African Journal of Estate and Property Management Vol. 1 (5), pp. 150-157, May, 2014. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

The effects of location and neighbourhood features on housing values in metropolitan Lagos

A.A Ebih

Department of Urban and Regional Planning,Faculty of Environmental Sciences
University of Lagos, Akoka, Lagos, Nigeria. E-mail: Adamebih@gmail.com; Tel: +2348037240742.

Accepted 15 November, 2013

The aim of this paper is to analyse and determine the relative roles of location and neighbourhood characteristics in the determination of housing values/prices. In order to achieve this, attempts were made to evaluate the role of location and neighbourhood factors in the determination of house prices; study how house prices / values vary by area; show how spatial variation of the housing attributes leads to the determination of income sub-groups in cities; and determine the extent to which these findings help in the understanding of the structure of the housing market in Nigerian cities. This paper therefore examined the spatial variations of location and neighbourhood attributes on house prices in the valuation zones. The hypothesis tested is that house prices vary by neighbourhood and locational attributes in metropolitan Lagos. The analysis of variance and multiple regression models were used in the analysis. It is concluded that neighbourhood and locational attributes show more importance on house values when smaller geographical housing units are examined.

Key words: Locational attributes, neighbourhood characteristics, house values.

INTRODUCTION

The impact of location in housing market is very significant. Since housing units are fixed in location, they differ in terms of their surroundings, the kind of community in which they are located, and their nearness to employment and shopping places. Locational area also means that a dwelling's surrounding is possibly of great importance in affecting its value. This research paper therefore among others examined how location determines house prices and the preferences of the people.

The aim of this research paper is to analyse and determine the relative roles of location and neighbourhood and the physical characteristics of houses in the determination of housing values/prices. This study will first examine the issue of the influence of location on housing prices. The questions posed are why do housing values vary by location and how can housing attributes be priced to reflect locational variation? Secondly, the research will examine the spatial variations in the housing values and seek explanation through neighbourhood attributes. This is to explore the nature of demand for neighbourhood preferences of households. Thirdly, we shall measure the neighbourhood effects to determine which variables actually contribute to the explanation of variations in house prices. Lastly, we shall examine variations over different segmentations of the urban housing market. This is to consider the spatial variations in house prices in the different heterogeneous neighbourhoods. The means of achieving the above set goal are to: Evaluate the effects of physical properties on house prices in different locational setting; Evaluate the role of neighbourhood attributes in the determination of house prices; Determine the extent to which these findings help in the understanding of the structure of housing market in Nigerian cities.

Location refers to the specific placement of a house which affects housing choices. A home is part of a neighbourhood and should be viewed in the community setting. Each occupant has needs which must be met in the larger community. Facilities for education, transport, worship, health care, shopping and recreation are factors to be considered when making housing choices. Location choices also range from urban to suburban to rural. A home that takes advantage of its surroundings reflects

the character of the area. For homes should always fit their surroundings. Location is thus an important consideration in the design and construction of a home. The materials used to build the structure as well as the furnishings used to decorate the interior can be affected by the location.

Neighbourhood, on the other hand is important due to its spatial linkage to the housing purchase. Once settled in a location, one is subject to the externalities that neighbourhood effects impose. Neighbourhoods are geographic units within which certain social relationships exist, although the intensity of these relationships and their importance in the lives of residents vary tremendously. Initially the neighbourhood unit was both a social and planning concept. On one hand, it had to provide convenience and comfort and direct, face-to-face contact in order to restore some sense of community that has been disturbed or destroyed by the specialization and segmentation of urban life. On the other hand, it was to constitute a special sub-part of a larger, more complex totality.

This research paper therefore among others examined how location and neighbourhood determine house prices and the preferences of the people. That is, spatial variation in house prices can be explained by differences in structural/physical characteristics of houses, neighbourhood attributes and location in space.

While the literature measuring externality from occupants or publicly and privately produced environmental good has been burgeoning (Anderson, and Crocker, 1971; Nelson, 1978; Li and Brown, 1980; Aluko, 2008a, 2008b), little has been said about the extent of neighbourhood effect, measured in price or distance, of non-conforming structures / uses, such as commercial or industrial buildings, on housing. The paucity of evidence on this is surprisingly because the presumed presence of this externality has often been used as one of the pretexts for zoning regulations. Also, existing studies are inconclusive on the extent of externality and there has been little effort to integrate neighbourhood externality into models of urban spatial structure. This study will incorporate these considerations into models of urban structure to provide an explicit geographical perspective and for comparisons with other models.

