

## Office Rental Dynamics in Minna, Nigeria

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### Abstract

This study explored the dynamics of office rents in Minna, Nigeria. Data for the study were obtained from primary and secondary sources. Primary data for the study were obtained from estate surveying and valuation firms which are active in the commercial property market in the city through field survey and comprise rental values of thirty-six office properties in the city for the period, 2001-2012. The secondary data for the study include data on macroeconomic variables in Nigeria for the same period and were obtained from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS). Results of data analysis revealed that the rental growth factor for office properties in Minna for the period, 2001-2012 is 1.056, representing an average rental growth rate of 5.6% for the study period. Also, 83% of the variation in office property rents in the commercial property market in the city is explained by the office rent model developed for the city. The study concludes that real GDP growth and vacancy rates are the major drivers of office rental change in the commercial property market in Minna.

**Keywords:** Office Properties; Rental Growth, Property Market; Minna

### Introduction

Rent is an important concept in land economic theory. Rental payments have been made for the use of land since the beginning of organised land settlement. These payments represent the economic return that goes to real estate resources for their use in production (Barlowe, 1986). In modern times, the genesis of rent has been traced to the rise in individual enterprises, rights and responsibilities as a result of the fall of feudalism. In the days of feudalism, a rent relationship existed between the lord of the manor and his workers. These workers were those who worked on the land of the feudal lords. The rent relationship that existed during the feudal times was in the form of quit rents, customary dues paid in money and socage. In the feudal system, socage is a system of land holding, in which every tenant either pay rent or carry out fixed service, usually agricultural and nonmilitary in nature whereas quit rent is a rent in the feudal system paid by a tenant to a feudal lord in exchange for being released from some feudal obligations. In simple terms, rent is the economic return to land resources. It is also the value of land on annual basis (Ifediora, 2005). As a factor of production, classical economists over the years have attempted to analyze the economic concept of land, the role of land in the production process and the nature of land rent. They viewed rent as a price of land and a payment made by a tenant farmer to the landlord for the use of original and indestructible powers of the soil. This analysis was initially based on agricultural production and was gradually extended to other land uses.

Rent from land could also be viewed as an unearned monopoly return which land owners could claim because of the institution of private property. However, most investors and real property owners, in contrast, see rent as a return on the capital value of their real estate investments and compare these returns with those they could receive from alternative capital investments. On the other hand, tenants view rental payments as an operating cost (Barlowe, 1986). This study examined the dynamics of office rents in Minna, Nigeria to identify leading indicators which influence office rental movements

in the city. The study is justified by the need for real estate practitioners in the Minna to get a better understanding of the characteristics of rental fluctuations so as to obtain important insights to the behaviour of the office property market in the city.

### **Literature Review**

Rosen (1984) suggested that office rents are influenced by demand and supply factors. This assertion is based on the premise that the behaviour of office rents is normally explained by the variation in demand and supply variables. Offices are the premier city-building land use. They house the economic base in metropolitan service centers and are owned by institutional investors (Howarth and Malizia, 1998).

Previous empirical studies have examined several demand and supply variables in an attempt to isolate office rental determinants. Since the mid-1980s, commercial property rental analysis have relied on this basis, given the historical relationship between real rent levels on one hand and demand-side and supply-side variables on the other hand (Chin, 2003). A study conducted by Gardiner and Henneberry (1989) on the determinants of office rents in eight standard planning regions in the United Kingdom using spatially disaggregated annual data for the period, 1977-1984 found that regional Gross Domestic Product (GDP) and the regional stock of office floor space were the main factors affecting office rents in those regions. The study evaluated the determinants of office rent and described the initial stages in the development of a regional office rent prediction model which uses readily available data to aid the investment decision-making process. They rejected cross-sectional analysis and preferred time series approaches. They formulated a spatially disaggregated model which allows for delays between changes in user output and changes in user demand, and which reflects the variable adjustment rate between these two factors. They concluded that the combined influence of the independent variables in the derived equation can explain up to 97 per cent of the variation in rent over the period examined.

Gardiner and Henneberry (1991) developed a habit-persistence model which is based on the assumption that experience conditions present behaviour and expectations. The model combines the adaptive expectations hypothesis with the partial adjustment process. They concluded that accurate forecasts for declining regions were produced but the results for growing regions were not significant. Dobson and Goddard (1992) through their research provided an insight into the determinants of office rents in certain regions across the United Kingdom. Only demand-side variables were used in their study to test the determination of rental levels and they found that office employment, house price index and interest rates were the major office rental determinants in the areas under study.

