IRE|BS
Foundation for African Real Estate Research

IREBS Foundation for African Real Estate Research - Am Schwarzenstein 30 - D 65366 Geisenheim - Germany
Phone: +49 (0) 69 24 00 08 40 - Fax: +49 (0) 69 24 00 08 49 - Mail: info@afrer.org - Web: www.afrer.org

Impact of Water View on Residential Properties House Pricing

Oludare I. Makinde
Ola O. Tokunboh

Paper presented at the American Real Estate Society Conference in Kigali, Rwanda from 23 -26 October 2013

Abstract: The study of impact of view on house prices should give the valuation profession in particular and property market in general great concern because of the serious implication it may have on valuation accuracy. Over the last two decades, considerable studies on this subject have been carried out in the developed countries particularly United Kingdom, Asia and the United States. However, in Nigeria the subject is yet to attract the same level of interest and concern. Thus, to bridge the gap in knowledge, this study examines the impact of water view on residential properties within a highbrow neighbourhood along the Lekki corridor of Lagos Island division of Lagos metropolis, Nigeria; Victoria Garden City. Primary data are obtained through questionnaire based on purposive sampling. The study adopts the standard hedonic pricing model using 18 housing characteristics as independent variables, and the analysis is carried out in linear, log-linear and log-log functional forms. The result indicates that views add 47.9 per cent to home prices in the study area.

Introduction

Around the world, most especially in the United Kingdom, United States, Asia and Australasia, the impact of views – beach, golf course, greenbelt, lake, lagoon, mountain, ocean, and sea – on property value is well documented in several literatures viz. Gatzlaff and Smith, 1993; Sirmans and Rodriguez, 1994; Benson et al, 1997; Benson et al, 1998; Haider and Miller, 2000; Seiler et al, 2001; Bond et al, 2002; Paterson and Boyle, 2002; Bourassa et al, 2004; Wyman and Sperry, 2010 among others.

Historically, a view was sought primarily for strategic motives; a dominant spot that would enable the dweller to be aware of possible intruders. But these days, the real estate market operators consider view differently and this influences the way they are ready to pay for it. Real estate developers now capitalise on the attractiveness and human preference for views. Summarily, a view is now being sought predominantly for aesthetic, beauty, calmness and easy access of nature associated with it – beyond the thought of getting away from intruders or security threats. Yet, some sales agents debated that the market place does not provide a premium for sellers of homes with good views, while others suggested that homes with good views often sell for more than comparable homes that do not provide these views (Makinde, 2011).

A dwelling place, a living necessity for both residents and families, is a heterogeneous product since its value depends on a number of factors which include structure, location and neighbourhood characteristics. Accordingly, regression analysis can be applied to derive the implicit price of each housing attribute and the contribution of each characteristic to the overall house price (Otegbulu and Johnson, 2011). Number of bedrooms, age and condition of property, and size of living rooms are important structure attributes that are often easily measurable. Variables pertaining to location include proximity to CBD, floor level, view and in some cases variables measured using Geographical Information System; and neighbourhood traits comprises socio-economic variables (such as neighbours' status, residents' income and unemployment rate), provision of social amenities, and externality likes crime rate, traffic noise and airport noise (Yan and Zhang, 2006; Makinde, 2011; Otegbulu et al, 2011).

In Nigeria, there appears to be dearth of study on the impact of water view on property values. This study therefore examines the contributory effect of water view on residential property prices in the country with particular reference to the Atlantic Ocean and Lagoon views in a highbrow residential area of Lagos metropolis viz. Victoria Garden City (VGC) vis-à-vis evaluating the level of significance of water view among other factors influencing house prices.

Hedonic Price Model

Real estate literatures revealed that hedonic price model have been studied extensively and it is the most widely adopted for interpreting the influence between numerous factors affecting property prices and for establishing the implicit price for individual attributes (Rosen, 1974; Kauko, 2003; Yan et al, 2006).

