RESEARCH ARTICLE OPEN ACCESS

Assessment of the Effects of Macroeconomic Variables on Real Property Investment Returns in Onitsha, Anambra State (2011 to 2020)

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Abstract:

Real property investment is capital intensive despite its numerous pecuniary and non-pecuniary benefits. Investors ought to have a proper guide or knowledge on how the performance of the general economy as indicated by macroeconomic variables influence the performance of their real property investment. Hence, this research assesses the effects of macroeconomic variables on residential and commercial real property investment returns in Onitsha Anambra State, Nigeria. The research methodology adopted was survey research design. The population of the study includes Estate Surveying and Valuation Firms practicing in Onitsha who provided primary data from the analysis of their letting and sales transactions. Secondary data on the selected macroeconomic variables were sourced from the CBN, NBS and World Bank. Data collected were analyzed and presented with tables and Multiple Regression Analysis. Also, ADF Stationarity tests were employed to determine the extent of stationarity of the time series data employed for this study. The study showed that macroeconomic variables accounted for 9.4%-72.7%, 2.9%-86.3% and 14.6%-60.0% variation in returns from the two bedroom, three bedroom and detached house residential property markets respectively, while macroeconomic variables accounted for 33.2%-53.4%, 33.0%-61.8%, 43.1%-77.3% and 31.7%-83.5% variations in returns from shops in Main Market, Ose Market, Bridge Head Market and Ochanja Market respectively as the various commercial property markets. However, the study concluded that macroeconomic variables have minimal influence on residential and commercial property investment returns considering that only few locations/zones across the property markets were significantly influenced by some of the selected macroeconomic variables.

Keywords **—Effect, Macroeconomic variables, Real Property, Investment Returns, Onitsha.**

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1.0INTRODUCTION

The distinctive nature of real estate has made it an attractive investment for many investors because among its numerous benefits, it provides a hedge against inflation and is also suitable for portfolio diversification (Peyton, Park and Lotito, 2008). Investment in real property market offers a lot of alternative investment opportunities. These alternatives could be in terms of diversification across location or diversification across different property types. Residential and commercial real estate investments are the most predominant types of real estate investment in most urban centers. The reason could be attributed

to the high demand for residential and commercial properties in cities.Real estate investment is usually capital intensive and hence there is need for investors to be aware of the likely outcome of whatever real estate investment they want to embark on (Okonu, Umeh, Akinwande and Muraina, 2019). National/regional macroeconomic trends and government policies have been established to influence demand potential in the local property market. Macroeconomic variables have been found to have an effect on real property investment returns (Anwar, Agwu and Nnametu, 2015). Macroeconomic variables are indicators or main signposts, which signals the current trend in the economy. They have no direct link or contact with the investment but influence the behaviour of such investment (Ezeokoli, Komolafe and Olukolajo, 2019).

Nigeria has a very fluctuating macroeconomic statistics which is a reflection of its unstable economy (Udoekanem, Ighalo and Nuhu, 2014). Onitsha as a commercial city has a busy property market due to the constant demand for commercial, residential and other types of properties. Therefore there is need for a periodic study of the effect of macroeconomic variables on residential and commercial property returns in Onitsha considering that these two types of property are mostly in demand in Onitsha property market.

Furthermore, most investors focus on the rental returns and capital appreciation from real estate investment without considering various forces that may affect the security of returns. Considering the volatile nature of the Nigerian economy, real property investors need to know the effect of the economy on their returns.

Also, considering the unique nature of real property investment in terms of its location characteristics, various studies conducted on the effect of macroeconomic variables on real property returns across various locations both nationally and internationally, have brought about different observations and mixed results. Hence, the need for this research.

2.0 LITERATURE REVIEW

Brooks and Tsolacos (1999) were one of the early researchers of the effect macroeconomic variables have on real property investment in the United Kingdom. Their study employed the vector autoregressive model to investigate the impact of macroeconomic and financial variables on United Kingdom real estate return series. The results indicated that unexpected inflation, and the interest rate term spread have explanatory power on the property market. Findings of the research also showed that the most significant influence on the real estate series are the lagged values of the real estate series themselves.

Also, Kofoed-Phil (2009) studied the influence of changes in the macro economy on commercial real estate market in the United States. The research developed an error correction regression model which was adopted in analyzing the macroeconomic determinants of the quarterly real estate total returns from 1984-2008. In other to address the smoothness problem of appraisal-based returns, the study applied the Massachusetts Institute of Technology's unsmoothed transaction-based return index to the regression model. The study also discovered that unemployment and long term interest rate are negatively influencing the total return of the US real estate market, while the gross domestic product over time heavily influences the total return positively. Inflation was found not to have any significant influence on the returns.

Likewise, Gaspareniene, Remeikiene and Skuka (2016) studied the impact macroeconomic factors have on housing price level in Lithuania over the period of 2008–2015. The results of the research revealed significant interdependence between aggregation of the major macroeconomic factors and the average annual housing price level in Lithuania over the researched period. The study revealed that Interest rate and availability of bank loans have the most significant impact on housing price level in the study area. Their findings agrees with that of Brooks and Tsolacos (1999), and Kofoed-Phil (2009) with regards to effect of interest rate on real property investment.

