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Inflation Hedging Potentials of Residential Real Estate Investments in Akwa Ibom State
by Dr. Mbosowo E. Ekpo, Hosanna M. Attai and Aniedi A. Isok

Inflation Hedging Potentials of Residential Real Estate Investments in Akwa Ibom State, Nigeria [1]

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Abstract

This research examines the relationship between residential real estate investment returns and the actual, expected and unexpected inflation components of the Nigerian economy, with a view to determining the inflation-hedging characteristics of residential real estate investment in the three senatorial districts of Akwa Ibom State of Nigeria. In order to achieve the stated aim, the objectives were to evaluate the average capital and average rental values in the study area, to analyse the return profile of residential real estate in the study area, to analyse the inflationary trend in the study area, to establish the inflation-hedging potentials of residential real estate in the study area. This research work adopted the cross-sectional survey type of design. The research population comprised Estate Surveyors and Valuers who have offered professional services across the State. Data was obtained through questionnaire survey. This was subsequently translated to returns using the Holding Period Returns. The Consumer Price Index was used as the actual inflation rates. Similarly, the 91-day Treasury bill rates were used as proxy for expected inflation for the period between 2012 and 2021. The two groups of data obtained for the study were subjected to unit root test using the Phillip-Perron test and the Ordinary Least Square Regression analysis was conducted between the variables. Findings from the study revealed that residential real estate returns from Ikot Ekpene senatorial district had a complete hedge against both actual and unexpected inflation, while it indicated a perverse hedge against expected inflation. It was also found out that returns from residential properties in Uyo senatorial district indicated a zero hedge against all the components of inflation, while returns from residential real estate investment in Eket senatorial district indicated a perverse hedge against actual and unexpected inflation components as well as a partial hedge against the expected inflation during the study period. The

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investment information provided in this study has significant implications for both local and foreign investors desiring to invest in the Nigerian property market and it is a useful resource for Sub-Sahara African growth and development in this era.

Keywords: Returns, Inflation, Residential Real Estate, Investment, Akwa Ibom State.

Introduction

Residential real estate is very vital in the economic and physical development of towns and cities all over the globe. Investors decide to carry out investments in asset classes that can hedge against inflation. Rapid and continued decisions to invest in residential real estate are expected in cities with better property performance. Many authors have attested to the existence of undeniable link between inflation and returns of residential property. The inflation hedging potential of an investment has to do with the ability of investment returns to have a hedge against inflation (Ekpo, 2021). Extensive development of residential real estate has been a distinguishing feature of the 21st century in Akwa Ibom State especially from 2007 when the uncommon transformation agenda of the Godswill-Akpabio-led administration was unleashed with evidence of concentration of economic and administrative decision-making hubs in towns across the state. Since then, investors have taken advantage of investing in residential real estate within the state.

The successful operation of residential real estate investment requires a rational investor to always seek to protect the purchasing power of their investment fund from eroding. This is because during the period of inflation, certain real estate investments exhibit negative hedging capabilities thereby bringing down the purchasing power of such investments. On this note, there is need to evaluate the inflation hedging characteristics of an asset class before embarking on its investment. Inflation refers to a general increase in prices and fall in the purchasing power of money and it comprises actual, expected and unexpected inflation as noted by Dabara (2015). Generally, the Consumer Price Index (CPI) serves as the official measurement of actual inflation worldwide (Ekpo, *et al* 2022). In the same vein, the 90-days treasury bill rates, Livingstone Survey and Autoregressive Integrated Moving Average are often used as proxies for expected inflation (Oluwasegun and Dabara, 2013), while the expected inflation is determined by establishing the difference between actual and expected inflation (Terahni *et al*, 2012; Zhe, 2010). Shrewd investors should give careful consideration to the inflation-hedging capabilities of their residential real estate investments to avoid inflation eroding their real estate income streams. Akwa Ibom State is presented in this research as a state in a country with emerging real estate market where there is dearth of literature on the hedging abilities of residential real estate for prospective investors. Research in this field has been conducted in Nigeria, which primarily focused in Lagos, Ibadan, Abuja and Akure property markets. The present position concerning property investment in Akwa Ibom state is that how inflation affects returns of residential real estate has remained the key issues that practicing estate surveyors and valuers as well as the investors are yet to exploit fully. Ekpo

