3.0 Materials and Methods**

The study adopted the descriptive survey research design. The study area is South-South, Nigeria and three cities were selected out of six for the study. The population of the study comprised of Estate Surveyors and valuers who are in active practice who provided data on rental and capital values of residential and commercial properties in Calabar, Uyo and Port Harcourt. Purposive sampling technique was used in selecting 50 units each of residential and commercial properties in the selected three cities from the study area. Primary data was collected using questionnaire administered on all the

practicing estate surveying and valuation firms selected in the study area. Descriptive statistics using frequency tables and percentage distribution were used in analysing the data, mean total returns were computed using the total returns formula, total risks were computed with the use of standard deviation while the hypotheses were tested using the analysis of variance (ANOVA).

### 3.0 Results

**Table 4.1: Mean (Average) Total Return and Total Risk for Residential Real Estate Investment in Calabar**

Types of Residential Property	Mean Total Return (%)	Mean Total Risk (%)
Tenements	12.13	3.69
1 Bedroom Flat	13.72	4.95
2 Bedroom Flat	11.47	5.56
3 Bedroom Flat	11.24	3.88
2 Bedroom Detached Bungalow	11.34	2.44
3 Bedroom Detached Bungalow	10.91	3.35
Mean Total Return & Mean Total Risk	11.80	3.99

Source: Researcher's Field Work, 2019

The analysis of total return and risk for residential real estate investment in Calabar is as shown in table 4.1 above. Six sectors of the residential real estate markets were analysed for a period of 10 years (2009 – 2018) and their mean total return and risk also analysed. From table 4.1, tenements in Calabar have mean total return of 12.13% and risk of 3.69%. One bedroom flat has a mean total return of 13.72% and 4.95% risk, two bedrooms flat with mean total return of 11.47% and 5.56% risk, three bedrooms flat having a mean total return of 11.24% and risk of 3.88%. For detached bungalows in Calabar, two bedroom detached bungalow has a mean total return of 11.34% and 2.44% risk while three bedroom detached bungalow has 10.91% as mean total return and 3.35% as risk. In terms of performance of the six residential sectors of the residential real estate investment studied in Calabar, one bedroom flat outperformed the others with a mean total return of 13.72%. In terms of risk performance, two bedrooms flat have the highest risk of 5.56% while two bedroom detached bungalow has the least risk of 2.44%. On the whole, the mean total return of all the residential real estate investment is 11.80% and Mean total risk of 3.99%.

**Table 4.2: Mean (Average) Total Return and Total Risk for Commercial Real Estate Investment in Calabar**

Types of Commercial Property	Mean Total Return (%)	Mean Total Risk (%)
Offices	9.0	3.34
Shops	12.61	7.19
Mean Total Return & Mean Total Risk	10.81	5.27

Source: Researcher's Field Work, 2019

The analysis of the commercial real estate investment in Calabar shows that shops or retail property outperformed office property with mean total return of 12.61% and risk of 7.19 as against 9.0% mean total return and 3.34% risk for office property. The mean total return for the two types of commercial real estate studied shows the return to be 10.81% with risk of 5.27%.

**Table 4.3: Mean (Average) Total Return and Total Risk for Residential Real Estate Investment in Uyo**

Types of Residential Property	Mean Total Return (%)	Mean Total Risk (%)
Tenements	10.55	5.65
1 Bedroom Flat	13.33	3.78
2 Bedroom Flat	10.81	2.51
3 Bedroom Flat	12.1	4.14
2 Bedroom Detached Bungalow	9.73	2.47
3 Bedroom Detached Bungalow	11.01	4.61
Mean Total Return & Mean Total Risk	11.26	3.86

Source: Researcher's Field Work, 2019

The analysis of total return and risk for residential real estate investment in Uyo is as shown in table 4.3 above. Six sectors of the residential real estate markets were also analysed for a period of 10 years (2009 – 2018) and their mean total return and risk also analysed. From table 4.3 above, tenements in Uyo have mean total return of 10.55% and risk of 5.65%. One

bedroom flat has a mean total return of 13.33% and 3.78% risk, two bedrooms flat with mean total return of 10.81% and 2.51% risk, three bedrooms flat having a mean total return of 12.1% and risk of 4.14%. For detached bungalows in Uyo, two bedroom detached bungalow has a mean total return of 9.73% and 2.47% risk while three bedroom detached bungalow has 11.01% and mean total return and 4.61% as risk. In terms of performance of the six residential sectors of the residential real estate investment studied in Uyo, one bedroom flat also outperformed the others with a mean total return of 13.33%. In terms of risk, tenements have the highest risk of 5.65% while two bedroom detached bungalow also have the least risk of 2.47%. On the whole, the mean total return of all the residential real estate investment is in Uyo 11.26% and Mean total risk of 3.86%.