Most urban analysts also agree that neighbourhood quality is an important element of the housing bundle. But there is little agreement, however, regarding the measurement of neighbourhood quality (Dubin and Sung, 1990; Mabogunje, 1968, 1975, 2007; Aluko, 2008). The choice of neighbourhood quality is based primarily upon data availability and hence little justification is given for the choice of variables. Perhaps because neighbourhood is difficult to measure, and more difficult to model, housing researchers have often asserted that it does not make much difference. If such is the case, then the observed ethnic and racial enclaves that obviously exist have no economic meaning. This assertion then implies that realtors, home buyers, and the general public are misguided or misinformed in their statements to pay premium for at least some neighbourhood amenities. It is thus necessary to examine both the modelling and the empirical concerns of neighbourhood as part of the housing purchase. That is, give more attention to neighbourhood characteristics as determinants of housing prices.

Furthermore, the typical inhabitant of a large society lives in a differentiated part of an extensive urban complex. The local community is, for him, a more or less differentiated neighbourhood with whatever place names and unique characteristics that obtain there. The fact that there is a spatial disparity in the distribution and quality of public services and infrastructural facility means there is great variation, by sub-area, within a metropolis. This research is therefore meant to know both the degree of absolute price effects of houses on each other and the differentiated contribution of various housing attributes in structural different neighbourhood.

There is a great deal of diversity among neighbourhood structures within metropolitan areas, and this, in turn, has a significant impact on the valuation of structural attributes of houses by consumers. This implies that a household normally considers the quality of its potential neighbourhood such as its location and the public services provided to that neighbourhood, in taking a decision about the housing unit it will reside in. For a lot of people would prefer to live in neighbourhoods where the returns on their housing investment will be highest. Also, for the same reason, people are willing to invest in maintaining dwellings where the returns on such expenditures will be sufficiently high. In other words, households pay much attention to neighbourhood characteristics as determinants of housing prices. But, existing empirical studies of housing demand and supply are inconclusive on the influence of the neighbourhood variables on household's residential choice (Williams, 1979; Goodman, 1989; Dubin and Sung, 1990; Can, 1991; Aluko, 2008). The results are inconclusive because the studies are of the assumption that the effect of structural housing characteristics on property values is fixed, that is, invariant across neighbourhoods. The contribution of structural housing attributes to housing prices fails to take into account the geographical realities operating at neighbourhood levels in housing price determination. Therefore, this study is to examine the different housing prices produced by housing attributes at different locations and their influence on the spatial variations in the demand for neighbourhood attributes.

RESEARCH AREA AND METHODOLOGY

This study utilized both secondary and primary sources of data. Primary information was collected from both direct interviews and personal observations. The secondary data were collected from the Lagos State valuation office, journals, articles, research reports from government agencies and parastatals. There were 16 local

governments divided into 8 areas and consisting of 53 residential zones in the metropolitan Lagos. The total number of properties in the 53 zones is 135,820. The number of questionnaires administered was 1500 (this was based on about 1% of the total number of houses). The large number of properties made it difficult to cover all because of limited fund. The selection of the houses covered by the questionnaire was done by both the random and systematic sampling methods in the Metropolitan areas. Descriptive and inferential statistics were employed to resolve the objectivesand the formulated hypothesis. To test for the variations in house values in different locations and neighbourhoods, the analysis of variance and multiple regression models were used.

The Lagos Metropolitan Area located within Lagos State in the south western part of Nigeria until recently served as both a state and a national capital. It still serves as the country's commercial centre, with an annual population growth rate of about 13.6% (about 5 times as fast as the national growth rate of 2.8%). Lagos is Africa's second fastest growing urban centre after Cairo, being a focal point for regional, national and international trade and served by significant and often overloaded road, rail, ocean and air transport facilities.

ANALYSIS AND DISCUSSION OF RESULTS

Locational attributes of housing

Many locational attributes were considered in this research (Table 1). They include: Location and access to market, location of workplace, distance of house to place of work, children's school, place of shopping, place of recreation and worship, amount paid on transport from home to area of activities (place of work, children's school, recreation and worship), time spent from home to area of activities. The choice of the aforementioned variables was based on their importance to the explanation of locational effects on house values. Previous studies (Blomquist and Worley, 1981; Nelson, 1978; Linneman, 1981; Casetti, 1986; Can et al., 1989; Arimah, 1990; Casetti and Can, 1990; Aluko, 2008) have used some of the variables. Also, the concentration of workers in the CBD is no more important as there are multiple-nuclei centres in Metropolitan Lagos.

The importance of each of the attributes is very essential for the selection of a house. The location of the market and accessibility to it sometimes play a decisive role in household choice of a house. The location of workplace is the most important factor when deciding to live in a place since this factor determines and affects a lot of things. The location of workplace was examined along with the distance to the house and this has its effect on the time spent and the amount paid on transportation.

