



Effect of inflation on residential property development in Bauchi metropolis

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Abstract: *The study is aimed at examining the effect of inflation on residential property development in Bauchi Metropolis. The research design adopted in this study was a survey design where structured questionnaire was administered to the target respondents. Secondary data were obtained from the Central Bank of Nigeria, National Bureau of Statistics and the records of practicing Estate Surveyors and Valuers in Bauchi State. The study employed both descriptive and inferential statistics for presentation and analysis of data. Data was analyzed using the Statistical Package for Social Science (SPSS) tool where a multiple regression analysis was carried out based on the confidence interval 95%. The number of completed properties over the period was taken as the dependent variable while the micro-economics variables of GDP, inflation, bank lending rate, income and prices of various building materials served as the independent variables.*

Key words: *building materials, inflation, interest rate, property development*

INTRODUCTION

Inflation is the rate of increase in prices over a given period of time. In simpler terms, inflation is 'too much money chasing too few goods' thereby causing a hike in prices of commodities. It is commonly taken to be an appreciation on real value whereas it is an increase in the volume of money and credit leading to a rise in the general level of prices and consequent erosion of purchasing power.

Inflation is characterized by a fall in the value of the country's currency and a rise in her exchange rate with other nation's currencies. This is quite obvious in the case of the value of the Naira (₦), which was ₦1 to \$1 (one US Dollar) in 1981, ₦100 to \$1 in year 2000 and over N128 to \$1 in 2003. In 2014 it was ₦161 to \$1, in 2016 it was ₦ 298 and presently it is ₦ 364 to \$1.

During inflation prices rises and prices of some goods and services rise faster than others while some may remain unchanged at the same time wages and salaries are more or less fixed but the prices of commodities continue to rise. This is evident in the prices of goods and services which has made it almost difficult to an average Nigerian to meet up the basic requirement of a decent livelihood. The price of building materials is not an exception as most of the materials are imported into the country which involves the exchange of currencies from different countries.

Where the materials are manufactured in Nigeria the raw materials are imported which consequently result to higher prices, even though these raw materials can be produced locally. Studies show that affordable housing or rent can have significant positive effects on citizens' economic development and personal well-being; access to health and education.

Recently, there has been growth in residential property development in Bauchi State as a result of development in road construction which improves accessibility in Bauchi metropolis coupled with the

influx of people from neighbouring states of Borno, Adamawa and Yobe State as a result of insecurity in those states. This increase in population has resulted to high rents and higher house prices. It then become pertinent to investigate the effect of prices of building materials on property development in Bauchi metropolis along side other micro-economic factors that affect residential property development in the study area.

Literature Review

According to Umaru and Zubairu (2012) the concept of inflation can be defined as a persistence rise in the general price level of broad spectrum of goods and services in a country over a long period of time. Adamson (1996) defines it as the rate of increase in general price level in an economy. Nwankwo (1982) believes that inflation is an excess of demand over supply.

Generally, the rapidly fluctuating inflationary pattern creates high degree of instability in an economy. Where the structure of the economy is weak, the effect could be very devastating.

Adamson (1996) identified fall in purchasing power, fall in aggregate output, fall in value of money, fall in exports, fall in exchange rate, increase in foreign debt burden and abandonment of currency as some effect of inflation in the economy.

Similarly, inflationary pressure is known to impact negatively on social welfare and disable the domestic economy from performing efficiently Fullerton, (Jr.) and Ikhida (1997).

Adewumi and Awosika (1982) observed that occasionally, inflation might be limited to only certain sectors of the economy or might exist in varying intensity in different sectors of the economy. This suggests that where there is little interdependence of the sectors, it is possible that inflationary pressures is strictly sectoral (Adewunmi and Awosika, 1982). However, it is argued that it is not possible to have a completely independent sector in an economy and hence the inflationary pressure in one sector is bound to transmit to other sectors depending on the nearness and degree of dependence. This was evidenced in a sectoral analysis performed by Adewumi and Awosika (1982) using time series data in Nigerian context which inferred that all sectors, except electricity, contributes to the overall inflationary trend.

Trend of Inflation in Nigeria

Trend of inflation in Nigeria shows ups and downs from 1970s to 2018. In 1970s Nigeria experienced a boom as a result of shift from agriculture to crude oil exportation which resulted to inflation rate of 13.8% in 1970. The shift brought about limited agricultural produce thereby creating scarcity, encouraged importation, helped increase instability in both exchange rate and inflation which led to a rise in inflation from 13.8% to 16% in 1971. It fell to 3.2 in 1972 and 5.2 in 1973. There was also rural urban migration which led to a fall in agricultural labour force, production gains from agriculture became poor, there was limited use of fertilizer which helps to improve the quality of the soil. Industrial Expansion was constraint at these period by the restrictive import policy adopted by the government which resulted in excess demand for many consumer goods and services which later resulted to high prices in the economy and consequently higher inflation rates up to 33.9%. Inflation continued to rise during the years until 1985 and 1986 when it dropped to a single digit of 5.5 and 5.4 respectively which was as a result of measures taken to deregulate exchange rate to solve the problem of inflation. It rose up to 40.9 in 1989. It fell in 1990 to 7.5% and 13% in 1991. It rose in 1992, 1993, 1994, and 1995 to 44.5, 57.2, 57, 72.8 respectively. as a result of international sanction. In the year 1999 and 2000 when the Democratic Government came they tried to adopt various policies geared towards economic growth such as privatization, recapitalization of commercial banks which brought inflation to a single digit of 6.6% and 6.9% respectively. Despite Government effort inflation rose to double digit from 2001-2006 to 18.9, 12.9, 14, 15, 17.9, and 15 respectively. In 2013 it fell to a single digit 8.5 and rose to a double digit 15.7 in 2016. It remained in double digit in 2017 and 2018 at 16.5 and 12.1 respectively.

Key economic factors influencing property development

There are key economic factors that inflation affects such that if inflation increases these factors increases and influences the ability of individuals and investors in developing residential property. These factors are gross domestic product (GDP), interest rate, mortgage finance.