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and Jeremiah (2022), Ekpo *et al* (2022) as well as Dabara et al (2015) have all discussed on the relationship between inflation and returns of properties and their literature discussions have thrown up conflicting viewpoints as well as mixed results, which may be attributed to the different economic conditions prevalent in their respective study area. As a result of this, the researchers were challenged to carry out this research. Therefore, this research was aimed at ascertaining the inflation hedging abilities of residential real estate investment in Akwa Ibom State. To achieve the stated aim, the following objectives were set:

(i) To evaluate the average capital and average rental values in the study area.
(ii) To analyse the return profile of residential real estate in the study area.
(iii) To analyse the inflationary trend in the study area.
(iv) To establish the inflation-hedging potentials of residential real estate in the study area

Review of Related Literature

Terahni *et al* (2012) examined the short-term and long-term inflation hedging ability of residential real estate in Third world countries between 1980 and 2011. The monthly Digest of Statistics was used to extract the annual data series on inflation rate, common stock price and time deposit rate from the Third world countries, while the residential real property returns were obtained from the Third World countries property review in line with earlier studies. The authors employed the Consumer Price Index A (CPIA) as a proxy for actual inflation because of the fact that it comprises the smallest weight of private housing cost among all the series of Third World countries' Consumer Price Index using ARDL Cointegration Approach. The method used for the analysis was the cointegration model. The studies revealed that small and medium size residential property in Third World countries provided a complete hedge against inflation and that it performed better than large and luxurious residential properties, stock and time deposit. However, the study gave no consideration on both the expected and the unexpected components of inflation in the Third World countries. This present study, nevertheless, employs the three components of inflation in testing the inflation hedging potential of commercial real estate in Akwa Ibom State, thereby revealing the different reactions of investment returns to each of the three inflation components. This is based on the theory of regressing real estate returns on inflation developed by Fama and Schwert (1977).

Bello (2005) comparatively analysed the inflation hedging potentials of direct real estate investments and investments in ordinary shares and naira denominated deposits in Nigeria between 1996 and 2002. The Nigerian Consumer Price Index and three months treasury bill rates were used as proxies for actual inflation and expected inflation respectively. The study also deduced the unexpected inflation by finding the difference between the actual and expected inflation rates. Regression model was used in the analysis of data for the study. The study revealed that ordinary shares performed better than the Naira denominated time deposits within the study

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period, and the study concluded that real estate investment does not hedge against actual inflation. Neither the Augmented Dickey fuller test nor the Philip Perron's test was carried out in the study to check for the stationarity of the time series data. However, this current research has employed the Philip Perron's test in order to check for the stationarity of the data used for the analysis.

Odu (2011) investigated the relative hedging capabilities of prime commercial real estate (office spaces) in Lagos between 1999 and 2010. The study which aimed at empirically probing the inflation hedging potentials of commercial real estate in Lagos, employed the ordinary least square model as proposed by Fama and Schwert (1977) to regress the returns data against the actual, expected and unexpected inflation rates. The Nigerian Consumer Price Index was used as a proxy for actual inflation; the treasury bills rates were used as a proxy for expected inflation while the difference between the actual and expected inflation formed the basis for the unexpected inflation. The study found out that office spaces provided a perverse hedge against actual inflation around Victoria Island and Ikoyi; while it had a complete hedge against inflation within Ikeja and its environs.

Ekpo *et al* (2022) carried out research on expected inflation and returns of residential property investment in Phases 2 and 3, Abuja, Nigeria. The aim of the research was to examine the relationship between residential real estate investment returns and the expected inflation of the Nigerian economy, with a view to determining the inflation-hedging characteristics in Phase 2 and Phase 3, Abuja, Nigeria. The research work adopted the cross-sectional survey type of design to obtain data from Estate Surveyors and Valuers in the study area through questionnaire survey. This was subsequently translated to returns using the Holding Period Returns. Similarly, secondary data with respect to the 91-day Treasury bill rates (used as proxy for expected inflation) for the period between 2012 and 2021 were also collected from the Central Bank of Nigeria. The two groups of data obtained for the study were subjected to unit root test using the rule of thumb method and the Ordinary Least Square Regression analysis was conducted between the variables. The study found out that the returns in the districts of Phase 2 in Abuja indicated a complete hedge against inflation, while that of Phase 3 districts returned a perverse hedge against inflation. The study concluded that the residential property investments in Phase 2 of the Federal Capital Territory, Abuja, has the ability to hedge against inflation, while that of Phase 3 district has perverse inflation-hedging potentials.