The locations of workplace of respondents to their homes are explained next. Majority of the people living in Lagos Island still work on the Island (64.3%). This could be due to the commercial nature of the area. Other neighbourhoods' residents recorded low percentages as those commuting daily with Lagos Island (Lagos Mainland-zones 10 to 20 (18.8%), Somolu-zones 21 to 24 (19.8%), Ikoyi- zones 4 to 6 (28.6%), Victoria Island-zones 7 to 9 (33.3%), Mushin-zones 25 to 31 (14.9%), Ikeja-zones 32 to 49 (18.3%) and Agege-zones 50 to 53 (18.5%)). The highest percentages of residents still work within their neighbourhoods. For instance, 51% of the residents of Ikeja work in the neighbourhood, 30% of the households in Lagos Mainland work in Mainland, and 54% of those in Lagos Island work in Lagos Island. All the same people still move from far and near to the Central Business District of Lagos. Other areas of importance are the industrial and other business centres which actually are scattered everywhere within the Metropolitan Lagos. The highest place of concentration of industries however is Apapa in Lagos Mainland and the total percentage of people who work in the area is the highest with 27%.

The respondents were asked why they chose to live in their present neighbourhoods. The reactions given vary over the neighbourhoods. While 60.7% of the residents in Lagos Island (zones 1 to 3) believed that it was because the houses were very close to their working places, 25% said the rent is affordable. 39% indicated that the environment is good and another 50% believed that they have no choice, being the place available to them due to the fact that the house is a family one inherited or because of scarcity of rooms to let. Other reasons given include those who were forced to resettle there because of its nearness to demolished shanty Maroko. A lot of people who earlier had properties in Maroko were forced to either live in nearby neighbourhoods or return to their villages /towns. Other neighbourhoods shared the same trend with Lagos Island in terms of rent affordability but with low percentage for the condition of the neighbourhood. A comparison with Ikoyi (zones 4 to 6), Victoria Island (zones 7 to 9), Ikeja (zones 32 to 49) and other specific neighbourhoods showed that good neighbourhood is of paramount importance for most residents. The availability of the house followed with 33.4% which is an indication that majority of the residents actually found themselves where they are either because it is the house their employers have already made available for them or due to scarcity of properties to rent. The idea that the rent is affordable looked normal, while the closeness to their working place is another factor.

Neighbourhood characteristics of housing

In the survey conducted for this research, the households were asked to assess some neighbourhood variables in order to evaluate the condition in their environments. Since defining a neighbourhood is to ask and know what the inhabitants think it is, some of the following neighbourhood variables were employed/utilized; length of stay of household head in the area (LAREA); flooding in your neighbourhood (FLOOD); cost of refuse collection(RCOST); the feeling/level of security (SECURE); incidence of crime (CRIME); the noise level

Table 1. Mean values of neighbourhood variables in metropolitan Lagos.

Zone	HRENT		AREA	
	Mean	S.D	Mean	S.D
1	256770.6	15874.0	479.0	517.2
2	14337.5	13231.3	155.0	64.9
3	13700.0	8967.2	170.0	80.0
4	118000.0	27503.3	4016.4	1094.9
5	188000.0	84193.7	4461.4	2096.1
6	116250.0	115209.8	1360.8	1765.0
7	255000.0	76217.4	1481.0	168.0
8	292500.0	142709.2	2525.5	404.3
9	250000.0	152255.8	1735.3	287.9
10	8528.0	4559.6	238.5	100.5
11	4094.5	2265.0	296.2	140.8
12	17496.0	7807.1	464.0	121.2
13	7332.5	2852.9	317.9	101.8
14	13231.4	6530.5	398.6	74.6
15	9177.8	5150.2	312.7	107.2
16	16247.4	10912.8	658.9	1012.8
17	8300.0	2834.0	376.0	110.1
18	15133.9	8071.1	439.1	178.0
19	8375.0	4721.3	473.7	133.7
20	9000.0	4925.5	481.3	222.5
21	13500.0	6873.2	450.4	63.8
22	7320.0	7177.7	429.7	144.5
23	15040.0	7261.0	748.8	212.7
24	7766.7	5138.6	364.6	122.6
25	10318.2	7075.8	513.6	322.5
26	9161.5	2713.0	461.1	144.5
27	12000.0	5063.2	446.6	157.4
28	17888.9	11994.7	608.0	173.9
29	9364.6	5447.6	528.6	207.4
30	8500.0	4062.0	381.7	72.9
31	9055.6	1823.0	417.6	65.2
32	27250.0	14404.1	520.3	89.0
33	50000.0	21908.9	1247.0	191.7
34	27500.0	2738.6	1293.5	270.0
35	27500.0	13693.1	531.5	135.0
36	52500.0	2738.6	2100.5	225.1
37	32500.0	8215.8	750.0	305.6
38	8600.0	2190.9	366.0	6.6
39	53750.0	13505.1	2250.0	879.3
40	19250.0	6353.7	608.9	178.6
41	30500.0	12391.3	5800.0	945.8
42	30500.0	15612.5	1025.3	670.1
43	106000.0	101334.0	626.2	169.5
44	71250.0	44062.2	905.3	341.3
45	16666.7	6614.4	747.7	209.6
46	20000.0	5477.2	611.5	20.3
47	17666.7	11821.6	2616.7	3294.0
48	7000.0	1954.0	638.3	202.5
49	9000.0	1843.0	717.5	656.2