Giussani, Hsia and Tsolacos (1993) examined office rent determinants across European cities for the first time. Their study also examined the relationship between office rental value and economic activity using cross section and time-series analysis, based on a demand and supply framework. The study empirically investigated office rental trends for some of the largest cities in Europe and used annual data for the period 1983-91 to test the changes in rental values and fluctuations in economic activity. They included a review of previous office market studies and an assessment of the research direction and information requirements of current European property research. Their findings suggest that European rental values are determined by similar demand-side variables and, in particular, real gross domestic product (GDP). Although the study ignored supply-side variables due to insufficient data at that time, they found that Gross Domestic Product (GDP) and unemployment rates play an important part in determining office rents. D'Arcy, McGough and Tsolacos (1994) also examined the determinants of office rents in twelve European cities over the period, 1982-1993 and their result is consistent with the result obtained by Giussani *et al* (1993). Similarly, they concluded that Gross

Domestic Product (GDP) and unemployment rates are the most important determinants of office rents across those twelve European cities.

Jones (1995) asserted that property markets are urban, or a series of linked urban markets, rather than regional and that the office market itself is determined by local flows, partly influenced in turn by urban form and differential planning policies. He concluded that the analysis of office property markets is most appropriately undertaken at the urban level and given the relationship between property market dynamics, demand and supply elasticities and rental change, rental growth for office properties is linked to the profitability of businesses and inflation and therefore subject to national economic influences.

McGough, Olkkonen and Tsolacos (1998) and D'Arcy, McGough, and Tsolacos (1998) examined individual property markets in Europe and offered additional insights into the determinants of office property rents. They also found that Gross Domestic Product (GDP) and unemployment rates were the important office rental determinants. Mueller (1999) determined rental growth rates to be statistically different at six different points in the property market cycle in the United States. McFarlane and Moon (1999) analysed demand, supply and rent in the office markets of Sydney and Melbourne central business districts in Australia using time-series data from 1970-1997 and were able to provide some insights into how net absorption, new office completion and rent relate with such independent variables as vacancy rate, occupied space, stock of office space and office employment. Yusof (2001) examined the determinants of office property rents in Malaysia with particular focus on the office market in the city of Kuala Lumpur. The study found that office rent in the city of Kuala Lumpur is significantly influenced by changes in unemployment level and average occupancy rate.

Chin (2003) analysed the relationship between macroeconomic factors and office rental movements in five South-East Asian cities of Singapore, Hong Kong, Taipei, Kuala Lumpur, and Bangkok over the period 1988-2001. The study tested office rental value against some indicators of economic activity which have been used in previous empirical studies. The study also assessed the influence of six-demand-side variables Real Gross Domestic Product (GDP), interest rates, prime lending rates, consumer price index, service sector output and unemployment rates and one supply-side variable (changes in office floor space). The study revealed that changes in floor space and prime lending rates were the key determinants of office property rental values in the selected cities apart from Bangkok.

Orr and Jones (2003) focused their study on the analysis and prediction of local office rents and in particular the development of econometric models for two UK cities, Edinburgh and Glasgow. Their study reviewed the current state of modelling and forecasting for office markets and noted the sparsity of urban office rent models. They contended that urban models that exist suffer from data problems and such models either make the fatal flaw of ignoring supply constraints or consider supply in terms of net change in floor space. The objective of their study was to address some of the deficiencies identified in existing empirical works on office market dynamics by using local take-up as a variable to model urban rents. Their study adopted two approaches to modelling urban office rents. The first model adopted a single reduced-form price equation using direct demand and supply measures and suggested that variation in market dynamics exists between the two centres. They asserted that these equations for the two cities have statistical weaknesses. The second model is a three-equation 'structural' model. The results of their analysis also suggest that Edinburgh responds more quickly to fundamental changes in supply-demand imbalances than Glasgow in the determination of office rents. The variation between Edinburgh and Glasgow, two cities within one administrative region of the UK, exemplifies the arguments in favour of urban analysis and the

deficiencies in the regional approach to forecasting. The results of their empirical analysis also emphasize the importance of including local supply variables in office rental modelling. They concluded that the use of a demand flow variable encompasses local economic drivers, and thereby negates to some extent the need for local economic indicators.