Grum and Govekar (2016) used the multiple linear regression model to investigate whether the observed microeconomic variables of unemployment rate, the current account of the country stock index, gross domestic product and industrial production are significantly associated with property prices in relation to the different cultural environments; Slovenia, Greece, France, Poland and Norway. The study discovered that there is a correlation between the prices of residential real estate and the selected macroeconomic variables. The result of the study indicated that a distinct pattern applies to France, Greece, Norway and Poland, where the prices of real estate observed is significantly associated with unemployment. It also indicated a significant relationship between real estate prices and share index in Slovenia.

Renigier-Bilozor and Wisniewski (2013) examined the influence of selected 14 macroeconomic independent variables (Gross Domestic Product, Harmonized Unemployment Rate, Consumer Price Index, Population Growth and so on) on Residential Property Prices Index (dependent variable) across different European countries, paying particular attention to Italy and Poland. The study adopted a rough set theory and an approach that uses a committee of artificial neural networks. Quarterly time series data constituted the material for testing and empirical results. The developed models showed that the economic and financial situation of European countries affects residential property markets.

On the other hand, in the aspect of indirect investments Dhony, Sri and Ahmad (2019) carried out a study on the effect of bond characteristics and macroeconomic factors on the return of corporate bonds in the sector of property, real estate and building construction in Indonesia from 2013-2016. They carried out their research using panel data regression techniques. Their result indicated that macroeconomic variables such as inflation and interest rate have negative effect on bond returns in the property, real estate, and building construction sector. It also indicated that other macroeconomic variables such as exchange rate and Indeks Harga Saham Gabungan (IHSG) that is, composite share price index have no effect on bond returns.

Adekunle, Alalade and Okulenu (2016) carried out a study on the effect of macroeconomic variables such as interest rate, inflation rate, and exchange rate on Nigeria's capital market growth from 1985-2013. Multiple regression was adopted in the analysis. Findings of the study revealed that interest rates have an adverse effect on capital market growth while, Inflation rate and exchange rate are not significant, especially at the 5 percent level of significance.

Likewise, John (2019) examined the effect of macroeconomic variables (such as money supply, interest rate, exchange rate and inflation rate) on stock market performance in Nigeria using annual time series data from 1981-2016. The research was conducted with analysis tools such as Augmented Dickey-Fuller (ADF), Ordinary Least Square (OLS) regression, Cointegration, Grandger Casualty test. The study showed that money supply and interest rate are the main factorsinfluencing stock market performance in Nigeria because they exhibited a significant effect on stock market performance. Whereas, exchange rate and inflation rate indicated a weak (non-significant) effect on stock market performance. His findings was in tandem with that of Adekunle *et al.* (2016).

In Kenya, Juma (2014) examined the effect of macroeconomic variables on growth in real estate investment using secondary data on annual real estate investments growth and on selected macroeconomic variables (Exchange Rate, average annual growth in Diaspora Remittances, average annual growth in Money Supply, average annual Inflation Rate and average annual GDP growth) obtained from Central Bank of Kenya (CBK) and Kenya National Bureau of Statistics (KNBS) for the period of 2000-2013. The study adopted regression analysis and established that a strong positive relationship exist between the macroeconomic variables and real estate investment growth. Also, the study concluded that growth in exchange rate, diaspora remittances, money in circulation, inflation rate, and real GDP growth do not

individually influence the growth in real estate investment in the country, but the combination effect of the change of the macroeconomic variables do influence real estate growth.

Also, Gathuru (2014) studied the effect of macroeconomic variables on the value of residential real estate supplied in Kenya from 2009 to 2013. The researcher adopted a multivariate regression model in testing the relationship between residential real estate prices and various macroeconomic variables such as Inflation rate, GDP rate, Employment growth rate, Population Growth rate, Cost of Construction and Percentage of debt financing. Findings showed that there were positive relationships with GDP and value of real estates supplied, being the most significant, followed by Inflation, Cost of construction and Percentage of debt financing.

In Nigeria, Ojetunde (2013) studied the interaction between the Nigerian residential property market and the macroeconomy. The study adopted Pairwise correlations, Cointegration, Granger Causality and Vector autoregression in the analysis of data. The study showed that the response of the residential property market to macroeconomic shocks of interest rate, real GDP, and exchange rate implies a relatively slow adjustment of the property market to the ever changing macroeconomic events in Nigeria making long run equilibrium elusive.

Also, Udoekanem *et al.* (2014) studied the determinants of commercial property market in Minna, Nigeria for the period of 2001 to 2012. The study used primary data (office rental levels and office space) and secondary data (macroeconomic variables mainly). Their study concluded that real GDP and vacancy rate are the major determinants of rental growth in the office market in Minna.

Olowofeso and Oyetunji (2016) examined the effects of some selected macroeconomic variables (Mortgage interest rate, Exchange rate, GDP and Inflation rate) on residential property prices in Lagos, Nigeria. The study adopted the semi-log form of regression equation model to establish the relationship between the selected macroeconomic variables and property prices. Their findings indicated that fluctuations in macroeconomic variables lead to corresponding change in the price of residential property.

