

EFFECT OF MACROECONOMIC FACTORS ON RESIDENTIAL PROPERTY RETURNS IN ABUJA, NIGERIA

MAKROEKONOMİK FAKTÖRLERİN ABUJA KONUT GETİRİLERİNE ETKİSİ, NİJERYA

M.B. WAHAB

*Federal University of Technology
wahabbabatunde2@gmail.com*

A.S. ADEOGUN

University of Ilorin

G.B. MORENIKEJI

Federal University of Technology

M. MAMMAH

Federal Polytechnic Kaduna

S.O. ABDULKAREEM

Federal Polytechnic Kaduna

*Received 12 April 2017- Accepted 31 July 2017
Gönderim 12 Nisan 2017- Kabul 31 Temmuz 2017*

Abstract: Performance of property market is a measure of total returns, and the totality of returns within the country property market is influenced by the state of the economy. The backward and forward relationship between property market and the economy has influenced a rise and fall in future of property returns in Abuja market. The study utilized both primary (returns) and secondary data (macro-economic variables), and the time-series data on annual macroeconomic indices and total returns index spanning between 2001-2015 were employed for the study. The result of Augmented Dicker Fuller (ADF) test showed that all the variables were stationary after first and second differencing order. The result of cointegration test further suggests the existence of long run relationship between macroeconomic factors and residential property returns. The result of further cointegration regression suggests that between 18.2%-83.6% and 16.2%-79% variation in 3B/R and 4B/R property returns respectively across the seven out of twelve residential markets were significantly influenced by macroeconomic indicators. The study concludes that positive economic policies are meant to improve the property market, vice versa. The study therefore recommends that policy-maker should painstakingly study the future implication of any macroeconomic policy as such could adversely affect the property market, and this could also conversely affect the contribution of real estate sector to the national economy development, vice-versa.

Keywords: Property returns, macroeconomic factors, cointegration regression analysis.

Öz: Emlak piyasasının performansı toplam getirilerin bir ölçüsü olarak kabul edilmektedir. Emlak piyasasındaki getiriler toplamı, ülkenin içinde bulunduğu ekonomik durumdan etkilenmektedir. Gayrimenkul piyasası ve ekonomi arasındaki geriye ve ileriye yönelik ilişki, Abuja pazarındaki gayrimenkul getirilerinin yükselişini ve düşüşünü etkilemiştir. Çalışma, hem birincil (getiriler) hem de ikincil verilerden (makro ekonomik değişkenler) yararlanarak 2001-2015 yılları arasındaki yıllık makroekonomik endeksler ve toplam getiri endeksine ilişkin zaman serisi verilerini kullanıldı. Augmented Dicker Fuller (ADF) testinin sonucunda, tüm değişkenlerin birinci ve ikinci fark sıralamasından sonra sabit kaldığı görülmüştür. Eşbütünleşme testi sonucunda, makroekonomik faktörler ile emlak dönüşleri arasındaki uzun dönemli ilişkinin varlığı da öne çıkmaktadır. Eşbütünleşme testi sonucunda, oniki konut piyasasından yedisinde sırasıyla 3B/R ve 4B/R emlak getirilerinde 18.2%, -83.6% ve 16.2% -79% arasında değişmelerin makroekonomik göstergelerden önemli ölçüde etkilendiğini düşündürmektedir. Bu çalışmada, olumlu ekonomik politikaların emlak

piyasasını iyileştirmek olduğu sonucuna varıldı. Bu nedenle çalışma, politika yapıcılarının, gayrimenkul piyasasını olumsuz yönde etkileyebilecek herhangi bir makroekonomik politikanın gelecekteki etkisini özenle incelemesi gerektiğini ve gayrimenkul sektörünün ulusal ekonomi gelişimine olan katkısını da tersine çevirebileceğini önermektedir.

Anahtar Kelimeler: Gayrimenkul getirileri, makroekonomik faktörler, eşbütünleşme regresyon analizi.

INTRODUCTION

Results from empirical studies linking macroeconomic factors with property investment market all over the world have shown that macroeconomic factors influence property return, in Europe (Lizieri & Satchell,1997; Brooks & Tsolacos,1999; Giussani *et al.*, 1992; Sinbad & Mhlanga, 2009), in America (Abraham & Hendershott,1996; Ling & Naranjo, 1997; Eldelstein & Tsang, 2007), in Asian (Peng & Hudsins-wilson, 2002; Peng *et al.*, 2005; Joshi 2006) and in Africa as developing continent (Clark & Daniel 2006;Kwangware, 2010; Bouchouicha & Ftiti, 2012; Ojetunde *et al.*, 2011; Ojetunde, 2013; Udoekanem *et al.* 2014; Udoekanem *et al.*, 2015) have researched and tried to establish both short and long run relationships between macroeconomic factors and property return, and the influence of these economic factors on property return. The interaction between macro economy and residential property market indicated that GDP, inflation, interest and exchange rates are the major macroeconomic factors that influence property returns, and the existence of long run relationship between macroeconomic factors and property market has always been found (Eldelstein & Tsang, 2007; Sinbad & Mhlang, 2009; Kwangware, 2010; Gutpa *et al.*, 2010; Ojetunde, 2013). Therefore since real property market is an aspect of global investment market, global macroeconomic determinants have become a focal point of study. Real property investment as an aspect of investment portfolio has expressed interdependency with the economy, and inseparable in making global investment decisions (Giussani *et al.*, 1992). Property returns as a measure of property investment performance is a key in property market (Hoesli & MacGregor, 2000; Kalu, 2001). Property investment cycles are related to the periods of excess demand and excess supply in real estate market, which are described as tight and soft markets respectively within the property market, and they are primarily affected by macroeconomic policy of national, regional and local economy (Born & Pyhrr, 1994; Apergis, 2003). Therefore, Property investment market and the national economy are interrelated such that economy majorly influences the property market which in turn affects the contribution of real estate sector to national economic development. This interdependent relationship has led to forward and backward relationship between the economy and the property market, and this has therefore created a rise and fall in the future of property returns in Abuja property market. The aftermath of rise and fall in property return has therefore been the major source of worry or contention among real estate investors. This study aimed at measuring the influence of macroeconomic factors on residential property returns in Abuja, Nigeria. This study is justified on the ground that, over the years, residential property investment performance has been anchored on non-economic factors such as locational, neighborhood and physical factors (Yusof & Ismail, 2012; Samy, 2015; Wilhelinsson, 2000) with little or no attention on economic factors. But the growing need of institutional investors, companies, banks to relate property investment market as part of country's economic market has therefore underscored

the need to study economic factors and how they affect residential property investment. Also the pressing need for improvement in property investment performance has required more than non-economic factors.