According to Yan et al (2006), the leading step of establishing a hedonic price model is to identify the traits that affect housing price, which can be divided into three categories, i.e. structure attributes, location attributes and neighbourhood attributes. Besides, these basic housing traits encompass both quantitative and qualitative qualities (Makinde, 2011); and the neighbourhood traits can further be divided into three kinds, socio-economic, public services and externalities (Wen, 2005).
Establishing a basic model, the relationship between housing price (P) and the housing traits vector (T) can be expressed as:

$$P = f(T) = f(T1, T2, T3,\ldots, Tn) \quad \ldots\ldots (1)$$

By calculating the partial derivative of this equation with each housing characteristics variable, we can get the corresponding implicit price of housing characteristic. The hedonic price equation is:

$$Pzi = \square\square/\square T\square \quad \ldots\ldots (2)$$

Research Area

The study area is the highbrow residential sub-market of the Lagos Island division on the corridor of the Lekki peninsula within Lagos metropolis in Nigeria; the Victoria Garden City (VGC). This selected neighbourhood boasts of naturally formed peninsula in the Atlantic Ocean and Lagos Lagoon which affords either full or partial water view to some of the residents and their family members from their diverse abodes.

Methodology

Hedonic price model is utilised to examine the impact of water views on house prices in the selected location. Transaction data were secured from the VGC Sales Department, and 250 questionnaires were administered through purposive sampling to estate surveyors and local agents with 145 returned and used in the study. Also, a number of interviews with VGC Management Company, real estate developers, estate surveyors, investors and local agents, and market analysis were conducted.

In order to gather adequate amount of transaction records and to avoid time effects of the sales value, transactions included in the study are between February 2005 and March 2011.

However, due to the constraint of data collection and complication of evaluation, the hedonic equation for the study would be of the linear function expressing the relationship between the housing characteristic and house price. That is:

$$P = \gamma 0 + \Sigma \gamma i Ti + \varepsilon \ (i = 1\sim 18) \quad \ldots\ldots (3)$$

Where P is housing price, γ0 is constant, γi are the relevant characteristic price, Ti are the relevant housing characteristic variables, and ε is the random error. As independent variables and dependent variable are in the linear model, regression coefficients γi in the corresponding hedonic prices are constants.

The multiple-regression was obtained by statistical procedures executed in Statistical Package for Social Sciences (SPSS) in which 18 independent variables were entered into the hedonic price model.

Results and Discussion

An aggregate of 18 related housing characteristic variables made up the independent variables. Table 1.0 below depicts representation of each variable with corresponding variable measurement:

Table 1: Coefficient of Related Characteristic Variable and Variable Measurement

Characteristic Variable	Relevant Coefficient	Characteristic Price	Variable Measurement
Age of building	T1	γ1	Number of bedroom available
Physical condition of building	T2	γ2	Good = 1, otherwise = 0
Number of bedroom	T3	γ3	Number of bedroom available
Number of bath/toilet	T4	γ4	Number of bath/toilet available
Level of facilities/service	T5	γ5	Available = 1, otherwise = 0
Size of bedroom	T6	γ6	(If standard>20sqm) = 1, otherwise = 0

Size of living room	T7	γ7	(If standard>26sqm) = 1, otherwise = 0
Size of kitchen	T8	γ8	(If standard>12sqm) = 1, otherwise = 0
Garage	T9	γ9	Available = 1, otherwise = 0
Swimming Pool	T10	γ10	Available = 1, otherwise = 0
Domestic Quarters	T11	γ11	Available = 1, otherwise = 0
Water view	T12	γ12	Has view = 1, otherwise = 0
Distance to work	T13	γ13	in kilometre (approximately)
Quality school	T14	γ14	Available = 1, otherwise = 0
Road network	T15	γ15	Good = 1, otherwise = 0
Power supply	T16	γ16	Regular = 1, otherwise = 0
Neighbourhood security	T17	γ17	Good = 1, otherwise = 0
Recreational facilities	T18	γ18	Available = 1, otherwise = 0

The house price P is described by a vector of continuous and dummy variables, and measured in Nigerian Naira and US Dollars (at an exchange rate of 160 Naira to 1 US Dollar). For paucity of secondary data on accommodation details, and lack of GIS information that cover these areas, most of the variables used are dummies.
Consequently, the hedonic price model is constructed as:

$$P = \gamma_0 - \gamma_1 T1 + \gamma_2 T2 + \gamma_3 T3 + \gamma_4 T4 + \gamma_5 T5 + \gamma_6 T6 + \gamma_7 T7 + \gamma_8 T8 + \gamma_9 T9 + \gamma_{10} T10 + \gamma_{11} T11 + \gamma_{12} T12 + \gamma_{13} T13 + \gamma_{14} T14 + \gamma_{15} T15 + \gamma_{16} T16 + \gamma_{17} T17 + \gamma_{18} T18 + \varepsilon \quad \ldots\ldots (4)$$

