An Analysis of the Impact of Zoning Policies on Residential Property Values in Abuja

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Abstract: Zoning policies are measures used to enforce compliance and control the development of an area. These measures have been used in different countries to achieve a well-planned and habitable residential environment. Enforcement of these measures has tended to increase or decrease property values in some jurisdictions. Thus, the objective of this study was to measure the influence of zoning policies on rental values in Abuja, Nigeria. Due to the dearth of data related to the subject matter of this research, residents, property developers and personnel responsible for enforcement of these policies were targeted and used for data gathering. The hedonic price modeling (HPM) was used to assess the contribution of zoning policies to rental values in this analysis. The results, however, revealed that zoning is negatively correlated to rental values, while other zoning policies used in the study area are positively correlated to rental values. The result extends the debate that the impact of zoning could either be positively or negatively correlated to price relative to the underlying measures adopted within a jurisdiction. This result suggests that it is imperative to undertake a study in a jurisdiction before decisions could be made. Again, zoning policies should be extended to other suburbs of Abuja so that population pressure within Abuja and its immediate suburbs could be mitigated.

Key words: Hedonic price model, rental value, residential property and zoning policies.

1. Introduction

There exist a nexus between a well-planned residential environment and rental values of properties. Planning of an environment is a function of governmental policies, programmes and regulations. Governments of different countries usually set standards through the use of various land use planning measures to achieve balance. Consequently, households look to a residential environment that is well-planned to buy or rent a property. Thus it can be argued that the demand for residential land or accommodation within a well-planned neighbourhood or geographical location could influence the amount that households are willing to pay for land or property. However, relative to land use policies including zoning and building regulations, divergent outcomes have evolved in the direction of their impacts (positive or negative) on values of land and property.

The impact of zoning policies on property values, therefore, has for a long time been theorized by Courant [1] who noted that this could lead to increase or decline in land values in a metropolitan area. In the United Kingdom, Cheshire and Shepphard [2] reported that about 3.9% of household incomes annually are equivalent to the estimated net costs of land use planning policies. Jaeger [3] observed that land use planning has a considerable effect on the value of the land. Pertinently, a property’s value could significantly increase by far after the grant of planning permission. Turner, Haughwout and Van Der Kaauw [4] in a study of residential plots in the United States of America also estimated the net price of land use regulations as a percentage of land value to be 38%.

Furthermore, Kendall and Tulip [5] noted that some
public land-use policies and control measures such as zoning, building regulations amongst others, restrict the supply of housing through several means such as minimum lot sizes, maximum building heights and planning approval processes. Though these constraints may bring benefits to some degree, they can increase housing values as well as the demand for more properties. This situation is also particularly true for developing countries, especially, Nigeria. Prior studies on zoning and other land-use policies relative to the Nigerian land and property markets exist [6-7]. However, while land and property values are primary elements that reflect decisions involving zoning policies, there exist a dearth of studies on the exact influence of different forms of zoning on property values in Abuja, Nigeria, with different sociocultural settings and behaviour of property market participants from other market contexts.

The only known study is undertaken in Abuja (same context with current study) on land use and management, assessing the contributions of different governmental agencies that are saddled with the responsibility of compliance to land-related policies by Ayoola et al. [10]. This current study extends the literature particularly [3, 5, 11], as it relates to zoning policies and values of residential properties in the Nigerian context. The main motivation is to see if a study in Nigeria, a country with different settings and market behaviour of players to the developed countries would be replicated to further reveal how controls and management of land could affect land and property values.

2. Literature Review

To avoid indiscriminate, unplanned and uncontrolled use of land, restrictions and regulations were put in place all over the world. The regulations to a certain degree influence the demand for and price of land and property. The influence may sometime be direct in some cases, which could be complex such as to arouse confusion or misunderstanding, while at other instances, the effects are mild. The report of Jaeger [3] observed that regulations on land use may be assumed to have negative effects on land and property values when in fact, it is positive. The direction of whether the effects are positive or negative is related to market reactions of a particular geographical location or region. The importance of land, notwithstanding, the magnitude of the influence of land use and management to property values in a particular market context needs thorough examination so that policymakers can utilise outcomes for future direction.