1. PROPERTY MARKET AND THE NATIONAL ECONOMY: THE CONCEPTUAL FRAMEWORK

Property market and macro economy are interlinked and intertwined. They are positively related to each other and they are interrelated in both short and long run and also influence each other. Belo and Agbatekwe (2002) submitted that the quality and quantities of the country's housing stock is a measure of the country's economic growth and prosperity. Also real estate sector has also become a focal point of government fiscal and monetary policies and used as yardstick for realizing low level inflation, high level of employment, low level of unemployment and balanced economic growth (Apergi, 2003). Fraser (1993) has related property market as an integral part of nation's economy; therefore there is reverse implication on one another. This indicates there is a reverse linkage between property market and the macro economy, which implies that, whatever affects the property market also affect the economy, vice versa. In the period of economy instability or macroeconomic fluctuation, disequilibrium in the property market is as a result of exogenous factors originated from government structural and deregulations in the country's economy (Dehesh & Pugh, 1998). Property market cycles is affected by shocks of macroeconomic factors and resulted into either tight or soft market, in that, in the period of economic stability and growth, the property market cycles is expected to exhibit excess supply, vice versa (Born & Pyhrr 1994). Therefore property market is linked to macro economy, such that macro-economic factors such as GDP, money supply, inflation, interest influence the performance of property market, such that, inflation acts as disincentives to real estate purchaser but acts as incentive to real estate investors, because increase in the property price reduces the demand, and increase in level of employment increases inflation and thus property price, therefore, macro economy parameters significantly influence the investor decisions and also determine property returns (Giussani *et al.*, 1992).

2 LITERATURE REVIEW

Sequel to the findings from the existing studies linking macro-economic factors to property market from different localities, it has been established that macroeconomic factors influenced property market; therefore different macroeconomic indicators have been identified to have major explanatory influence on property return. Brooks and Tsolacos (1999) adopted multi-equation regression analysis in examining the impact of economic and financial factors on property return in UK using quarterly data between 1985 and 1998, the result showed that lagged effect of unexpected inflation on property return with a noticeable negative influence and negative shock of short term interest rates negatively impact on property return. Brooks and Tsolacos (2001) used multi-equation regression method, the result showed interest spread is not feasible over a short period and the

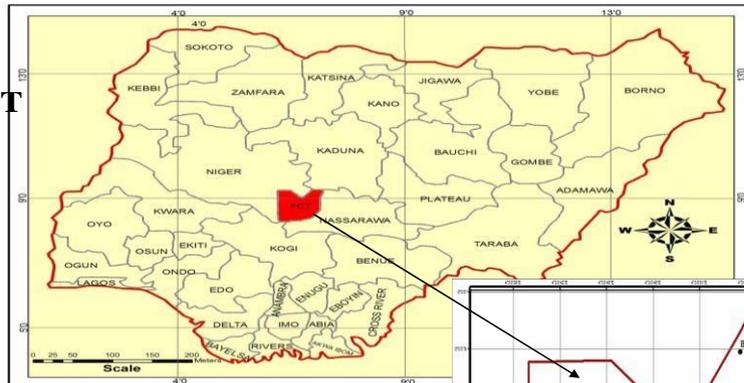
magnitude of influence is not proportional over a long run to establish the linkage in UK market. Apergis (2003) objectively analyzed the dynamic effect of macroeconomics on real estate pricing in Greece 1981-1999, and adopting multi-equation regression model. The result variance decomposition showed that mortgage rate has explanatory power and positive influence of employment and inflation rates increase property returns. Joshi (2006) adopted multi-equation regression to model the impact of monetary shocks on residential property market in India using quarterly data between 2001 and 2005. The resulting multi-equation regression analysis showed that the major variation in residential housing market is described by innovation in interest rate and the shock of interest rate permanently influence the return from residential housing market. This result is consistent with Brook and Tsolacos (1999). Eldelstine and Tsang (2007) studied the influence of macro-economic factors on housing market in U.S using quarterly data between 1988 and 2003. The result showed that employment and interest rate have strong positive significant influence on property market. This finding is consistent with that of Apergi (2003). Sari *et al.*, (2007) studied the relationship between macroeconomics and housing market in Turkey between 1961 and 2000. The study adopted multi-equation regression and the result indicated that interest rate has a relatively more substantial effect on housing investment market than employment rate; this finding is consistent with previous studies (Apergi, 2003; Eldelstine & Tsang, 2007). Schalck and Antipa (2009) empirically studied the impact of fiscal policy on property returns in France, using multi-equation regression analysis, the result showed interest rate positively influence property investment. It is therefore concluded that interest rate subsidy is the most efficient measure of influence; the finding is consistent with that of previous studies (Eldelstine & Tsang, 2007; Sari *et al.*, 2007). Ge (2009) has empirically adopted multiple regressions to examine the determinants of property price returns in New Zealand (1980-2007), and having employed time series quarterly data and concluded that unemployment and mortgage rate majorly explained the variation in property price return, the finding on the explanatory influence of mortgage rate on property returns is consistent with Apergis (2003). Feng *et al.*, (2010) analyzed the relationship between macro-economic factors and property price return in Hong Kong. The result of multi-equation regression showed the existence of significant stable long run relationship; the research, therefore, found out that error correction mechanism can affect the deviation house price return long run through slow adjustment. Ojetunde *et al.*, (2011) examined the interaction between macro-economy and residential property market using annual data between 1984 and 2009. The result revealed that influence of real GDP and exchange rate explained 28% variation in rent. Wei and Morley (2012) empirically examined the interaction between macro economy and property return U.S, the study utilized multi-equation regression analysis to model the bi-causal relationships between the variables, the result showed interest rate explained the major variation in property return, and thereby the shock of interest has contemporaneous effect on house price. These findings are consistent with that of previous studies (Apergi, 2003; Eldelstine & Tsang, 2007; Schalck and Antipa 2009). Siband and Mhlanga (2013) having empirically examined the interaction between property return and the macro economy in UK, and the multi-equation regression model was applied on quarterly data between 1994-2011 to establish to the interaction, the result showed the shock of inflation positively impact on property return after six quarters and negative shock

