

# The income elasticity of demand in a sub-Saharan African housing market: evidence from Ibadan, Nigeria

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**Abstract.** Very little is known about the behaviour of housing demand in sub-Saharan housing markets. This ostensibly is due to the dearth of such studies in this region. In this paper the author estimates the parameters of the demand for housing, using data drawn from the city of Ibadan in Nigeria. The empirical analysis, in which housing is viewed as a composite product, reveals that the demand for housing is income inelastic. Specifically, income-elasticity estimates for renters and owners are 0.88 and 0.56, respectively. Furthermore, these income-elasticity estimates were found to be higher than those reported for other African cities.

## 1 Introduction

Over the last two decades, urbanization and its attendant problems have become a basic policy concern in developing countries (Jimenez and Keare, 1984). This in turn has resulted in the proliferation of research aimed at further understanding the various dimensions of the urban economy in Third World cities. In this respect, a number of studies designed to enhance our understanding of the operations of housing markets, particularly housing-demand behaviour, have been undertaken. These studies, mostly conducted under the auspices of the World Bank (Follain and Jimenez, 1985; Follain et al, 1980; 1982; Ingram, 1981; Malpezzi and Mayo, 1987; Quigley, 1982; Shefer, 1990; Strassman, 1980), are restricted to the 'more developed' Latin American and Asian countries. Consequently, very little is known about the behaviour of housing markets in African cities, as there exists a dearth of such scholarly studies in this region.

The need to obtain information on housing-demand behaviour in the views of Jimenez and Keare (1984), Malpezzi and Mayo (1987), and Shefer (1990) is a *sine qua non* for the formulation and implementation of housing programmes and policies designed to alleviate housing problems in Third World cities. This is because shelter-related projects are formulated on the basis of ad hoc notions with respect to income elasticities. A clear understanding of the behaviour of the housing market must therefore precede the formulation and eventual execution of all housing-related programmes.

My aim in this paper is to estimate systematically the parameters of the demand for housing as a composite product, by means of data drawn from the city of Ibadan. In so doing, I seek to identify the impact of income and other taste-determining factors on housing expenditure. Furthermore, the extent to which income-elasticity estimates from other geographical entities are comparable to those obtained for the city of Ibadan is also examined. In this respect, this paper can be seen as an extension to the spatial scope of the limited number of housing-demand studies in Africa.

In section 2 I outline the model used in estimating the demand parameters. In section 3, certain salient features of the Ibadan housing market are discussed, and in section 4 I discuss the data base and variables used in the empirical analysis.

In section 5, the empirical results are presented and discussed, and in section 6 I summarize the conclusions and highlight some of the policy implications of the paper.

## 2 A model of housing demand

The housing-demand model used in this paper is one in which a general utility function is assumed. From first-order conditions, an expenditure demand function for housing can be obtained:

$$E_X = f(Y, P, \mathbf{Z}_i), \quad (1)$$

where  $E_X$  is a measure of housing expenditure,  $Y$  is a measure of income,  $P$  is the unit price of housing, and  $\mathbf{Z}_i$  is a row vector of household and taste-determining attributes. Empirically, equation (1) is specified as an income consumption path or Engels curve in which a measure of housing expenditure is regressed on income, price per unit of housing, and a set of taste-determining attributes.

The income elasticity as well as the elasticities of other household and taste-determining attributes can be estimated if a multiplicative rather than an additive specification of the independent variables is used:

$$E_X = aY^b P^c \mathbf{Z}_i^{d_i}, \quad (2)$$

where  $a$  is a constant,  $b$  is the estimated income elasticity,  $c$  is the price elasticity, and  $d_i$  ( $d_i^*$ ) are the elasticity estimates of household and taste-determining attributes measured on a continuous (binary) scale. Equation (2) can be linearized by taking the natural logarithms such that:

$$\ln E_X = b(0) + b \ln Y + c \ln P + d_i \ln Z_i + d_i^* \mathbf{Z}_i. \quad (3)$$

Such models as specified in equation (3) are referred to as constant-elasticity models, whereby the relative effect of a change in any of the independent variables is constant and equal to the given regression coefficients.

## 3 The Ibadan housing market

Apart from existing as a precolonial urban centre, Ibadan is Nigeria's second largest city after Lagos, with a population of about 1.8 million. Homeownership rates are relatively high; 55% of households are owners, the remaining 45% are renters. The Ibadan housing market can be broken down into the older and newer traditional core areas, the transitional zone, and the modern residential districts. The first two areas coincide with the precolonial (1820-93) period, whereas the last two residential zones coincide with the colonial (1893-1960) and post independence (1960) developments (Schwerdtfeger, 1982). The different phases left the city with distinct spatial patterns of population and housing densities, housing types, as well as socioeconomic and cultural characteristics.