Wahab *et al.* (2017) examined the effect of macroeconomic variables on residential property returns in Abuja from 2001-2015. They adopted Augmented Dicker Fuller (ADF) test and cointegration test to analyse time-series data on annual macroeconomic indices and total return index. The result of cointegration test indicated the existence of long run relationship between macroeconomic variables and residential property returns.

Akali, Sipan and Razali (2018) examined the relationship between real estate residential price and macroeconomic variables in Nigeria. The study reviewed previous literatures concerning macroeconomy and real estate residential prices and identified GDP, inflation rate, exchange rate, interest rate and crude oil price as the major determinants of real estate price in Nigeria.

However, Akali, Sipan and Razali (2019) carried out a quantitative study of the impact of macroeconomic variables on real estate price forecasting modelling in Abuja, Nigeria using the family of Box-Jenkins ARIMA models. The study revealed that macroeconomic variables (consumer price index, crude oil price, exchange rate, GDP, interest rate and household income) has significant positive impact on real estate residential price forecasting model of 2 bedroom, 3 bedroom and 5 bedroom flat while they have strong negative impact on the price forecasting model of 4 bedroom flat.

Ezeokoli *et al.* (2019) carried out a study on the influence of some selected macroeconomic variables on returns from event centres in Akure, Nigeria from 2005-2014. Coefficient of determination (R^2) employed in the study established that the considered macroeconomic variables account for 97.5% of the variation in returns from event centres. Also, the regression coefficient reveals that inflation rate and exchange rate have significant effects on returns from event centres.

Recently, Ekwebelem and Emoh (2020) examined the effects of macroeconomic variables on residential property investment performance in Abuja metropolis, Nigeria. The study covered a period of 2001 to

2015. Single equation regression model was employed to examine the influence of the selected macroeconomic variables on property returns and the study concluded that macroeconomic policy has significant effect in Abuja residential market. Their findings shows a contrast between the effect macroeconomic variables (particularly, inflation rate and exchange rate) have on real property market and on the capital market. While the studies by Adekunle et. al (2016) and John (2019) indicated that inflation rate and exchange rate have no significant effect on the capital market performance, studies by Ezeokoli *et al.* (2019) and Ekwebelem and Emoh (2020) showed that inflation rate and exchange rate have significant effect on the property market.

Numerous studies have examined the impact of macroeconomic variables on capital asset investment returns (Adekunle *et al.*, 2016; Khan and Khan, 2018; John, 2019; Dhony, Sri and Ahmad, 2019; Celebi and Hönig, 2019; Kalam, 2020). This is because data on stock prices and returns (dividends) are easily obtainable from the stock exchange market unlike property, where data is not readily available especially in developing countries like Nigeria.

Also, earlier studies have concentrated on developed countries in Europe and countries like the United State of America (Hartzell, Hekman and Miles, 1987; McCue and Kling, 1994; Ling and Naranjo, 1997; Brooks and Tsolacos, 1999). This could be attributed to the developed nature of their property market with good property databank. In recent times we have had similar studies in Asia (Fang, Chang, Lee and Chen, 2016; Trofimov, Aris and Xuan, 2018) and Africa; Nigeria and Kenya precisely (Ojetunde, 2013; Gathuru, 2014; Juma, 2014; Olowofeso and Oyetunji, 2016; Wahab *et al*, 2017; Olatunji *et al*, 2017; Alkali *et al.*, 2019; Ezeokoli *et al*., 2019; Ekwebelem and Emoh, 2020). These geographical variations across studies have brought about different observations hence, mixed results.

In Nigeria, previous studies have established that there is a nexus between the wider economy and the property market, but these studies adopted Abuja, Lagos, Minna and Akure as their study areas and concentrated on residential property investment returns. It is against this backdrop that this research seeks to determine the effect of macroeconomic variables on residential and commercial property investment returns in Onitsha, Anambra State.

3.0 RESEARCH METHODOLOGY

The study adopted both primary and secondary data. The primary data for the study comprised rental and capital values from registered estate surveying and valuation firms in Onitsha between 2011 and 2020 which were collected through the structured questionnaires. The secondary data comprised of macroeconomic indices from Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and the World Bank between 2011 and 2020. The macroeconomic indices employed for the study were identified from the literature which includes Real Gross Domestic Product (RealGDP), Inflation Rate, Interest Rate and Exchange rate. The total number of registered Estate Surveying and Valuation firms practicing in Onitsha is Twenty Four (24) as obtained from the Secretariat of the Nigeria Institution of Estate Surveyors and Valuers (NIESV) Anambra State Branch. The population is manageable thus attempt was made to reach out to the entire population of the study in order to achieve a general view about the required data for the study. However, Twenty-Three (23) Estate Surveying and Valuation Firms were successfully accessed and Six Hundred and Fifty One (651) letting and sales transactions were effectively retrieved fromTwenty One (21) firms.The study utilizes both descriptive and inferential method of data analysis. Descriptive analysis involves determination of annual rate of totalreturn of residential and commercial property investments upon which the influence of macroeconomic variables is established. The capital and rental values collected were converted to Rate of Total Returns (RTR) using the formula below:

$$\text{Rate of } TotalReturn = \frac{(CV_t - CV_{t-1}) + NI}{CV_{t-1}} \; X \; 100$$

Where: CVt is capital value at end of the year
CVt-1 is the capital value at the beginning of the year
NI represents net income or rental value

The inferential method required the use of stationarity test adopting Augmented Dicker Fuller (ADF) and multiple regression analysis.