Hui and Yu (2006) analysed the Hong Kong's office rental market for the period 1990-2004, using single-equation multiple regression analysis incorporating systems dynamics. They found that vacancy rate, Finance, Insurance and Real Estate (FIRE) unemployment rate, Gross Domestic Product (GDP), change in Consumer Price Index (CPI), and FIRE Real Wage Index exerted significant influence on office property rental movement in the Central District of Hong Kong within the study period. In the same vein, Boon and Higgins (2007) examined the determinants of office rents in the Singapore office market for the period, June 1992-December, 2005, using a single equation regression analysis. Their office rent equation was able to account for 72 per cent of variation in gross office rents for the study period. Changes in previous year vacancy rates, construction costs, prime lending rates and office sector employment rates were identified by the study as the key determinants of variation in gross office rents in the Central Region of Singapore (Boon and Higgins, 2007). To this end, findings from all previous empirical studies which have been reviewed suggest that different locality is subject to different rental growth factors. These factors are basically grouped as demand and supply factors and include interest rate, inflation rate, unemployment rate, employment level, real GDP growth and vacancy rate. Consequently, direct application of rental growth parameters developed elsewhere to the analysis of the commercial property market in any city in Nigeria would produce spurious results due to variations in key rental determinants. This study explored these leading indicators to examine their influence on office rents in Minna, Nigeria.

### Research Methodology and Data

The target population for this study comprised office properties in Minna, Nigeria which are owned strictly for the purpose of investment and which are expected to produce benefits in the form of direct monetary return and are said to have income - earning potential or rent or income - earning capacity or generates rental income through letting. As used in this study, an office is an accommodation provided for advisory and service sectors of commerce, industry and related economic activities. The study covered office properties in Minna, for the period, 2001-2012. It utilized primary and secondary data. The primary data basically comprise rental data of office properties in Minna for the study period. These include annual data on rental levels for office properties under study for the period 2001 – 2012 and their specific characteristics, occupancy levels and property floor stock. Secondary data for the study are mainly data on macro-economic indices in Nigeria for the period 2001 – 2012. These macro-economic indices are inflation rate, interest rate on real estate loans, interest rate on commerce, Monetary Policy Rate (MPR), Gross Development Product (GDP), Exchange rate, Unemployment rate, and Employment rate. The type, composition and source of data utilized for the study is presented in Table 1.

**Table 1 - The type, composition and source of data utilized for the study**

Data Type	Composition	Source
Primary Data	Annual data on rental levels for office properties under study for the period 2001-2012 and their specific characteristics, office floor stock and occupancy levels.	Field Survey

Secondary Data	Annual data on inflation rate, interest rate on real estate loans, interest rate on commerce, Monetary Policy Rate (MPR), Gross Development Product (GDP), Exchange Rate, Unemployment rate, and Employment Rate.	Annual statistical bulletins of the National Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN) for the period, 2001-2012
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A total of 36 office properties in Minna were selected for this study using purposive sampling technique. The small number of office properties in Minna selected for the study is due to the paucity of reliable office property rental data in the city. Research instruments used in data collection for the study were based on this sample size. The values of the various variables utilised in the study were determined using different parameters. This necessitated the transformation of the original data on all the variables to a common unit of measure. This involved the conversion of the original data on all the variables to natural logarithm values. The purpose of this transformation was to linearise the original data for regression analysis.

### Results and Discussion

In order to establish the rental trend for the office properties under study, rental index was constructed based on the weighted rent/m<sup>2</sup> of office properties in the commercial property market in the city. The rental index was constructed using 2001 as the base year as presented in Table 2. Annual rental growth rates were determined for the properties under study for the period, 2001 – 2012. The annual rental growth rates were determined based on the rental growth factor of office properties for each year under study. The rental growth factor for each year under study was calculated as the quotient of the weighted rent/m<sup>2</sup> in the following year and the weighted rent/m<sup>2</sup> in the preceding year.

**Table 2 - Weighted Rent, Rental Index and Annual Rental Growth for Office Properties in Minna, 2001 – 2012**

Year	Weighted Rental Value/m <sup>2</sup> in ₦'000	Rental Index	Annual Rental Growth Rate
2001	1.7157	100	-
2002	1.715733	100.002	-
2003	1.7318	100.94	0.94
2004	2.013269	117.34	16.25
2005	2.027194	118.16	0.69
2006	2.347688	136.84	15.81
2007	2.462125	143.51	4.87
2008	2.576063	150.15	4.63
2009	2.675676	155.95	3.87
2010	2.836676	165.34	6.02
2011	2.9526	172.09	4.09
2012	3.126736	182.24	5.90

Office rents increased progressively in Minna during the study period. The weighted rent/m<sup>2</sup> for office properties in the city in 2001 was ₦ 1, 715.7. This increased to ₦ 2,462 in 2007 and ₦ 3, 126.7 in 2012. Rental index for office properties in Minna using 2001 as the base year indicates progressive upward movement in rental values of office properties in the city within the study period.

