

# CONTRIBUTING EFFECT OF LAND TITLING TO LAND VALUE: LEARNING FROM AKURE, NIGERIA

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## ABSTRACT

**Purpose:** The purpose of this paper is to explain the contributing effect of land titling on land value with a special focus on Akure, Nigeria. Land titling has an abstract economic value that untitled physical assets do not have. The inability to measure this economic value as it affects land value in the context of the urban land market often poses a difficult task as there were no readily available data. The consequence may mean difficulty in determining the precise land value under competitive conditions in the urban land market.

**Design/methodology/approach:** Questionnaires are distributed to 2026 household heads who are landowners of selected private residential layouts/estates in the study area. Data gathered are analysed using 2 stages hierarchical form of semi-log hedonic price analysis to determine the contribution of land titling to land value.

**Findings:** The finding shows that when land titling is considered alone with land value, there is a statistically significant contribution of about 27% to land value and 126% when considered alongside the other independent variables.

**Originality/value:** The outcome of the paper will join the body of existing studies to empirically demonstrate to landowners, valuers, land administrators, other stakeholders and policymakers that land titling is a unique factor to be considered when assessing land value. Otherwise, considerable discretion and logical judgment may be difficult to make under the untitled land transaction setting.

**Keywords:** Land titling; Land market; Land value; Private residential layouts/estates; Semi-log hedonic price analysis; Titled land; Untitled land; Urban area; Akure; Nigeria

## 1. INTRODUCTION

As aptly observed by the International Federation of Surveyors (1995), land titling is the legal recognition of ownership or an interest in land. It is the delivery process of real rights to occupants of land or property. Land titling is associated with rights, restrictions and responsibilities connected with forms of ownership and use of land as well as the official recording of the title to provide reliable documentary evidence of the title granted. Given its great potential benefit to provide enforceable legal and secure rights to the possession and use of a given portion of land, land titling gives greater confidence to parties seeking to participate in the urban land market. Hence, titling provides a good

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hedge for a land transaction. The direct consequence of this is that stakeholders like financial institutions while granting loans, considered legal backing on land as convincing evidence of ownership to the exclusion of any other party claiming ownership to the same portion of land.

Correspondingly, the wide-ranging acceptability of title documents as conclusive evidence of rights subsisting on land has created an active market for land titling. This has a subsequent effect on land value. Brasselle, Gaspart and Platteau (2002) cited in Jacoby and Minten (2007) confirmed that land titling can increase land values due to its ability to guarantee the interests that can be enforced against a specific land. Nevertheless, despite the significance of land titling, measuring it is often difficult while appraising land value. According to Abidoye and Chan (2017), the traditionally expected variables in land value appraisals are structural, locational, neighbourhood and environmental attributes. Land value has however been argued as a fallout from the subjective assessments made by willing purchasers of the fulfilment derived from ownership of the interest subsisting inland (Oduwaye, 2009). Denman and Prodano (1972) cited in Udoekanem, Adoga and Onwumere (2014) established that land value is not only determined by mere claim of ownership and valuation of the physical land as a resource but by the rights subsisting on the land which can only be substantiated by titling.

Therefore, it is not just the value of the physical structure that is only important but the proprietary rights on the land. For instance, it is titling that creates the wherewithal to borrow the requisite funds and empower the mortgagee to take up title to land in case of foreclosure and not the physical development. According to De Soto (2000) cited in Smith, Williamson, Burns, Chung, Ha, and Quyen (2007), land titling has an abstract economic value, valid in a wide range of contexts, which untitled physical assets did not have. The critical question then is, how can this economic value be measured and how will land titling affect land value in the context of the urban land market? Inability to answer these questions may mean difficulty in determining the precise land value under competitive conditions in the urban land market. Regrettably, operationalizing the economic value inherent in land titling faces several empirical challenges. Due to the scanty research in this area, very little is known about the influence of land titling, particularly on land value. Thus, as a response to the existing knowledge gap, this study has attempted to investigate the possible effects of land titling on land value in the urban areas of Nigeria with a particular focus on the selected residential layouts/estates in the Akure metropolitan area of Ondo State, Nigeria.

A handful of studies established the influence of land titling on land value. On the one hand, another strand of literature has not been able to validate the contributory effects of land title to land values, but in particular, acknowledged the significant and positive effect of land titles on the likelihood to transfer land. To this end, the empirical evidence substantiating these viewpoints is inconclusive. Given the present position, the precise effect of titling on land value in an urban setting becomes necessary, as the emphasis of some of the existing studies was on the economic analysis of rural land. Akure area of Ondo State became the focus of this paper as an urban centre that is a typical illustration of a dynamic land market dominated by both formal and informal activities. However, given the high spate of land development in Akure, there is massive expansion towards all the urban-fringe areas of the city. This has allowed the establishment of most of the residential layout/estate used for the study.