Studies have been carried out on land-use policies, planning, and administration amongst others for various purposes in the developed and developing countries with Nigeria inclusive. In the United States, Ohls, Weisberg and White [11] assess the effect of two categories of zoning including externality and fiscal zoning relative to land values. Whereas the fiscal zoning comes with the burden of tax imposition on land users and developers, the former does not lead to a conclusion that sometimes zoning does not enhance land values in some communities. Malpezzi [12] examined the impacts of various degrees of land regulations on residential property prices. Glaeser and Gyourko [13] assessed the influence of zoning policy in California and some eastern cities and found that the high price of properties is due to zoning and other land use control measures. Quigley and Rosenthal [14] also studied the influence of land use regulations on the price of housing in the United States. The research studied the magnitude to which house price escalations are linked to land use regulation in California.

Gyourko and Summers [15] analysed the implications of land use regulation on land prices in the Philadelphia metropolitan area. Jaeger [3] used land price data to examine how land-use regulations affect property values in Oregon, U.S.A. and found that land values have increased since the land use planning and control was implemented in the jurisdiction. Ajibola et al. [7] assessed the influence of urban land-use
planning on residential property values in Agege, Nigeria and found that there are differences between property values of areas that are well-planned and areas that are not well-planned. In Indonesia, Tutuko and Shen [16] evaluated the effects of zoning policies on housing development in the border area of Surabaya and Sodoarjo regency. In Australia, Kendall and Tulip [5] measure the effects of zoning on house prices in the four largest cities including Brisbane, Melbourne, Sydney and Perth of Australia.

Findings in these studies revealed that the impact of land-use policies and regulations varies from country to country, because of its distinct nature and characteristics. Most recently, Gwanna and Yusuf [17] measure the influence of land-use changes on the rental value of residential properties in Kaduna metropolis. This particular study was very close to this study, but its focus was on land-use changes over time. Kendall and Tulip [5] did a comparative study of the influence of zoning on the average prices of property in some selected major cities in Australia and found that zoning has led to considerable increase in the price of properties in Melbourne (69%), Brisbane (42%), Perth (54%), relative to cost, respectively values. Again the focus of all foregoing studies undertaken in the Nigerian land and property market context pertains to another aspect of land use administration and management, while their implications on land and property values to our knowledge are under study.

3. Research Methodology

This section is primarily concerned with the procedures used in gathering data for the study. The questionnaire survey was primarily used in this study to gather relevant information on rent paid per annum and other explanatory variables. Thus, the residents in rented-occupation and government officials that are responsible for enforcing land use planning policies and regulations on land in Abuja were targeted in this study. These were targeted because information on rent paid, residential property attributes and zoning policies enforced within the study area could easily be obtained from the tenants. Another group of people that such information was readily obtained from are property owners (landlords), and/or their respective agents (estate surveyors and valuers), and personnel (director), Ministry of Lands, Housing and Urban Development in Abuja and Federal Capital Development Authority (FCDA).

Consequently, the sampling frames for this research were drawn from the total number of houses in Abuja. According to the National Housing Census of 2006 and further accentuated by the National Population Commission, Nigeria Bureau of Statistics and Social Economic Survey on Nigeria (2008) are 31,608,085. The total number of houses as revealed by the survey includes detached houses/stand, apartment in a block of flats, semi-detached houses; rooms let in houses, informal buildings among others. The list of practising Estate Surveying and Valuation firms was taken from the 2018 directory of the Nigerian Institution of Estate Surveyors and Valuers (NIESV), and cross-referenced with the Abuja branch of NIESV, which reveals that eight hundred and ten (810) firms of estate surveying and valuation are operating in Nigeria. Of this number, a total of one hundred and four (104) are firms that are based in Abuja.