of short term interest negatively impact on property return, vice versa. This finding is consistent with that of Brooks and Tsolacos (1999). Ojetunde (2013) adopted multi-equation regression to examine the existence of long run relationship and influence of macro economy on residential rental performance in Nigeria using annual data from 1984 to 2011. The result showed that real GDP and exchange rate forecasted 31.4% of variation and positively influenced residential market and at the same time have positive shock influence on residential rent. This study is consistent with that of Ojetunde *et al.*, (2011). Udoekanem *et al.*, (2014) studied the determinants of commercial property rental growth in Minna, Nigeria between 2001 and 2012. The study adopted both granger causality test and single equation regression to establish both causal linkage and the influence of the determinants on rent, the result revealed that real GDP and vacancy rate account for 83% in variation. The study showed an explanatory influence of GDP on property rents, and this is consistent with that of previous studies (Ojetunde *et al.*, 2011; Ojetunde, 2013). Miregi and Obere (2014) studied the effect of market fundamental variables on property price in Kenya between 2001 and 2014; the result of multi-equation regression employed revealed that inflation and interest rates had significant lagged positive and negative influence on property price. Udoekanem *et al.*, (2015) examined the determinants of commercial property rental value in Wuse commercial district of Abuja, Nigeria between 2001 and 2012. Single equation regression was adopted; the result revealed that real GDP and vacancy rate respectively account 74% and 83% of variation in office rent, therefore the study concludes that real GDP and vacancy rate are the major drivers of rental change in Wuse market. This finding is consistent with that of previous studies in Nigeria (Ojetunde *et al.*, 2011; Ojetunde, 2013; Udoekanem *et al.*, 2014). Most of the existing studies carried out outside Nigeria have succeeded in establishing the influence of macro economy on property returns and price without the use nominal rent as commonly used in most Nigerian studies. Therefore the existing studies in Nigeria have not been able to establish the influence of macroeconomic factors on residential investment return but have only succeeded in examining the influence of macroeconomic factors on rental value. The pressing need for institutional investors to measure the influence of macro economy on the performance of real investment has therefore created the vacuum or gap which the study intends to fill.

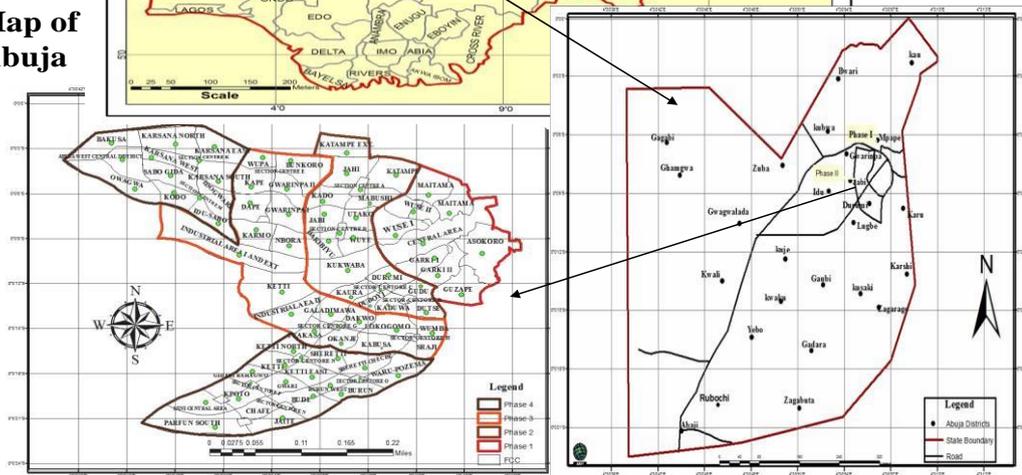
3. STUDY AREA

Abuja is a capital city of Nigeria. Abuja is selected for study on the basis of the existence of heavy property market transaction and due to presence of high level housing infrastructural services provision and development which cannot be compared with any city within the country. Abuja, the Federal Capital Territory (FCT) is on the longitude $6^{\circ} 44'$ to $7^{\circ} 37'$ E and latitude $8^{\circ} 23'$ to $9^{\circ} 28'$ N. Federal capital city (FCC) is the Abuja Municipal Area Council (AMAC) having four phases of development. The map of Nigeria (see figure 1) showing federal capital territory (FCT) in figure 2 and the FCT map showing federal capital city (FCT) are presented in figure 3 as shown.

**Fig1: Ma
Of Nigeria
Showing FCT**



**Fig3: Map of
FCC, Abuja**



4 METHODOLOGY

The study employed both primary and secondary data. The primary data for the study comprised rent and actual sale data from registered estate surveying and valuation firms in Abuja between 2001 and 2015 which were collected through the structured questionnaires. The secondary data comprised of macroeconomic indices from Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) between 2001 and 2015. The macroeconomic indices employed for the study were identified from the literature which includes real gross domestic product (RGDP), inflation rate, interest rate, exchange rate, employment and unemployment rates. The sample size adopted for each of residential areas of the city was quantitatively determined using the model developed by Frankfort-Nachmias (1996). The model used purposely when the population is too large. The model is therefore used to sample residential transactions and the number of sales and lettings were presented in table 1. The equation 2 is adopted to determine total returns from residential investment. This model for sample size determination is described in equation 1.

$$n = \frac{Z^2pqN}{e^2(N - 1) + Z^2pq} \quad \text{equation 1}$$

Where N = population size

n = sample size

p = 95% confidence level of the target population

q = 1- p

e = Acceptable error Z = 1.96(the standard normal deviation at 95% confidence level)

Also various residential property zones, the number of residential transaction and the sampled properties is presented in table 1.