Many studies in this field simply investigated the relationship between real estate investment returns and actual inflation in terms of the correlation coefficient between the two variables as found in the research carried out by Ekpo *et al* (2022) but this study followed the Fama & Schwert (1977) model. This model breaks inflation into three basic components (actual, expected and unexpected) thereby revealing the different reactions of investments returns to each of the three inflation components. However, the study improved on both the Fama & Schwert (1977) study as

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well as prior Nigerian studies by first testing for the stationarity properties of the data series using Phillip-Perron test for stationarity of data.

Research Methods

This research adopted the cross-sectional survey type of design. Stratified random sampling method was used to obtain data from the three (3) senatorial districts of the state. The research population comprised the Estate Surveyors and Valuers, who have offered their professional services in the study area for the past ten years. Data collection was from both primary and secondary sources. Both descriptive and inferential statistics were employed in this research. Primary data required for this study was obtained through questionnaire survey. The questionnaire was designed in such a way as to obtain information on the average capital and rental values of selected residential properties in the metropolitan areas of the 3 senatorial districts in the State. The residential properties sampled comprised majorly single 2-bedroom flats and the study period was between 2012 and 2021, which was subsequently computed to obtain the returns using Equation 1. The capital and rental values of residential properties in the study area were collected from branch managers who are all registered Estate Surveyors and Valuers through a total enumeration survey of seventy-eight (78) Estate Surveying and Valuation firms who have carried out professional services to their clients across the three senatorial districts. Each of the firms surveyed had an average of eighty-nine (89) residential properties in their management portfolios making an average total of 6,942 residential properties in the management portfolios of all the estate surveying firms in study area. However, every questionnaire was correctly filled by each branch manager and returned for analysis, representing 100% response rate and was used for the study.

Second, the valuation-based indices of the average rental and capital values for the 6,942 single 2-bedroom flats obtained from the Estate Surveying and Valuation firms were used to calculate the total returns from investments in the selected areas. The rental and capital values of investment in commercial properties were all computed accordingly to obtain their respective holding period returns using Equation 1.

The Holding Period Return is expressed as

$$r = \frac{Q_1 - Q_0 + a_1}{Q_0} \qquad \text{... Equation 1}$$

Where:
r = Holding Period Return
Q_0 = Capital value of commercial property at the beginning
Q_1 = Capital value of commercial property at the end
a_1 = Net Income of direct property received during the holding period

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Third, the secondary data on actual and expected inflations required for the study were obtained from the records of National Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN) respectively. In line with previous studies such as Bello (2005) and Ogunba *et al* (2013), the actual inflation rates were derived from the Nigerian Consumer Price Index (CPI) which was computed by the Nigerian National Bureau of Statistics. Similarly, the 91-day Treasury bill rates, which was used as a proxy for expected inflation was obtained from the records of the Central Bank of Nigeria, while the unexpected inflation was calculated as the difference between the actual and expected inflation. Furthermore, polynomial trend analysis was carried out using Microsoft Excel 2016 Version and presented graphically to display trends in the inflation components used for this study to help analyze problem of future predictions. The R-squared value was used to determine the reliability of the trend and the accuracy of the forecast or predictions made. A trend line is said to be most accurate when its R-Squared value is at or near 1. Similarly, polynomial regression equations were generated for prediction of inflation values.

Fourth, an initial test for the stationarity properties of the data sets (using the Philip-Perron unit root test) was undertaken. This was done using the (Eviews Version 8) statistical package This was important so as to avoid spurious results in subsequent analysis and to efficiently capture the long-run information or relationship of the data sets.

The Philip-Perron unit root test equation used is expressed as

$$\Delta Yt = \alpha + bYt\ \text{-}1 + \mathcal{E}t \qquad\qquad \textbf{…Equation 2}$$

Where:
$\mathcal{E}t$ is a zero-mean k-variate stationary time series process
α is a k-vector of drift parameters,
ΔYt is (trend) stationary.
The hypothesis is given by:
H_o: $\eth = 0$ (The variable has unit root)
H_1: $\eth \neq 0$

The decision rule for this analysis is that:

If t-statistic is greater than Phillip Perron's critical value, it means unit root exists. Alternatively, If the t-statistic is less than the Phillip Perron's critical value, unit root does not exist and it means we should reject the null hypothesis. The test confirmed that the data sets used in the study were all stationary data series. Finally, following the determination of the stationarity properties of the data sets, the dependent variable (returns) was regressed against the independent variables (actual, expected and unexpected inflation rates) employing the Fama and Schwert (1977) regression model in SPSS version 25.