The precolonial period witnessed the development of two identical areas: the first being what Mabogunje (1962; 1968) referred to as the core region; the second area encircles the core region and extends to the eastern part of the city. These two zones, which are representative of the traditional/indigenous sections, display the worst environmental and housing conditions within the city. The result of the process of growth by fission, described by Mabogunje (1962; 1968) as the fragmentation and replacement of traditional large compounds by more complex and numerous smaller buildings, has been high densities of housing and population, as well as the haphazard spatial distribution of houses which hardly leaves space between the units.

The colonial period marked the growth of the city towards its northeastern, western, and southern parts. This area, which is designated the transitional zone, arose to cater for the needs of migrants. The northeastern sections of this zone grew as a result of younger members of families in the older and newer core regions requiring land to build upon. The Government Reservation Areas towards the south were designed to cater for the needs of the colonial administrators. Although some of the houses in this submarket are no better than those in the older and newer core regions, a sizeable number are of Western standards.

The postindependence period in Ibadan was one of unprecedented development in the peripheral areas. Although immediate post-1960 residential development was aimed at providing accommodation for a new crop of Nigerian professionals, who were to replace their colonial counterparts, the houses in this zone consist of an admixture of new Western-style units and low-quality informal housing. The implication of this is that this submarket contains a combination of different income groups. This zone defines the modern, predominantly migrant, sections of the city.

The mean values of some selected housing attributes for each of the different residential zones are presented in table 1. The table reveals that these housing attributes increase from the traditional to the modern zones. For instance, the mean annual income of the head of the household, regardless of tenure status, increases from ₦2250 for the older core region, to ₦4186 for the transitional zone, to ₦5387 for the modern residential zone.<sup>(1)</sup> In terms of rent-to-income ratios, the values for renters are 0.207, 0.214, 0.267, and 0.303 for the older core, newer core, transitional, and modern residential zones, respectively. For owner-occupiers, the average budget shares for housing are 26.3%, 29.1%, 39.0%, and 41.8% for the successive residential zones. Mean rent-to-income ratios for the entire city are 0.254 and 0.347 for renters and owners, respectively. The mean values for other attributes

**Table 1.** Mean values of selected housing attributes—Ibadan housing market (source: author's fieldwork).

Housing attributes	Older core	Newer core	Transitional	Modern	Entire city
Annual income of head of household (₦)	2249.61	2909.53	4185.66	5387.29	3636.35
Rent-to-income ratio (renters)	0.207	0.214	0.267	0.303	0.254
Rent-to-income ratio (owners)	0.263	0.291	0.390	0.418	0.347
Number of rooms occupied by household	2.49	2.69	3.18	4.32	3.07
Average room size (m <sup>2</sup> )	18.28	23.42	27.44	35.48	26.21
Plot size per household (m <sup>2</sup> )	61.18	88.56	199.22	330.30	156.55
Number of floors per housing unit	1.44	1.51	1.52	1.65	1.55
Number of lavatories per household	0.30	0.40	0.58	0.94	0.58
Percentage of houses with:					
water-operated lavatories	17.6	33.1	45.2	61.2	39.8
pipe-borne water	53.0	75.4	71.9	61.5	61.7
electricity	89.5	92.5	94.5	90.7	92.5
concrete walls	37.5	54.7	65.5	79.5	60.1
asbestos roofing sheets	7.1	10.5	21.6	43.1	26.7
need of general repairs	80.7	66.2	55.5	50.5	62.2

<sup>(1)</sup> Nigerian currency, where ₦9.4697 equaled US\$1 in January 1992.

can be gleaned from table 1. All said, the picture painted is one in which the quality of housing improves with each successive residential zone.

#### 4 Data base

The data used in this paper were obtained via a household survey for a larger study on the housing market for the city of Ibadan, undertaken between November 1987 and September 1988 (Arimah, 1990). The survey was designed to obtain information on housing values, housing attributes, and socioeconomic characteristics for both the renter and the owner housing submarkets. The sampling frame used was the total number of housing units in Ibadan, broken down into the city's forty-seven census enumeration wards. This was compiled by the Estate and Valuation Department of the Ibadan Municipal Government and was based on the number of houses assessed for the payment of tenement rates for 1982. There were a total of 67 961 assessed houses, out of which 1263 were sampled, in proportion to the number of houses in each ward. The valuation role on which the sampling frame is based underestimates the number of houses in the city, as a sizeable number of houses have not been assessed. However, in terms of what is available it provides a suitable sampling frame. Of the 1219 households used in the final analysis, 44.6% were renters, the remaining 55.4% were owners.