## 2. LITERATURE REVIEW

### 2.1. Empirical Studies on contributing effect of Land Titling to Land value

The contribution of land titling to land values has not received enough attention in Nigeria as literature related to this aspect of the valuation of the land is limited. Consequently, land titling has not always been perceived as having a significant contributing effect on land value. However, the hedonic technique has been used in the past mostly on rural or agricultural land to determine the contributing effect of land titling on land value. Thus, studies attempting to measure the contributing effect of land titling to land value in the urban area are sparse. One of the first studies to analyse the contributing effect of land titling to land value is Asabere (1981) who employed the hedonic analysis to explain the value of vacant lands in Accra, the capital city of Ghana. The study regressed land prices on certain land attributes such as location, zoning, land title, ethnic clustering, time-of-sale, lot size, and site services. The results indicated that all the variables including land title contributed to land values. The study however did not state the magnitude of land title contribution to land value. In addition, the economic, geographic and cultural settings of the study area are different from this present study, hence its findings cannot be generalized in the study area. The time setting of the study is age-long and may not be relevant in the modern-day land valuation as the issue of land keeps changing with the trend. The variables used may be peculiar to the study area as there are other variables aside from this already established in the previous studies as germane to determining land value. In another study, Feder and Onchan (1987) estimated the effect of titles on economic performance in four of the rural provinces in Thailand. Hedonic analysis captured land titles data, soil quality and market proximity as independent variables. The result revealed a statistically significant effect of titled on land value in all the selected rural provinces of Thailand. In the same way, Feder, Onchan, Chamlamwong, and Hongladarom (1988) examined the economic implications of land titling in an agrarian area and utilized farm-level data from a sample of about 900 farmers in four Thailand provinces. The study selected sites in which squatters and titled farmers operate in geographical proximity within a similar agro-climatic environment. Land values reported by the sampled farmers were analysed through a hedonic price model in the study areas. Other variables like soil quality, market proximity which might affect land values were accounted for. Land titling had a statistically significant effect on land prices in all the provinces considered. Both studies though confirmed the significant effect of land titling on land values did not indicate the level of its contribution to land values.

In Brasington and Sarama (2008) a data set of 37,043 housing sales that have registered title in five metropolitan areas of Ohio was appraised. The explanatory variables employed include the 15 deed types and 14 structural characteristics of the houses which are the number of fireplaces, bedrooms, and full and partial bathrooms in the house; the number of detached structures on the lot; the age of the house; the size of the house and yard; and dummy variables for whether the house is one-story, made of brick, and has a deck, courtyard, garage, or finished basement. The title to the land was found to affect the house's sale price. The magnitude of the land titling effect which is germane to this present study is not also stated.

On the contrary, Antwi (2002) employed the hedonic technique to examine the relationship between the residential land plots and other independent variables that affect the land value such as date of transaction, state of development of the land, neighbourhood quality, whether the land was obtained from government or customary

landowners, source of finance, the extent of market search undertaken before purchase, sources of market information and perception of real estate rights purchased. Titling was not a significant contributory factor to land value. The reason may not be far-fetched as the land transaction data was obtained from land purchasers who did not have any formal title to land purchased. To them, titling is not an important variable in land value determination. This outcome aligns with Pagiola (1999) as well as Roquas (2002) that land titles may be less important where enforcement mechanism is persistently lacking. The repercussion of this may not be immediate, but such transaction is subject to litigation, public control and insecurity from financial institution assistance.

Nkurunziza (2007) explored a different approach in Kampala city of Uganda. Three case study settlements were used to analyse and explain the nature of institutions that regulate and underpin land delivery processes in informal settlements. It was found that the key factors influencing the price of land were the plot size, location, access to water, the existence or absence of a registered certificate of title, neighbourhood characteristics and the quality of available infrastructure and social services. Emoh, Oni and Egolum (2013) equally analysed the different contributory factors of residential land values and the strength of the different factors contributing to land value variations in Onitsha, Nigeria. Employing regression analysis, thirteen main factors (accessibility, neighbourhood quality, land title, zoning regulations, transportation, rent, improvement tax, environmental quality, view of amenities, travel time to the city centre and irrevocable power of attorney) were established as determining land values in the study area. The land title was ranked third out of the thirteen variables based on the magnitude of its contribution by using the Standardized beta ( $\beta$ ) coefficient of 2.595, which implies a contribution of about 260%.

A more recent and similar study by Madalasa (2014) adopted a semi-log form of the hedonic model to evaluate the premium paid to a title in Bangalore, India. A data set of 2263 observations of appraised land prices was modelled into the hedonic equation as the dependent variable, while 9 independent variables to show the combined effects of title and planning were employed in the analysis. The value of the coefficient for the land title was found positive and significant. The coefficient value of land title indicated that it was one of the largest contributors to the pricing of the parcel. This accounts for about 7.4% of the price increase attributable to the land title premium. This study is unique in that it controls other variables such as locational amenities, neighbourhood characteristics amongst others that affect land values and only allows the isolation of the effect of titling. A similar methodology was replicated in this present study. However, because of the focus of this study which is to determine the contribution of land titling to land value, effects of titling were isolated while major categories of variables earlier established in the previous study were considered as may apply to the selected urban areas. This was done by ensuring minimal dissimilarities in the variables that affect land value.