The average rental growth rate for office properties in the city for the period, 2001-2012 was determined using the geometric mean model, based on the natural logarithmic values of the weighted rent/m<sup>2</sup>. The choice of geometric mean for the calculation of the average rental growth rate for the office properties for the period, 2001 – 2012 was based on the fact that each annual rental growth rate accumulated over each year, thereby creating a compounding process for the entire period. The geometric mean reasonably approximates the exponential characteristics of this compounding process. The rental growth factor for office properties in Minna for the period, 2001-2012 is 1.056, representing an average rental growth rate of 5.6% for the study period as presented in Table 3.

**Table 3 - Office Rental Change, Rental Growth Factor and Average Rental Growth Rate for Office Properties in Minna, 2001 – 2012**

Rental Change	0.6001
Slope	0.05455
Rental Growth Factor	1.056
Average Rental Growth Rate	5.6%

Vacancy rates for office properties in the city for the period, 2001-2012 were determined based on the office space data for the city obtained through field survey as presented in Table 4. Given the stock of office space and office vacancy rate for a particular commercial property market, the occupied office space is expressed as:

$$\text{Occupied Space} = \text{Stock of Office Space} \times [1 - \text{Vacancy Rate}] \quad (\text{Equation 1})$$

$$\text{Hence, Vacancy Rate} = 1 - \frac{\text{Occupied Space}}{\text{Stock of Office Space}} \quad (\text{Equation 2})$$

The vacancy rate ranges from 0 to 1 (in decimal) or 0 to 100 (in percent). The higher the occupied space -to- stock of office space ratio, the lower the vacancy rate and conversely, the lower the occupied space -to- stock of office space ratio, the higher the vacancy rate. Similarly, vacancy rate is an important indicator of the level of economic vitality of a commercial area. It is also a measure of the quantum of unutilized space in the commercial property market. Thus, the closer the vacancy rate is to 0, the better the level of economic vitality of a commercial area.

**Table 4 - Office Space Data and Vacancy Rates in Minna, 2001 – 2012**

Year	Total Available Office Space (m <sup>2</sup> )	Occupied Office Space(m <sup>2</sup> )	Occupied -to- Stock of Office Space Ratio	Vacancy Rate (%)
2001	9246	2968	0.3210	67.9
2002	9246	5022	0.5432	45.68
2003	9246	5666	0.6128	38.72
2004	14089	8310	0.5898	41.02
2005	18798	10549	0.5612	43.88
2006	19033	11745	0.6171	38.29
2007	19033	12549	0.6593	34.07
2008	19033	13385	0.7033	29.67
2009	19919	15187	0.7624	23.76
2010	19919	16448	0.8257	17.43
2011	20315	17974	0.8848	11.52
2012	20817	19159	0.9204	7.96

The Augmented Dicker Fuller (ADF) unit root test was carried out on all the data series to examine the extent of their stationarity. The ADF result showed that all the variables are stationary at first-order difference, except changes in office rent and office vacancy rate that are stationary at second-order difference. This implies that the time series data on the variables utilised for the study are suitable for regression analysis. Also, based on the stationary nature of the time series data utilised for the study, Granger causality test was applied to the data to assess the causal linkage between the explanatory variables explored for the study and office rental movements in the commercial property market in the city. In econometrics, a time series  $x_t$  Granger causes another time series  $y_t$  if the addition of past values of  $x_t$  contributes significantly to the explanation of variations in  $y_t$ . The econometric model is as follows:

$$y_t = a_0 + a_1 y_{t-1} + a_2 y_{t-2} + a_m y_{t-m} + e_t \quad (\text{Equation 3})$$

Where  $x$  and  $y$  are stationary time series and  $e_t$  is the residual term. In econometric analysis, this autoregression is usually augmented through the inclusion of the lagged values of  $x$ . The result of the Granger causality test revealed that among all the explanatory variables explored for the study, only real GDP growth, vacancy rate and employment level have statistically significant causal linkage to office rental movements in Minna and as such Granger causes office rental movements in the commercial property market in the city as presented in Table 5.