It is important to point out that the houses in the sample are basically privately owned or rented units. Publicly provided low-cost units, and houses serving as residential quarters for government officials or private institutions were excluded from the survey. This is because the rents paid on such institutional housing do not reflect their prevailing market value. Furthermore, the houses in the sample cannot be said to be under rent control, as the provision of the rent edict promulgated in 1977 remains a dead letter. This is because of the wide deviations between edict-stipulated rents and the actual rents paid. The effect of all these is to minimize the possible public-policy bias.

The variables used in the empirical analysis are presented in table 2. Two measures of housing expenditure have been adopted. For renters, the net annual housing rent (ANRENT) is used because it gives an observable and unambiguous measure of housing demand for renters. For owners, our strategy was to obtain a measure of housing expenditure that would be somewhat comparable to ANRENT,

**Table 2.** Definition of housing-demand variables.

Variable	Definition
<i>Dependent variables</i>	
ANRENT	Annual housing rent (₦)
OWNRENT	Owners' estimate of annual housing rent (₦)
<i>Independent variables</i>	
INCOME	Current annual income of head of household (₦)
HOUSIZE	Number of persons in the household
EDUC	Number of years of completed schooling by head of household
OCCUP	Unity if head of household is a white-collar worker, zero otherwise
MARITAL	Unity if head of household is married, zero otherwise
SEXH	Unity if head of household is male, zero otherwise
AGEH	Age of head of household
AVAGE	Average age of household
HOUSFIN	Unity if head of household has benefitted from any form of formal/institutionalized housing finance, zero otherwise
YRSTAY	Length of stay in present dwelling unit

and at the same time take cognizance of the subletting of part of the housing units by landlords living in them. To this end, we adopted owners' estimates of annual housing rents (OWNRENT) by asking landlords how much they would charge were they to let out the housing units. To cater adequately for subletting in multiple apartment units, this value was divided by the total number of rooms occupied by the landlord's household. If the housing unit were a single-family dwelling unit, the value remains the same as given by the landlord, otherwise, the obtained value adjusts correspondingly to the actual number of rooms occupied.

We contend that our measure of OWNRENT reflects the market value of housing for two reasons. First, in developing countries, owners more often than not sublet part of their housing units and, in so doing, they are conversant with the prevailing housing-market situation. Second, some studies (Jimenez, 1982; Kain and Quigley, 1972) have established a high correlation between owners' estimates of the dwelling value (which is analogous to our measure) and the otherwise assessed dwelling value. Nonetheless, we note that for the vast majority of owners, the actual expenditure on housing does not entail a regular monthly or annual payment, and the actual investment in housing is likely to reflect sources of cash other than monthly payment.

Existing literature on housing demand suggests that permanent rather than current income is the appropriate income measure to use (Malpezzi and Mayo, 1987; Mayo, 1981). This hinges primarily on the permanent-income hypothesis which states that in well-functioning capital markets a household's consumption of durable goods is determined by the permanent income, which takes cognizance of the flow of income over a long time period. This is because current income usually contains transitory components which bring about fluctuations in the flow of income over a given period. This in part has resulted in a downward bias in estimates obtained via current income (Follain et al, 1980; Shefer, 1990).

The measure of income used here relates to current rather than permanent income. This is justified on four grounds. First, the difficulty and possible bias involved in using the well-known methods of measuring permanent income in a developing country might far outweigh those of using current income. Second, in many policy applications, the current-income value is readily available. Third, many past estimates have been undertaken by means of current income, and hence these are readily comparable. Fourth, Malpezzi and Mayo (1987), although acknowledging that permanent income does generally yield higher estimates, note that such differences are 'comparatively modest'.

The collection of income data for the household heads employed in the formal sector did not pose much difficulty. Their monthly income was aggregated over twelve months to obtain the annual income. In the case of household heads engaged in the informal sector the major problem encountered was that they did not have a fixed monthly income. This problem was solved with an approximation of what they made on a daily basis, which was aggregated first over six working days and then over fifty-two weeks to provide an approximation of their annual income. The use of the head of household's income in situations where there is more than one income earner is justified on the grounds that in Nigeria it is customary for household heads in urban centres solely to finance housing expenditure. Although other members of the household, especially the spouse, might assist, they are not necessarily obliged to do so.