**Table 4.4: Mean (Average) Total Return and Total Risk for Commercial Real Estate Investment in Uyo**

Types of Commercial Property	Mean Total Return (%)	Mean Total Risk (%)
Offices	13.92	12.12
Shops	11.80	4.46
Mean Total Return & Mean Total Risk	12.86	8.29

Source: Researcher's Field Work, 2019

The analysis of the commercial real estate investment in Uyo shows that Office property outperformed shops or retail property with mean total return of 13.92% and risk of 12.12 as against 11.80% mean total return and 4.46% risk for shop property. The mean total return for the two types of commercial real estate studied in Uyo shows the mean total return to be 12.86% with risk of 8.29%.

**Table 4.5: Mean (Average) Total Return and Total Risk for Residential Real Estate Investment in Port Harcourt**

Types of Residential Property	Mean Total Return (%)	Mean Total Risk (%)
Tenements	29.34	13.74
1 Bedroom Flat	13.21	8.75
2 Bedroom Flat	10.02	3.86
3 Bedroom Flat	8.41	3.86
2 Bedroom Detached Bungalow	8.98	7.74
3 Bedroom Detached Bungalow	6.52	7.93
Mean Total Return & Mean Total Risk	12.75	7.65

Source: Researcher's Field Work, 2019

The analysis of total return and risk for residential real estate investment in Port Harcourt is as shown in table 4.5 above. Six sectors of the residential real estate markets were analysed for a period of 10 years (2009 – 2018) and their mean total return and risk also analysed. From table 4.5, tenements in Port Harcourt have mean total return of 29.34% and risk of 13.74%. One bedroom flat has a mean total return of 13.21% and 8.75% risk, two bedrooms flat with mean total return of 10.02% and 3.86% risk, three bedrooms flat having a mean total return of 8.41% and risk of 3.86%. For detached bungalows in Port Harcourt, two bedroom detached bungalow has a mean total return of 8.98% and 7.74% risk while three bedroom detached bungalow has 6.52% as mean total return and 7.93% as risk. In terms of performance of the six residential sectors of the residential real estate investment studied in Port Harcourt, Tenements outperformed the others with a mean total return of 29.34%. In terms of risk performance, two bedrooms and three bedroom flats have the least risk of 3.86% while tenements has the highest risk of 13.74%. On the whole, the mean total return of all the residential real estate investment in Port Harcourt is 12.75% and Mean total risk of 7.65%.

**Table 4.6: Mean (Average) Total Return and Total Risk for Commercial Real Estate Investment in Port Harcourt**

Types of Commercial Property	Mean Total Return (%)	Mean Total Risk (%)
Offices	7.37	5.15
Shops	13.0	7.34
Mean Total Return & Mean Total Risk	10.19	6.25

Source: Researcher's Field Work, 2019

The analysis of the commercial real estate investment in Port Harcourt shows that shop property outperformed office property with mean total return of 13.0% and risk of 7.34 as against 7.37% mean total return and 5.15% risk for office property. The mean total return for the two types of commercial real estate studied in Port Harcourt shows the mean total return to be 10.19% with risk of 6.25%.

**Table 4.7: Mean Total Return and Mean Total Risk of Residential Real Estate Investment in Calabar, Uyo and Port Harcourt**

City	Mean Total Return (%)	Mean Total Risk (%)
Calabar	11.80	3.99
Uyo	11.26	3.86
Port Harcourt	12.75	7.65

Source: Researcher’s Field Work, 2019

A comparison of the residential real estate investments analysed in Calabar, Uyo and Port Harcourt show that the residential real estate investment in Port Harcourt outperformed that of Calabar and Uyo with a mean total return of 12.75% as against 11.80% 11.26% for Calabar and Uyo. In terms of risk performance, residential real estate investment in Uyo performed better with less risk of 3.86% compared to 3.99% for Calabar and 7.65% for Port Harcourt.