- ***Gross Domestic Product (GDP)***

Gross domestic product measures the monetary value of final goods and services that is those that are bought by the final user-produced in a country in a given period of time (say a quarter or a year). It counts all the output generated within the borders of a country. It is composed of goods and services produced for sale in the market and also includes some nonmarket products such as defence, education service provided by the Government. Not all productive activity is included in GDP for example unpaid work (such as that performed in the home or by volunteers). Gross domestic product is important because it gives information about the size of the economy and how an economy is performing. The growth rate of real GDP is used as an indicator of the general health of the economy. In broad terms an increase in real GDP is interpreted as a sign that the economy is doing well. When real GDP is growing strongly, employment is likely to be increasing as companies hire more workers for their factories and people have more money in their pockets.

At present, concerns are in opposite direction. A several years of exceptionally strong real GDP growth many countries are experiencing a slow down with real GDP estimated to have declined in a number of industrial countries in recent quarters.

- ***Interest Rate***

Interest is effectively the cost of using borrowed funds over a period of time. McAleese (2004) defined interest rate as the amount of interest paid per unit of time as a fraction of the balance outstanding. Interest rate is also considered as the rate of return on investment. It is expected that as inflation rates change, there is a corresponding change in the interest rates (Brealey *et al*, 2006). This simply means inflation determines the rate of interest fixed on loans obtained from financial institution by individuals for residential property development, where the inflation is high the rates becomes high because the financial institution will protect its finances against the expected future inflation, the result of this is that it will discourage people from seeking for such loans. This translate to the fact that people will not be able to build their own houses from their income.

Residential property purchase is affected by interest rates where the residential property purchase is financed by a mortgage bond. This has been suggested in some international research where it was found that the most important factor affecting residential house prices in the United Kingdom was interest rates.

Yun, Wong, Man, Hui and Seabrooke (2003), indicates that the effect of interest rates on housing prices is dependent on whether the country is in an inflationary or deflationary period. Their study on housing prices in Hong Kong, spanning 1981 to 2001, found that in times of inflation (pre-1997) there was an inverse relationship between housing prices and nominal Interest Rates while in periods of deflation (1998-2001) there was a positive relationship between interest rates and property prices. This illustrated that a decline in interest rates did not results to increase in property prices during the period.

- ***Mortgage***

In spite of the merits of mortgages for financing housing, the experience in Nigeria is that mortgage lending is small in scale and difficult to access. Ademiluyi (2010) attributes the housing problem in Nigeria to the absence of specified criteria, principles and philosophy with planned aims and objectives that define the overall housing policy on which housing programmes and delivery system should be based on.

The absence of a robust secondary mortgage market has been identified as a major reason for the poorly organized and developed mortgage system in Nigeria. Nubi (2002) asserted that the existing primary mortgage institutions are poorly capitalized and inexperienced, granting short term loans at very high interest rates.

A well-functioning mortgage market is considered to have large external benefits to the domiciled national economy like contribution to economic growth and improved standards of living. With the absence of a well-functioning housing finance system, a market-based provision of housing would therefore be lacking. The contribution of mortgage finance to Nigerias GDP (Gross Domestic Product) is close to negligible with real estate contributing less than 5%, and mortgage loans and advances at 0.5% of GDP. The Minister of Lands, Housing and Urban Development recently put Nigeria’s debt to mortgage ratio, a measure of the penetration of mortgage section at a dismal 4%. In spite of the relative growth in Nigerian mortgage sector, the 4% figure is one of the lowest in Africa behind South Africa (30%), Namibia (20%), Morocco (15%) and Tunisia (13%). Finmark Trust (2010) also revealed that only 15% of the houses sold by developers in Nigeria are bought using mortgages. This is a glaring contrast to 77% in the United State, 80% in the United Kingdom, 50% in Hong Kong and 33% in Malaysia. The Bank of England estimated that one-third of lending by UK banks world-wide is to the commercial real estate sector. Omirin and Nubi (2007) observed that the contribution of deposit money banks to housing provision is insignificant and that such loans are provided at excessively high interest rates besides other attached stringent conditions.

Research Methodology

The research design used in this study was a survey research design using quantitative analysis of secondary data obtained from the Central Bank of Nigeria, National Bureau of Statistics and the records of practicing Estate Surveyors and Valuers in Bauchi State. The study employed both descriptive and inferential statistics for presentation and analysis of data. Data was analyzed using the Statistical Package for Social Science (SPSS) tool where a multiple regression analysis was carried out based on the confidence interval 95%. The number of completed properties over the period was taken as the dependent variable while the micro-economics variables of GDP, inflation, bank lending rate, income and prices of various building materials served as the independent variables,

The multiple regression model is in the form

$$Y= a+\beta_1X_1+\beta_2X_2+\beta_3X_3..... +\beta_nX_n + \varepsilon \dots\dots\dots 1$$

- Where: Y= Dependent variable;
- a= constant/intercept
- X₁-X_n= Independent Variable
- β₁-β_n=Coefficients
- ε= Error

Thus based on the above, the following model was formulated.

$$COMPTY=a + \beta_1INF+ \beta_2BLR+ \beta_3GDP+ \beta_4INCOME + \beta_5PPC + \beta_6PT + \beta_7PTS + \beta_8PTG + \beta_9PCS + \beta_{10}PSR + \beta_{11}MDAY + \varepsilon$$

- Where:
- COMPTY= Number of Completed Properties
- a= Constant or intercept
- INF= Inflation
- BLR= Bank Lending Rate
- GDP= Gross Domestic Product
- INCOME= Income
- PPC= Price of Portland Cement
- PTS= Price of Trip of Sand
- PTG= Price of Trip of Gravel
- PCS= Price of Corrugated Iron Sheet

PSR= Price of Steel Rod

MDAY=Man-Day Hour

β_1 - β_{11} =Coefficients

Results And Discussion

Trend Analysis of inflation, other macro-economic variables and Prices of Building Materials

Figure 1 shows inflation rate from 2004-2013. In 2004 inflation rate was 15%,it rose to 17% in 2005,there was a fall in 2007 to 5.41%.It rose to 11.58%,12.54%13.72% in 2008,2009,2010 respectively and there was a fall in 2013 to 10.67% which is two digit and not good for the economy.