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The regression equation is expressed as:

$$Rjt = \alpha j + \beta j E(\Delta t \mid \o t\text{-}1) + yj[\Delta t - E(\Delta t \mid \o t\text{-}1)] + \mathcal{E}jt \qquad \text{…Equation 3}$$

Where:

Rjt is the nominal return (could be measured in income return or capital return term) on real estate type j from period t-1 to t;

αj is the intercept term in the regression model, it reflects the real return on real estate type j from period t-1 to t;

βj is the slope coefficients for expected inflation for real estate type j with respect to income return or capital return;

E(Δt | øt-1) is best estimation of the expected value of inflation rate in time t Δt based on the information set available up to time t-1, denoted as *øt-1*;

Δt is the true value of observed inflation rate from period t-1 to t;

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

Δt - E(Δt | øt-1) is used to measure shocks after acknowledgement of true inflation rate *Δt*, or rather the unexpected or unanticipated inflation rate, which is known in time t;

Ɛjt is the error term for return of real estate type j from period t-1 to t.

The regression equation was further broken down into actual inflation, expected inflation and unexpected inflation components as income, capital and total returns reacted differently to different inflationary phenomenon. Thus,

The regression equation for actual inflation is given as:

$$Rt = \alpha + \beta \,[\text{Actual\_Inflation}(t)] \qquad \text{…Equation 4}$$

The regression equation for expected inflation is given as:

$$Rt = \alpha + \gamma \,[\text{Expected\_Inflation}(t)] \qquad \text{…Equation 5}$$

The regression equation for unexpected inflation is expressed as:

$$Rt = \alpha + \gamma \,(\text{Expected\_Inflation}) + \delta \,(\text{Actual\_Inflation} – \text{Expected\_Inflation})t \qquad \text{…Equation 6}$$

Where:

Rt is the mean nominal return on residential properties at time *t*; α is the intercept term in the regression model, which also reflects the real rate of return on the property asset;

β is the coefficient for actual inflation for the property asset, with respect to total return;

Actual_Inflation(t) is the observed inflation rate from period *t – 1* to *t*;

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γ is the coefficient for expected inflation

Expected_Income(t) is the expected inflation estimate for period *t*;

δ is the coefficient of unexpected inflation for the property asset with respect to total return;

(*Actual_Inflation – Expected_Inflation*)*t* is the unexpected inflation estimate for period *t*; *er* is an error term.

Decision Rule

An asset is considered a complete hedge against inflation if the value of β is not significantly less than 1 (between 1 and 0.5). An asset is a partial hedge against inflation if the value of β is significantly less than 1 (between 0.4 and 0.1). An asset has zero hedge against inflation if the value of β is not significantly different from zero. An asset has a perverse hedge against inflation if the value of β is negative.

Data Presentation and Analysis

This section presented the results from analysis of data obtained for the study and subsequently discusses the results accordingly. First, the respondents' profile was analyzed; second, the rental and capital values of residential property investments in the study area were presented and used to calculate the holding period returns obtained from the study area between 2012 and 2021. Third, the inflation trend in the study area within the study period was presented and analyzed accordingly. Fourth, the unit root test conducted was presented and discussed and finally, regression results which revealed the inflation-hedging characteristics of the selected residential property were accordingly presented and discussed in order to achieve the objectives of this research.

Analysis of the profile of respondents

In this section, an attempt was made to analyse the profile of the respondents in order to ascertain the reliability of the data obtained.

Table 1: Respondents' profile

Profile	Item	Frequency	Percentage
Educational Qualification	Doctor of Philosophy (PhD)	6	7.69
	Master of Science (MSc)	15	19.23
	Bachelor of Science (BSc)	52	66.67
	Higher National Diploma (HND)	5	6.41
	Total	**78**	**100**

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Professional	FNIVS	5	6.41
Qualification	ANIVS/RSV	61	78.21
	ANIVS	12	15.38
	Total	**78**	**100**
Years of	Above 20 years	3	3.85
Professional	15 – 19 years	7	8.97
Experience	10 – 14 years	8	10.26
	5 – 9 years	42	53.84
	1 – 4 years	18	23.08
	Total	**78**	**100**

Source: Researchers' field survey, 2022.