In a similar study, Aikaeli and Markussen (2017), investigated the effects of land titling on land values in urban and rural areas of Tanzania. The log of land value is the dependent variable, while the independent variables include; land titling inheritance letter, purchase agreement, lot size, year of land acquisition, distance to home, distance to road, distance to market, soil type, soil quality and land slope. The results of the regression analysis showed that the effect of land titling is significant and strong in both urban and rural areas. Land titling made a contribution of about 32 per cent to land value in both areas. However, the results of the urban areas were based on fewer observations.

From the foregoing, it is apparent that empirical studies have been undertaken on the contributing variables to land value globally, but there exist very few studies on the

connection between land titling and land values. Nonetheless, none of the few available studies has painstakingly dealt with land titling as one of the factors influencing land values in Nigeria; yet, market values are also a reflection of the extent to which titled land makes the transaction easier or otherwise (Jacoby and Minten, 2007). Besides, most of the previous studies that consider titling as a contributory variable to land value are the result of government intervention that is followed by granting of title free of charge as such their model specifications were not clearly stated and defined.

## 2.2. Empirical adaptation from previous studies on the impact of Land Titling on Land Value

A vast number of the existing studies have empirically explored the value of titling to land values in the rural area, particularly land tiling impact on agricultural land with only a few in the urban area. For instance, in Jakarta (Dowall and Leaf, 1991); in rural India (Pender and Kerr, 1994); in Brazilian frontier (Alston et al. 1996); in Senegal and South Africa (Payne, Durand-Lasserve, Rakodi, Marx, Rubin, and Ndiaye (2008) and the city of Bangalore in India (Madalasa, 2014). However, since this present study is focusing on the urban area, it will be original in its approach by developing a unique conceptual framework that captures all variables in the study area.

From the pieces of literature reviewed, only Madalasa (2014) was identified to be relevant to the scope of this study; while the earliest application of the hedonic pricing model was on agricultural land. Given this, the conceptual analysis in this study was built on Madalasa (2014) to guide the empirical finding on the contribution of titling to land values in this present study.

However, the regression framework of the hedonic model should be specified correctly for both functional forms as well as for independent variables to achieve unbiased assessments (Case, Pollakowski, & Wachter, 1991; Malpezzi, 2003). Therefore, to ascertain the effect of guaranteed land title on land prices in the Bangalore city of India, the following variables were adopted by Madalasa (2014); appraised land price deflated by the housing specific deflator for the city of Bengaluru for the corresponding period, distance to the city centre, distance to the nearest infrastructure/employment point, displacement to nearest arterial road, distance to closest market/ commercial area, distance to nearest transportation hub, floor area ratio of the plot calculated as total buildable area/ plot area, a size variable calculated as the size of the plot, a dummy to denote whether the plot can be used for commercial purposes and dummy variables to denote the combined effects of title and planning.

In addition, the hedonic model developed by Madalasa (2014) to a data set of 2263 observations of appraised land values to ascertain the impact of guaranteed land title on land prices in the Bangalore city of Indian is represented in a log-linear form by equation (1):

$$L_{nPR} = \beta_0 + \beta_i \gamma_i + \varepsilon_i \dots \dots \dots (1)$$

Where:

$L_{nPR}$  = land prices

$\beta_0$  = Constant term

$\beta_i \gamma_i$  = Variable characteristics

$\varepsilon$  = Error term

The model in equation (1) was further specified in equation (2) as follows:

$$\begin{aligned} \ln P = & \beta_0 + \beta_1 \ln (\text{DistCBD}) + \beta_2 \ln (\text{DistEmp}) + \beta_3 \ln (\text{DistRoad}) \\ & + \beta_4 \ln (\text{DistMarket}) + \beta_5 \ln (\text{DistTrHub}) + \beta_6 * \text{FAR} + \beta_7 \\ & * \ln (\text{Sq}_{\text{Size}}) + \beta_8 * (\text{Use}) + \beta_9 \text{BDALyt} + \beta_{10} \text{LargeprivateLyt} \\ & + \beta_{11} \text{SmallPrivateLyt} + \beta_{12} \text{RevenueLyt} + \sum_j^n y_j Y_i \\ & + \varepsilon_i \dots \dots \dots (2) \end{aligned}$$

P = Natural Log of deflated Appraised Sales Price on a per square feet basis for each land parcel. Price is in Indian Rupees

Ln (DistCBD) = natural logarithm of the linear distance of the site from the CBD measured in kilometres. The CBD is taken as the Main Railway terminal/ Bus terminal.