Table 1: Residential Markets, total number of residential transactions and Residential Properties’ Sampled Abuja

Residential Markets	No. of Residential Letting Transactions	No of Residential Lettings Sampled	No of Residential Sale Transactions	No. of Residential Sales Sampled
Maitama (3B/R)	87	40	50	30
Maitama (4B/R)	109	44	50	30
Wuse II (3B/R)	63	34	42	27
Wuse II (4B/R)	453	63	42	27
Gwarinpa (3B/R)	157	50	50	30
Gwarinpa (4B/R)	66	35	40	26
Utako (3B/R)	47	29	25	19
Utako (4B/R)	45	28	27	20
Area1 (3B/R)	63	34	24	18
Area1 (4B/R)	47	29	27	20
Area 10 (3B/R)	47	29	27	20
Area 10 (4B/R)	29	21	25	19
Total	1,213	436	429	286

The study utilizes both descriptive and inferential method of data analysis. Descriptive analysis involves determination of annual return index of residential property investment upon which the influence of macroeconomic factors is established. To determine the total return, holding period of total return model is employed as described as follows:

$$TotalReturn = \frac{(CV_t - CV_{t-1}) + NI}{CV_{t-1}} \quad \text{equation 2}$$

Where CV_t is capital value at end of the year, CV_{t-1} is the capital value beginning of the year and NI represents net income or rental value.

The inferential method required the use of stationarity test using Augmented Dicker fuller (ADF), Feager Granger conintegration test and conintegration regression analysis. The model for Augmented Dicker fuller is described as follows:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{i=1}^k \pi_i \Delta Y_{t-1} + U_t \quad \text{equation 3}$$

Where Y_t represents vector of time series, t represent time, U_t represents the error terms and π represents the coefficient matrix of the variables, Δ represents differences in variables.

5. RESULT AND DISCUSSION

Augmented Disker Fuller (ADF) unit root test is carried out on all the time series data to examine the extent of their stationarity. The test requires time series data to be stationary over the period before it can be considered appropriate for further analysis and to also avoid spurious regression result. Cointegration test is used to establish the long-term (run) relationship among the time series data. The result of ADF unit root test presented in table 2 shows that real GDP, inflation rate, interest rate and unemployment rate are stationary at first-order difference, only exchange rate is stationary at second-order difference, employment rate is stationary at level and while property returns from different markets are stationary at level. The implication of this test is that the time series data employed for this study is suitable and appropriate for further analysis.

Table 2: Stationary or Unit Root Test

Variables	Computed t-statistic	ADF Critical @0.05	Prob.*	Order of integration
Δ Real GPD	-5.003512	-3.144920	0.0025	I(1)
Δ Inflation Rate	-4.296966	-3.144920	0.0075	I(1)
Δ Interest Rate	-7.446427	-3.144920	0.0001	I(1)
Δ Unemployment Rate	-4.444466	-3.144920	0.0059	I(1)
$\Delta\Delta$ Exchange Rate	-3.604032	-3.175352	0.0255	I(2)
Δ Employment Rate	-6.405753	-3.119910	0.0002	I(1)
Maitama 3B/R(Rt)	-3.483968	-3.119910	0.0066	I(0)
Maitama 4B/R(Rt)	-3.866170	-3.119910	0.0139	I(0)
Wuse 3B/R(Rt)	-3.872870	-3.175352	0.0167	I(0)
Wuse 4B/R(Rt)	-3.993629	-3.175352	0.0138	I(0)
Gwarinpa 3B/R(Rt)	-4.299031	-3.119910	0.0066	I(0)
Gwarinpa 4B/R(Rt)	-3.919592	-3.119910	0.0127	I(0)
Utako 3B/R(Rt)	-7.402952	-3.144920	0.0001	I(0)
Utako 4B/R(Rt)	-3.692435	-3.212696	0.0244	I(0)
Area 1 3B/R(Rt)	-4.907100	-3.144920	0.0029	I(0)
Area 1 4B/R(Rt)	-4.208528	-3.175352	0.0099	I(0)
Area 10 3B/R(Rt)	-5.667033	-3.144920	0.0009	I(0)
Area 10 4B/R(Rt)	-4.578586	-3.144920	0.0048	I(0)

In order to establish long run relationship between the variables, Feagle Granger cointegration test is employed in table 3 and 4. The test reveals the at least two or more cointegrating equations, suggesting that macroeconomic variables come together to have a significant long run relationship with property returns. This

finding is consistent with previous studies (Feng *et al.*, 2010; Ojetunde, 2013; Siband and Mhlanga 2013).

Table 3: Eagle Granger Cointegration Test (3B/R)