**Table 4.8: Mean Total Return and Mean Total Risk of Commercial Real Estate Investment in Calabar, Uyo and Port Harcourt**

City	Mean Total Return (%)	Mean Total Risk (%)
Calabar	10.81	5.27
Uyo	12.86	8.29
Port Harcourt	10.19	6.25

Source: Researcher’s Field Work, 2019

A comparison of commercial real estate investments analysed in Calabar, Uyo and Port Harcourt shows that commercial real estate investment in Uyo outperformed that of Calabar and Port Harcourt in terms of return with a mean total return of 12.86% as against 10.81% for Calabar and 10.19% for Port Harcourt. In terms of risk performance, commercial real estate investment in Calabar performed better with less risk of 5.27% compared to Uyo with 8.29% and Port Harcourt with 6.25%.

**Table 4.9: Mean and Standard Deviation of Total Returns on Residential Real Estate: Location by House Type**

House Type	Property Location	N	Mean	Standard Deviation	Standard Error
Tenement	Calabar	9	12.133	3.911	4.078
	Uyo	9	10.547	5.990	4.078
	Port Harcourt	9	16.867	6.035	4.078
	<b>Total</b>	<b>27</b>	<b>13.182</b>	<b>5.868</b>	<b>4.078</b>
One Bedroom	Calabar	9	29.122	47.118	4.078
	Uyo	9	13.333	4.007	4.078
	Port Harcourt	9	12.211	9.280	4.078
	<b>Total</b>	<b>27</b>	<b>18.556</b>	<b>27.794</b>	<b>4.078</b>
Two Bedroom	Calabar	9	11.467	5.902	4.078
	Uyo	9	10.811	2.665	4.078
	Port Harcourt	9	10.022	4.095	4.078
	<b>Total</b>	<b>27</b>	<b>10.767</b>	<b>4.292</b>	<b>4.078</b>
Three Bedroom	Calabar	9	11.244	4.115	4.078
	Uyo	9	12.100	4.291	4.078
	Port Harcourt	9	8.411	4.086	4.078
	<b>Total</b>	<b>27</b>	<b>10.585</b>	<b>4.343</b>	<b>4.078</b>
Two Bedroom Det. Bungalow	Calabar	9	10.789	2.520	4.078
	Uyo	9	9.733	3.110	4.078
	Port Harcourt	9	8.978	8.206	4.078

	<b>Total</b>	<b>27</b>	<b>9.833</b>	<b>5.121</b>	<b>4.078</b>
Three Bedroom Det. Bungalow	Calabar	9	10.911	3.549	4.078
	Uyo	9	11.011	4.885	4.078
	Port Harcourt	9	10.478	7.292	4.078
	<b>Total</b>	<b>27</b>	<b>10.800</b>	<b>5.257</b>	<b>4.078</b>
Total	Calabar	54	14.278	19.829	1.665
	Uyo	54	11.256	4.273	1.665
	Port Harcourt	54	11.328	7.095	1.665
	<b>Total</b>	<b>162</b>	<b>12.287</b>	<b>12.410</b>	<b>1.665</b>

Source: Researcher's Field Work, 2019

The results from Table 4.9 and for tenement properties, mean return was highest in Port Harcourt ( $x = 16.867$ ) followed by Calabar ( $x = 12.133$ ) and the least was Uyo ( $x = 10.547$ ). For one bedroom flat, the mean total return was highest in Calabar ( $x = 29.122$ ) followed by Uyo ( $x = 13.333$ ) while the least was Port Harcourt ( $x = 13.211$ ). This pattern was also observed in two bedrooms flat. In the case of three bedroom flat, the highest mean total return was seen in Uyo ( $x = 12.100$ ) followed by Calabar ( $x = 11.244$ ) and the least was in Port Harcourt ( $x = 8.411$ ). This pattern was also observed for three bedroom detached bungalow. For two bedroom detached bungalow, the highest mean total return was observed in Calabar ( $x = 10.789$ ) followed by Uyo ( $x = 9.733$ ) and the least was Port Harcourt ( $x = 8.978$ ). On the whole, a highest mean total returns on residential real estate investment was observed in Calabar ( $x = 14.278$ ) followed by Port Harcourt ( $x = 11.328$ ) and the least was Uyo ( $x = 11.256$ ). The results of the two-way ANOVA are presented in Table 4.10.