Note the exclusion of the price per unit of housing from the independent variables. The inclusion of a price term permits us to draw inferences pertaining to the price elasticity of demand, but also guarantees that the estimated income-elasticities are

**Table 3.** The means and (in parentheses) standard deviations of the housing-demand variables—renters.

Variable	Older core	Newer core	Transitional	Modern	Entire city
ANRENT	431.77 (301.22)	547.69 (465.38)	1003.89 (1223.89)	1402.85 (1219.02)	912.66 (1041.16)
INCOME	1949.43 (1172.98)	2391.23 (1558.25)	3817.66 (4540.12)	4451.22 (3551.05)	3359.92 (3425.73)
HOUSIZE	5.19 (2.13)	5.53 (6.35)	5.31 (2.07)	6.31 (2.43)	5.63 (4.00)
EDUC	6.98 (4.99)	8.55 (4.46)	10.51 (4.93)	11.27 (5.89)	9.76 (5.26)
OCCUP	0.34 (0.48)	0.39 (0.49)	0.57 (0.85)	0.61 (0.49)	0.50 (0.50)
MARITAL	0.85 (0.36)	0.85 (0.36)	0.87 (0.33)	0.88 (0.33)	0.86 (0.34)
SEXH	0.87 (0.34)	0.88 (0.33)	0.89 (0.31)	0.88 (0.33)	0.88 (0.32)
AGEH	37.11 (8.28)	37.54 (7.98)	38.49 (8.13)	39.85 (6.87)	38.42 (7.82)
AVAGE	19.47 (4.75)	19.92 (6.88)	19.25 (4.99)	20.59 (5.32)	19.84 (5.72)
HOUSFIN	0.34 (0.48)	0.46 (0.50)	0.58 (0.50)	0.70 (0.46)	0.55 (0.50)
YRSTAY	5.35 (3.29)	5.16 (4.38)	5.74 (3.55)	5.64 (2.73)	5.49 (3.62)

**Table 4.** The means and (in parentheses) standard deviations of the housing-demand variables—owners.

Variable	Older core	Newer core	Transitional	Modern	Entire city
OWNRENT	506.19 (353.93)	832.47 (1200.13)	1585.20 (2706.18)	4249.78 (14463.28)	1358.99 (5202.16)
INCOME	2376.88 (1862.51)	3213.72 (3753.95)	4539.52 (5569.44)	7185.53 (6326.95)	3862.96 (4632.18)
HOUSIZE	7.92 (2.85)	7.61 (2.86)	7.92 (3.11)	9.71 (3.03)	7.99 (3.00)
EDUC	2.73 (3.73)	3.40 (6.59)	5.85 (6.88)	7.67 (7.88)	4.67 (6.58)
OCCUP	0.14 (0.34)	0.14 (0.35)	0.24 (0.43)	0.36 (0.49)	0.19 (0.39)
MARITAL	0.99 (0.09)	0.99 (0.31)	0.98 (0.14)	1.00 (0.00)	0.99 (0.22)
SEXH	0.94 (0.25)	0.89 (0.31)	0.91 (0.29)	0.95 (0.22)	0.91 (0.29)
AGEH	54.37 (11.55)	53.44 (9.95)	53.32 (9.35)	57.23 (7.37)	54.00 (9.91)
AVAGE	26.54 (9.08)	24.80 (7.77)	25.37 (6.42)	25.64 (5.17)	25.37 (7.46)
HOUSFIN	0.07 (0.26)	0.18 (0.43)	0.23 (0.42)	0.57 (0.50)	0.21 (0.43)
YRSTAY	41.16 (15.83)	30.34 (15.79)	28.07 (15.49)	26.36 (17.61)	31.09 (16.53)

not biased because of the exclusion of the relevant explanatory variables (Follain et al, 1980; Polinsky, 1977). However, if the income and price vectors are not correlated, the exclusion of the price term would not bias the income-elasticity estimates. In such a situation, the price per unit of housing is implicitly incorporated into the error term. On the other hand, the omission of the price vector in cases where it is correlated with income would result in an upward bias in the estimates of the income parameters. The implications of the foregoing have been amply highlighted by Polinsky (1977).