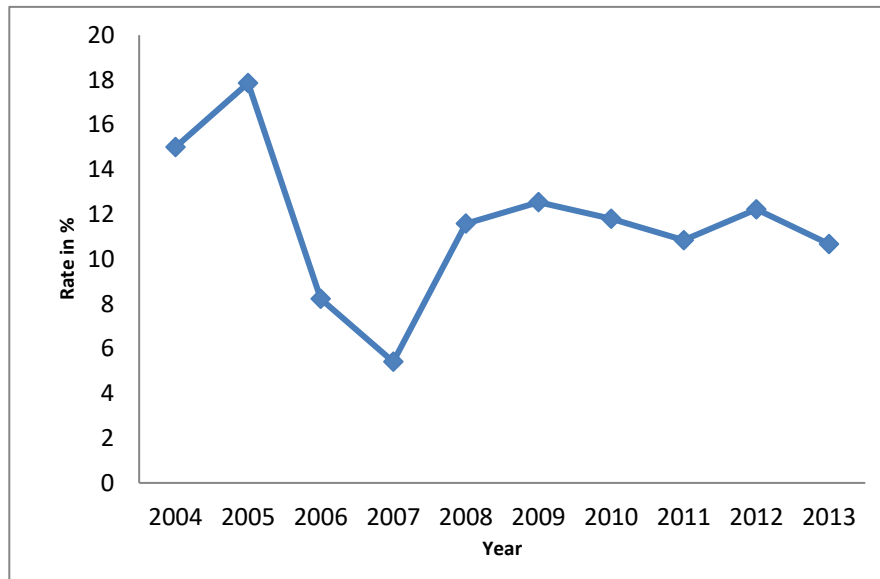


Figure 1: Inflation rate for the period 2004 - 2013

Figure 2 shows a rise throughout the period under study from 765.00 per capita in 2004 to 1052.18 per capita in 2013.

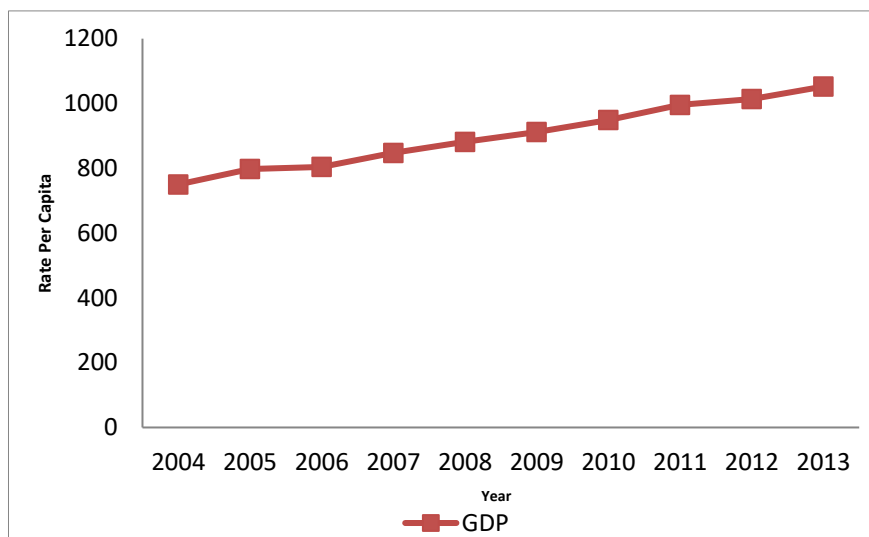


Figure 2: Gross Domestic Product Rate for the period 2004 - 2013

Figure 3 revealed that in 2004 the bank lending rate was 19%.There was a fall in 2005, 2006 2007 and 2008 to 18, 17, 17 and 15 respectively. It rose to 18.2 in 2009, and in 2013 it was 17%.

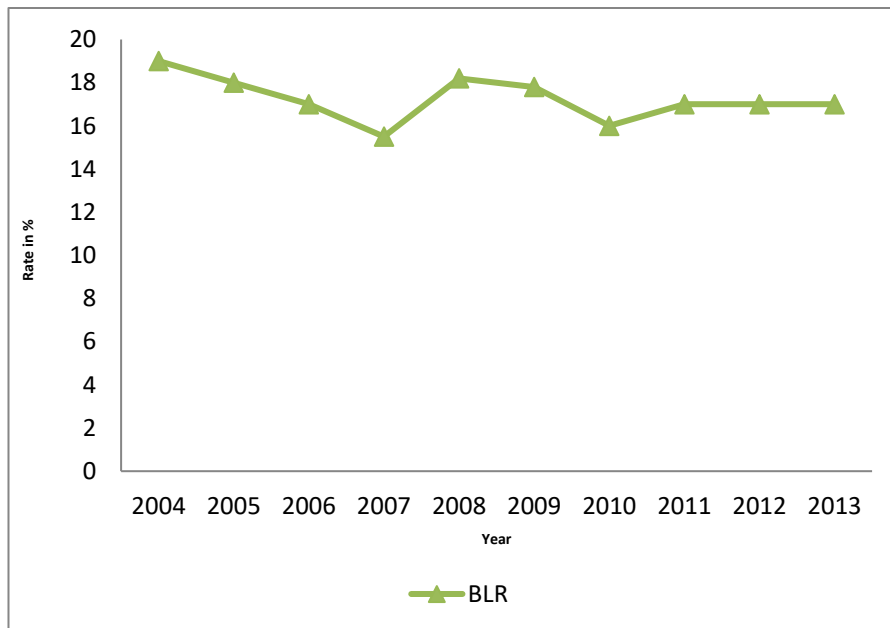


Figure 3: Banking Lending Rate for the period 2004 - 2013

Figure 4 showed a continues increase in the price of timber, the price was ₦ 450 in 2004,2005,it rose to ₦ 500 in 2006, 2007, it then rose to ₦ 600 in 2008 and then rose to ₦ 750, ₦ 850, ₦ 850, ₦ 900, ₦ 950 in 2009, 2010, 2011, 2012 and 2013 respectively.