Table 1. Contd.

50	6333.3	1794.4	376.7	76.0
51	6658.3	3855.5	424.3	131.2
52	7357.1	9530.0	406.6	171.1
53	5000.0	1549.2	325.7	125.8
Total sample	390836.3	18329.1	963.9	637.6

Source: Fieldwork, 2010.

(NOISE); number of markets/ shopping centres in the neighbourhood (NACCESS); number of waste disposal centres (WASTES); number of police stations in the neigh-bourhood (POLICE); number of children's playground in the neighhourhood (PLAY); number of recreational facilities in the neighhourhood (RECREAT); number of nursery and primary school in the neighbourhood (PRISCH); number of public hospital/ health centres (PUBHOSP) and number of private clinics (PCLINIC) in the neighbourhood. The chosen variables with their methods of measurement are representative and com-parable to the earlier studies by Nelson (1978), Witte et al., (1979), Blomquist and Worley (1981), Linneman (1981), Follain and Malpezzi, (1981), Megbolugbe (1983), Arimah (1990) and Aluko (2008).

The importance and purpose of the variables vary considerably. As much as possible the variables were measured by asking for specific units of provision of the neighbourhood facilities and a dummy variable is only used when measurement will result in error. Therefore, the idea that neighbourhood variables are problematic, intangible and difficult to measure objectively as observed by some researchers (Downs, 1981; Li and Brown, 1980; Arimah, 1990) is not all that valid. We should know that some structural attributes are difficult to measure too. For example, electricity supply, wall, roof materials, water supply, cracks in the wall are always measured as dummy variables. Therefore, one major improvement of this study over previous ones is that some of the neighbourhood attributes are calibrated/ measured to certain extent.

Spatial aspects of the location and neighbourhood attributes on house values

In examining the spatial variation among the neigh-bourhood and locational variables as they affect the housing values, different statistical techniques are em-ployed. They vary from simple analysis of variance to multiple regression analysis. In an investigation to throw light on the nature of the spatial variations on the locational and neighbourhood attributes, the set of descriptive statistics of means and standard deviations were used and the analysis of variance describe the dimensions of variation in these housing attributes. In the analysis here, the spatial variations were examined through frequencies and mean deviations over 53 zones in the metropolitan Lagos and also over three identified submarkets that represent the historical expansion/ growth of the city.

One of the most important variables in identifying the housing values in different neighbourhoods is the house rentals. The quantity of properties with basic amenities and their location confer some measure of value on the neighbourhood. That is why some people, while considering their status socially and economically will always prefer specific neighbourhoods, no matter the cost. Table 1 shows the zonal variation and pattern of average house rental values in metropolitan Lagos. The average annual rent per household is N390,836.30. On neighbourhood basis, it shows that 100% of the surveyed residential buildings in Lagos Island (Zones 1 to 3), Lagos Mainland (zones 10 to 20), Somolu (Zones 21 to 24), Mushin (zones 25 to 31), Agege (Zones 50 to 53) and 78.3% in Ikeja (Zones 32 to 49) would not go more than N500, 000 yearly. These neighbourhoods are where the rooming houses are very common with single rooms being rented between N1000 and N2000 monthly. In Victoria Island (Zones 7 to 9) and Ikoyi (Zones 4 to 6), 100% of the owners would charge over N1,510,000 as rent yearly, while 21.7% of the buildings in Ikeja would go for the same rent yearly. However, it should be noted that the quoted rental values were based on the survey carried out in 2005 by the valuation department of Lagos State Government. Since that time, the prices of things including rental charges have gone up tremendously. Several adjustments are being made in relation to recent realities.

An observation on how nearby housing is maintained affects each household's daily aesthetic pleasure and is another indicator of social and economic status. These relationships do not occur because of economic market relationships; they flow directly from one household to another and hence are external to markets. Yet such externalities have a great effect on the market value of all the housing in the neighbourhood and thus affect the owners of property there.