In calculating the price per unit of housing services for the Korean housing market, Follain et al (1980) and Lim et al (1980; 1984) used location-specific data on the price per unit of land, price per unit of structure, as well as the share of housing expenditure attributable to land and structure inputs. For the city of Ibadan, such data are basically lacking or extremely difficult to obtain. Thus, it becomes impossible to include a price term in our empirical estimation.

The summary statistics for the housing-demand variables presented in tables 3 and 4 reveal certain differences with respect to tenure. For instance, in terms of income, age, the proportions of married and male-headed households, owners report higher values than do renters. This trend is also maintained for the mean household size and the average age of the household, which are 7.99 persons and 25.37 years for owners as against 5.63 persons and 19.84 years for renters. On the other hand, we observe that in terms of the proportion of households benefitting from institutionalized forms of housing finance, as well as occupational and educational status, renters fare better.

## 5 Empirical estimation and discussion of results

Tables 5 and 6 present estimates of the demand functions for the renter and owner submarkets, respectively. The functional form adopted is the double-log formulation in which all variables except the dummies are in natural logarithms. This was done to enable the coefficients to be presented as elasticity estimates. Furthermore, utilizing the double-log model reduces the occurrence of heteroscedasticity, thereby ensuring the efficiency of the parameter estimates. The  $R^2$  values are generally high, with the household and taste-determining factors in the renter submarket accounting for between 51% and 88% of housing expenditure. In the case of owners, between 43% and 62% of the variation in housing demand is accounted for.

In an exploratory manner, an attempt was made to use a measure of permanent income by obtaining the predicted value of a regression of current income on variables such as age and sex of the head, household size, education and occupation of head, housing tenure, and number of income earners in the household. These variables, which are identical to those employed by Follain and Jimenez (1985) reflect the lifetime earning capacity of the household. The permanent-income estimates were not plausible in that: they were insignificant in about 50% of the estimated equations; in some cases they were negative; and where positive, they did not conform to theoretical expectation in that they were below those obtained with current income. The foregoing observations, although surprising, lend credence to Jimenez and Keare's (1984, page 190) assertion "that using current income for demand estimation may be sufficient to give us 'ballpark' estimates which are not misleading". Alternatively, the permanent-income elasticities could be attributed to the method employed in obtaining them. It was not possible to experiment with other measures of permanent income, such as the overall consumption expenditure and the average income over a number of years, as the data set does not contain enough information to obtain these.

**Table 5.** Housing-demand regression coefficients with (in parentheses) absolute *t* values—renters.

Variable	Older core	Newer core	Transitional	Modern	Entire city
INCOME	0.6194 (3.91) <sup>a</sup>	0.8176 (5.15) <sup>a</sup>	0.8856 (11.14) <sup>a</sup>	0.7202 (13.38) <sup>a</sup>	0.8788 (17.02) <sup>a</sup>
HOUSIZE	0.8412 (3.18) <sup>a</sup>	0.4883 (2.42) <sup>a</sup>	0.4424 (1.85) <sup>b</sup>	0.3965 (3.24) <sup>a</sup>	0.5369 (5.37) <sup>a</sup>
EDUC	0.0578 (0.65)	0.3275 (3.27) <sup>a</sup>	0.2681 (3.09) <sup>a</sup>	0.8638 (1.20) <sup>a</sup>	0.1891 (4.24) <sup>a</sup>
OCCUP	0.1294 (0.52)	-0.1831 (0.97)	-0.1802 (1.05)	0.2971 (2.70) <sup>a</sup>	-0.0476 (0.52)
MARITAL	-0.0539 (0.22)	0.0585 (0.21)	0.0701 (0.34)	0.2447 (1.96) <sup>b</sup>	0.0229 (0.20)
SEXH	-0.0388 (0.17)	-0.0248 (0.14)	-0.0652 (0.46)	0.0719 (0.89)	-0.0038 (0.49)
AGEH	-0.0863 (0.16)	-0.1999 (0.42)	-0.8668 (0.21)	0.0971 (0.36)	-0.1340 (0.62)
AVAGE	0.4725 (1.33)	-0.1206 (0.47)	0.3474 (1.29)	0.3299 (2.18) <sup>b</sup>	0.2140 (1.67) <sup>b</sup>
HOUSFIN	-0.0274 (0.13)	0.1868 (1.09)	0.1846 (1.18)	-0.1166 (1.22)	0.1483 (1.78) <sup>b</sup>
YRSTAY	-0.1145 (0.13)	-0.3236 (3.06) <sup>a</sup>	-0.2159 (2.59) <sup>a</sup>	-0.0690 (1.30)	-0.1889 (4.02) <sup>a</sup>
CONSTANT	-1.2049 (0.86)	-0.26669 (0.18)	-2.3327 (2.42) <sup>a</sup>	-1.4734 (1.98) <sup>b</sup>	-1.7944 (3.05) <sup>a</sup>
$R^2$	0.6587	0.5141	0.7137	0.8844	0.6853
Adjusted $R^2$	0.5774	0.4836	0.6961	0.8758	0.6794
<i>F</i> ratio	8.105 <sup>a</sup>	16.825 <sup>a</sup>	40.633 <sup>a</sup>	103.250 <sup>a</sup>	115.856 <sup>a</sup>
Sample size	53	170	174	146	543