4.0 RESULT AND DISCUSSION

Augmented Dicky-Fuller (ADF) Unit Root Test was carried out in order to examine the stationarity of a set of time series data and then, multiple regression analysis was used to examine the level of influence and significance the selected macroeconomic data (independent variable) has on the RTR from a particular property market (dependent variable).

Augmented Dicky-Fuller (ADF) Unit Root Test

Hypothesis
H_0: There is no unit root in the series.
H_1: There is unit root in the series.

Decision Rule: We shall reject the null hypothesis if the p-value is less than the alpha (0.05), otherwise we will not.

The above stated hypothesis was used in making decision in all subsequent ADF Unit Root Tests

TABLE I
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from 2BR Flat in American Quarters	0.0087	0.0064	level
Selected Macroeconomic Variables and RTR from 2BR Flat in Omogba Phase 1	0.0097	0.0070	level
Selected Macroeconomic Variables and RTR from 2BR Flat in Omogba Phase 2	0.0109	0.0078	level
Selected Macroeconomic Variables and RTR from 2BR Flat in In-land Town	0.0128	0.0089	level
Selected Macroeconomic Variables and RTR from 2BR Flat in Odoakpu	0.0004	0.0009	level
Selected Macroeconomic Variables and RTR from 2BR Flat in Fegge	0.0064	0.0050	level
Selected Macroeconomic Variables and RTR from 2BR Flat in Woliwo	0.0138	0.0095	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 2
RESULT OF REGRESSION ANALYSIS FOR 2 BEDROOM FLAT (2BR) PROPERTY MARKET IN ONITSHA

Markets (2B/R)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
American Quarters	Intercept	-0.218	42.237	-0.005	0.996	**0.094**
	Real GDP	3.956E-011	0.000	0.542	0.611	
	Inflation	0.383	1.278	0.300	0.776	
	Interest	-0.638	0.996	-0.641	0.550	
	Exchange	-0.009	0.027	-0.329	0.756	
Omagba Phase 1	Intercept	84.916	59.587	1.425	0.213	**0.438**
	Real GDP	-5.706E-011	0.000	-0.554	0.604	
	Inflation	-1.684	1.804	-0.934	0.393	
	Interest	-1.154	1.405	-0.822	0.449	
	Exchange	-0.055	0.038	-1.434	0.211	
Omagba Phase 2	Intercept	92.067	49.269	1.869	0.121	**0.562**
	Real GDP	-6.731E-011	0.000	-0.790	0.465	
	Inflation	-1.719	1.491	-1.153	0.301	
	Interest	-1.228	1.161	-1.058	0.339	
	Exchange	-0.060	0.032	-1.902	0.116	
Inland Town	Intercept	-10.086	64.477	-0.156	0.882	**0.113**
	Real GDP	6.438E-011	.000	0.578	0.589	
	Inflation	.554	1.952	0.284	0.788	
	Interest	-.821	1.520	-0.540	0.612	
	Exchange	-.021	.041	-0.519	0.626	
Odoakpu	Intercept	-72.552	38.233	-1.898	0.116	**0.672**
	Real GDP	1.754E-010	0.000	2.653	0.045	
	Inflation	2.823	1.157	2.440	0.059	
	Interest	-1.241	0.901	-1.377	0.227	
	Exchange	-0.047	0.025	-1.928	0.112	
Fegge	Intercept	20.963	26.190	0.800	0.460	**0.727**
	Real GDP	3.942E-011	0.000	0.871	0.424	
	Inflation	0.081	0.793	0.102	0.923	
	Interest	-1.434	0.617	-2.323	0.068	
	Exchange	-0.055	0.017	-3.261	0.022	
Woliwo	Intercept	13.232	39.349	0.336	0.750	**0.252**
	Real GDP	2.123E-011	0.000	0.312	0.768	
	Inflation	0.496	1.191	0.417	0.694	
	Interest	-0.656	0.928	-0.707	0.511	
	Exchange	-0.032	0.025	-1.253	0.266	

The result of regression analysis presented in Table 2 showed the influence of macroeconomic variables on residential property returns. In American Quarters 9.4% variation in 2BR residential property investment return are influenced by macroeconomic variables, but the influence is insignificant because the P-values are greater than 0.05. In Omagba Phase 1 and Omagba Phase 2, 43.8% and 56.2% variation in

2BR residential property investment returns are influenced by macroeconomic variables respectively, but the influence is insignificant because the P-values are greater than 0.05. In Inland Town 11.3% variation in 2BR residential property investment return are influenced by macroeconomic variables and the influence is also insignificant. In Odoakpu, Fegge and Woliwo 67.2%, 72.7% and 25.2% variations in return from 2BR residential property investment are influenced by macroeconomic variables respectively.

However, in the entire 2BR flat residential market, Real GDP had significant influence on returns from 2BR flat residential property investment in Odoakpu (with P-value of 0.045) and Exchange rate had significant influence on returns from 2BR flat residential property investment in Fegge (with P-value of 0.022). It implies that an increase in real GDP by 1% increases return from 2BR flat in Odoakpu by 1.75%. Likewise, an increase in Exchange rate by 1% leads to a decrease in return from 2BR flat in Fegge by 0.055%.