Ln (DistEmp) = natural log of the distance from the nearest employment centre in kilometres.

Ln (DistAR) = natural logarithm of the linear distance of the site from the nearest arterial road in kilometres.

Ln (DistMarket) = natural logarithm of the linear distance of the site from the nearest commercial centre in kilometres.

Ln (DistTrHub) = natural logarithm of the linear distance of the site from the nearest Transportation Hub, which could be a bus station or railway station, in kilometres.

Ln (Sq\_Size) = natural logarithm of the square of the size of the site in square feet.

FAR = variable which measures the Floor Area Ratio of the land parcel (density regulation).

Dummy variable to denote whether the plot has the propensity to be used for commercial purposes.

BDALyt = dummy variable that denotes the site is in a BDA developed layout and has an applicable title and a planning premium (BDALyt = 1).

LargePrivateLyt = dummy variable that refers to a site within a large private layout, with title premium = 0 and high planning premium (Largeprivatelyt = 1).

SmallPrivateLyt = a site within a small private layout, title premium = 0 and low planning premium (SmallPrivateLyt = 1)

RevenueLyt = a revenue site in an unplanned layout, title premium = 0 and planning Premium = 0 (RevenueLyt = 1)

$\beta_0$  = the intercept

$\beta_i$  terms = the coefficient estimates from the linear regression model

$\varepsilon_i$  = Errors

$Y_i$  terms = fixed effects in time (with coefficients of  $\gamma$ )

The focus of this particular study is, however, different from Madalasa (2014) as it considered the contribution of land titling to land value. Since the study is not unaware that there are other factors affecting land value, consideration was given to few variables under the major attributes of land value determinants as applicable to the selected communities in the study area.

Though the study's focus is to determine the contribution of land titling to land value, other variables affecting land value is taken into consideration. According to Madalasa (2014), it is imperative to do this as it is not only land titling that affects land value. However, defining the right attributes of land to be included in the hedonic price analysis is essential to avoid bias in variable selection. To maintain fairness in the selection of the right variables for the hedonic price analysis, this study referred to previous studies on various attributes of landed property and make representation for each category of attributes earlier identified.

Empirical studies have generally grouped major attributes contributing to land values to include; physical or land characteristics such as plot size, years of transaction and floor area ratio (Megbolugbe, 1989; Arimah, 1992; Ottensmanna, Paytona, and Man, 2008); locational characteristic such as distance to CBD and distance from employment centres (Small and Song, 1994; Osland and Thorsen, 2008; Aluko, 2011); neighbourhood characteristic such as crime, education and health facilities (Bello and Ajayi, 2010; Kolowe, 2014); as well as environmental characteristic including distance to hazards, distance to parks and cemetery (Tse & Love, 2000; Bao, Glascock & Zhou, 2008; Akinjare, Ayedun, Oluwatobi, Iroham, 2011; Babawale, 2013).

Therefore, the following attributes are employed in addition to land titling in this study: physical or land characteristics (plot size), locational characteristics (distance to CBD and distance to the nearest bus stop), neighbourhood attributes (schools and health facilities) and accessibility. Accessibility as a value attribute is assumed to be different from locational attributes in this study, in that time taken to get to a particular place may not mean ease of getting there. Given the focus of this study, which is to investigate the contribution of land titling to land value as well as the contribution of other variables viz-a-viz land titling; a 2-stage hierarchical form of the semi-log hedonic price analysis was employed.

### 3. METHODOLOGY

To gather the quantitative data required for this study, the cross-sectional survey design was used. Cross-sectional sample surveys are used to take a snapshot of a proportion of the population at one point in time. It was adopted for this study as it has the advantages of generating adequate data in a short time and at a reasonably low cost. Besides, it can easily produce relevant data which can be generalized to a wider population. The target population in this study are the household heads of the selected private residential layouts/ estates, namely Ademola Adesida Estate, Alaba Layout, Ifelere Estate, Ire-Akari Estate, Obele Estate, Oke-Ogba Community, Osolo-Abibiri Estate and Wesco Estate in Akure city. They are of specific interest to this study as they are major participants actively operating in the land market. The selected private residential layouts /Estates, demographically similar communities will be adopted. This provided a unique dataset in a framework that assists not only to isolate the fundamental role of land-titling but also in minimizing the endogenous problems characteristic.

The housing population employed in Olamiju (2014) for the selected private residential layouts/estates (Ademola Adesida Estate, Alaba Layout, Ifelere Estate, Ire-Akari Estate, Obele Estate, Oke-Ogba Community, Osolo-Abibiri Estate and Wesco Estate) was adopted as the sampling frame. Given the target population, a household head per house was used. The sampling frame aggregates of the Eight (8) selected residential layouts/estates within the study area is as further shown in Table 1.