Another important variable in the spatial variation of neighbourhoods is the type of people living in the area.

The results show the variation in the different neighbourhoods of the Metropolitan Lagos. While there are pockets of business executives (10.7%), senior civil servants (17.9%) and diplomats (3.6%) in Lagos Islands (Zones 1 to 3), majority of the residents in the neighbourhood are medium/low income earners (67.8%). Lagos Mainland (Zones 10 to 20), Somolu (Zones 21 to 24), Mushin (Zones 25 to 31) and Agege (Zones 50 to 53) further confirmed that the areas are not inhabited by Diplomats as the response of the residents shows zero percentage.

A look at Victoria Island (Zones 7 to 9), Ikoyi (Zones 4 to 6) and Ikeja (Zones 32 to 9) show that majority of the residents (100, 85.7 and 61.6% respectively) are either Business Executives / Senior Civil Servants or Diplomats. In Victoria Island, there are more of the Diplomats as it recorded 27.8% as against 14.3% in Ikoyi. Also, 50% of the residents in Victoria Island are believed to be business executives while the Senior Civil Servants are more in Ikoyi with 38.1%. Ikeja, however, has the mixture of all but with the business executives leading (38.3%) followed by middle level officers (25%), senior civil servants (23.3%) and low income earners (13.3%).

The cost of land in the high income areas, especially Ikoyi, Victoria Island, Lekki Peninsula are in millions while the rental values in these areas are in tens of thousands per month, there is no doubt that they are exclusive areas for the highly rich people. An observation revealed that most of the tenants in these areas have their properties either rented or paid for by the government (state or federal) or their companies. No worker except the foreigners would have ventured to spend over half a million on rent. Another observation is the invasion of these highly planned residential areas by commercial activities and financial institutions. This has increased the land values of the areas astronomically.

Another important factor in explaining the neighbourhood characteristics in different locations is the area of land occupied. While land is no doubt an expensive commodity in housing production, Lagos brings out the issue clearly as it is the most expensive state in Nigeria. The zonal variation of average area of land occupied by the surveyed houses shows that the average area of land occupied per household is 963.9m^2. On neighbourhood basis, it shows that 92.8% of the buildings in Lagos Island (Zones 1 to 3) are less than 500m^2 in size, 98.1% in Lagos Mainland (zones 10 to 20), 95.8% in Somolu (Zones 21 to 24), 91.6% in Mushin (Zones 25 to 31) and 88.9% in Agege (Zones 50 to 53). Other neighbourhoods like Ikoyi-zones 4 to 6 (71.5%), Victoria Island-zones 7 to 9 (91.7%) and Ikeja-zones 32 to 49 (58.4%) have most of the population occupying over 1000 m^2. The houses in these specific neigh-bourhoods (Ikoyi-zones 1 and 2, Victoria Island- zone 3, Ikeja- zones 2, 8, 12 and 13, Surulere G.R.A.(Mainland) zone 7, Ajao Estate (Mushin) zone 4, Anthony Village (Somolu) Zone 3, Gbagada Estate (Somolu) Zone 1, Ilupeju G.R.A (Mushin) Zone 1) occupied large areas of land with superb buildings (Duplexes, Bungalows and Flats), large number of rooms and few number of households. These areas are provided with other basic amenities like schools, shopping centres, water, electricity and quality toilets, bathrooms and kitchen facilities.

An overall general observation in Lagos metropolitan areas is that some facilities are well provided and very common in almost all the neighbourhoods. They include provision of private clinics, access to shopping centres/local shops, nursery/primary schools and secondary schools. No matter where you are, you need not travel to the central business centre for your needs except for specialized goods. This would include buying of electronic gadgets in places like Alaba market or Idumota in central Lagos and attending higher institutions which have specific locations.

Multivariate analysis

A further analysis of the locational and neighbourhood attributes was carried out through the use of analysis of variance and multiple regressions. The research estimates the values of the locational and neighbourhood attributes by use of a hedonic regression model. The functional form adopted is the linear model in which all the attributes were measured using the multiple regression model. The model was also used to test for market segmentation. The use of non linear models (log and semi log models) was found through the test runs not to contribute much in terms of the explanation of the model. Many researchers have used the hedonic technique to determine the implicit marginal prices for certain housing attributes, and a linear regression was used. Borukhov et al. (1978) in the study of housing market and preferences in Israel found that homeowners place great emphasis on good neighbourhoods, condition of building exterior, a small number of dwelling units in the apartment, and a great number of rooms for a given floor space. Linneman (1981) and Ayeni (2007) used the linear model on the demand for residence site characteristics where the results show linear model has the best fit.