**Table 4.10: Two-Way ANOVA of Total Returns on Residential Real Estate: Location by House Type**

Source of Variation	Sum of Squares	Df	Mean Square	F-Value	P-Value
Corrected model	3240.313	17	190.607	1.273	.218
Intercept	24457.839	1	24457.839	163.381*	.000
House Type	1445.457	5	289.091	1.931	.093
Location	321.107	2	160.553	1.073	.345
House Type X Location	1473.750	10	147.375	0.985	.460
Error	21555.803	144	149.693		
Total	49253.954	162			
Corrected Total	24796.116	161			

\*Significant at .05 level.  $P < .05$

The results in Table 4.10 reveal that only the P-value (.000) associated with the computed F-value (163.381) is less than .05. The P-values (.218, .093, .345 & .460) associated with the computed F-values (1.273, 1.931, 1.073 & .985) for the corrected model, house type, location and house type by location respectively are greater than .05. As a result, the null hypothesis was not rejected. This means that total returns of residential properties is significant by the type of house as well as the location of the property. The two-way ANOVA was repeated with location and usage of commercial properties as factors and total returns on investment in commercial real estate as dependent variable. The results of the descriptive statistics are shown in Table 4.11.

**Table 4.11: Descriptive Statistics of Total Returns on Commercial Real Estate: Usage by Location**

Property Usage	Property Location	Mean	Standard Deviation	Standard Error
Offices	Calabar	9.011	3.538	2.429
	Uyo	19.122	11.616	2.429
	Port Harcourt	7.367	5.467	2.429
	Total	11.833	9.090	1.402
Shops	Calabar	12.611	7.623	2.429
	Uyo	11.800	4.734	2.429
	Port Harcourt	12.978	7.789	2.429
	Total	12.463	6.610	1.402
Total	Calabar	10.811	6.055	1.717
	Uyo	15.461	9.394	1.717
	Port Harcourt	10.172	7.138	1.717
	Total	12.148	7.878	.992

Source: Researcher's Field Work, 2019

From Table 4.11 and for offices, Uyo had the highest mean total returns ( $x = 19.122$ ) followed by Calabar ( $x = 9.011$ ) and the least was Port Harcourt ( $x = 7.367$ ). In the case of shops, Port Harcourt had the highest mean total return ( $x = 12.978$ ) followed by Calabar ( $x = 12.611$ ) and the least was Uyo ( $x = 11.800$ ). The results of the ANOVA are presented in Table 4.12.

**Table 4.12: Two-Way ANOVA of Total Returns on Commercial Real Estate: Usage by Location**

Source of Variation	Sum of Squares	Df	Mean Square	F-Value	P-Value
Corrected model	741.286	5	148.257	2.793*	.027
Intercept	7969.185	1	7969.185	150.110*	.000
Usage	5.352	1	5.352	.101	.752
Location	300.018	2	150.009	2.826	.069
Usage X Location	435.916	2	217.958	4.106*	.023
Error	2548.269	48	53.089		
Total	11258.740	54			
Corrected Total	3289.555	53			

\*Significant at .05 level.  $P < .05$

The results in Table 4.14 show that the P-values (.027, .000 & .023) associated with the computed F-values (2.793, 150.110 & 4.106) for the corrected model, intercept and the interaction effect of location and usage respectively are less than .05, while the P-values (.752 & .069) associated with the computed F-values (.101 & 2.826) for usage and location respectively, are greater than .05. The null hypothesis for corrected model, intercept and usage by location interaction were rejected while those for usage and location (main effect) were retained. This means that there is significant joint influence of location and usage on total returns on investment.

**Table 4.13: Two-Way ANOVA of Risk in Residential Real Estate Investment: House Type by Location**

House Type	Property Location	N	Mean	Standard Deviation	Standard Error
Tenement	All	3	7.693	5.327	3.076
One Bedroom Flat	"	3	5.827	2.598	1.500
Two Bedroom Flat	"	3	3.977	1.528	.882
Three Bedroom Flat	"	3	3.960	.156	.090
Two Bedroom Det. Bungalow	"	3	4.217	3.051	1.762
Three Bedroom Det. Bungalow	"	3	5.297	2.366	1.366
Total	Calabar	6	3.978	1.122	.458
	Uyo	6	3.860	1.233	.503
	Port Harcourt	6	7.647	3.664	1.496
	Total	18	5.162	2.835	
<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F-value</b>	<b>P-value</b>
Corrected model	136.638	17	8.038	1.634	.069
Intercept	479.570	1	479.570	97.495*	.000
House Type	31.833	5	6.367	1.294	.084
Location	55.619	2	27.810	5.654*	.000
House Type X Location	49.186	10	4.919		
Total	616.208	18			
Corrected Total	136.638	17			