The list of real estate developers (landlords) in Abuja was derived from an online directory of the Real Estate Developers Association of Nigeria (REDAN), which reveals, that there are one hundred and twenty-six (126) REDAN members across Nigeria with majority practising in the study area. From the sample frame, the sample size was estimated using a formula advanced by Yamane [18] in this study. The formula is given as:

\[ n = \frac{N}{1+N(e)^2} \]  

where,
- \( n \) = size of the sample;
- \( N \) = size of finite population;
- \( e \) = acceptable error which is taken to be 0.05 for this study.
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\[
\begin{align*}
n &= \frac{31,608,085}{1 + \frac{31,608,085(0.05)^2}{2}} \\
n &= 400
\end{align*}
\]

Furthermore, the formula designed by Otte [19], was used to corroborate earlier findings of the sample size for the residential properties within the study. The formula is given in Eq. (2):

\[N = P(100 - P) \times \frac{Z}{D^2}\] (2)

where,
- \(N\) = required sample size;
- \(P\) = anticipated prevalence;
- \(D\) = allowable error estimate (desired precision) and
- \(Z\) = appropriate value from the normal distribution for the desired confidence level.

Nevertheless, if the sample size is too large, a re-adjustment is provided by Otte [19] to bring the sample size to a figure within the limit as follows:

\[N' = \frac{N}{1 + \frac{N}{T}}\] (3)

where,
- \(N'\) = adjusted sample size;
- \(N\) = previous sample size;
- \(T\) = total population.

The anticipated response in this research is 35%, as a result of the generality of the figure which encompasses different kind of houses in the study locations, and the need to cover only residential properties in the selected area and a permissible error estimate of 5%.

\[35 \times (100 - 35) \times (1.96^2/5^2) = 350\] (4)

Following readjustments:

\[\frac{350}{1 + (350/31,608,085)} = 349\] (5)

Using the above-stated procedures, the sample size for the residential properties (of which household heads are research subjects) in the study area is four hundred (400). As a result of the nature of this research and the relatively fewer number of the practising Estate Surveying and Valuation firms in the study area and REDAN members, the total population in the study area would be sampled. The summary of the sample frame and size used in this current investigation is given in Table 1.

Accordingly, the study area is stratified into three namely Wuse, Maitama and Nyanya districts, respectively. Relative to social class and income level, Maitama district has a high percentage of people whose income level is high; followed by Wuse and Nyanya that are predominantly middle-level income class. The main instrument used in this study for data gathering is a questionnaire, backed up by structured interviews and personal observations of the study area. In the course of this research work, an interview guide was prepared; the type of interview that was adopted is structured to give room for follow-up questions if necessary. The interviews were done personally through scheduled meetings with directors in the Ministry of Lands, Housing and Urban Development and Federal Capital Development Authority responsible for land issues.

Also, trained field research assistants were used to assist in the distribution of questionnaires to owners of residential lands, estate surveyors and valuers, and REDAN in Abuja. Table 2 gives a summary of distributed and collected questionnaires.

Table 2 shows the total questionnaires distributed and retrieved. Out of the 104 questionnaires administered to estate surveyors and valuers, 93 were retrieved which represent 89.42%. One hundred and sixteen (116) questionnaires representing 86.57% were retrieved from the 134 questionnaires administered to

| S/N | Sample frame | Target population                                                                 | Sample size |
|-----|--------------|----------------------------------------------------------------------------------|-------------|
| 1   | 31,608,085   | Owners of residential lands within the selected areas (that is, those that have plots of land for residential purposes in the study area) | 400         |
| 2   | 2            | Director, Ministry of Lands, Housing and Urban Development in Abuja/Federal Capital Development Authority (FCDA) | 2           |
| 3   | 104          | Estate Surveying and Valuation firms                                             | 104         |
| 4   | 126          | Real estate developers in Abuja                                                  | 126         |
| Total|              |                                                                                  | 632         |
the occupants of Nyanya; 109 questionnaires representing 81.95% were retrieved from the 133 questionnaires administered to the occupants of Maitama while 114 representing 85.71% were retrieved from the occupants of Wuse. Ninety and seven (97) questionnaires out of the 128 questionnaires distributed among the real estate developers and officials of the ministry were retrieved representing 75.78%.