Table 1 presents the profile of respondents who supplied primary data on rental and capital values in terms of their educational qualifications, professional qualifications and years of professional practice as Estate Surveyors and Valuers. This was carried out in order to ascertain the validity and reliability of the data collected for the study. All the respondents were either polytechnic or university graduates with different categories of degree. The PhD holders formed 7.69% of the respondents; HND (Higher National Diploma) holders and MSc holders constituted 6.41% and 19.23% respectively while the BSc holders constituted 66.67% and formed the highest rate. This shows that all the respondents had good academic qualifications in the respective firms, which give more credence to the reliability of the data provided. In the same vein, all the respondents are in different membership cadre of the Nigerian Institution of Estate Surveyors and Valuers (NIESV), and most of them have professional experience of above 10 years. This showed that all the respondents are academically and professionally qualified to supply reliable data for this study.

Analysis of the average rental value, capital value and returns of 2-bedroom single unit residential investment in Uyo Senatorial District of Akwa Ibom State.

In order to tackle the first and second objectives of this research, an attempt was made to analyse the average rental and average capital values of residential properties in the study area from 2012 to 2021 and the subsequent determination of the holding period returns for residential properties in Uyo senatorial district, using Equation 1, and presented in Table 2.

Table 2: Average capital value, average rental value and returns in Uyo Senatorial District.

Year	Capital Value (₦)	**Rental** Value (₦)	**Rate of Returns**
2012	5,834,672.00	120,000.00	9.10
2013	6,187,281.00	120,000.00	8.10
2014	6,509,063.00	200,000.00	8.32
2015	6,790,369.00	200,000.00	7.51
2016	7,002,545.12	200,000.00	6.07
2017	7,316,250.45	250,000.00	8.05
2018	7,724,713.38	250,000.00	9.00

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Year			
2019	8,172,255.60	300,000.00	9.03
2020	8,703,374.71	300,000.00	10.17
2021	9,311,340.00	350,000.00	11.01

Source: Researchers' field survey, 2022.

As shown in Table 2, apart from a continuous increase in both the capital and rental values of the property from year to year, there is also a consistent increase in returns from year to year, except a decline which occurred in 2015 and 2016. This may not be unconnected with the global economic meltdown that traumatized every investment during that period The highest return, which is 11.01% from the residential properties was obtained in 2021; while the lowest return (6.07%) was obtained in the year 2016, which was the particular year that the global economic meltdown was felt in every sector of the economy.

Analysis of the average rental value, capital value and returns of residential investment (2-bedroom single unit) in Ikot Ekpene Senatorial District of Akwa Ibom State.

In this section, an attempt was made to analyse the average rental and average capital values of residential properties (mainly 2-bedroom single units) and the subsequent computation of the holding period returns in Ikot Ekpene senatorial district of Akwa Ibom State, from 2012 to 2021. It was presented in Table 3.

Table 3: Average capital value, average rental value and returns in Uyo Senatorial District.

Year	Capital Value (₦)	Rental Value (₦)	Rate of Returns
2012	4,440,572.00	85,000.00	7.90
2013	4,723,794.00	100,000.00	8.63
2014	5,001,298.00	150,000.00	9.05
2015	5,375,435.00	150,000.00	10.48
2016	5,703,849.00	150,000.00	8.90
2017	6,077,657.00	200,000.00	10.06
2018	6,598,468.00	200,000.00	11.86
2019	7,130,239.00	200,000.00	11.09
2020	7,766,475.01	280,000.00	12.85
2021	8,500,000.00	280,000.00	13.05

Source: Researchers' field survey, 2022.

Table 3 shows a continuous increase in both the capital and rental values of the property from year to year and also a consistent increase in returns from year to year, except 2016 which had a fall in the returns to 8.90%, but later returned to the yearly consistent rise in returns. The highest return, which is 13.05% from the residential properties was obtained in 2021. The fall in 2016 may not be unconnected with the irregular economic atmosphere that prevailed in the world then.

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Analysis of the average rental value, capital value and returns of residential investment (2-bedroom single unit) in Eket Senatorial District of Akwa Ibom State.

In this section, an attempt was made to analyse the average rental and average capital values of residential properties (mainly 2-bedroom single units) and the subsequent compilation of the holding period returns in Eket senatorial district of Akwa Ibom State, from 2012 to 2021 and presented in Table 4.

Table 4: Average capital value, average rental value and returns in Eket Senatorial District.

Year	Capital Value (₦)	Rental Value (₦)	Rate of Returns
2012	4,610,171.98	75,000.00	7.21
2013	4,870,226.00	100,000.00	7.81
2014	5,164,715.00	100,000.00	8.10
2015	5,501,232.00	150,000.00	9.42
2016	5,736,869.00	150,000.00	7.01
2017	6,056,056.00	200,000.00	9.05
2018	6,444,100.00	200,000.00	9.71
2019	6,907,843.00	250,000.00	11.08
2020	7,418,397.00	280,000.00	11.44
2021	8,000,000.00	280,000.00	11.61

Source: Researchers' field survey, 2022.