TABLE 3
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES
(3 BEDROOM FLAT PROPERTY MARKET IN ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from 3BR Flat in American Quarters	0.0196	0.0133	level
Selected Macroeconomic Variables and RTR from 3BR Flat in Omogba Phase 1	0.0323	0.0234	level
Selected Macroeconomic Variables and RTR from 3BR Flat in Omogba Phase 2	0.0021	0.0023	level
Selected Macroeconomic Variables and RTR from 3BR Flat in In-land Town	0.0089	0.0066	level
Selected Macroeconomic Variables and RTR from 3BR Flat in Odoakpu	0.0022	0.0024	level
Selected Macroeconomic Variables and RTR from 3BR Flat in Fegge	0.0029	0.0028	level
Selected Macroeconomic Variables and RTR from 3BR Flat in Woliwo	0.0036	0.0033	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 4
RESULT OF REGRESSION ANALYSIS FOR 3 BEDROOM FLATS IN ONITSHA

Markets (3B/R)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
American Quarters	Intercept	-22.984	42.899	-0.536	0.615	**0.272**
	Real GDP	8.465E-011	0.000	1.141	0.305	
	Inflation	0.968	1.298	0.745	0.490	
	Interest	-0.995	1.011	-0.984	0.370	
	Exchange	-0.022	0.028	-0.788	0.467	
Omagba Phase 1	Intercept	-40.107	36.715	-1.092	0.324	**0.493**
	Real GDP	1.144E-010	0.000	1.803	0.131	
	Inflation	1.650	1.111	1.485	0.198	
	Interest	-1.082	0.865	-1.250	0.267	
	Exchange	-0.033	0.024	-1.407	0.218	
Omagba Phase 2	Intercept	-37.637	37.982	-0.991	0.367	**0.466**
	Real GDP	1.124E-010	0.000	1.711	0.148	
	Inflation	1.514	1.150	1.317	0.245	
	Interest	-1.119	0.895	-1.250	0.267	
	Exchange	-0.032	0.024	-1.330	0.241	
Inland Town	Intercept	-35.967	18.026	-1.995	0.103	**0.831**
	Real GDP	1.247E-010	0.000	4.000	0.010	
	Inflation	1.095	0.546	2.008	0.101	
	Interest	-1.787	0.425	-4.205	0.008	
	Exchange	-0.028	0.012	-2.395	0.062	
Odoakpo	Intercept	-33.623	13.796	-2.437	0.059	**0.863**
	Real GDP	1.075E-010	0.000	4.509	0.006	
	Inflation	1.451	0.418	3.476	0.018	
	Interest	-1.228	0.325	-3.778	0.013	
	Exchange	-0.032	0.009	-3.563	0.016	
Fegge	Intercept	-48.960	18.412	-2.659	0.045	**0.734**
	Real GDP	1.175E-010	0.000	3.691	0.014	
	Inflation	1.480	0.557	2.656	0.045	
	Interest	-0.797	0.434	-1.836	0.126	
	Exchange	-0.005	0.012	-0.428	0.686	
Woliwo	Intercept	14.575	29.568	0.493	0.643	**0.029**
	Real GDP	-5.897E-012	0.000	-0.115	0.913	
	Inflation	0.085	0.895	0.095	0.928	
	Interest	0.103	0.697	0.147	0.889	
	Exchange	-0.005	0.019	-0.281	0.790	

The result of regression analysis presented in Table 4 showed the influence of macroeconomic variables on residential property returns. In American Quarters 27.2% variation in 3BR residential property investment returns are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05

In Omagba Phase 1 and Omagba Phase 2, 49.3% and 46.6% variation in 3BR residential property investment returns are influenced by macroeconomic variables respectively but the influence is insignificant because the P-values are greater than 0.05.

In Inland Town 83.1% variation in 3BR residential property investment returns are influenced by macroeconomic variables. However, only real GDP and Interest rate had significant influence on 3BR flat residential property investment returns in Inland Town with P-values at 0.01 and 0.008 respectively. This implies that 1% increase in real GDP will result in 1.25% increase in RTR from 3BR flat in Inland Town. Likewise, 1% increase in Interest rate will result in 1.79% decrease in RTR from 3BR flat in Inland Town.

In Odoakpu 86.3% variation in 3BR residential property investment returns are influenced by macroeconomic variables. All the selected macroeconomic variables had significant influence on 3BR flat residential property investment returns. Real GDP, Inflation rate, Interest rate and Exchange rate all had significant influence at 0.006, 0.018, 0.013 and 0.016 P-values respectively. This implies that 1% increase in Real GDP will result in 1.08% increase in RTR from 3BR flat in Odoakpu. Likewise, 1% increase in Inflation rate will lead to 1.45% increase in RTR from 3BR flat in Odoakpu. 1% increase in Interest rate will result in 1.23% decrease in RTR from 3BR flat in Odoakpu. Also, 1% increase in Exchange rate will lead to 0.032% decrease in RTR from 3BR flat in Odoakpu.