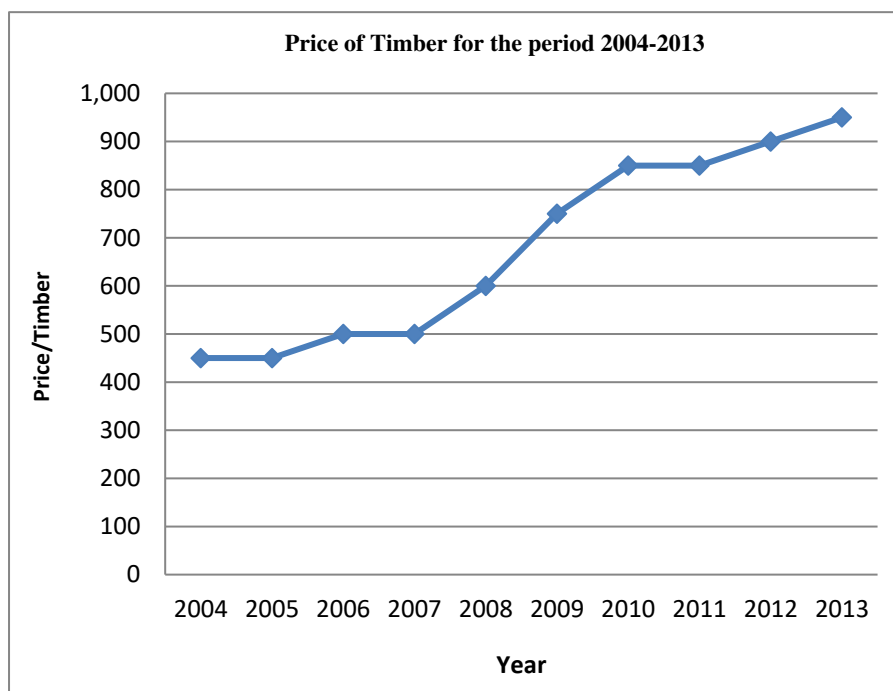


Figure 4: Price of timber for the period 2004 - 2013

Figure 5 showed that the price of cement fluctuates during the period under study. It was ₦ 1050 in 2004 to ₦ 1250 in 2005, it rose to ₦ 1570 in 2006 to ₦ 1600 in 2007 and was ₦ 1650, ₦ 2000, ₦ 2000 and ₦ 2850 in 2008, 2009, 2010, 2011,2012 and 2013 respectively.

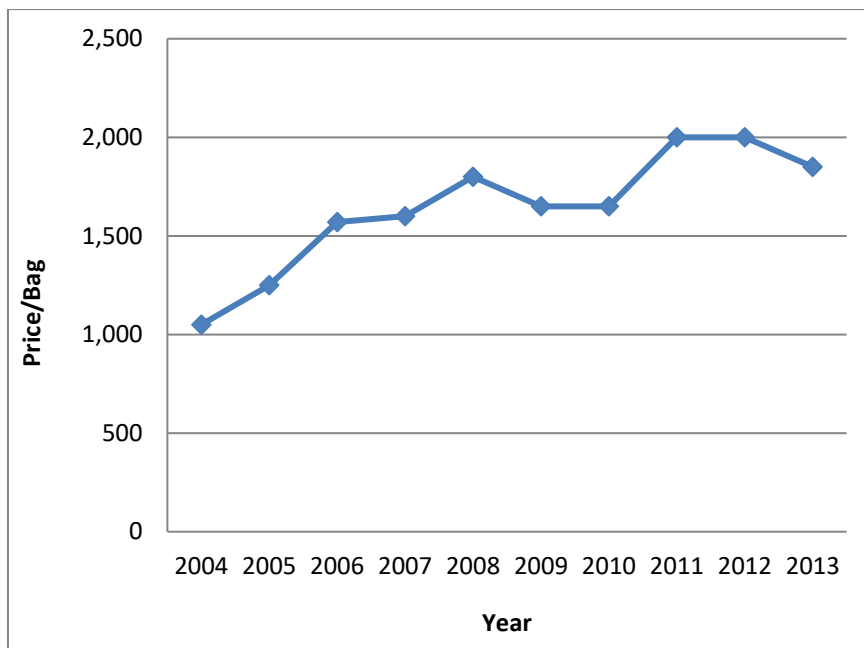


Figure 5: Price of 50kg Bag of Portland cement for the period 2004 - 2013

Figure 6 indicated a continuous rise in the price of gravel from 2014 - 2013. The price was ₦ 17,000 in 2004, it rose to ₦ 18,500, ₦ 19,000, ₦ 20,000, ₦ 22,000, ₦ 25,000, ₦ 28,000, ₦ 30,000 and ₦ 35,000 in 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