Also, in order to determine that the variables employed in the analysis of the regression estimates are unaffected by multicollinearity, the zero order correlation matrix is used as presented in Table 2. Table 2 shows that we do not have pair wise correlations in excess of 0.80 among the independent variables.

In the explanation of the contributions and the spatial variation of housing values by neighbourhood attributes, ten predictor variables were selected on stepwise regression. They are the length of stay in the house (LHOUSE), length of stay in the area (LAREA), number of parking facilities in the neighbourhood (PARK), number of secondary schools in the neighbourhood (SECSCH), number of wastes collection centres in the neighbourhood

Table 2. Zero order correlation coefficient matrix for housing attributes.

HRENT	1.00											
INCOME	0.48	1.00										
NROOM	0.57	0.39	1.00									
DWORK	0.10	0.40	0.48	1.00								
PEOPLE	-0.35	0.07	0.08	0.64	1.00							
AREA	0.41	0.66	0.61	0.30	-0.12	1.00						
BDUCQ	0.54	0.30	0.39	0.56	0.18	0.56	1.00					
NPERS	0.22	0.54	0.56	0.63	0.44	0.38	0.59	1.00				
BUILD	-0.09	0.18	0.22	0.53	0.64	0.01	0.39	0.46	1.00			
ROOMS	-0.23	0.08	-0.00	0.38	0.52	-0.07	0.10	0.30	0.39	1.00		
TAREC	0.48	0.42	0.38	0.45	0.16	0.54	0.73	0.54	0.31	0.08	1.00	
TCOST	0.27	0.57	0.59	0.66	0.43	0.37	0.57	0.69	0.46	0.26	0.59	1.00

Source: Fieldwork, 2010.

Table 3. The analysis of neighbourhood attributes of housing in metropolitan Lagos.

	Submarket 1		**Submarket 2**		**Submarket 3**		**Total Sample Beta**	
	Beta	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**
LHOUSE	-0.086	-1.813	0.293	6.392	0.180	2.946	0.217	8.477
LAREA	-0.186	-4.451	0.368	8.969	0.282	4.605	0.276	10.668
PARK	-0.427	-4.937	0.047	-1.363	-0.145	-3.009	-0.150	-5.502
SECSCH	0.018	0.329*	0.072	2.403	0.113	2.484	0.157	6.924
NOISE	-0.370	-6.123	-0.145	-3.853	-0.276	-4.770	-0.125	-4.526
ROAD	0.230	4.818	-0.110	-2.890	-2.089	-0.752	0.116	4.174
WASTES	0.149	2.822	0.089	-2.852	-0.036	0.811	-0.044	-1.834
RECREAT	0.266	3.615	0.165	4.111	-0.142	-2.671	0.101	0.346
PEOPLE	-0.576	-10.405	0.121	2.763	-0.177	-1.543	-0.382	-11.904
REPUT	0.028	0.482*	0.008	0.260*	-0.187	-3.553	-0.119	-4.701
Constant	4.465	9.591	0.640	6.506	6.506	15.963	2.049	18.050
Multiple R	0.870		0.664		0.703		0.749	
R Square	0.758		0.441		0.494		0.562	
F-ratio	47.175		40.781		28.366		79.234	
N	164		800		446		1410	

*Coefficient not significant at 95% confidence level; Source: Fieldwork, 2010.

(WASTES), number of recreational facilities (RECREAT), if noise level is high (NOISE), and the type of people in the neighbourhood (PEOPLE). The dependent variable is the housing values or house rental values. The correlation coefficient of the total sample of households of 1410 as shown in Table 3 is 0.601. This is found to be highly significant at 0.05 levels and this means that the correlation between the criterion and predictor variables is not a chance occurrence. Also, the R^2 = 0.46 implying that the variables explain only 46% of the total variation of housing values. The analysis of variance value of F = 56.885 confirms the significance of all the variables. Although the R^2 is low which suggest that other variables should have been included, it could be explained that neighbourhood attributes explanation of spatial variation of housing values is not as important as the socio-economic variables and the structural attributes as revealed in later chapters.

The neighbourhood attributes were also regressed in the 3 submarkets. In submarket 1, the R = 0.87 which shows that there is strong relationship between the neighbourhood attributes and house values. The R^2 = 0.76 which also shows that 76% of the house values variation is explained by neighbourhood attributes. We interpreted this result to mean that using smaller geographical areas (as the number of households in

submarket 1 is 164) shows the importance of neighbourhood attributes more than treating the whole city as an entity. This could be substantiated by submarkets 2 and 3 where R = 0.664 and 0.703 respectively. The submarkets 2 and 3 however have R^2 = 0.44 and 0.49 respectively which show lower percentage explanation because of the large number of households in the sub-markets (800 households for submarket 2 and 446 households for submarket 3).