Table 2: Descriptive Statistics

Variables	Minimum	Maximum	Median	Mean	Std. Dev.
House Price	112,500	1,562,500	594,375	745,896	431,842
Age of building	2	18	6	6.792453	2.903912
Physical condition of Building	0	1	1	0.971698	0.166622
Number of bedroom	2	5	5	4.613208	0.610554
Number of bath/toilet	2	6	5	4.962264	0.791918
Level of facilities/service	0	1	1	0.981132	0.136705
Size of bedroom	0	1	1	0.990566	0.097129
Size of living room	0	1	1	0.990566	0.097129
Size of kitchen	0	1	1	0.990566	0.097129
Garage	0	1	0	0.349057	0.478936
Swimming pool	0	1	0	0.179245	0.38538
Domestic Quarters	0	1	1	0.943396	0.232182
Water view	0	1	0	0.273585	0.447916
Distance to work	0	1	1	0.820755	0.385386
Quality school	0	1	1	0.924528	0.265406
Power supply	0	1	1	0.935478	0.146517
Neighbourhood security	0	1	1	0.831866	0.265406
Recreational Facilities	0	1	1	0.924528	0.39648

In Table 2 above, the statistics of the hedonic price model for VGC were presented and these include the maximum and minimum values, mean value, median and standard deviation. The average sales value in the location, regardless of property type is estimated at 745,896USD. The maximum value ever obtained was 1,562,500USD while the minimum was 112,500USD.
While there were properties that had existed for 18 years, there were some that had only being for little period of 2 years. The average age of property is however estimated as 6.79 years. The highest number of bedroom that could be found in any property is 5 while the minimum is 2.
Each property consisted of at least 2 baths/toilets, and some had up to 6 baths/toilets. The average number of bedroom and bath/toilet is estimated at 4.61 and 4.96 respectively. These figures imply that there are more properties with 4 bedrooms and 4 baths/toilets.
While these attributes were estimated with actual figure (for example number of bedroom, number of bathrooms), other attributes presented in the table were estimated using dummy. The highest value associated with each of these is 1 and the lowest 0, that respectively represent available/good/standard

and otherwise. The average value computed for physical condition of property, level of service/facilities, size of living room, size of bedroom, availability of boys quarters, access to work and quality of school, is close to 1; meaning that most of the properties reflect available/good/standard in terms of those attributes. Standard of construction, size of kitchen, access to road network, electricity, security and recreational facilities all have a unit as average value. This poses difficulty in including them as explanatory variables, after the model has already contained a constant. Thus, they were eliminated from the estimation.

Table 3: Regression Estimation Result for Property Value

	Linear Model		Log-linear Model		Log-log Model	
	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Constant	-414887.1	0.4504	11.60672	0.000	11.48139	0.0000
Age of building	-4046.349	0.7268	-0.008629	0.5034	-0.061224	0.4416
Physical condition of building	77904.75	0.7120	0.093401	0.6907	0.092849	0.6918
Number of bedroom	91030.51	0.4376	0.156445	0.0513	0.204009	0.5861
Number of bath/toilet	155982	0.0144	0.173991	0.01442	0.611731	0.0611
Level of service/facilities	87458.62	0.6878	0.097754	0.6864	0.094792	0.7000
Size of living room	671548.5	0.0847	1.215171	0.0056	1.325335	0.0025
Garage	90998.98	0.3229	0.138357	0.1777	0.150560	0.1509
Swimming pool	300094.5	0.0020	0.234882	0.0276	0.236661	0.0295
Domestic quarters	62963.68	0.6252	0.144107	0.3158	0.132803	0.3812
Water view	517348.7	0.0000	0.479251	0.0000	0.508578	0.0000
Distance to work	124288.1	0.1296	0.178249	0.0516	0.181188	0.0515
Quality school	48269.91	0.6553	0.140733	0.2434	0.158469	0.1955
F value	15.62578	0.0000	14.43603	0.000	13.79965	0.000
R2/Adjusted R2	0.66373	0.62125	0.64583	0.60109	0.63545	0.58940
Durbin-Watson stat.	0.909178		1.374816		1.289596	
Akaike Info Criterion	28.04352		0.625573		0.654461	
Schwarz Criterion	28.36637		0.948428		0.977310	
White Heteroscedasticity Test						
F-statistic	2.301334	0.001209	0.537373	0.984315	0.563647	0.976732
Obs*R-squared	66.57754	0.015578	29.47216	0.954366	30.50613	0.938948