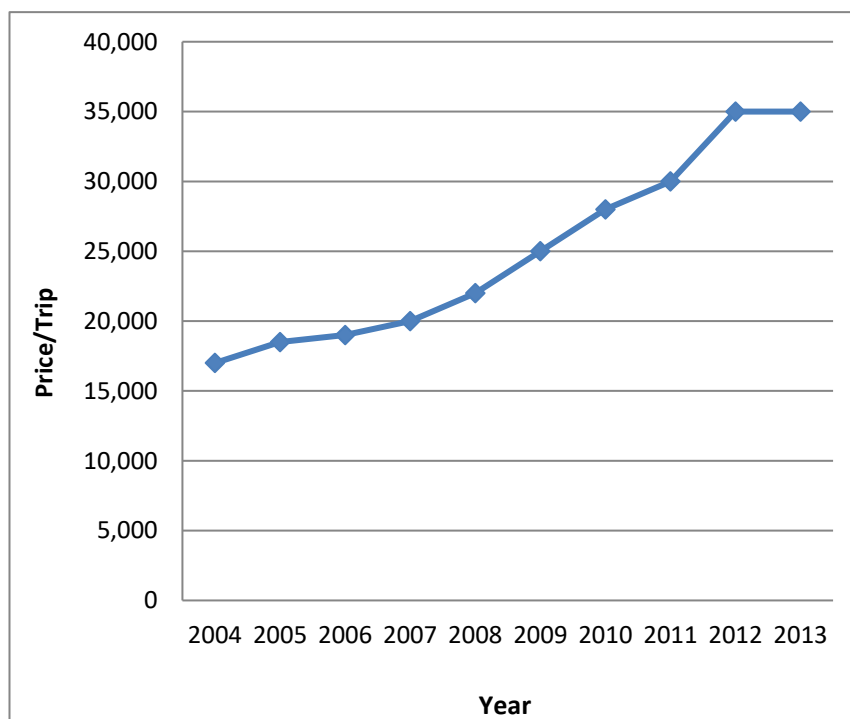


Figure 6: Price of Trip of Aggregate (Gravel) for the period 2004-2013

Figure 7 shows a continuous rise in the price of corrugated iron sheet. The price was ₦8,000 in 2004 and it then rose to ₦ 8,500, ₦ 9,000, ₦ 10,000, ₦ 10,500, ₦ 10,700, ₦ 11,500, ₦ 12,500, ₦ 12,500 and ₦ 11,500 respectively.

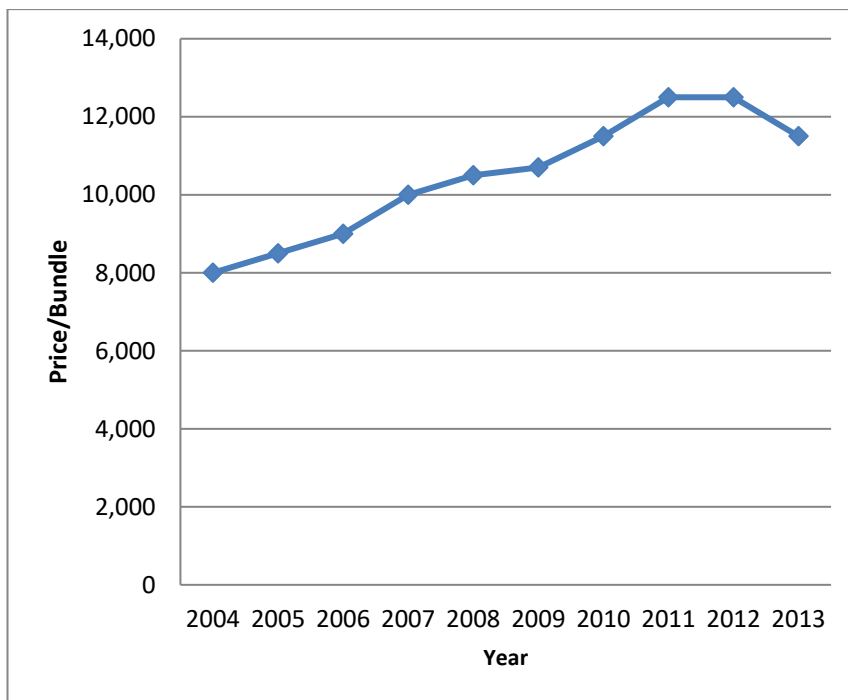


Figure 7: Price of One Bundle of Corrugated Iron Sheet for the period 2004-2013

Figure 8 revealed a continuous rise in the price of sharp sand from ₦ 5,500 in 2004 to ₦ 6,000, ₦ 6,500, ₦ 6,700, ₦ 7,000, ₦ 7,000, ₦ 7,500, ₦ 8,000 in 2005, 2006, 2007, 2008, 2009, 2010, 2011 respectively and then there was a sharp rise to N16,000 in 2012 and 2013

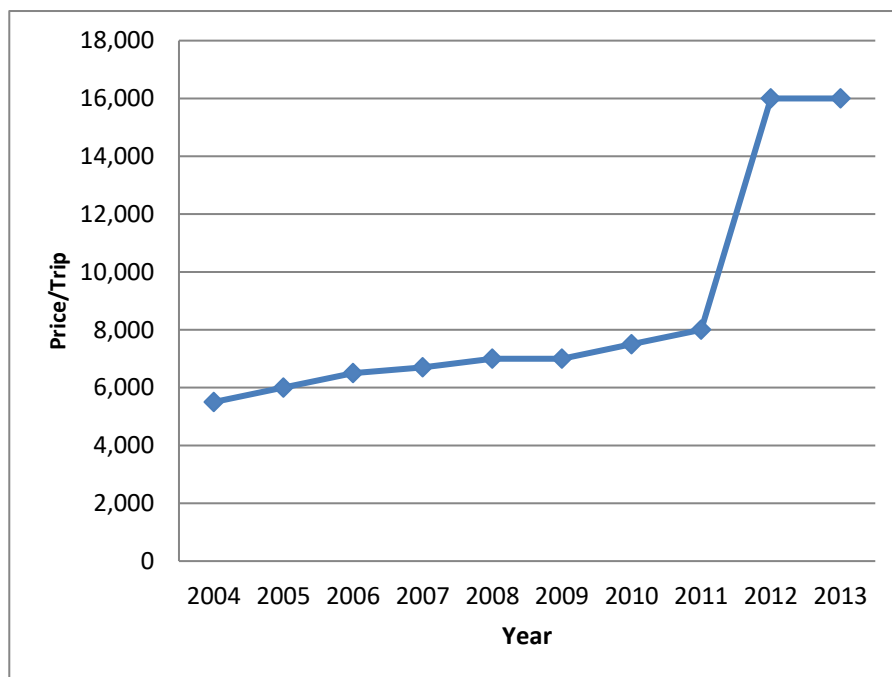


Figure 8: Price of Trip of Sharp Sand for the period 2004-2013

Figure 9 revealed that the price of man hour per day was relatively stable then there was a sharp rise where in 2004 the price was ₦ 1,250 and ₦ 1,500, ₦ 1,500, ₦ 1,500, ₦ 1,500, ₦ 1,500 in 2005, 2006, 2007, 2008, 2009 respectively and then a sharp rise in 2010, 2011, 2012 to ₦ 2,250 and to ₦ 3,000 in 2013.