Kasilevicius, Sapoka, and Filipaviciute (2006) acknowledged the application of formulae as the best approach to determining sample size. Yamane formula as explained by Bartlett, Kottrliik and Hiiggiinss (2001); Isreal, (2012) provides a simplified formula for proportions to determine the sample size for large populations. Hence, the formula as shown in equation 3 was employed in the estimation of the sample sizes for the household heads in each of the selected residential layouts/estates in the study area.

$$n = \frac{N}{1 + N(e)^2} \dots \dots \dots (3)$$

Where, n = the sample size;

$N$  = the population size;

$e$  = the level of precision.

The level of precision also called sampling error is the range in which the true value of the population is estimated to be. This range is often expressed in percentage points, for instance,  $\pm 5$  per cent. Selecting a 95% confidence level implies that 95 out of 100 samples will have the true population value within the specified range of precision (Israel, 1992). Hence, a 95% confidence level and  $\pm 5\%$  (0.05) precision were adopted for this study. The total population of the eight (8) selected private residential layouts/estates is 8369 and taking 5% significant level, the equitable distribution of respondents sample size across the selected study area is as shown in Table 1.

**Table 1:** Estimated number of buildings in the selected residential layouts/estates in Akure

| S/N          | Residential Layouts/Estates | Location               | No. of Existing Building | Sample Size |
|--------------|-----------------------------|------------------------|--------------------------|-------------|
| 1.           | AdemolaAdesida Estate       | Alagbaka               | 563                      | 234         |
| 2.           | Alaba Layout                | FUTA Area              | 1052                     | 290         |
| 3.           | Ifelere Estate              | Aule Quarters          | 386                      | 196         |
| 4.           | Ire-Akari Estate            | OritaObele             | 1586                     | 319         |
| 5.           | Obele Estate                | Ijare Road             | 1673                     | 323         |
| 6.           | Oke-Ogba Community          | Agagu Road             | 2580                     | 346         |
| 7.           | Osolo-Abibiri Estate        | Irese Road             | 244                      | 152         |
| 8.           | Wesco Estate                | Akure-Ilesa Expressway | 285                      | 166         |
| <b>TOTAL</b> |                             |                        | <b>8369</b>              | <b>2026</b> |

A 4 stage-multi sampling technique was used to select the residential layouts/estates and the corresponding respondents (household heads) therein. In the second stage, the selection of eight residential estates/layouts as highlighted in Table 1 was done. The eight residential estate/layouts were specifically selected from the eleven residential development corridors earlier identified by Olamiju (2014) using a non-random purposive sampling method. The selection of the specific residential estate/layouts was based on the availability of data on their housing population. In the third stage, one out of every ten buildings was selected for the survey of the household head residing in each of the chosen buildings across the selected residential estate/layouts. The fourth stage involved the separation of the household heads into titled and untitled groups for the survey. Primary data were obtained from field investigation using a structured questionnaire. Data collected from the study areas were thoroughly checked and validated for accuracy and completeness.

A collinearity test was conducted before the hedonic price analysis to see if the data meets the assumption that there was no multicollinearity. To achieve this, the Tolerance and Variance Inflation Factor (VIF) was used as the basis for measurement. If the VIF value is greater than 10, or the Tolerance is less than 0.1, then there is concern over multicollinearity. Otherwise, the data has met the assumption of collinearity (Tabachnick & Fidell, 2007). To check for independent errors or auto-correlation, the Durbin-Watson test was carried out.

Hedonic price analysis was used in investigating the contribution of land titling to land value in the study area to determine the marginal contribution of land titling to land value. Hedonic price analysis is a form of regression that is based on the recognition that land value is a direct function of several attributes (Oduwole and Eze, 2013). Therefore, with the hedonic price analysis, the marginal contribution of each of the attributes can be

determined (Jan and Diewert, 2013). According to Madalasa (2014), land prices are modelled in a hedonic setting to ascertain the value of various attributes including the title. The hedonic technique controls the heterogeneous nature of land by decomposing land value into its constituent characteristics since landed properties are a combination of many factors. Though attributes are not sold separately, when the sale price of properties based on their various characteristics are regressed, it gives the marginal contribution of each characteristic.

Xiao (2017), however, noted the sensitivity of hedonic price analysis to the choice of functional form, as it becomes inefficient when the correct functional form is not employed (Oduwale and Eze, 2013). Jan and Diewert (2013) acknowledged the fully linear model and the logarithmic-linear model as the two predominant hedonic functional forms in practice. However, the logarithmic-linear model provides a better fit to data than a linear model as it gives room for data transformation. Oduwale and Eze (2013) and Xiao (2017), corroborated Jan and Diewert (2013) assertion, but further expanded the logarithmic-linear function. In addition to the linear specification, other functional forms of the logarithmic-linear hedonic price regression model are semi-log, log-log or double-log and the Box-Cox transform. For this study, the semi-log form of the hedonic price regression analysis is adopted.