\*Significant at .05 level.  $P < .05$

From Table 4.13, the highest mean risk of residential real estate investment was in tenement buildings ( $x = 7.693$ ), followed by one bedroom flat ( $x = 5.827$ ) and the least was for three bedroom flat ( $x = 3.960$ ). By location, the highest mean risk was observed in Port Harcourt ( $x = 7.647$ ) followed by Calabar ( $x = 3.978$ ) and the least was Uyo ( $x = 3.860$ ). The P-values (.000) associated with the computed F-values (97.493 & 5.654) for the intercept and location respectively, are less than .05, but the P-values (.069 & .084) associated with the Fvalues (1.634 & 1.294) for corrected model and house type respectively are greater than .05. Thus, the null hypothesis with respect to the intercept and location effect was rejected while those for corrected model and house type were retained. This means that location of property is a significant determinant of risk but house type is not. To locate the pair means that was responsible for the observed significant results, LSD test was carried out. The results are summarised and presented as Table 4.14.

**Table 4.14: LSD Pairwise Comparison of Risk in Residential Real Estate Investment by Location**

Location of Property	Calabar	Uyo	Port Harcourt
Calabar	3.978**	.118	3.669*
Uyo	.063	3.860	3.787*
Port Harcourt	.000	.000	7.647

\*Significant at .05 level.  $P < .05$

\*\*Values along main diagonal are group means, above it are mean difference and below it are corresponding Pvalues.

The results from Table 4.14 show that the mean risk in Port Harcourt is significantly different from that of Calabar (MD = 3.669,  $P = .000$ ) and Uyo (MD = .3787,  $P = .000$ ) but the difference between Calabar and Uyo (MD = .118,  $P = .063$ ) is not. The two-way ANOVA was repeated for commercial property. Location and usage were factors and risk in commercial real estate investment as dependent variable. The results are presented in Table 4.15.

**Table 4.15: Two-Way ANOVA of Risk in Commercial Real Estate Investment: Usage by Location**

Property usage	Property Location	N	Mean	Standard Deviation	Standard Error
Offices	All	3	6.870	4.636	2.677
Shops	All	3	6.330	1.621	.936
Total	Calabar	2	5.265	2.722	1.925
	Uyo	2	8.290	5.416	3.830
	Port Harcourt	2	6.245	1.549	1.095

	Total	6	6.000	3.120	1.274
Source of Variation	Sum of Squares	Df	Mean Square	F-value	P-value
Corrected model	48.676	5	9.735	.503	.913
Intercept	261.360	1	261.360	13.503*	.000
Usage	.437	1	.437	.023	.998
Location	9.529	2	4.764	.246*	.984
Usage X Location	38.710	2	19.355		
Total	310.036	6			
Corrected Total	48.676	5			

\*Significant at .05 level.  $P < .05$

The results in Table 4.15 show that the risk of commercial real estate investment in offices ( $x = \bar{6.810}$ ) is higher than that of shops ( $x = 6.330$ ). By location, risk of commercial real estate investment in Uyo ( $x = \bar{8.290}$ ) is the highest, followed by that of Port Harcourt ( $x = 6.245$ ) and the least was Calabar ( $x = 5.265$ ). The P-value (.000) associated with the computed F-value (13.503) for the intercept is less than .05. Consequently, the null hypothesis was rejected. This means that there is significant difference between the total risk of commercial properties in Calabar, Uyo and Port Harcourt.

## 5.0 Discussion

The first hypothesis was tested to find out if there is significant difference in total returns of residential and commercial properties in South-South Nigeria using Calabar, Uyo and Port Harcourt. This hypothesis was tested using a two-way ANOVA with total return on residential and commercial property as dependent variable and house type and location as factors. The result of the test shows that for tenement building, the mean total return was highest in Port Harcourt, followed by Calabar and least in Uyo. For one bedroom flat, the mean total return was observed to be higher in Calabar, followed by Uyo and least in Port Harcourt. The same pattern was observed in two bedrooms flat where the mean total return for Calabar was the highest, followed by Uyo and least in Port Harcourt. For three bedrooms flat, Uyo produced the highest mean total return, followed by Calabar and least in Port Harcourt. For two bedroom detached bungalow, Calabar has the highest mean total return, followed by Uyo and least in Port Harcourt. Three bedroom detached bungalow produced the same pattern with three bedrooms flat where the highest mean total return was observed in Uyo, followed by Calabar and least in Port Harcourt. On the whole, the highest mean total return on residential real estate investment was in Port Harcourt, followed by Calabar and least was Uyo. This implies that residential real estate investments in Port Harcourt with the highest mean total return performed better than Calabar and Uyo. Therefore, total returns of residential properties are significantly different in Calabar, Uyo and Port Harcourt.