3B/R Markets	Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
Maitama	RETURN	-6.437713	0.0960	30.3755	0.0001
	REAL_GDP	-3.988168	0.6533	-14.3378	0.6396
	INTE_RATE	-4.66968	0.4549	30.52579	0.0001
	EXCH_RATE	-6.201303	0.0194	-19.9269	1.0000
	INFLATION	-7.252933	0.0440	-21.0986	1.0000
	EMPLOY_RATE	-4.32209	0.5582	36.69313	0.0003
	UNEMPL_RATE	-3.902365	0.6821	-14.7895	0.5266
Wuse	RETURN	-3.908583	0.6893	47.80655	0.0001
	REAL_GDP	-4.181423	0.5878	-15.1815	0.4206
	INTE_RATE	-5.871743	0.1614	-18.5896	1.0000
	EXCH_RATE	-3.781787	0.7210	-15.7335	0.3030
	INFLATION	-5.564236	0.0255	-82.7079	0.0000
	EMPLOY_RATE	-5.104092	0.0103	-17.7841	0.8904
	UNEMPL_RATE	-3.367483	0.8420	-36.7424	0.0000
Gwarinpa	RETURN	-4.686353	0.4371	-57.5731	0.0000
	REAL_GDP	-5.611742	0.0170	-89.2341	0.0000
	INTE_RATE	-4.21596	0.5913	38.63290	0.0003
	EXCH_RATE	-4.025233	0.6404	-16.3623	0.1650
	INFLATION	-5.585215	0.0275	-18.9995	1.0000
	EMPLOY_RATE	-4.429249	0.5063	-16.6201	0.1847
	UNEMPL_RATE	-3.81292	0.7111	-14.3025	0.6418
Utako	RETURN	-4.914659	0.3720	-16.4743	0.0000
	REAL_GDP	-6.092334	0.0446	-17.8033	0.0000
	INTE_RATE	-6.193358	0.0326	-18.5254	0.0000
	EXCH_RATE	-7.858926	0.0300	-20.1097	0.0000
	INFLATION	-5.917695	0.1681	-17.7679	0.0000
	EMPLOY_RATE	-3.929992	0.6829	-44.0564	1.0000
	UNEMPL_RATE	-3.994415	0.6565	-14.2391	0.1356
Area 1	RETURN	-5.058254	0.3500	-22.8334	0.0001
	REAL_GDP	-6.311626	0.0195	-18.931	0.0000
	INTE_RATE	-6.254197	0.1257	-18.6597	0.0000
	EXCH_RATE	-9.945403	0.0045	-21.6159	0.0000
	INFLATION	-7.922129	0.0283	-20.1145	0.0000
	EMPLOY_RATE	-5.393507	0.2738	-72.3341	1.0000
	UNEMPL_RATE	-3.605305	0.7764	-13.2775	0.6613
Area 10	RETURN	-4.615304	0.4590	-16.0171	0.0000
	REAL_GDP	-6.168125	0.1355	-18.8606	0.0000
	INTE_RATE	-5.910564	0.1691	-18.0912	0.0000
	EXCH_RATE	-10.8733	0.0021	-22.0442	0.0000
	INFLATION	-7.822112	0.0310	-20.0177	0.0000
	EMPLOY_RATE	-4.83546	0.4072	-60.8249	1.0000
	UNEMPL_RATE	-3.603988	0.7767	-13.3286	0.6461

Table 4: Eagle Granger Cointegration Test (4B/R)

4B/RMarkets	Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
Maitama	RETURN	-6.437713	0.0160	-20.3755	1.0000
	REAL_GDP	-3.988168	0.6533	-14.3378	0.6396
	INTE_RATE	-4.66968	0.4549	30.52579	0.0001
	EXCH_RATE	-6.201303	0.0294	-19.9269	1.0000
	INFLATION	-7.252933	0.0440	-21.0986	1.0000
	EMPLOY_RATE	-4.32209	0.5582	36.69313	0.0003
	UNEMPL_RATE	-3.902365	0.6821	-14.7895	0.5266
Wuse	RETURN	-4.376681	0.0320	-15.3136	0.0000
	REAL_GDP	-4.206898	0.5944	-44.2089	1.0000
	INTE_RATE	-4.334939	0.5454	-15.0484	0.0000
	EXCH_RATE	-4.191168	0.5993	-40.8457	1.0000
	INFLATION	-4.007046	0.6579	-39.0844	1.0000
	EMPLOY_RATE	-5.866694	0.0004	-81.3304	1.0000
	UNEMPL_RATE	-3.291448	0.8595	-34.1767	1.0000
Gwarinpa	RETURN	-6.437713	0.0260	-20.3755	0.0000
	REAL_GDP	-3.988168	0.6533	-14.3378	0.6396
	INTE_RATE	-4.66968	0.4549	30.52579	0.0001
	EXCH_RATE	-6.201303	0.0094	-19.9269	1.0000
	INFLATION	-7.252933	0.0440	-21.0986	1.0000
	EMPLOY_RATE	-4.32209	0.5582	36.69313	0.0003
	UNEMPL_RATE	-3.902365	0.6821	-14.7895	0.5266
Utako	RETURN	-5.244473	0.2909	-17.5884	0.0000
	REAL_GDP	-4.460399	0.5061	-16.7172	0.0000
	INTE_RATE	-4.919841	0.3706	-16.4079	0.0000
	EXCH_RATE	-5.591198	0.0205	-18.327	0.0000
	INFLATION	-7.685843	0.0349	-20.2082	0.0000
	EMPLOY_RATE	-4.727987	0.4378	-54.2095	1.0000
	UNEMPL_RATE	-3.16206	0.8890	-12.2005	0.8417
Area 1	RETURN	-4.615304	0.4590	-16.0171	0.0000
	REAL_GDP	-6.168125	0.0355	-18.8606	0.0000
	INTE_RATE	-5.910564	0.1691	-18.0912	0.0000
	EXCH_RATE	-10.8733	0.0021	-22.0442	0.0000
	INFLATION	-7.822112	0.0310	-20.0177	0.0000
	EMPLOY_RATE	-4.83546	0.4072	-60.8249	1.0000
	UNEMPL_RATE	-3.603988	0.7767	-13.3286	0.6461
Area 10	RETURN	-5.344813	0.2685	-18.748	0.0000
	REAL_GDP	-5.97323	0.1602	-19.3703	0.0000
	INTE_RATE	-6.510188	0.1007	-18.7289	0.0000
	EXCH_RATE	-9.288929	0.0082	-21.573	0.0000
	INFLATION	-7.258737	0.0314	-19.5454	0.0000
	EMPLOY_RATE	-4.68071	0.4517	-59.5589	1.0000
	UNEMPL_RATE	-3.848966	0.7035	-13.8934	0.3828

Table 5 and 6 presented the result of cointegration regression analysis. Co-integrating regression is considered appropriate, in that, macroeconomic variables are not stationary (at level) in the linear relationship specified in chapter three, until first and second differencing, only the property return index is stationary (at level). therefore macroeconomic variables are said to be co-integrated. It is simply the unit root test applied to the residual of ordinary least square estimation. The test of autocorrelation was carried out through Durbin Watson (DW) statistics presented in Table 5 and Table 6 to ensure non-spurious, $R^2 < DW$ is necessary condition to suggest no autocorrelation in the residual. Durbin-Watson statistic suggests no autocorrelation in the regression as presented in aforementioned Tables. The finding shows the result of regression is non-spurious and the outcome regression is therefore appropriate.