<sup>a</sup> Significant at the 0.01 level and above (one-tail test)

<sup>b</sup> Significant at the 0.05 level (one-tail test)

Prior to a discussion of the parameter estimates, a test for the homogeneity of the demand equations across the various residential zones is undertaken with the *F*-test (Chow test). This is because the outcome of such a test will determine whether or not African housing markets, with respect to demand behaviour, are best seen as a series of residential zones (submarkets) or as an integrated whole. An *F*-test does not reject the null hypothesis that there are no significant differences between the parameter estimates of residential zones, on the one hand, and the entire city, on the other, for both forms of tenure. The implication of this is that the differences in parameter estimates among the various submarkets are not significant enough to necessitate independent analysis. Consequently, in the paragraphs that follow, further investigation and discussion are undertaken with respect to the metropolitan-wide samples for both forms of tenure.

The income coefficients obtained are positive and highly significant. The major observation concerning these elasticities is that they are inelastic (less than unity). For renters, the income-elasticity estimate is 0.88, indicating that the demand for housing increases by 0.88% given a 1% increase in the head of household's annual income. In the case of owners, the income coefficient reveals that, other things being equal, a 1% increase in the annual income of the head of household will occasion a 0.56% increase in housing demand.



**Table 6.** Housing-demand regression coefficients with (in parentheses) absolute *t* values—owners.

Variable	Older core	Newer core	Transitional	Modern	Entire city
INCOME	0.2222 (3.15) <sup>a</sup>	0.4656 (7.01) <sup>a</sup>	0.7919 (7.25) <sup>a</sup>	0.5039 (1.61)	0.5616 (11.11) <sup>a</sup>
HOUSIZE	0.5818 (4.39) <sup>a</sup>	1.1057 (7.42) <sup>a</sup>	0.5668 (2.72) <sup>a</sup>	0.7361 (1.05)	0.7686 (7.36) <sup>a</sup>
EDUC	0.0486 (1.12)	0.9450 (2.19) <sup>b</sup>	0.0267 (0.37)	-0.1229 (0.68)	0.0715 (2.14) <sup>b</sup>
OCCUP	0.0524 (0.44)	0.0151 (0.12)	0.0778 (0.44)	0.9899 (2.11) <sup>b</sup>	0.1899 (2.18) <sup>b</sup>
MARITAL	-0.3681 (0.79)	0.2250 (1.93)	0.0639 (0.15)	ni -	0.2329 (1.88) <sup>b</sup>
SEXH	0.0330 (0.19)	-0.3634 (2.57) <sup>a</sup>	0.0041 (0.02)	-0.8293 (1.19)	0.1398 (1.27)
AGEH	0.4869 (1.67) <sup>b</sup>	0.2696 (1.59)	0.0222 (0.05)	-1.7849 (1.31)	0.2313 (1.48)
AVAGE	0.4232 (2.35) <sup>a</sup>	0.5245 (2.70) <sup>a</sup>	0.5539 (1.75) <sup>b</sup>	1.5406 (1.30)	0.4634 (3.20) <sup>a</sup>
HOUSFIN	0.1846 (1.03)	0.3819 (3.25) <sup>a</sup>	-0.0535 (0.30)	0.5705 (1.63)	0.2740 (3.12) <sup>a</sup>
YRSTAY	-0.5596 (5.32) <sup>a</sup>	-0.0333 (0.43)	-0.2028 (1.51)	0.0144 (0.04)	-0.1676 (2.66) <sup>a</sup>
CONSTANT	2.0900 (2.35) <sup>a</sup>	-2.3254 (2.98) <sup>a</sup>	-2.2316 (1.62)	3.7972 (0.59)	-1.7411 (2.78) <sup>a</sup>
<i>R</i> <sup>2</sup>	0.6218	0.5895	0.6181	0.4348	0.5780
Adjusted <i>R</i> <sup>2</sup>	0.5887	0.5750	0.5958	0.3577	0.5717
<i>F</i> ratio	18.745 <sup>a</sup>	40.500 <sup>a</sup>	27.680 <sup>a</sup>	5.641 <sup>a</sup>	91.038 <sup>a</sup>
Sample size	125	293	182	76	676

<sup>a</sup> Significant at the 0.01 level and above (one-tail test).