In general, 529 questionnaires out of the 632 questionnaires distributed were retrieved representing 83.70%. This suggests a great percentage of response, thus giving sound footing for further analysis. To estimate the influence of zoning policies on the rental value of residential properties in Abuja, the hedonic price modelling (HPM) was used. The HPM is an approach whereby the relationship between a set of explanatory variables that are regressed against a dependent (response) variable. Pompe and Rinehart [20] used a standard linear HPM defined as follows:

\[ P_i = f(s_i, n_i, x_i) \]  

(6)

where, the rental value of a property is defined as \( P \), whose expression is a function of zoning policies as well as other characteristics of the property as explanatory variables. The hedonic model is stated below:

\[ P = \gamma_0 + \Sigma \gamma iT_i + \varepsilon \]  

(7)

where, 
- \( P \) is rental value;
- \( \gamma_0 \) is constant;
- \( \gamma_i \) is the relevant characteristic price;
- \( T_i \) is the relevant zoning policy instruments, housing, neighbourhood and structural variables, and random error is depicted as \( \varepsilon \).

The data for the hedonic model were derived from available details of property transactions relative to property rental values in the selected study areas. The dependent and independent variables used in this analysis are provided in Table 3.

### 4. Analysis and Discussion

The section contains an analysis of the influence of zoning policies on the rental value of residential properties. The analysis was done relative to the stratified areas of Abuja as noted earlier. However, for ease of comprehension, results of the three stratified areas (Nyanya, Wuse and Maitama) are combined and summarised in Table 4.

The variability of the relationship between zoning policies and property values is explained by the \( R^2 \) and adjusted \( R^2 \). Thus, the analysis has shown that 73% variability in rental values of residential property in Nyanya is explained by the independent variables. Again about 73% and 68% variability in rental values of properties in Wuse and Maitama are explained by the structural and land use policy variables in this analysis. When adjusted to the general population, results show a very good and robust analysis of the influence of zoning policies on the rental value in Abuja.

As expected, variables produce appropriate signs. For instance, lot size, building height, planning approval, density and population growth are positively correlated to rental values. However, building height and population growth are not significant in this analysis. Age of property, condition and land size

| Respondents                                      | No. distributed | No. collected | Percent |
|--------------------------------------------------|-----------------|---------------|---------|
| Type A: estate surveyor and valuers               | 104             | 93            | 89.42   |
| Type B: occupants of Nyanya                       | 134             | 116           | 86.57   |
| occupants of Maitama                              | 133             | 109           | 81.95   |
| occupants of Wuse                                 | 133             | 114           | 85.71   |
| Type C: real estate developers and ministry officials | 128             | 97            | 75.78   |
| Total                                            | 632             | 529           | 83.70   |
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Table 3  Property data and scale.

| Variable code | Definition of variable | Measurement scale |
|---------------|------------------------|-------------------|
| RENTAL        | Rental value           | The actual figure in Naira (₦) |
| LOT SIZE      | Lot size               | Actual lot size in square metre |
| BLDGHGT       | Building height        | The actual number of floors |
| PLANAPP       | Planning approval      | 1—approved; 2—not approved |
| PLOTCOV       | Plot coverage ratio    | Percentage |
| DENSITY       | Density of housing     | 1—low; 2—medium; 3—high |
| POPULATION    | Population growth      | 1—low; 2—medium; 3—high |
| FLOOR AREA    | Floor area ratio       | Actual lot size in square metre |
| LANDUSE       | Land use               | 1—residential; 2—commercial; 3—others |
| PROPTYP       | Property type          | 1—flat; 2—bungalows duplex (detached/semi-detached) |
| AGE           | Age of property        | Actual age |
| CONDITION     | Condition of property  | 3—good; 2—fair; 1—bad |
| LAND SIZE     | Land size              | Actual lot size in square metre |
| ZONING        | Zoning policies        | 1—available; 2—not available |