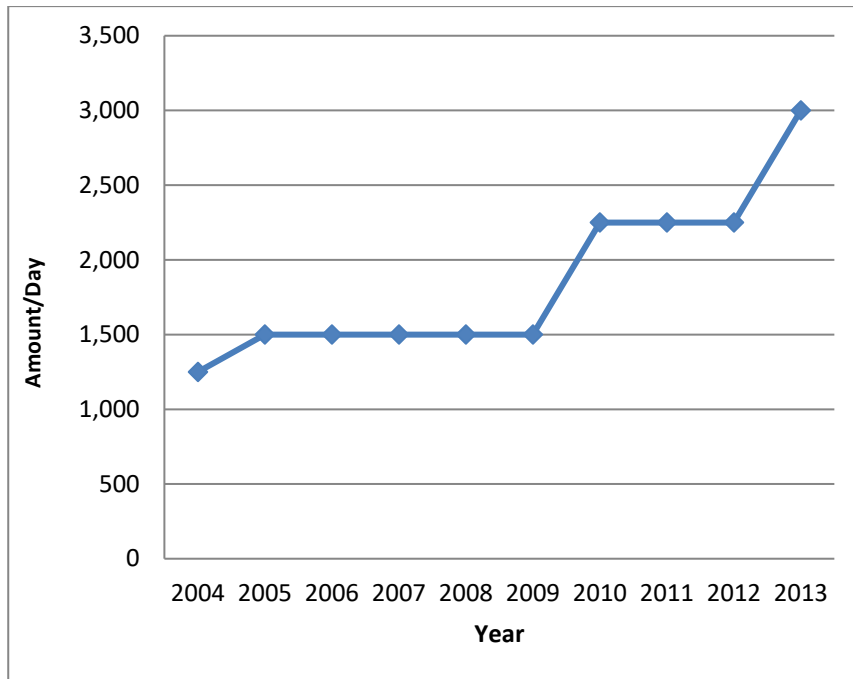


Figure 9: Man-Hour/Day for the period 2004-2013

Rental Trend in the Study Area

Figure 10 shows rise in the rent of one bedroom and 2 bedroom located in Wunti Dada throughout the period under study. For one bedroom the rent was N35,000 in 2004, it rose to ₦ 40,000, ₦ 40,000, ₦ 45,000, ₦ 80,000, ₦ 85,000, ₦ 90,000, ₦ 110,000, ₦ 12,000 and ₦ 120,000 in 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

For 2bedroom it was N80,000 in 2004 and 2005, it rose to ₦ 95,000, ₦ 95,000, ₦ 95,000, ₦ 100,000, ₦ 100,000, ₦ 120,000, ₦ 150,000 and ₦ 150,000 in 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

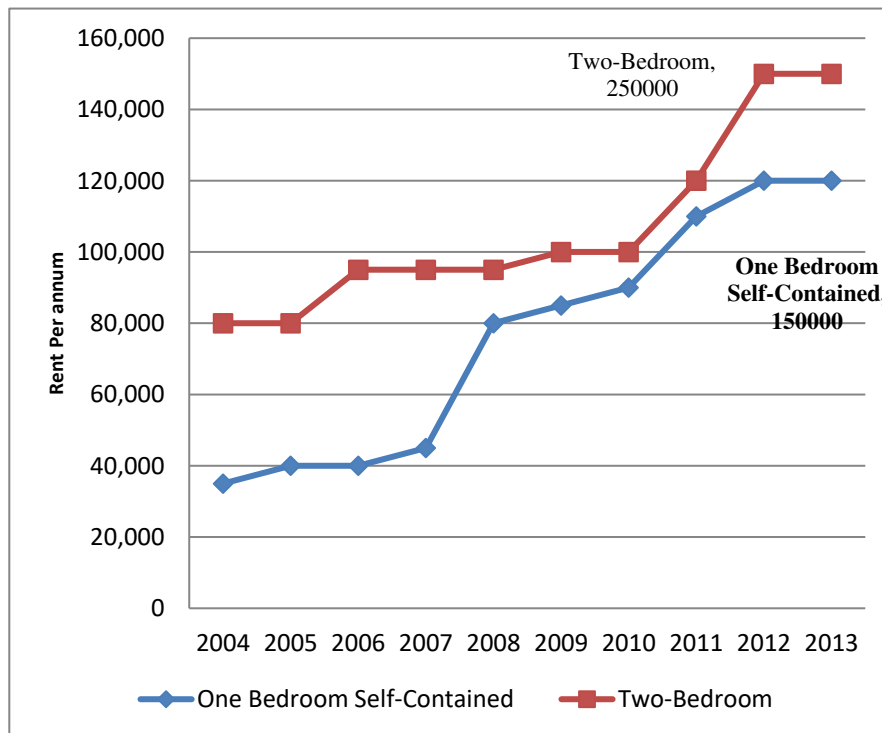


Figure 10: Rental trend in the study area 2004-2013

Figure 11 shows that rent of one bedroom in 2004 was ₦ 100,000 the rent was stable up to 2006. In 2007 it was ₦ 120,000 up to 2009 and in 2010 it was ₦ 125,000 then it rose to ₦ 130,000, ₦ 150,000 and ₦ 150,000 in 2011, 2012 and 2013 respectively.