The semi-log form of the hedonic price analysis was adopted as it either accommodates the dependent variable in log form and independent variable in linear, or dependent variable in a linear and independent variable in log form. According to Xiao (2017), the semi-logarithmic form is the more predominant among the other functional forms in hedonic literature. It is easy to interpret the semi-logarithmic form coefficients as the proportionate change in price arising from a unit change in the value of the attribute. In addition, unlike log-log models, the semi-log model accommodates dummy variables for attributes that are either present or absent (0 or 1).

A 2-stage hierarchical form of the semi-log hedonic price analysis is employed. In the first stage of the hierarchical form of the semi-log hedonic price analysis, land titling was entered into the equation to identify its contribution to land value after other variables have been controlled for. Subsequently, in the second stage, titling and other variables were entered into the equation to determine their respective contributions. Land value is the dependent variable, while the selected variables (including plot size, accessibility to land, and presence of neighbourhood amenities) as the representation of land attributes and land titling (which is the subject of interest) are the independent variables. Generally, the semi-log specification of the hedonic price analysis usually takes the form:

$$\ln P = \ln \beta_0 + \sum_{k=1}^K \beta_k X_k + \varepsilon \dots \dots \dots (4)$$

Where,

P = land value;

$\varepsilon$  = a vector of random error term; and

$\beta_k$  (k = 1, ..., K) indicates the rate at which the price increases at a certain level, given the characteristics X (Xiao, 2017).

The framework specification for the 2 stages hierarchical form of the hedonic price analysis for this study is therefore defined respectively as follows:

$$\ln \text{LNDVAL} = \beta_0 + \beta_1 \text{LNDTIT} + \varepsilon \dots \dots \dots (5)$$

Where,

$\beta_0$  = a constant;

$\beta_1$  = regression coefficients;

LNDTIT = a dummy variable representing land titling (independent variable); and

$\varepsilon$  = residual error term.

$$\ln LNDVAL = \beta_0 + \beta_1 LNDTIT + \beta_2 \ln LOCCHA + \beta_3 NEICHA + \ln \beta_4 LNDCHA + LNDACC + \varepsilon \dots \dots \dots (6)$$

Where,

$\ln LNDVAL$  = natural logarithm of Land Value on a per square meter basis for each land parcel;

$\ln LOCCHA$  = natural logarithm of locational characteristics (accessibility);

$NEICHA$  = a dummy variable representing neighbourhood characteristics;

$\ln \beta_4 LNDCHA$  = natural logarithm of land characteristics;

$LNDACC$  = a dummy variable representing accessibility characteristics.

The variables included in the hedonic price analysis are further operationalized in Table 2.

#### 4. PRESENTATION AND DISCUSSION OF RESULTS

The interpretation and discussion of inferences made from the analysis of the data collected are presented in this section. The data was obtained from the house heads who are landowners in the selected Residential Layouts/Estates of the study area. Necessary tests and assumptions were also observed before the use of inferential statistics. The data obtained was used to examine the contributing effect of land titling on land value. The results are presented in the Table 3 and Table 4.

**Table 2:** Operationalization of variables for the hedonic price analysis

| Variable Code                        | Definition                                                                           | Measurement                         |
|--------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------|
| <b><math>\ln LNDVAL</math></b>       | Natural log of land value                                                            | Actual price (₦)                    |
| <b><math>LNDACC</math></b>           | Land accessibility (ease of getting to a particular plot)                            | 1, if accessible, or 0 if otherwise |
| <b>Land characteristics</b>          |                                                                                      |                                     |
| <b><math>PLSIZ</math></b>            | Plot size                                                                            | M <sup>2</sup>                      |
| <b><math>LNTIT</math></b>            | Existence of land title                                                              | 1 if titled land, or 0 if otherwise |
| <b>Locational characteristics</b>    |                                                                                      |                                     |
| <b><math>DISCBD</math></b>           | Distance to the central business district                                            | Km                                  |
| <b><math>DISBST</math></b>           | Distance to the nearest bus stop                                                     | Km                                  |
| <b>Neighbourhood characteristics</b> |                                                                                      |                                     |
| <b><math>PBNAM</math></b>            | Presence of neighbourhood amenities such as school, clinic and other infrastructures | 1, if present, or 0 if otherwise    |

**Table 3:** Collinearity test for the 2-stage hierarchical form of semi-log hedonic analysis

| S/N | Variables                                                          | Tolerance | Variance inflation factor (VIF) |
|-----|--------------------------------------------------------------------|-----------|---------------------------------|
| 1.  | Land Titling                                                       | 0.115     | 8.733                           |
| 2.  | Accessibility                                                      | 0.291     | 3.441                           |
| 3.  | Distance to central business district                              | 0.687     | 1.457                           |
| 4.  | Distance to the nearest bus stop                                   | 0.111     | 8.988                           |
| 5.  | Plot size                                                          | 0.148     | 6.765                           |
| 6.  | Neighbourhood Amenities (School, Clinic and other infrastructures) | 0.159     | 6.289                           |