Table 4  Regression coefficients of the influence of zoning on rental values.

| Variable                     | Nyanya          | Wuse            | Maitama         |
|------------------------------|-----------------|-----------------|-----------------|
| (Constant)                   | 0.277 0.542     | 0.272 0.552     | 0.406 0.380     |
| Lot size                     | 0.437 0.000     | 0.436 0.000     | 0.379 0.000     |
| Building height              | 0.016 0.899     | 0.016 0.904     | 0.033 0.807     |
| Planning approval            | 0.335 0.010     | 0.335 0.011     | 0.292 0.027     |
| Plot coverage ratio          | -0.224 0.010    | -0.225 0.014    | -0.255 0.007    |
| Density                      | 0.279 0.035     | 0.280 0.048     | 0.377 0.015     |
| Population growth            | 0.028 0.836     | 0.030 0.833     | 0.058 0.688     |
| Floor area ratio             | -0.016 0.874    | -0.017 0.873    | -0.025 0.812    |
| Land use type                | 0.336 0.000     | 0.334 0.000     | 0.316 0.001     |
| Property type                | -0.168 0.025    | -0.168 0.026    | -0.159 0.041    |
| Age of property              | 0.225 0.006     | 0.225 0.006     | 0.194 0.021     |
| Property condition           | 0.021 0.783     | 0.021 0.785     | 0.013 0.870     |
| Land size                    | 0.336 0.000     | 0.337 0.000     | 0.314 0.000     |
| Zoning                       | -0.374 0.002    | -0.374 0.002    | -0.337 0.006    |
| $R^2$                        | 0.732 0.728     | 0.677           |
| Adj. $R^2$                   | 0.698 0.692     | 0.633           

is positively correlated to rental values but property condition is not significant in this analysis. Zoning, property type, plot coverage ratio are negatively correlated to rental values in this analysis. This depicts that residents do not pay much attention to these variables when searching for rental accommodation. Due to the high demand for property and quest to live near the place of work, many people tend to downplay on some important variables when searching for accommodation. Nevertheless, this analysis has shown that zoning policies have considerable influence on the rental values of residential properties in the study area.

The result in this analysis aligned itself with findings by Ohls, Weisberg and White [11], who found that zoning policy is negatively correlated to property value, but contrasted with the findings of Jaeger [3], and Kendall and Tulip [5], who found a positive correlation of zoning policy to property prices.

5. Concluding Remarks

All over the world zoning policies have been used to control development and make the environment more
habitable. However, since zoning could either be fiscal or externality, people consider the tax effect of what is paid to achieve a well-planned environment. Property owners particularly investors capitalised the amount of taxes paid into rent and thus contributes to higher land and property values. This has made findings in the previous assessment of the influence of zoning policies on property values to be divergent. The objective of this study was therefore to assess the contribution of zoning policies to rental values of residential properties in Abuja. While the focus of the previous assessment was on property value or price, this study measures the impact on rental values of properties paid per annum.

The HPM was used in this analysis against different explanatory variables relative to the context under investigation. Results have shown that zoning is negatively correlated to rental values depicting the impact to be marginal. However other zoning measures used in the assessment of zoning including building height, planning approval, density, population growth and land-use type are positively correlated to rental value in the study area. This shows that zoning in Abuja influences rents paid for properties. Thus the government can extend zoning policies to other suburbs of Abuja to encourage people to live in such areas thereby reducing population pressure within the city. For future research, it might be necessary to extend a similar study to other states of Nigeria to generalise findings.

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