<sup>b</sup> Significant at the 0.05 level (one-tail test).

ni variable was not included in this model.

To evaluate the plausibility of the income-elasticity estimates, I attempt a brief comparison with those of other African cities. This is presented in table 7. For renters, the table indicates that the income elasticity of 0.88 for Ibadan is higher than those for other African cities. Intermediate values are reported for Cairo and Beni Suef, with upper-limit values ranging between 0.51 and 0.66, as well as for Abidjan, with an income elasticity of 0.64. Worthy of note are the low estimates for Kumasi, which fall between 0.28 and 0.33. These low values can be attributed to the strict enforcement of the rent control legislation in Ghana. In the case of owners, the correspondence in elasticity estimates for Ibadan and Lusaka is remarkable, as both cities have income elasticities of 0.56 each, whereas upper-limit estimates for Beni Suef and Cairo are 0.42 and 0.49, respectively. The major conclusion to be drawn from this brief comparison is that elasticity estimates for both forms of tenure in African cities are less than unity.

When compared with those of other developing countries, the value of the income elasticity for renters in Ibadan is consistent with those obtained by Follain et al (1980) and Lim et al (1984) for Korea; Jimenez and Keare (1984) for El Salvador; Ingram (1981) and Strassman (1980) for Colombia; and Shefer (1990) for Indonesia, in that it is less than unity. On the other hand, the income elasticity for owners, aside from falling below the median value of 0.65 in the literature, does not approach or exceed unity as obtained by Strassman (1980) and Jimenez and Keare

**Table 7.** Income-elasticity estimates for selected African cities.

Author	Study area	Survey year	Income elasticity <sup>a</sup>
<i>Renters</i>			
Arimah	Ibadan, Nigeria	1987/88	0.88
Willis et al (1990)	Kumasi, Ghana	1986	0.28
Malpezzi and Mayo (1987)	Kumasi, Ghana	1980	0.33
Malpezzi and Mayo (1987)	Beni Suef, Egypt	1981	0.37-0.66
Malpezzi and Mayo (1987)	Cairo, Egypt	1981	0.42-0.51
Grootaert and Dubois (1986)	Abidjan, Côte-d'Ivoire	1979	0.64
<i>Owners</i>			
Arimah	Ibadan, Nigeria	1987	0.56
Malpezzi and Mayo (1987)	Beni Suef, Egypt	1981	0.23-0.42
Malpezzi and Mayo (1987)	Cairo, Egypt	1981	0.17-0.49
Ndulo (1986)	Lusaka, Zambia	1979	0.56

<sup>a</sup> These elasticity estimates are restricted to studies in which housing is treated as a composite product.

(1984). The observation here reveals that, contrary to the findings for developed countries (de Leeuw, 1971; Lakshmanan et al, 1978; Polinsky, 1977) and for a couple of developing countries (Jimenez and Keare, 1984; Malpezzi and Mayo, 1987), the income-elasticity estimate for renters is higher than that for owners. This, as observed elsewhere, can in part be attributed to the different modes of housing acquisition between owners both in developed and in developing countries (Arimah, 1992).

In developed countries, particularly in the United States, residential units are easily bought and resold on the open market through realtors. This suggests that as the income of the household improves, it is more likely to increase its demand for housing. In the case of developing countries (at least in Nigeria), owners mostly acquire housing through personal construction, which entails a lot in terms of capital and time. Furthermore, there are sociocultural factors in African societies which make the sale of personal houses a taboo. Citing the case of Kumasi, Willis and Tipple (1991, page 1707) note that "Ownership rights in housing mean that, with cultural and peer group pressure engendering respect for family rights in houses, virtually no houses once built are sold: they remain within the ownership of the family to be passed to successive generations". This, in effect, implies that increases in income might not necessarily call for corresponding or proportionate increases in housing consumption. Conversely, in the case of renters, their tenure is somewhat temporary and they are likely to increase their demand for housing with an increase in income. It is in this respect that the demand for housing is more responsive to income for renters than it is for owners.