Two bedroom was ₦ 140,000 in 2004 then it rose to ₦ 150,000, ₦ 150,000, ₦ 200,000, ₦ 200,000, ₦ 220,000, ₦ 230,000, ₦ 230,000, ₦ 250,000 and ₦ 250,000 in 2005, 2006, 2007, 2008, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

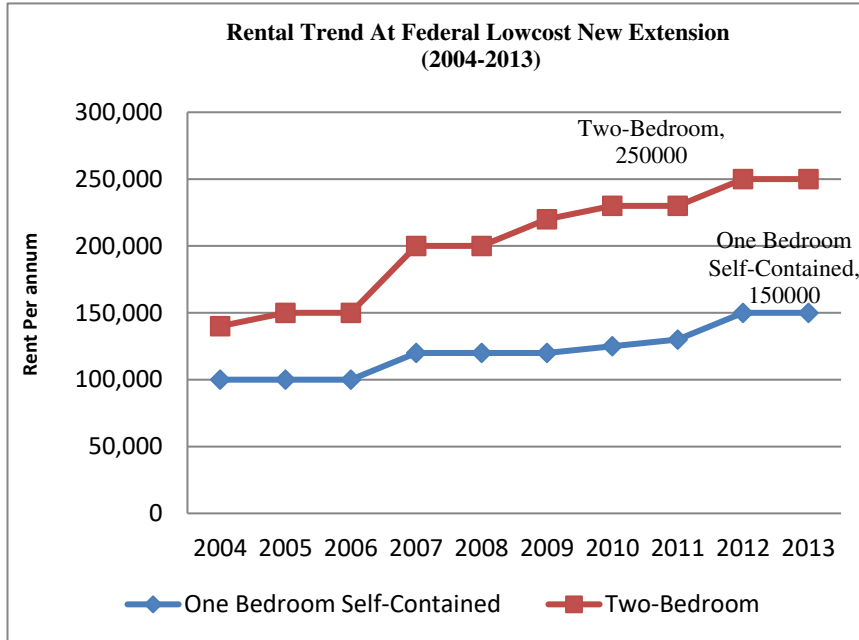


Figure 11: Rental Trend at Federal Lowcost New Extension for the period 2004 – 2013

Figure 12 shows that the rent of one bedroom in Yelwa as at 2004 was ₦ 75,000, in 2005 it was, it rose to ₦ 85,000, ₦ 85,000, ₦ 90,000, ₦ 90,000, ₦ 125,000, ₦ 130,000, ₦ 130,000 and ₦ 150,000 in 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

The rent for two bedroom was stable in the year 2004, 2005, 2006, 2007 which was ₦ 100,000, then it rose to ₦ 120,000, in 2008 and 2009, in 2010 it became ₦ 140,000 and then rose to ₦ 150,000, ₦ 150,000 and ₦ 180,000 in 2011, 2012 and 2013 respectively.

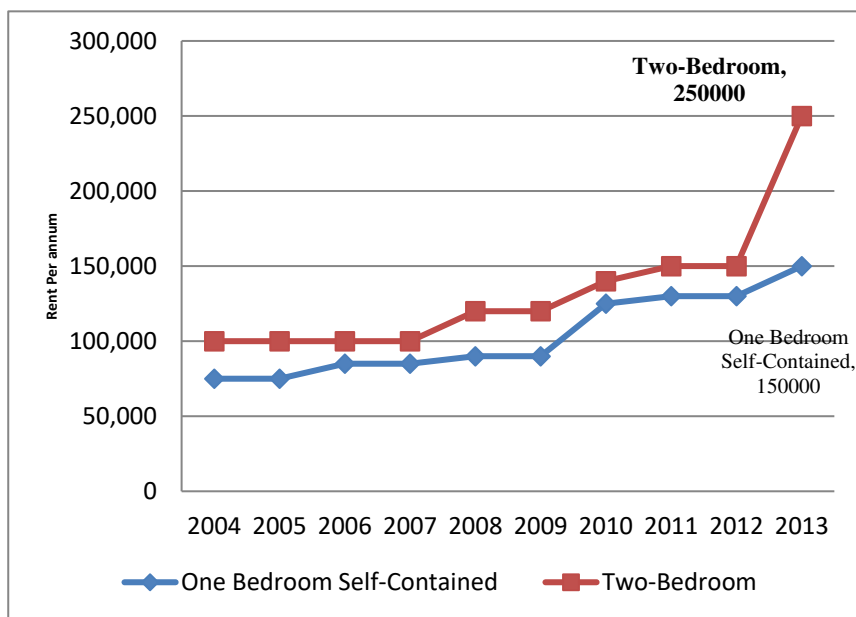


Figure 12: Rental Trend at Yelwa for the period 2004 – 2013

Figure 13 shows that in 2004 rent for one bedroom was ₦ 110,000 up to 2006, it rose to ₦ 120,000 in 2007 and was stable up to 2009. In 2010 it was 125,000 it rose to 130,000, 150,000 and 150,000 in 2011, 2012 and 2013 respectively.

Two bedroom was ₦ 130,000 in 2004 it rose to ₦ 140,000, ₦ 140,000, ₦ 180,000, ₦ 180,000, 200,000 ₦ 220,000, ₦ 250,000 and ₦ 250,000 in 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2013 respectively.