Table 4 shows a continuous increase in both the capital and rental values of the property from year to year and also a consistent increase in returns from year to year, except 2016 which had a fall in the returns to 7.01%, but later returned to the yearly consistent rise in returns. The highest return, which is 11.61% from the residential properties was obtained in 2021. The fall in 2016 may not be unconnected with the irregular economic atmosphere that prevailed in the world then.

In order to fulfil the second research objective, the actual and expected inflation rates were obtained from the records of the Central Bank of Nigeria (CBN) and analysed by finding the difference between them and presented as shown in Table 5.
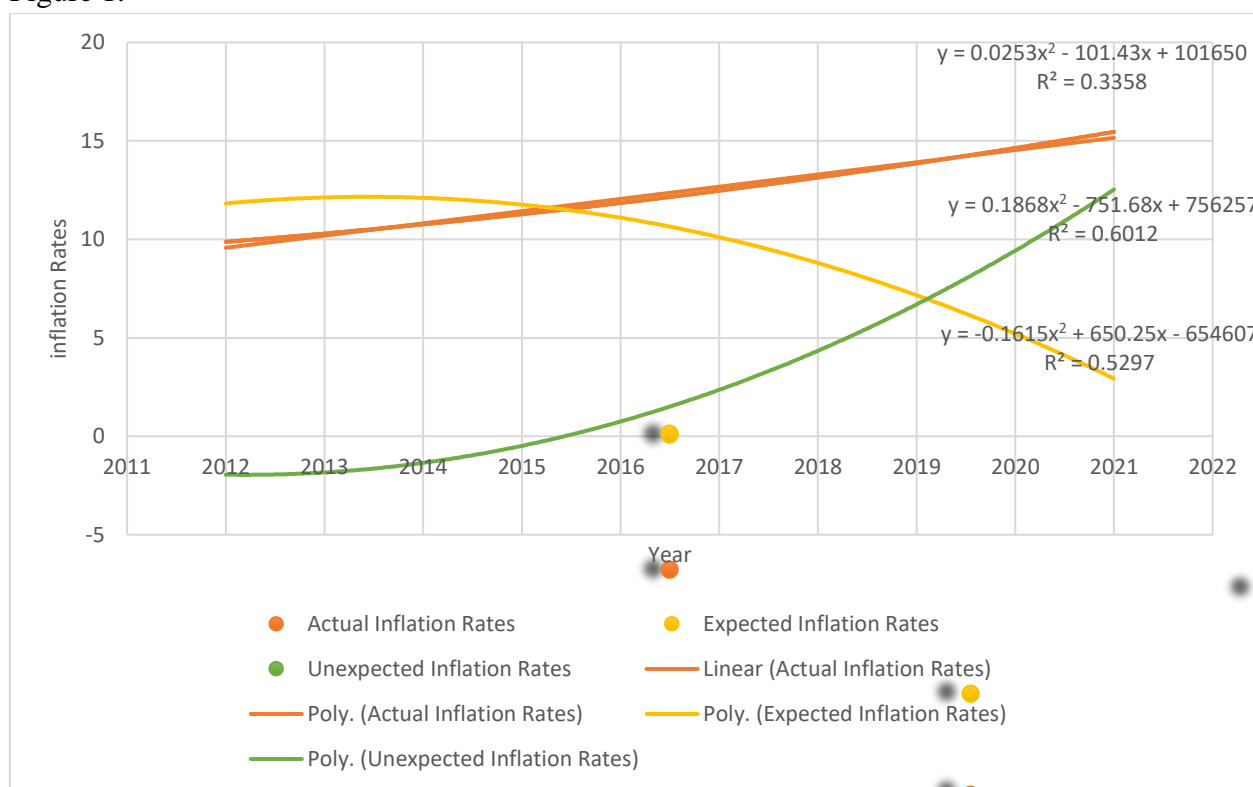
Table 5: Actual, Expected and Unexpected Inflation rates in Nigeria

Year	Actual Inflation Rates	Expected Inflation Rates	Unexpected Inflation Rates
2012	12.22	14.49	-2.27
2013	8.48	10.17	-1.69
2014	8.06	11.92	-3.86
2015	9.01	10.77	-1.76
2016	15.68	5.53	10.15
2017	16.52	13.60	2.92
2018	12.09	11.84	0.25

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2019	11.40	10.42	0.98
2020	13.25	2.39	10.86
2021	16.91	2.00	14.91

Source: Central Bank of Nigeria, 2022

Table 5 showed that throughout the study period, the actual inflation rates were in the single digits between 2013 and 2015, while the rest were in the double digits throughout the study period. The expected inflation had been in the double-digit range with the exception of 2016, 2020 and 2021. The unexpected inflation rates were observed to have negative values from 2012 to 2015. It was observed that all inflation rates were observed to have kept fluctuating indicating some inflation volatility in the study area. In order to analyse the inflation rates, it was graphically presented in Figure 1.