The locational attributes have eight variables as predictor variables. They are the transport cost to work place of household heads (TCWORK), the household monthly transport cost (TCOST), distance to children school (SCHDIST), distance to location of workplace (PWORK), transport cost to children school (TCOSTSCH), time spent to children school (TSCH), time spent to place of work (TWORK) and distance to households heads place of work (DWORK). The R = 0.587 and R^2 = 0.345. Although the analysis of variance value of F = 56.885 confirms the significance of all the variables, the R^2 = 0.345 shows that locational attributes explain only 34.5% of the variation in the housing values. As expected, when all housing attributes are regressed, the locational attributes contribute the least but on smaller scale they show great importance. The R = 0.802 in submarket 1 and R^2 0.643. These values are high because the number of households is 164. Also, the values could be interpreted to mean that most households in this submarket 1 live and work within the neighbourhoods. They are favoured by the location factors unlike other submarkets that have some of their residents working in other areas. The submarket 1 happens again to include the central business district.

The submarket 2 has R = 0.610 and R^2 = 0.373 while submarket 3 has R = 0.548 and R^2 = 0.301. The number of households for these submarkets 2 and 3 are 800 and 446 respectively which show the large geographical size of the locations. It is concluded that neighbourhood and locational attributes show more importance on house values when smaller geographical housing units are examined.

Also, the two housing attributes (locational and neighbourhood) were combined and regressed and 13 variables were entered as predictor variables. The variables have for the total households R = 0.837 and R^2 = 0.700. This is an indication that there is a high significant relationship between location and neighbourhood attributes and house values, for the variables explained 70% of the spatial variation in housing values. Also the combined variables were analysed on submarket basis. All the submarkets analyses show high explanatory power of the variables. Submarket 1 has R = 0.920 and R^2 = 0.847, submarket 2 has R = 0.743, R^2 = 0.552 and submarket 3 with R = 842 and R^2 = 0.709. There is therefore greater impact of the locational and neighbourhood attributes on housing values when they are examined on smaller geographic units. In order to show the order of importance of the housing attributes and to enable the author compare the results among the hedonic housing traits of locational, neighbourhood and structural attributes, the structural attributes were also regressed. Ten variables were also entered as predictor variables. They are the area of land occupied by the building (AREA), number of rooms occupied by the household (NROOM), number of persons in each household NPERS), number of kitchens in the house (KITCHEN), number of toilet facilities (TOILET), number of bathrooms (BATHS), if water supply is pipe borne (WATER), number of open space provisions (OPENS), if building is occupied by single household (BUILD), and if appearance of the house is good (HAPP). The total sample has R = 0.789 and R^2 = 0.623. The values are the highest when compared with the other two housing attributes locational and neighbourhood. This means that the structural attributes come first, followed by neighbourhood and locational attributes. The submarkets results of all the housing attributes also follow the overall order of importance of structural, neighbourhood and locational attributes. These results conform with the previous studies by Mark (1978), Arimah (1990) and Aluko (2008) in their order of importance. Richardson, (1974), however, had different results with neighhourhood attributes emerging the most important group of attributes explaining housing values and then followed by locational and structural attributes respectively. Sumka (1977) and Megbolugbe (1983) only compared two housing attributes (structural and neighbourhood) with structural attributes being the more important variables. But as earlier observed, most of the socio-economic characteristics are examined and regressed under structural attributes and this gives the structural attributes most explanatory power over other attributes. The reasons for the differences in research findings could be linked to the choice of variables or spatial variation in relative importance of variables in the study areas. The prevailing environmental conditions could also influence the choice of variables.

The overall combination of the variables (structural, neighbourhood and locational) gives R = 0.852 and R^2 = 0.726. These results are very important in that they show that all the variables have significant relationship with housing values and with 72.6% explanation of the spatial variation in the different housing locations and neighbourhoods. The same high values were recorded for all the submarkets - submarket 1 (R = 0.959, R^2 = 0.920), submarket 2 (R = 0.776, R^2 = 0.603), and submarket 3 (R = 0.868, R^2 = 0.754).

The analysis of variance of house rental values by all the housing attributes shows that the F ratio is 388.6048 and the observed F probability is 0.0000. Variable V32 house rental charges by variable V1 Area (Table 4).

That is, the variation between group means is signifycant and is too large to be attributable to chance. There are zonal variations in house rental values in all the

Table 4. Analysis of variance.

Source	D.F	Sum of squares	Mean squares	F Ratio	F Prob.
Between groups	7	553.3665	79.0524	388.6043	0.0000
Within groups	1402	285.2037	0.2034		
Total	1409	838.3702			

different locations and neighbourhoods. The results show variability both within groups and between groups. That is, there is variation within neighbourhoods as well as between the neighbourhoods. In examining other variables on location and neighbourhood basis, the overall analysis on them show that they all have significant variations except the access to shopping centres.