Tests to see if the data employed in the 2 stages hierarchical form of semi-log hedonic price analysis met the assumption of collinearity was presented in Table 3. The outcome of the analysis showed that multicollinearity was not a concern (Land titling, Tolerance = 0.115, VIF = 8.733; Accessibility, Tolerance = 0.291, VIF = 3.441; Distance to central business district, Tolerance = 0.687, VIF = 1.457; Distance to the nearest bus stop, Tolerance = 0.111, VIF = 8.988; Plot size, Tolerance = 0.148 VIF = 6.765 and Neighbourhood amenities, Tolerance = 0.159, VIF = 6.289). The tolerance value shows the level of variability of a particular independent variable is not explained by the other independent variables in the analysis. The VIF value should not be greater than 10, or the Tolerance less than 0.1 (Tabachnick & Fidell, 2013).

A two-stage hierarchical form of the semi-log hedonic regression was conducted in Table 4, with land value as the dependent variable. Land titling was entered at stage one of the regression to control for accessibility, distance to the central business district, distance to the nearest bus stop, plot size and neighbourhood amenities. Accessibility, distance to the central business district, distance to the nearest bus stop, plot size, neighbourhood amenities including land titling were entered at stage two. The Durbin-Watson statistics has a value of 1.108 and therefore no independent errors and first-order autocorrelation is detected. According to Tabachnick and Fidell (2019), Durbin-Watson values can be anywhere between 0 and 4. However, a value close to 2 is appropriate to meet the assumption of independent errors.

The R Square value of 0.071, indicates that the overall model explains 7.1per cent of the variance after 'land title' have been inputted being the focused independent variable in the first stage. Similarly, after the second set of variables (Accessibility, distance to the central business district, distance to the nearest bus stop, plot size, neighborhoodamenities as well as land titling) have been integrated into the second stage, the variability accounted for went up from 7.1% to 81.3% - a significant increase. This suggests the model as a whole explains 81.3 per cent. This is an indication that the model captured a very reasonable share of the variation in the land value.

**Table 4:** Analysis of the contribution of land titling to land value

| Variable                                                           | Stage 1: Semi-log model |            |              | Stage 2: semi-log model |                     |            |                |              |
|--------------------------------------------------------------------|-------------------------|------------|--------------|-------------------------|---------------------|------------|----------------|--------------|
|                                                                    | $\beta$ Coefficient     | Std. Error | t-Statistic  | Prob.                   | $\beta$ Coefficient | Std. Error | t-statistic    | Prob.        |
| Land Titling                                                       | <b>0.266</b>            | 0.019      | <b>8.800</b> | <b>0.000</b>            | <b>-1.264</b>       | 0.026      | <b>-31.714</b> | <b>0.000</b> |
| Accessibility                                                      |                         |            |              |                         | -0.199              | 0.014      | -7.949         | 0.000        |
| Distance to central business district                              |                         |            |              |                         | 0.404               | 0.014      | 24.834         | 0.000        |
| Distance to the nearest bus stop                                   |                         |            |              |                         | 0.452               | 0.050      | 11.185         | 0.000        |
| Plot size                                                          |                         |            |              |                         | 0.612               | 0.000      | 17.438         | 0.000        |
| Neighbourhood Amenities (School, Clinic and other infrastructures) |                         |            |              |                         | -0.424              | 0.021      | -12.532        | 0.000        |
| R                                                                  | <b>0.266</b>            |            |              |                         | <b>0.901</b>        |            |                |              |
| R <sup>2</sup>                                                     | 0.071                   |            |              |                         | 0.813               |            |                |              |
| Adjusted R <sup>2</sup>                                            | 0.070                   |            |              |                         | 0.811               |            |                |              |
| F-statistics                                                       | 78.846                  |            |              |                         | 744.141             |            |                |              |
| Standard Error of Estimate                                         | 0.27213                 |            |              |                         | 0.12252             |            |                |              |
| Probability                                                        | <b>0.000</b>            |            |              |                         | <b>0.000</b>        |            |                |              |
| Durbin-Watson                                                      |                         |            |              |                         | <b>1.108</b>        |            |                |              |
| Observations                                                       | 1037                    |            |              |                         | 1037                |            |                |              |