Figure 1: Graphical Illustration of Actual, Expected and Unexpected Inflation in Nigeria

Figure 1 shows the graphical trend in the three inflation components. The trend lines indicated a fluctuating rise in the actual and unexpected components of inflation from 2012 to 2021. The level of reliability of the trend and accuracy of the forecast as determined by the R^2 value for actual inflation was as low as 33.58%; while that of the expected inflation was 52.97% and the unexpected inflation indicated an R2 value of 60.12%. Similarly, the polynomial regression equations were displayed on the graph for the purpose of predictions or forecasts. Beyond the year of this research.

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An attempt was made to check the stationarity of all the categories of times series data used in the regression analysis so as to avoid the employment of spurious data in the analysis and the results were presented in Table 6.

Table 6: Phillip-Perron Unit Root Test for returns and inflation between 2012 and 2021

Unit root test	Eket returns	Uyo returns	Ikot Ekpene returns	Actual inflation	Expected inflation	Unexpected inflation
Phillip-Perron test statistic	-0.726667	-0.537085	-0.350382	-0.985012	-1.512331	-0.362278
1% critical value	-4.420595	-4.420595	-4.420595	-4.420595	-4.420595	-4.420595
5% critical value	-3.259808	-3.259808	-3.259808	-3.259808	-3.259808	-3.259808
10% critical value	-2.771129	-2.771129	-2.771129	-2.771129	-2.771129	-2.771129

Source: Analysis of survey data, 2022.

The computed Phillips-Perron test-statistics as seen in Table 6 are integrated of order I (1) and I (2). From Table 6, the computed Phillips-Perron test-statistic for both the returns and inflation series after first and second differencing accordingly were observed to be smaller than the critical values - "tau" at 10%, 5%, and 1% significant levels respectively. On this note, the null hypothesis for both returns and inflation series was rejected. Therefore, the data series are all stationary series at 10%, 5% and 1% significant levels. This suggests that the most appropriate model for further analysis of the data set in determining the hedging characteristics of the residential properties in question is a regression model.

From the foregoing, Equation 3, which expressed the Ordinary Least Square Regression as proposed by Fama & Schwert (1977) was used in the determination of the hedging characteristics of residential property investments in the study area between 2012 and 2021. Table 7 presents the result of regressing the residential investment returns (holding period returns) against actual inflation rates in the study area using Equations 4.

Table 7: Summary statistics of the relationship between returns and actual inflation

	Standardized Coefficients Beta	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept		8.097545	0.586666	0.578816	-15.0634	24.56454
Returns_IK	1.146	1.930824	1.074155	0.324041	-2.65055	6.79856
Returns_Uyo	0.070	1.272693	0.129566	0.901144	-2.94927	3.279064
Returns_Eket	-0.876	2.218292	-0.74882	0.482276	-7.08908	3.766857

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Regression Statistics	
Multiple R	0.464086
R Square	0.215376
Adjusted R Square	-0.17694
Durbin-Watson statistic	1.782

Source: Researchers' analysis

Table 7 shows the inflation-hedging characteristics of residential property investment in the study area vis-à-vis the actual inflation. It shows the R^2 value to be 0.2154, while the standardized beta coefficients for returns from Ikot Ekpene, Uyo and Eket senatorial districts were 1.146, 0.070 and -0.876 respectively. However, the Durbin-Watson statistic was found to be 1.782

An attempt was also made to present the result of regressing the residential investment returns (holding period returns) against the expected inflation component in the study area using Equations 5 and the results presented in Table 8.

Table 8: Summary statistics of the relationship between returns and expected inflation

	Standardized Coefficients Beta	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept		9.352875	2.735275	0.033948	2.697029	48.46835
Returns_IK	-1.183	2.230152	-1.30977	0.238185	-8.37797	2.535997
Returns_Uyo	0.003	1.469993	0.006425	0.995082	-3.5875	3.606388
Returns_Eket	0.584	2.562185	0.590633	0.576322	-4.75613	7.782753
Regression Statistics						
Multiple R	0.662046					
R Square	0.438305					
Adjusted R Square	0.157458					
Durbin-Watson statistic	1.761					

Source: Researchers' analysis, 2022.