Conclusion

In conclusion, the overall results show that there are significant variations in virtually all the entered variables. There are spatial variations of neighbourhood and locational attributes on house rental charges. The variability is much more experienced within group means than between group means. That is, there are lots of variations for individual houses within the same locations and neighbourhoods. However, why some variable show high variability in the different neighbourhoods, some are not significant. The above analyses have proved the important role of neighbourhood's in house rental charges. The significant variations in almost all the variables in the different neighbourhoods could be attributable also to the various locational differences which exist in the housing structures.

REFERENCES

Aluko O (2008a). Housing and Urban Development in Nigeria, Kins, Ibadan.

Aluko O (2008b). Rural Transportation and Development Planning in Nigeria, Kins, Ibadan.

Aluko O (ed.) (2008). Introductory Course in Environmental Sciences, Kins, Ibadan.

Anderson RJ, Crocker T (1971). "Air Pollution and Residential Property Values". Urban Studies, 8: 171-180.

Arimah BC (1990). An Analysis of Urban Housing Market in a Developing Country: A Case Study of Ibadan Nigeria, Ph.D. Thesis, Department of Geography University of Ibadan, Ibadan.

Blomquist G, Worley L (1981). "Hedonic Prices, Demands for Urban Housing Amenities, and Benefit Estimates". J. Urban Econ., 9: 212-221.

Can A, Anselin L, Saseth E (1989). "Spatial Variation in the Propensity to move of Household", Sistemi Urban, 1: 107-127.

Can A (1991). "The Measurement of Neighbourhood Dynamics in Urban Housing Prices". J. Urban Econ., 1: 254-272.

Casetti E (1986). "The Dual Expansions Method; An Application for Evaluating the Effects of Population Growth on Development", IEEE Transactions on Systems, Man and Cybernetics, Vol. 16, No.1, January/February pp. 29-39.

Casetti E, Can A (1990). "Trigonometric Expansions: An Application to the study of Migration Fields". Modelling and Simulation, 17; 23-28

Dubin RA, Sung C (1990). "Specification of Hedonic Regressions: Non-nested test on Measures of Neighbourhood Quality", J. Urban Econ., 27: 97-110.

Follain, J, Malpezzi S (1981). "Flight to the Suburbs: Insights gained from an analysis of central city vs. suburban price differentials". J. Urban Econ., 9: 381-398.

Goodman AC (1989). "Topics in Empirical Urban Housing Research", in Muth, R.F. and Goodman, A.C., The Economic of Housing Markets. Harwood Academic Publishers, pp. 49-145.

JF (1962). "The Journey-to-work as a Determinant of Residential location". Papers and Proceedings of the Regional Science Association, 9: 137-160

Li, Brown H (1980). "Micro-neighbourhood externalities and hedonic housing prices", Land Econ., 56: 125-141

Linneman P (1981). "Some Empirical Result on the Nature of the Hedonic Price Function for the Urban Housing Market", J. Urban Econ., 9: 126-148

Mabogunje AL (1968). Urbanization in Nigeria, University Press, London.

Mabogunje AL (1975). "Urbanization in Nigeria a Constraint of Economic Development". Econ. Dev. Cult. Change, 8(4): 413-438.

Mabogunje AL (2007). Developing Mega Cities in Developing Countries, being text of a lecture delivered at a Colloquim organized by the 2007 Graduating Class, Department of Geography, University of Lagos on Wednesday, 12 September, 2007.

Mark JH (1978). "Determinants of Urban House Prices: A Methodological Comment". Urban Studies, 14: 359-363

Megbolugbe IF (1983). "An Hedonic Index Based Model of Housing Demand for Third World Cities", Ph.D. Thesis, Department of City and Regional Planning, University of Pennsylvannia

Nelson JP (1978). "Residential Choice, Hedonic Price and the Demand for Urban Air Quality". J. Urban Econ., 5: 357-369

Richardson HW (1974). "Determinants of Urban House Prices", Urban Studies, 11: 189-199.

Sumka HJ (1977). "Measuring the Quality of Housing: An Econometric Analysis of Tax Appraisal Records". Land Econ., 53: 293-309

Williams R (1979). "A logit model of demand for neighbourhood", in The Economics of Neighbourhood (David Segal, Ed.), Academic Press, New York, pp. 17-41

Witte A, Sumka M, Erekson H (1979). "An Estimate of a Structural Hedonic Price Model of the Housing Market: An Application of Rosen's Theory of Implicit Markets". Econometrical, 47: 1151-73