Table 3 above reflects the estimate of the linear model, log-linear model and log-log model of hedonic pricing. Comparing the three functional forms, the log-linear model is rated superior to linear model in terms of the number of significant coefficient and homoscedasticity of errors. Log-linear model also yields better results than log-log model by comparing R2 and adjusted R2, F value, Akaike info and Schwarz criteria. The implication is that this model (log-linear), in terms of adjusted R2, has the highest influence on the independent variables explained on property value, the lower Akaike and Schwarz criteria and higher F value, which together depicts a good performance of regression model.

Hence, the estimation of log-linear model is preferred over other functional forms and its estimates are chosen for interpretation and these are hereby presented as follows; number of bedroom increases the price of the house by 15.6%, while additional number of bath/toilet increases the price of the house by 17%. The standard size of the living room increases the price of the house by 122%, and when a house has a swimming pool, the house price increases by 23.4%. The average property in Victoria Garden City with a full view increases house price by 47.9%.

Conclusion

Rationally, access to a good view such as water should confidently influence dwelling prices. The study has however examined the effect of water view on house prices in a highbrow residential area of Victoria Garden City (VGC). The result of correlation analysis for VGC revealed that water view is statistically significant at 99% level of confidence contributing to house price by 47.9% putting into consideration other significant house price determinants.

Finally, the study has demonstrated that water view has a high value for house prices, but a good understanding of the adopted housing traits is quite important for the valuation of residential properties with views such as water.

References

Benson, E. D., Hansen, J. L., Schwartz, A. L., & Smersh, G. T. (1998). Pricing Residential Amenities: The Value of a View. Journal of Real Estate Finance and Economics , 55-73.

Benson, E. D., Hansen, J. L., Schwartz, A. L., & Smersh, G. T. (1997). The Influence of Canadian Investment on U.S. Residential Property Values. Journal of Real Estate Research , 231-245.

Bond, M. T., Seiler, V., & Seiler, J. (2002). Residential Real Estate Prices: A Room with a View. Journal of Real Estate Research , 130-136.

Bourassa, S. C., Chan, W. H., & McMillian, I. (2004). What's in a View? Environmental and Planning , 27-50.

Gatzlaff, D. H., & Smith, M. T. (1993). The Impact of Miami Metrorail on the Values of Residences near Station Locations. Land Economics , 54-66.

Haider, M., & Miller, E. J. (2000). Effects of Infrastructural and Location on Real Estate Values: Application of Spatial Autoregressive Techniques. Transportation Research Record , 1-8.

Kauko, T. (2003). Residential Property Value and Locational Externalities on the Complimentarity and Substitutability of Approaches. Journal of Property Investment and Finance , 250-270.

Makinde, O. I. (2011). The Effect of Water View on House Prices in Lekki. An Unpublished M.Sc. Dissertation submitted to the Department of Estate Management, University of Lagos, Lagos, Nigeria.

Otegbulu, A., & Johnson, O. (2011). The Impact of Jacuzzi Bathtubs on House Prices. Journal of Sustainable Development , 199-209.

Paterson, R. W., & Boyle, K. J. (2002). Out of Sight, Out of Mind? Using GIS to Incorporate Visibility in Hedonic Property Value Models. Land Economics .

Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. Journal of Political Economy , 34-55.

Seiler, M. J., Bond, M. T., & Seiler, V. (2001). The Impact of World Class Great Lakes Water Views on Residential Property Value. Appraisal Journal , 287-295.

Sirmans, C. F., & Rodriguez, M. (1994). Quantifying the Value of a View in a Single Family Housing Markets. The Appraisal Journal , 600-603.

Wen, H. (2005). Characteristic Price of Urban House: Theory and Empirical Research. Beijing: Economic Science Press.

Wyman, D., & Sperry, S. (2010). The Million Dollar View: A Study of Golf Course, Mountain and Lake Lots. The Appraisal Journal , 159-168.

Yan, D., & Zhang, W. W. (2006). Neighbourhood Characteristic and Housing Price: An Empirical Analysis Based on Hedonic Price Model. The CRICOM 2006 Symposium on "Advancement of Construction Management and Real Estate.