In Fegge 73.4% variation in 3BR residential property investment returns are influenced by macroeconomic variables. However, only real GDP and Inflation rate had significant influence on 3BR flat residential property investment returns in Fegge with P-values at 0.014 and 0.45 respectively. This implies that 1% increase in real GDP will result in 1.18% increase in RTR from 3BR flat in Fegge. Likewise, 1% increase in Inflation rate will result in 1.48% increase in RTR from 3BR flat in Fegge.

In Woliwo there is a very weak regression, 2.9% variation in 3BR residential property investment returns are influenced by macroeconomic variables but the influence is very insignificant because the P-values are much greater than 0.05.

TABLE 5
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES
(DETACHED HOUSES MARKET IN ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from Detached House in Main GRA	0.0428	0.0345	level
Selected Macroeconomic Variables and RTR from Detached House in Akpaka GRA	0.0002	0.0005	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 6
RESULT OF REGRESSION ANALYSIS FOR DETACHED HOUSE IN ONITSHA

Markets (Detached House)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
Main GRA	Intercept	-11.652	28.112	-0.414	0.696	**0.146**
	Real GDP	3.946E-011	0.000	0.812	0.454	
	Inflation	0.373	0.851	0.438	0.679	
	Interest	-0.178	0.663	-0.269	0.799	
	Exchange	-0.003	0.018	-0.159	0.880	
Akpaka GRA	Intercept	-33.506	58.874	-1.379	0.226	**0.600**
	Real GDP	8.747E-011	0.000	2.082	0.092	
	Inflation	1.292	0.736	1.757	0.139	
	Interest	-0.402	0.573	-0.701	0.514	

The result of regression analysis presented in Table 6 showed the influence of macroeconomic variables on residential property returns. In Main GRA 14.6% variation in returns from Detached House are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05 and the R-squared is weak. In Akpaka GRA 60% variation in returns from Detached House are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05 though the R-squared is strong.

TABLE 7
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES
(SHOPS IN SELECTED ZONES IN MAIN MARKET ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from shops in Textile Zone Main Market	0.0362	0.0271	level
Selected Macroeconomic Variables and RTR from shops in Article Zone Main Market	0.0025	0.0026	level
Selected Macroeconomic Variables and RTR from shops in Jewelleries Zone Main Market	0.0004	0.0008	level
Selected Macroeconomic Variables and RTR from Stationaries and Book Zone Main Market	0.0168	0.0115	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 8

RESULT OF REGRESSION ANALYSIS FOR SHOPS IN SELECTED ZONES IN MAIN MARKET ONITSHA

Markets (Shop)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
Textile	Intercept	-11.224	13.020	-0.862	0.428	**0.534**
	Real GDP	4.592E-011	0.000	2.040	0.097	
	Inflation	0.239	0.394	0.605	0.571	
	Interest	-0.365	0.307	-1.190	0.287	
	Exchange	-0.001	0.008	-0.173	0.869	
Articles	Intercept	-32.375	22.201	-1.458	0.205	**0.502**
	Real GDP	8.463E-011	0.000	2.205	0.079	
	Inflation	0.835	0.672	1.242	0.269	
	Interest	-0.684	0.523	-1.307	0.248	
	Exchange	-0.005	0.014	-0.327	0.757	
Jewelleries	Intercept	-22.259	26.474	-0.841	0.439	**0.495**
	Real GDP	7.245E-011	0.000	1.583	0.174	
	Inflation	1.231	0.801	1.537	0.185	
	Interest	-0.735	0.624	-1.178	0.292	
	Exchange	-0.028	0.017	-1.637	0.163	
Stationaries & Books	Intercept	-1.898	22.027	-0.086	0.935	**0.332**
	Real GDP	2.171E-011	0.000	0.570	0.593	
	Inflation	0.818	0.667	1.227	0.275	
	Interest	-0.121	0.519	-0.233	0.825	
	Exchange	-0.017	0.014	-1.207	0.281	

The result of regression analysis presented in Table 8 showed the influence of macroeconomic variables on commercial property returns. In Textile Zone Main Market 53.4% variation in returns from shops are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05. In Articles Zone Main Market 50.2% variation in returns from shops are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05 though the R-squared is strong. . In Jewelleries Zone Main Market 49.5% variation in returns from shops are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05. Likewise, in Stationaries and Book Zone Main Market 33.2% variation in returns from shops are influenced by macroeconomic variables but the influence is also insignificant because the P-values are greater than 0.05.