The result of cointegration regression in Table 5 shows that 53.5%, 83.6%, 55.2% and 47.4% variation in 3B/R property return is significantly influenced by macroeconomic variables in Maitama, Wuse, Gwarinpa and Utako markets respectively. This further implies that four markets out of six residential markets for 3B/R were significantly influenced by macroeconomic indicators, and the significance of cointegration regression model is presented in table 7. While 38.5% and 18.2% variation in property return in Area 1 and Area 10 respectively, are insignificantly influenced by macroeconomic variables. Table 6 shows that 60.9%, 78.6%, and 79.9% variation in 4B/R property return is significantly influenced by macroeconomic variables in Maitama, Wuse and Utako markets respectively. Also 14.3%, 16.2% and 26.2% variation in property return in Gwarinpa, Area 1 and Area10 respectively, are insignificantly influenced by macroeconomic variables. This further implies that three markets out of six residential markets for 4B/R were significantly influenced by macroeconomic indicators, and the significance of cointegration regression model is presented in table 8. This finding is consistent with (Apergis, 2003; Joshi, 2006; Eldelstine&Tsang, 2007; Kwangware, 2010).

Table 5: Results of Co-integrating Regression Analysis (3B/R Market)

Markets	Variables	Coefficients	Std. Error	t-statistic	Prob	R	DW
Maitama	REAL_GDP	0.2509	0.2597	0.9664	0.3782	0.535	2.02
	EXCH_RATE	0.0856	0.0228	3.7478	0.0133		
	INTE_RATE	0.4609	0.2279	2.0229	0.099		
	INFLATION	0.1425	0.0505	2.8218	0.037		
	EMPLOY_RATE	0.0781	0.0253	3.0899	0.0272		
	UNEMPL_RATE	-0.0500	0.0489	-1.0229	0.3532		
	C	19.728	9.0664	2.1759	0.0815		
Wuse	REAL_GDP	0.9434	0.2128	4.4334	0.0068	0.836	2.12
	EXCH_RATE	0.0674	0.0187	3.6015	0.0155		
	INTE_RATE	0.7535	0.1867	4.0354	0.01		
	INFLATION	0.1627	0.0414	3.9319	0.011		
	EMPLOY_RATE	0.1372	0.0207	6.6269	0.0012		
	UNEMPL_RATE	-0.1359	0.0401	-3.3912	0.0194		
	C	-32.6039	7.4294	-4.3885	0.0071		
Gwarinpa	REAL_GDP	0.1936	0.889	4.5919	0.002	0.552	2.01
	EXCH_RATE	0.3394	0.4695	1.383	0.043		
	INTE_RATE	0.271	0.326	1.2029	0.224		
	INFLATION	0.4473	0.5521	0.81	0.423		

	EMPLOY_RATE	0.2806	0.2194	1.28	0.21		
	UNEMPL_RATE	-0.5437	0.3709	-1.4658	0.041		
	C	-15.434	5.472	-2.82	0.008		
Utako	REAL_GDP	0.8743	0.2679	3.2642	0.0223	0.474	1.78
	EXCH_RATE	0.0171	0.0235	0.7254	0.5007		
	INTE_RATE	0.6062	0.2351	2.5790	0.0495		
	INFLATION	0.1629	0.0521	3.1291	0.026		
	EMPLOY_RATE	0.0391	0.0261	1.5008	0.1937		
	UNEMPL_RATE	0.1189	0.0504	2.3573	0.065		
	C	-15.4537	9.3522	-1.6524	0.1594		
Area 1	REAL_GDP	0.1655	0.1532	1.0802	0.3294	0.385	2.01
	EXCH_RATE	0.0081	0.0135	0.5969	0.5765		
	INTE_RATE	0.0267	0.1344	0.1987	0.8503		
	INFLATION	0.0368	0.0298	1.2345	0.2719		
	EMPLOY_RATE	0.0547	0.0149	3.6688	0.0145		
	UNEMPL_RATE	0.0051	0.0288	0.1753	0.8677		
	C	-3.6832	5.3480	-0.689	0.5217		
Area 10	REAL_GDP	0.1010	0.2114	0.4778	0.653	0.182	1.77
	EXCH_RATE	-0.0089	0.0186	-0.4808	0.651		
	INTE_RATE	0.1514	0.1855	0.8159	0.4516		
	INFLATION	-0.0233	0.0411	-0.5671	0.5952		
	EMPLOY_RATE	0.0063	0.0206	0.3079	0.7706		
	UNEMPL_RATE	0.0737	0.0398	1.8515	0.1233		
	C	-3.3106	7.3824	-0.4485	0.6726		

Fully Modified Least Squares (FMOLS)

Table 6: Results of Co-integrating Regression Analysis (4B/R Market)

Markets	Variable	Coefficients	Std. Error	t-statistic	Prob	R	DW
Maitama	REAL_GDP	0.1967	0.2702	0.7279	0.4993	0.6096	1.82
	EXCH_RATE	0.0705	0.0238	2.9667	0.0313		
	INTE_RATE	0.6248	0.2371	2.6346	0.0463		
	INFLATION	0.2165	0.0525	4.1214	0.0092		
	EMPLOY_RATE	0.1203	0.0263	4.5734	0.006		
	UNEMPL_RATE	-0.0869	0.0509	-1.7093	0.1481		
	C	20.4129	9.4349	2.1635	0.0828		
Wuse	REAL_GDP	0.1150	0.02504	4.5952	0.0025	0.7866	1.95
	EXCH_RATE	0.1026	0.0220	4.6613	0.0055		
	INTE_RATE	0.1325	0.02197	6.0342	0.0018		
	INFLATION	0.3144	0.0487	6.4579	0.0013		
	EMPLOY_RATE	0.0852	0.0244	3.4953	0.0174		
	UNEMPL_RATE	-0.1512	0.0472	-3.2064	0.0238		
	C	-50.3989	8.7432	-5.7644	0.0022		
Gwarinpa	REAL_GDP	0.2535	0.1563	1.6217	0.156	0.1434	2.04
	EXCH_RATE	0.0109	0.0126	0.8638	0.4209		
	INTE_RATE	0.1122	0.0899	1.2469	0.2589		
	INFLATION	-0.018	0.0169	-1.0560	0.3316		
	EMPLOY_RATE	0.0464	0.0316	1.4697	0.192		
	UNEMPL_RATE	-6.7036	4.3732	-1.5329	0.1762		