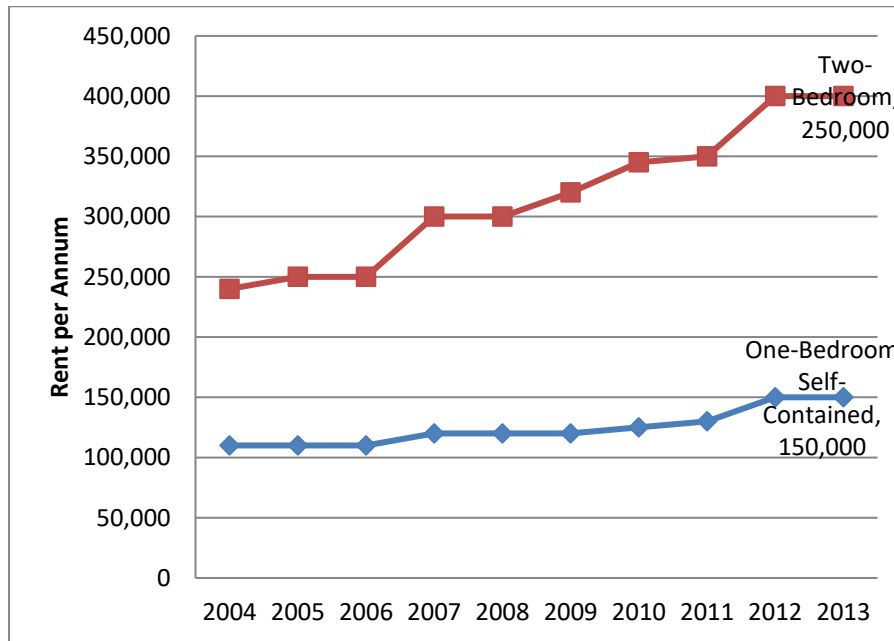


Figure 13: Rental Trend for Self-Contained and Two-Bedroom at Fadaman Mada

Measurement of Effect of Inflation on Residential Property Development

The model summary table reports the strength of the relationship between the model and the dependent variable. R, the multiple correlation coefficients, is the linear correlation between the observed and model-predicted values of the dependent variable. As shown in Table 11 the multiple correlation coefficient returned a value of .785 or 79% approximately. Its large value indicates a strong relationship. R-Square, the coefficient of determination, is the squared value of the multiple correlation coefficients. It shows that more than half of the variation in number of residential properties developed in the study area is explained by the independent variables in the model.

Table 1: Multiple Regression Analysis On Test Model(model summary)

Model	R	R-square	Adjusted R-square	Std. Error of the Estimate
1	.785	.616	.568	3.967
a. Predictors: (Constant), INF, BLR, GDP, INCOME, PPC, PT, PTS, PTG, PCS, PSR, MDAY				
b. Dependent Variable: COMPTY(Completed property)				

Key:

- INF= Inflation
- BLR= Bank Lending Rate
- GDP= Gross Domestic Product
- INCOME= Income
- PPC= Price of Portland Cement
- PTS= Price of Trip of Sand
- PTG= Price of Trip of Gravel
- PCS= Price of CorrugatedIron Sheet

PSR= Price of Steel Rod

MDAY=Man-Day Hour

COMPTY= Number of Completed Properties

Table 2 shows the ANOVA which tests the acceptability of the model from a statistical perspective. The Regression row displays information about the variation accounted for by the predictors of the model under consideration. The Residual row displays information about the variation that is not accounted for by the predictors but other unaccounted variables.

The significance value of the F statistic is less than 0.05, which means that the variation explained by the model is not due to chance.

Table 2: Multiple Regression Analysis On Test model ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	202.201	8	202.201	12.849	.007 ^a
	Residual	125.899	3	15.737		
	Total	328.100	11			
a. Predictors: (Constant), INF, BLR, , GDP, INCOME, PPC, PT, PTS, PTG, PCS, PSR, MDAY						
b. Dependent Variable: COMPTY						

Table 3 shows the coefficients of the regression line and the respective p-values. Among the eleven explanatory variables included in the regression model, eight showed statistical significance. These were GDP ($\beta=0.048$, p-value=0.004), INCOME ($\beta=0.001$, p-value=0.007), PT ($\beta=0.026$, p-value=0.011), PTS ($\beta=0.002$, p-value=0.0035), PTG($\beta=0.001$, p-value=0.004), PCS ($\beta=0.003$, p-value=0.005), PRS ($\beta=0.023$, p-value=0.026), MDAY ($\beta=0.009$, p-value=0.001). On the other hand, two explanatory variables, inflation (INF) and bank lending rate (BLR) reported beta and alpha values of -0.195, 0.759 and -2.653, 0.185 respectively.

Table 3: Multiple Regression Analysis on Test model Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	24.602	7.528		3.268	.011
INF (Inflation)	-.195	.614	-.112	-.317	.759
BLR (Bank Lending Rate)	-2.653	1.829	-.456	-1.451	.185
GDP (Gross Domestic Product)	.048	.012	.810	3.913	.004
INCOME (Income)	.001	.000	.785	3.584	.007
PPC (Price of Potland Cement)	.011	.005	.614	2.199	.059
PT (Price of Timber)	.026	.008	.757	3.279	.011
PTS (Price of Trip of Sand)	.002	.001	.667	2.533	.035
PTG (Price of Trip of Gravel)	.001	.000	.818	4.021	.004
PCS (Price of Bundle of Corrugated Iron Sheet)	.003	.001	.810	3.907	.005
PSR (Price of Steel of Rod)	.023	.008	.694	2.726	.026
MDAY (Man/Hour Day)	.009	.002	.869	4.979	.001
<i>a. Dependent Variable: COMPTY</i>					

As shown in Table 3 the coefficients of inflation and bank lending rate were all negative which indicate that increase in any of the two variables would result to decrease in the number of residential property

that would be developed in the study area. By implication therefore, inflation negatively affect the number of residential property development and this could be linked to the fact that prices of building materials responds to changes in inflationary trends especially in countries where price control is not enforced.

Conclusion

The research made an attempt to investigate effect of prices of building materials on property development in Bauchi metropolis along side other micro-economic factors that affect residential property development in the study area. It was found that bank lending rate and inflation rate are the major factors that affect individuals from owning their own houses, it then becomes pertinent for Government to improve on the value of naira so that the exchange rate of naira to dollar stabilized. This will in turn bring down the prices of materials imported into the country. In addition to this, is price economic stability It is recommended that government should invest in research and development of our indigenous building materials so that these materials can be manufactured in a more sophisticated way as to compete with the ones imported into the country. There should be enlightenment campaign on the need to use indigenous building materials for property development.

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