Table 8 shows the inflation-hedging characteristics of residential property investment in the study area vis-à-vis the expected inflation. It shows the R^2 value to be 0.4383, while the standardized beta coefficients for returns from Ikot Ekpene, Uyo and Eket senatorial districts were -1.183, 0.003 and 0.584 respectively, with a Durbin-Watson statistic value of 1.742.

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Table 9: Summary statistics of the relationship between returns and unexpected inflation

	Standardized Coefficients Beta	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept		13.60863	-1.5308	0.176696	-54.1312	12.46698
Returns_IK	1.374	3.244917	1.539328	0.174649	-2.94503	12.93502
Returns_Uyo	0.033	2.138871	0.07268	0.944423	-5.07817	5.389081
Returns_Eket	-0.833	3.728033	-0.8515	0.427163	-12.2966	5.947747

Regression Statistics	
Multiple R	0.671515
R Square	0.450932
Adjusted R Square	0.176398
Durbin-Watson statistic	1.903

Source: Researchers' analysis, 2022

Table 9 shows the inflation-hedging characteristics of residential property investment in the study area vis-à-vis the unexpected inflation. It shows the R^2 value to be 0.4509, while the standardized beta coefficients for returns from Ikot Ekpene, Uyo and Eket senatorial districts were 1.374, 0.033 and -0.833 respectively, with a Durbin-Watson statistic value of 1.903

Discussion of Findings

The study revealed a consistent rise in the capital and rental values in the study area. The highest average rental value, which was ₦350,000.00 per annum was observed in Uyo senatorial district in 2021, while the lowest average rental value of ₦280,000.00 per annum was observed same year in both Ikot Ekpene and Eket senatorial districts. The study also revealed that the highest average capital value was observed to be ₦9,311,340.00 from Uyo senatorial district in 2021, while the average capital value was ₦4,610,171.98 from Eket senatorial district. Nevertheless, the highest return of 13.05% was observed in Ikot Ekpene senatorial district in 2021 while the lowest return (6.07%) was observed from Uyo senatorial district in 2016. This implies that the global economic meltdown that crippled almost every sector of the economy in 2016, also affected the real estate sector.

Moreover, findings from the study revealed that residential real estate returns from Ikot Ekpene senatorial district had a complete hedge against both actual and unexpected inflation, while it indicated a perverse hedge against expected inflation. It was also found out that returns from residential properties in Uyo senatorial district indicated a zero hedge against all the components of inflation, while returns from residential real estate investment in Eket senatorial district indicated a perverse hedge against actual and unexpected inflation components as well as a partial

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hedge against the expected inflation during the study period. This result of this research is in congruent with the studies carried out by Dabara *et al* (2015) and Ekpo *et al* (2022).

Conclusion

This study was carried out to ascertain the inflation hedging abilities of residential real estate in the three senatorial districts of Akwa Ibom State of Nigeria. the objectives were to evaluate the returns of residential real estate, mainly two-bedroom flat (single unit) as well as to determine the unexpected inflation rates in the study area. The research adopted the cross-sectional survey type of design. The research population comprised the Estate Surveyors and Valuers, who have offered their professional services in the study area for the past ten years. Data collection was from both primary and secondary sources. Both descriptive and inferential statistics were employed in this research. Although this research found out the highest average rental and capital values to be in Uyo senatorial district, it returned a zero hedge against inflation. On this note, the research concluded that it is rather more viable to invest in Ikot Ekpene senatorial district because the returns from the senatorial district indicated a complete hedge against the actual and unexpected components of inflation. It is recommended that similar research be carried out to ascertain the inflation hedging capabilities of other classes of real estate such as the commercial, recreational as well as the industrial real estate classes. This research has contributed a lot to knowledge by bringing in useful tools in other fields like the operational research, statistics, among others to explain and analyse the performance of residential real estate business for the purpose of making informed decisions.

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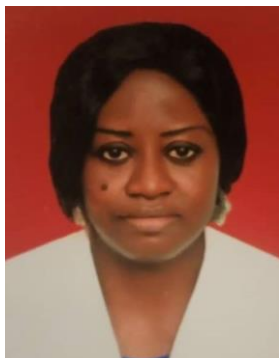
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