The 2 stages semi-log form of hierarchical hedonic price analysis also shows the contributing effect of land titling to land value after controlling for the influence of other independent variables. Land titling was the first variable entered at Stage 1 while holding the other variables constant. The first stage shows the Standardized Coefficients Beta for land titling,  $\beta = 0.266$ ,  $t = 8.800$ , which was statistically significant at  $p < 0.05$ . This implies that holding all other factors constant, land titling contributed about 26.6% to land value. It also implies that land titling has a positive impact on land value by way of securing rights to land in the study area. In the second stage, all the four variables were statistically significant, with land titling showing a higher beta value (beta = -1.264,  $p < 0.05$ ), than the other variables in order of their beta values and significant contribution including: plot size (beta = 0.612,  $p < 0.05$ ), distance to the nearest bus stop (beta = 0.452,  $p < 0.05$ ), neighbourhood amenities (beta = -0.424,  $p < 0.05$ ), distance to central business district (beta = 0.404,  $p < 0.05$ ) and accessibility (beta = -0.199,  $p < 0.05$ ). Consistently, the Beta Standardized Coefficients of  $\beta = 0.266$ ,  $t = 8.800$  and beta = -1.264,  $t = -31.714$  for land titling in the first and second stage hierarchical semi-log form of the hedonic price analysis is statistically significant at  $p < 0.05$ . This shows that that land titling has a significant contribution to land value. Additionally, a Standardized Coefficients Beta of (-1.264), is an indication that a one standard deviation increase in titling leads to a 1.264 standard deviation decrease in land value.

In addition, the percentage contributions from the coefficient of the parameters of this analysis were measured in the second stage. In a trans-log functional form with the dependent variable being expressed in natural log terms, the contribution of each independent variable was determined using the beta values that is given multiplied by one hundred per cent. Land titling contributed about 126% to land value, while accessibility, distance to the central business district, distance to the nearest bus stop, plot size and neighbourhood amenities, contributed 19.9%, 40.4%, 45.2%, 61.2%, and 42.4% respectively to land value. This means that land titling makes a statistically significant contribution to explaining the land value when the variance explained by all other variables in the analysis is controlled for.

Given the foregoing outcome, the findings from the analysis supported earlier studies that found high coefficients on a dummy variable for the land title in the hedonic analysis of land value. For instance, Chalamwong and Feder (1998) earlier observed titled land is significantly correlated with higher land prices. The values of untitled land are 80%, 43% and 47% of titled land in Lop Buri, NakhonRatchasima, and KhonKaen provinces of Thailand. Alston, Libecap and Schneider (1996), though in an agrarian area of Brazil, found that at market-centre, land values were 189% higher for titled vs. untitled land; at a distance of 40 kilometres, they were 72% higher, and at a distance of 140 kilometres, values were predicted to be 45% higher. Dowall and Leaf (1991), also found that titled residential plots in Jakarta sold for a 45 per cent premium over comparable plots without a land title. Land values for plots with the land title are higher by 30% in Nicaragua (Deininger and Chamorro, 2004). Broegaard (2005), arrived at similar findings in Nicaragua. In the Khashaa districts of Mongolia located in East Asia and the Pacific, land titling leads to higher land value. The average percentage price premium for land titling ranges from 170 to 223% depending on the districts in consideration (CHF International, 2006). Galiani and Schargrodsky (2011) also observed increases in property values of approximately 19 per cent from titling in suburban Buenos Aires of Argentina. A similar finding is reported in a study carried out in the Onitsha area of Nigeria that land titling contributed approximately 260% to land value (Emoh, Oni & Egolum, 2013),

while in India land titling contributed about 7.4% in a hedonic model of land value (Madalasa, 2014) and correspondingly, 32% in Tanzania (Aikaeli and Markussen, 2017).

## 5. CONCLUSION AND RECOMMENDATIONS

This study examined the contributing effect of land titling on land values in some selected private residential layouts/estates of the study area. It adopted the cross-sectional survey method of sampling. Different factors influence individuals to value titling more in particular places. The factors range from threats to ownership security to more opportunities for using the landed property as collateral, or the ability to obtain a higher price when disposing of it. To empirically establish the value ascribed to land titling, the study revealed that when land titling is considered alone with land value, there is a statistically significant contribution of about 27% to land value and 126% when considered alongside the other independent variables. This indicates that land titling made a significant unique contribution to the prediction of the land value in the study area. The results of this study have policy implications for the use of land titling in achieving the efficient utilization and exploitation of land both in Nigeria and countries of similar urban settings where the state of development requires genuine ownership of a relatively scarce expanse of land. Based on the findings of the study, the following are recommended on land titling practice in the study area:

1. Since land titling is a significant contributor to land values, it should be included for the proper specification of hedonic land value models.
2. Based on the significant contribution of land titling in this research, there is a need for special consideration to be given in policy formulation and the enforcement of titling on non-titled land.
3. Land titling institutions may also use the information on the contribution effect of land titling to land value in determining the reserve title premiums across different locations within and across the urban area.
4. Also, to the Nigerian Institution of Estate Surveyors and Valuers (NIESV), land titling is a unique factor to be considered when determining the land value in urban areas.
5. For policymakers, empirical evidence about the determinants of the value of title can assist in providing a decision-making framework.

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