For commercial real estate investments, a two-way ANOVA was also computed with total returns on investment as the dependent variable and location and usage of commercial property as factors. The result of the two-way ANOVA shows that for offices, Uyo produced the highest mean total return, followed by Calabar and least in Port Harcourt. For shops, Port Harcourt produced the highest mean total return, followed by Calabar while Uyo was the least. The result shows that there is significant joint influence of location and usage on total returns on investment. A Post Hoc test (LSD) was used to locate the source of the significant interaction effect. The result shows that only the total return between Port Harcourt and Uyo were significant for commercial property while all other paired comparison were not significant. In measuring the performance of residential and commercial real estate investments in South-South, Nigeria based on mean total returns, residential property performed better than commercial property in Calabar with mean total return of 11.80% and 10.81% respectively. In Uyo as commercial property with mean total return of 12.86% performed better than residential property with 11.26% mean total return. In Port Harcourt, residential property with mean total return of 12.75% performed better than commercial property with mean total return of 10.19%. A comparison of the residential real estate investments analysed in Calabar, Uyo and Port Harcourt showed that the residential real estate investment in Port Harcourt outperformed that of Calabar and Uyo with a mean total return of 12.75% as against 11.80% 11.26% for Calabar and Uyo. Also a comparison of commercial real estate investments analysed in Calabar, Uyo and Port Harcourt shows that commercial real estate investment in Uyo outperformed that of Calabar and Port Harcourt in terms of return with a mean total return of 12.86% as against 10.81% for Calabar and 10.19% for Port Harcourt.

The second hypothesis was tested to see if there is significant difference between total risk of residential and commercial properties in South-South, Nigeria using Calabar, Uyo and Port Harcourt. A two-way ANOVA was computed for residential and commercial properties separately. Risk performance of investment in residential real estate was used as dependent variable while location and house type as factors. To test for significance, the F-ratio and LSD were used. The result shows that the highest mean risk for residential investment was tenements, followed by one bedroom flat and the least was observed in three bedrooms flat. In terms of location, Port Harcourt produced the highest mean risk, followed by Calabar and least in Uyo. The result indicates that location of property is a significant determinant of risk while house type is not. The result from the LSD test shows that the mean risk in Port Harcourt for residential real estate investment is significantly different from the risk in Calabar and Uyo. This implies that there is significant difference between risk of residential properties in Calabar, Uyo and Port Harcourt (South-South, Nigerian).

For commercial property investment risk, a two-way ANOVA was also computed with commercial real estate investment risk as dependent variable and location and usage of property as factors. The result shows that the risk of investment in offices higher than that of shops. In terms of location, Uyo commercial properties produced the highest risk, followed by Port Harcourt and least in Calabar. The result shows that there is significant difference between total risk of commercial properties in Calabar, Uyo and Port Harcourt (SouthSouth, Nigeria).

## 6.0 Conclusion and Recommendation

The study on the measurement of risk-return performance of residential and commercial real estate investments cannot be completed without an in-depth analysis of risk and return. Performance measurement of real estate investment is very essential as it helps to guide real estate investors on the performance of their real estate investment. This would also help real estate investors to plan to invest more on a particular sector of the real estate market or disinvest in terms of underperforming investments. Performance measurement of real estate investments also requires the analysis of risk and most investors are risk-averse while others are risk takers. Findings from this study have shown that the higher the risk of an investment in real estate, the higher the expected return. Comparison of the residential and commercial real estate investments in South-South, Nigeria shows that their performance differs both at the sector level, type of use and location. There is need to evaluate real estate investment performance regularly to monitor investment performance. The findings of this result can be very useful for investment forecasting, decision making on the type of asset to be included in an investment portfolio as a measure for protecting investor's earnings and help in minimizing risk. The study recommends that real estate investors should be well knowledgeable with the environment they are entering to invest. Investors wishing to invest in real estate within the South-South or even across Nigeria should have a fair knowledge of the dynamics of the property market in the study area. There should be periodic assessment of the performance of real estate investment return and risk analysis. Real estate investors should also diversify their investments and not just focusing on one sector of the property market as this would help to reduce risk.

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