TABLE 9
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES (SHOPS IN SELECTED ZONES IN OSE MARKET ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from Shops in Food Stuff Zone Ose Market	0.0115	0.008	level
Selected Macroeconomic Variables and RTR from Shops in Provision Zone Ose Market	0.0003	0.0008	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 10
RESULT OF REGRESSION ANALYSIS FOR SHOPS IN SELECTED ZONES IN OSE MARKET ONITSHA

Markets (Shop)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
Food Stuff	Intercept	-26.645	35.032	-0.761	0.481	**0.330**
	Real GDP	9.072E-011	.000	1.498	0.194	
	Inflation	.903	1.060	0.852	0.433	
	Interest	-.792	.826	-0.959	0.382	
	Exchange	-.010	.022	-0.460	0.665	
Provisions	Intercept	-54.017	30.487	-1.772	0.137	**0.618**
	Real GDP	1.386E-010	0.000	2.630	0.047	
	Inflation	1.518	0.923	1.645	0.161	
	Interest	-1.431	0.719	-1.991	0.103	
	Exchange	-0.005	0.020	-0.276	0.794	

The result of regression analysis presented in Table 10 showed the influence of macroeconomic variables on commercial property returns. In Food Stuff Zone Ose Market 33.0% variation in returns from shops are influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05. In Provision Zone Ose Market 61.8% variation in returns from shops are influenced by macroeconomic variables. However, only Real GDP had significant influence on returns from shops in Provision Zone Ose Market because the P-value is less than 0.05. Hence, 1% increase in Real GDP will result in 1.39% increase in return from shops in Provision Zone Ose Market.

TABLE 11
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES
(SHOPS IN SELECTED ZONES IN BRIDGE HEAD MARKET ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from Shops in Plumbing Zone Bridge Head Market	0.0128	0.0089	level
Selected Macroeconomic Variables and RTR from Shops in Ogbo Ogwu Bridge Head Market	0.0022	0.0024	level
Selected Macroeconomic Variables and RTR from Shops in Timber Zone Bridge Head Market	0.0076	0.0058	level
Selected Macroeconomic Variables and RTR from Shops in Rod Zone Bridge Head Market	0.0003	0.0007	level
Selected Macroeconomic Variables and RTR from Shops in Building Material Zone Bridge Head Market	0.0226	0.0155	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 12
RESULT OF REGRESSION ANALYSIS FOR SHOPS IN SELECTED ZONES IN BRIDGE HEAD MARKET ONITSHA

Markets (Shop)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
Plumbing	Intercept	-68.911	22.906	-3.008	0.030	0.773
	Real GDP	1.468E-010	0.000	3.706	0.014	
	Inflation	1.464	0.693	2.112	0.088	
	Interest	-0.377	0.540	-0.698	0.517	
	Exchange	0.015	0.015	1.044	0.344	
Ogbo Ogwu	Intercept	-43.449	28.394	-1.530	0.187	0.493
	Real GDP	1.028E-010	0.000	2.095	0.090	
	Inflation	1.192	0.859	1.387	0.224	
	Interest	-0.328	0.669	-0.490	0.645	
	Exchange	0.002	0.018	0.096	0.927	
Timber	Intercept	-39.258	55.881	-0.703	0.514	0.431
	Real GDP	1.258E-010	0.000	1.302	0.250	
	Inflation	1.617	1.691	0.956	0.383	
	Interest	-0.569	1.317	-0.432	0.684	
	Exchange	-0.041	0.036	-1.149	0.303	
Rod	Intercept	8.883	34.760	0.256	0.808	0.511
	Real GDP	5.094E-011	0.000	0.848	0.435	
	Inflation	0.448	1.052	0.426	0.688	
	Interest	-0.631	0.819	-0.770	0.476	
	Exchange	-0.041	0.022	-1.844	0.124	
Building Material	Intercept	142.495	117.673	1.211	0.280	0.708
	Real GDP	-2.372E-010	0.000	-1.166	0.296	
	Inflation	-6.210	3.562	-1.744	0.142	
	Interest	5.389	2.774	1.943	0.110	
	Exchange	0.070	0.076	0.922	0.399	

The result of regression analysis presented in Table 12 showed the influence of macroeconomic variables on commercial property returns. In Plumbing Zone Bridge Head Market 77.3% variation in returns from shops are influenced by macroeconomic variables. However, only Real GDP had significant influence on returns from shops in Plumbing Zone Bridge Head Market because the P-value is less than 0.05. Hence, 1% increase in Real GDP will result in 1.47% increase in return from shops in Plumbing Zone Bridge Head Market.

Also, in Ogwu Ogwu Zone 49.3% variations in returns from shops were influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05. In Timber Zone Bridge Head Market 43.1% variation in returns from shops were influenced by macroeconomic variables but the influence was also insignificant.

In Rod and Building Material Zones 51.1% and 70.8% respective variations in returns from shops were influenced by macroeconomic variables but their influence is insignificant because the P-values are greater than 0.05.

TABLE 13
RESULT OF ADF STATIONARITY TEST FOR GROUPS OF DATA SERIES
(SHOPS IN SELECTED ZONES IN OCHANJA MARKET ONITSHA)

Group of Series	ADF-Fisher Chi-Square (P-Value)	ADF-Choi Z-Stat (P-Value)	Order
Selected Macroeconomic Variables and RTR from Shops in Textile Zone Ochanja Market	0.0378	0.0288	level
Selected Macroeconomic Variables and RTR from Shops in Electrical Zone Ochanja Market	0.0009	0.0014	level
Selected Macroeconomic Variables and RTR from Food Stuff Zone Ochanja Market	0.0175	0.0119	level
Selected Macroeconomic Variables and RTR from Shoe Zone Ochanja Market	0.0243	0.0167	level

The P-values of all the individual group of series are less than the alpha (0.05) at level. Hence, the null hypothesis is rejected, which indicates that there is stationarity in the group of time series data. The implication of this is that, the time series data on the variables utilized for the study are suitable for regression analysis.