	C	-6.7036	4.3732	-1.5328	0.1762		
Utako	REAL_GDP	0.1572	0.02397	6.5595	0.0012	0.7996	1.71
	EXCH_RATE	0.1293	0.0211	6.1347	0.0017		
	INTE_RATE	0.3451	0.0211	6.3938	0.0014		
	INFLATION	0.2379	0.0466	5.1055	0.0038		
	EMPLOY_RATE	0.1219	0.0233	5.2274	0.0034		
	UNEMPL_RATE	-0.2101	0.0451	-4.6539	0.0056		
	C	-58.8432	8.3703	-7.0300	0.0009		
Area 1	REAL_GDP	0.1588	0.2298	0.6911	0.5203	0.1623	2.12
	EXCH_RATE	0.029	0.0202	1.4428	0.2087		
	INTE_RATE	0.038	0.2017	0.1905	0.8564		
	INFLATION	0.0007	0.0447	0.0158	0.988		
	EMPLOY_RATE	0.0296	0.0224	1.3244	0.2427		
	UNEMPL_RATE	-0.0059	0.0433	-0.1368	0.8965		
	C	4.3938	8.0256	0.5475	0.6076		
Area 10	REAL_GDP	0.2626	0.3422	0.7675	0.4774	0.2625	1.98
	EXCH_RATE	0.0319	0.0301	1.0612	0.3371		
	INTE_RATE	0.3989	0.3003	1.3286	0.2414		
	INFLATION	0.1518	0.0665	2.2817	0.0074		
	EMPLOY_RATE	0.0176	0.0333	0.5281	0.6201		
	UNEMPL_RATE	-0.0482	0.0644	-0.7475	0.4884		
	C	11.2214	11.9472	0.9392	0.3907		

Fully Modified Least Squares (FMOLS)

The result of significant test of co-integration regression presented in Table 7 and Table 8 revealed that the overall market model for both Area 1 and Area 10 in Table 7 were jointly insignificant, and in Table 8, the overall market model for Gwarinpa, Area 1 and Area 10 were jointly insignificant. Furthermore, Maitama, Wuse, Gwarinpa and Utako in table 7 and Maitama, Wuse and Utako in Table 8 had their overall market model to be statistically significant, in other words. All variables included in the market models were jointly significant. Therefore, the models can be used for the purpose of predicting of returns in the markets.

Table 7: Wald Test of Significance of the Co-integrating Regression Model

3B/R Markets	T statistic	Value	DF	Prob
Maitama	F-statistic	5.516434	(8, 5)	0.0391
Wuse	F-statistic	15.10564	(8, 5)	0.0043
Gwarinpa	F-statistic	5.915467	(8, 5)	0.0331
Utako	F-statistic	5.806467	(8, 5)	0.0352
Area1	F-statistic	3.688136	(8, 5)	0.0849
Area 10	F-statistic	0.849408	(8, 5)	0.5935

Table 8: Wald Test of Significance of the Co-integrating Regression Model

4B/R Markets	T statistic	Value	DF	Prob
Maitama	F-statistic	5.970942	(8, 5)	0.0333
Wuse	F-statistic	9.047895	(8, 5)	0.0138
Gwarinpa	F-statistic	1.108410	(8, 6)	0.4581
Utako	F-statistic	12.61281	(8, 5)	0.0066
Area 1	F-statistic	1.185575	(8, 5)	0.4407
Area 10	F-statistic	1.612272	(8, 5)	0.3096

CONCLUSION AND RECOMMENDATION

The influence of macroeconomic variables in Abuja residential market property market showed that the real GDP, exchange rate, inflation, interest rate and employment rate have been found to have a significant influence on property return across the nine markets. Therefore the implication of this outcome is that property investors tends to have an increase in property returns whenever positive macroeconomic policy is made to secure the economy by improving GDP base, increasing exchange rate to encourage local demand, the increase in employment rate increases the purchasing power in housing market, increase in interest and inflation rates increase the housing rent and prices thereby positively influence the investor's return, property returns are negatively influenced by negative policy-action that meant to increase unemployment in the economy, therefore any development in economy must be continuously monitored to determine how such development affect property returns. It is on this basis that the study recommends that the policy-makers should painstakingly study the past and present economic policy before the implementation as such could adversely affect the property market which conversely affects the contribution of real estate sector into national economy development.