**Table 5 - Result of Granger Causality Test between the Suggested Explanatory Variables and Office Rental Movements in Minna, 2001-2012**

Null Hypothesis	F-Statistics	p- Value
INTGC does not Granger cause Office Rent	0.24328	0.86176
INTREL does not Granger cause Office Rent	0.07593	0.96730
INFR does not Granger cause Office Rent	0.19324	0.89347
MPR does not Granger cause Office Rent	0.11097	0.94609
UNEMP does not Granger cause Office Rent	6.28899	0.14027
EXCHR does not Granger cause Office Rent	0.34749	0.79943
Real GDP does not Granger cause Office Rent	6.59364	0.03963*
EMP does not Granger cause Office Rent	27.9135	0.03478*
VACR does not Granger cause Office Rent	84.1431	0.01177*

\*Significant at 0.05 level INTGC= Interest Rate on General Commerce; INTREL = Interest Rate on Real Estate Loans; INFR = Inflation Rate; MPR = Monetary Policy Rate; UNEMP = Unemployment Rate; EXCHR = Exchange Rate; EMP = Changes in Employment Level; VACR = Office Vacancy Rate.

Consequently, explanatory variables with no statistically significant causal linkage were dropped while those with statistically significant causal linkage were utilised to develop regression model for office property rents in the commercial property market in the city. The regression analysis was based on the theoretical framework of the commercial property rent equation in which commercial property rent is assumed to be a linear function of demand and supply factors in the commercial property market. This was modified to capture the lags required for the rental adjustment process in the office property market in Minna. The result of the regression analysis is presented in Table 6. Based on the parameters presented in Table 6, the model for office property rents in the office property market in Minna is:

$$ORent = \beta_0 + \beta_1 EMP_{t-2} + \beta_2 RGDP_{t-1} + \beta_3 VACR_{t-1} + e_t$$

The Durbin-Watson Statistic for the model is 1.97. This exceeded its critical value at 0.05 level (1.864) and indicates that residual serial correlation was not statistically significant in the model. The collinearity statistics, that is, tolerance and Variance Inflation Factor (VIF) are within acceptable statistical limits and this suggests that the predictor variables for the model have no problem of multicollinearity.

**Table 6 - Result of the Regression Analysis**

Term	Coefficient	t-Statistics	p-Value	Tolerance	VIF	R2	SE	DW- Statistics
Intercept	4.658	30.50	<0.0001			0.83	0.15623	1.97
$\Delta EMP_{t-2}$	0.03565	1.15	0.2835	0.6463	1.5473			
$\Delta RGDP_{t-1}$	0.7351	5.68	0.0005*	0.3911	2.5569			
$\Delta VACR_{t-1}$	-0.2159	-3.27	0.0114*	0.4147	2.4114			

\*Significant at 0.05 level

Also, 83% of the variation in office property rents in the commercial property market in Minna is explained by the model with real GDP growth and vacancy rate as the major drivers of rental change. Although change in employment level Granger causes office rental movements in the city within the period under study, its influence in predicting office property rents in the city is not as significant as those of real GDP growth and vacancy rates. Thus, a unit increase in real GDP growth will produce 0.7351 increase in office rents in Minna while a unit increase in vacancy rate will produce 0.2159 decrease in office rent in the city. Also, a unit increase in employment level will produce 0.0357 increase in office rents in the commercial property market in the city. The significance of the regression models was tested using F-test. In terms of the model for office property rents in the office property market in Minna, the computed F-statistic (13.35) is significant at  $p=0.0018$ . This indicates that the office rent model for Minna fits the data utilised and as such can be used as a basis for prediction of office property rents in the commercial property market in the city. The result of the test for the statistical significance of the model is presented in Table 7.

**Table 7: Result of the Test for the Statistical Significance of the Regression Model**

Commercial Property Market	Source of Variation	Sum of Squares	DF	Mean Square	F-Statistics	p -Value
Minna	Model	0.97774	3	0.32591	13.35	0.0018*
	Residual	0.19527	8	0.02441		
	Total	1.17300	11			

\*Significant at 0.05 level

### Conclusion

The dynamics of office property rents in the commercial property market in Minna are significantly influenced by real GDP growth and vacancy rates. Theoretically, real GDP growth is an office space demand factor while vacancy rate is a major factor for office space supply. Based on the results of data analysis carried out for the study, real GDP growth and vacancy rates are the significant drivers of rental change in the office property market in Minna. While real GDP growth influences office rental movements in the office property market in the city positively, vacancy rate influences office rental movements in the office property market in the city negatively.

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