TABLE 14
RESULT OF REGRESSION ANALYSIS FOR SHOPS IN SELECTED ZONES IN OCHANJA MARKET ONITSHA

Markets (Shop)	Variables	Coefficients	Standard Error	t Stat	P-value	R^2
Textiles	Intercept	-63.303	29.179	-2.169	0.082	**0.835**
	Real GDP	1.953E-010	0.000	3.871	0.012	
	Inflation	0.809	0.883	0.916	0.402	
	Interest	-1.457	0.688	-2.118	0.088	
	Exchange	-0.013	0.019	-0.696	0.518	
Electricals	Intercept	67.534	49.828	1.355	0.233	**0.317**
	Real GDP	-5.580E-011	0.000	-0.648	0.546	
	Inflation	-1.391	1.508	-0.922	0.399	
	Interest	-0.189	1.175	-0.161	0.878	
	Exchange	-0.026	0.032	-0.820	0.449	
Food Stuff	Intercept	-11.872	31.440	-0.378	0.721	**0.349**
	Real GDP	6.618E-011	0.000	1.217	0.278	
	Inflation	0.422	0.952	0.444	0.676	
	Interest	-0.746	0.741	-1.007	0.360	
	Exchange	0.012	0.020	0.594	0.578	
Shoe	Intercept	-74.640	47.884	-1.559	0.180	**0.633**
	Real GDP	1.875E-010	0.000	2.265	0.073	
	Inflation	1.598	1.449	1.103	0.320	
	Interest	-0.691	1.129	-0.612	0.567	
	Exchange	-0.020	0.031	-0.652	0.543	

The result of regression analysis presented in Table 14 showed the influence of macroeconomic variables on commercial property returns. In Textile Zone Ochanja Market 83.5% variation in returns from shops were influenced by macroeconomic variables. However, only Real GDP had significant influence on returns from shops in Textile Zone Ochanja Market because the P-value is less than 0.05. Hence, 1% increase in Real GDP will result in 1.95% increase in return from shops in Textile Zone Ochanja Market.

Also, in Electrical Zone 31.7% variations in returns from shops were influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05.

Similarly, in Food Stuff Zone 34.9% variations in returns from shops were influenced by macroeconomic variables but the influence is insignificant because the P-values are greater than 0.05.

Finally, in Shoe Zone Ochanja Market 63.3% variations in returns from shops were influenced by macroeconomic variables but the influence was also insignificant because the P-values are greater than 0.05.

5.1 FINDINGS

The study discovered from the analysis presented in Table 2 that 9.4% to 72.7% variation in returns (RTR) from 2BR flat residential property market in the study area were influenced by macroeconomic variables. However, only returns from Odoakpu and Fegge were significantly influenced by Real GDP and Exchange rate respectively. Likewise, it was discovered from the analysis presented in Table 4 that 2.9% to 86.3% variation in returns from 3BR flat residential property market in the study area were influenced by macroeconomic variables. However, just Real GDP and Interest rate had significant influence on returns from 3BR flats in Inland Town. In Fegge, just Real GDP and Inflation rate had significant influence on the returns, while in Odoakpu all the selected macroeconomic variables had significant influence on the returns.For the Detached House property market, macroeconomic variables did not have significant influence on their returns.

Tables 8, 10, 12 and 14 revealed that 33.2% to 83.5% variation in returns from the commercial properties were influenced by macroeconomic variables. However, only Real GDP had significant influence on shops in Provision Zone Ose Market, shops in Plumbing Zone Bridge Head Market and shops in Textile Zone Ochanja Market. None of the macroeconomic variables had significant influence on returns from shops in Main Market Onitsha.

5.2 CONCLUSION

The study has been able to analyze the influence of macroeconomic variables on residential and commercial property investment returns in Onitsha. In the 2BR residential property market, Real GDP and Exchange rate had significant influence on just two locations; Odoakpu and Fegge respectively out of the seven locations under this market. Hence, macroeconomic variables have minimal influence on the 2BR residential property market in the study area. Only Odoakpu was significantly influenced by all the selected macroeconomic variables in the 3BR residential property market, returns from 3BR in Fegge was only influenced by Real GDP and Inflation rate while returns from 3BR in Inland Town was only influenced by Real GDP and Interest rate, the other locations in this market were not significantly influenced. Hence, macroeconomic variables have minimal influence on 3BR residential property market in the study area. For Detached House market there was no significant influence at all. In the commercial property market only Real GDP had significant influence on few zones in the selected markets. Hence, macroeconomic variables have minimal influence on returns from commercial properties (shops) investment in the study area.

5.3 RECOMMENDATIONS

Investors who intend to delve into residential or commercial property investment in Onitsha should first consult professional Estate Surveyors and Valuers so that they can carry out feasibility and viability analysis with the Rate of Total Returns (RTR) derivable from the various residential and commercial property markets before taking a decision on the most viable or appropriate property market to invest in.

Also, Investors and their advisers should consider endogenous and exogenous factors (such as macroeconomic varables) in making their investment decisions. This study has shown that macroeconomic variables have various levels of influence on real estate investment returns depending on the property type and location. Hence, the need to consider them while making real property investment decisions.

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