REFERENCES

- Abraham, J. and Hendershott, P. (1996), "Bubbles in Metropolitan Housing Markets", *Journal of Housing Research*, 7(2): 191-207.
- Apergis N. (2003), "Housing Price and Macroeconomic Factor: Prospect within the European Monetary Union", *International Real Estate Review*, 6(1): 63-74.
- Belo M. and Abgatekwe A. (2002), "Project Management in Property Development: the Nigeria experience", *Ibadan: University Press PLC*.
- Born, W. and Pyhrr, S. (1994), "Real Estate Valuation: The Effect of Market and Property Cycles", *Journal of Real Estate Research*, 4(3): 455-485.
- Brook and Tsolacos (2001), "Linkages between Property Return and Interest Rate. Evidence for the UK", *Journal of Applied Economics*, 33(6): 711-719.
- Brooks, C. and Tsolacos, S. (1999), "The Impact of Economic and Financial Factors on UK Property Performance", *Journal of Property Research*, 16(2): 139-152.
- Clark, A. and Daniel, T. (2006), "Forecasting south Africa house price", *Journal of Investment Analysts*, 64:27-33.
- Dehesh, A. and Pugh, C. (1998), "Property Cycles in a Global Economy", *Urban studies, Journal of Real Estate Research*, 37(13): 2581-2602.
- Edelstein, R. and Tsang D. (2007), "Dynamics of residential housing cycles analysis", *Journal of Real Estate Finance*, 35: 295-313.
- Feng L., Lu W., Hu W. and Liu K. (2010), "Macroeconomic Factors and Housing Market Cycle: an Empirical Analysis Using National City Level Data in China", *The Conference on Web-Based Business Management, Scientific Research*.
- Frankfort-Nachmias, C. and Nachmias, D. (1996), "Research Methods in the Social Sciences", *Fifth Edition*, Arnold, London.
- Fraser, W.D. (1993), "Principles of Property Investment and Pricing", London: *The Macmilland Press Ltd*.
- Ge, X.J. (2009), "Determinant of House Price in New Zealand", *University of Technology Sydney. Pacific Rim Property Research Journal*, 5(1): 90-121.
- Giussani, B, Hsai M. and Tsolacos S. (1992), "A Comparative Analysis of the Major Determinants of Office Property Value", *Journal of Property Valuation and Investment*, 11: 157-173.
- Gutpa R., Jurglas M. and Kabundi A. (2010), "Effect of Monetary Policy on Real House Price Growth in South Africa. A factor-Augmented Vector Autoregressive Approach", *Economic Modelling*, 27: 315-323.
- Hoesli, M. and Macgregor B. (2000), "Property Investment: Principles and Practice of Portfolio Management", Longman Essex.
- Joshi, H. (2006), "Identifying the asset price bubble in the housing market in India: Research bank of India", 27(2): 73-88.
- Kalu, I. U. (2001), "*Property Valuation and Appraisal*", Owerri: Bon Publications.

- Kwangware, B. (2010), "The Impact of Macroeconomic and Financial Factor On The Performance of the Housing Property Market In South Africa. Department of Economics and Economic History": *Rhodes University Conference, Grahamstown*.
- Ling, D. and Naranjo, A. (1997), "Economic Risk Factor and Commercial Real Estate Returns", *Journal of Real Estate Finance and Economics*, 14(3): 283-30.
- Lizieri, C. and Satchell, S. (1997), "Property Company Performance and Real Interest Rate: a Regime Switching Approach", *Journal of Property Research*, 14(1):85-97.
- Miregi, M. O. and Obere, A. (2014), "Effect Of Market Fundamental Variable On Property Prices In Kenya- A Case of Nairobi Residential Property Market". *Journal of Economics and Finance*, 5(5): 101-113.
- Ojetunde, I. (2013), "Revisiting Interaction between the Nigeria Residential Property Market and the Macro Economy. International Federation of Surveyor", *Journal of Geography, Environment and Planning*, 7(2): 256-278.
- Ojetunde I., Popoola N. and Kemiki O. (2011), "On the Interaction between the Residential Property Market and the Macro Economy", *Journal of Geography, Environment and Planning*, 7(2), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2105998, Retrieved: 10.05.2017.
- Peng, R. and Hudson-Wilson S. (2002), "Testing Real Estate Price Bubble: An Application to Tokyo Office Market", *Proceedings of 7th conference in Seoul*.
- Peng W., Tan B. and Yiu M. (2005), "The Property Market and the Macro Economy of the Mainland: A Cross Region Study Hong Kong", *Institute for Monetary Research China*.
- Samy, L. (2015), "Indices of House Price and Rent Prices of Residential Property in London 1835-1939", *Discussion Paper in Economics and Social History Number 134*.
- Sarı, R., Ewing B. T. and Aydın, B. (2007), "Macroeconomic variables and housing market in Turkey", *Emerging markets finance and trade*, 43(5): 5-19.
- Schalck, C. and Antipa, P. (2009), "Impact of fiscal policy on residential investment in France", *Journal of Urban Economics*, 37(2): 1-33.
- Sinbad, M. and Mhlanga, R. (2013), "The Interaction Between Property Return and The Macro Economy", *International Journal of Business and Social Research*, 3(4): 146-152.
- Udoekanem, N. B., Ighalo J. I. and Nuhu, M.B (2014), "Determinants of Commercial Property Rental Growth in Minna, Nigeria", *EUL Journal of Social Science*, 5(1): 60-75.
- Udoekanem, N.B., Ighalo J. I., Sanusi, Y. A. and Nuhu M. B. (2015), "Office Rental Determinants in Wuse Commercial District of Abuja, Nigeria", *University of Mauritius Research Journal*, 21:1-26.
- Wei, Q. and Morley, B. (2012), "The Interaction between the Macro Economy and House Price Return", *Journal of Property Return*, 17(8): 1-17.

Wilhelinsson, M. (2000), "The Impact of Traffic Noise on the Value of Single-Family Houses", *Journal of Environmental Planning and Management*, 43(6): 799- 815.

Yusof, M. A. and Ismail, S. (2012), "Multiple Regression in Analyzing House Price Variation", IBIMA Publishing, Article ID 38310 :19-18.

Muktar Babatunde Wahab is a real estate Practitioner and Research Assistant at Federal University of Technology, Minna Nigeria. He holds a Bachelor of Technology (B.Tech) in Estate Management and Master of Technology (M.Tech) in Estate Management and Valuation at Federal University of Technology Minna, Nigeria. His research interest is property investment market analysis and economic dynamics in Property Market.

Muktar Babatunde Wahab, Federal Teknoloji Üniversitesi, Minna Nijerya'da gayrimenkul Uygulayıcısı ve Araştırma Asistanı olarak görev almaktadır. Federal Teknoloji Üniversitesi'nde Gayrimenkul Yönetimi lisansını tamamlamış ve yine Federal Teknoloji Üniversitesi'nde Gayrimenkul Yönetimi ve Değerleme yüksek lisans programından (M.Tech) mezun olmuştur. Araştırma ilgi alanları, gayrimenkul piyasasında gayrimenkul yatırım piyasa analizi ve ekonomik dinamikler üzerine yoğunlaşmaktadır.