The effect of the demographic component as measured by the household-size coefficient conforms to the priori expectation in that it is positive and significant. The HOUSIZE coefficient for renters indicates that households will increase their demand for housing by 0.54% given a 1% increase in household size. For owners, the doubling of household size will, other things being equal, increase housing consumption by 77%. Our HOUSIZE elasticities appear quite high when compared with those obtained by Follain et al (1980) and Lim et al (1984) for the Korean housing market. This observation becomes more glaring when it is seen that the HOUSIZE coefficient has the highest absolute value for owners. These estimates are, however, plausible in that they are consistent with those obtained by Ndulo (1986) for Lusaka. In this respect, relatively large household-size elasticities might be a

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feature of African housing markets. This could be a reflection of the extended family system which appears more pronounced in Africa vis-à-vis other developing countries.

The impact of social status is measured by the educational attainment (EDUC) and occupation (OCCUP) of the head of household. For the renter housing submarket, only EDUC is significant, and it reveals that rental expenditure increases by 0.19% given a 1% increase in the educational attainment of the head of the household. For owners, EDUC indicates that, on the average, the doubling of the head's educational attainment will increase housing expenditure by 7.2%. OCCUP reveals that households in which the heads are employed in white-collar jobs are, perhaps, more likely to increase housing expenditure by 0.19%. These observations are consistent with those obtained by Blomquist and Worley (1981) and Witte et al (1979) for cities in the United States.

The responsiveness of housing demand to changes in the stage of the family life-cycle is measured by the average age of the household (AVAGE). For renters, the coefficient is 0.21, indicating that renter expenditure increases by 2.1% given a 10% increase in the average age of the household. For owners, the coefficient shows that a 10% increase in average age of the household will increase housing demand by 4.6%.

The variable HOUSFIN, in a very general sense, examines the impact of programmes to subsidize housing expenditure. The coefficients for renters and owners reveal that households benefitting from any form of institutionalized housing finance spend more on housing services; this finding conforms to expectation. Specifically, the HOUSFIN elasticities for the renter and owner housing submarkets are 0.15 and 0.27, respectively.

The elasticity estimates measuring the responsiveness of housing expenditure to changes in the length of stay in the dwelling unit for both forms of tenure reveal that housing expenditure decreases with the length of stay, but at a less than proportional rate. For renters, the YRSTAY coefficient indicates that given a 1% increase in the duration of stay, housing expenditure will decrease by 0.19%. In the case of owners, a doubling of the length of stay will, other things being equal, result in a 17% reduction in housing expenditure. The negative coefficient in the case of renters is consistent with the notion that landlords tend to grant discounts to tenants who have resided in the unit for a considerable length of time. In the case of owners, Malpezzi and Mayo (1987) note that the negative relationship could be due to the fact that long-term owners have not moved in recent times and they underestimate their housing expenditure because they are no longer conversant with the prevailing housing-market situation.

## **6 Conclusion: summary and implications**

In this paper I have aimed primarily at estimating parameters of the demand for housing as a composite product for the renter and owner housing submarkets, using data drawn from the city of Ibadan in Nigeria. The empirical analysis revealed that income, household size, educational attainment, occupation, stage in family life-cycle, access to sources of institutionalized housing finance, and duration of stay in the dwelling unit are the major factors determining housing expenditure for both forms of tenure. Further investigation indicated that the income elasticities are less than unity for both forms of tenure. Specifically, income elasticities for renters and owners are 0.88 and 0.56, respectively. These estimates, though higher than those for other African cities, are consistent with those reported for other Third World cities in that they are less than unity.

The demand function estimated in this paper can be seen as a means of consistently setting affordability standards for housing programmes in Nigeria. What is initially required is that tenure-specific regression estimates be used to predict housing expenditures for different income groups, target populations, residential zones, or even the tenure types under consideration. The predicted housing expenditure values can then be used to obtain rent-to-income (affordability) ratios which are not arbitrarily defined but are consistent with household characteristics and what households actually spend on housing.

The issue of consistently setting affordability criteria for housing-related programmes is of utmost importance in Nigeria. This is because past attempts at solving housing problems, through either direct construction of housing units or sites and services, and slum upgrading projects, have implicitly assumed an affordability criteria where households are willing to pay no more than 20% of their monthly income (Nigeria, 1975). The setting of such universal and arbitrary affordability criteria eventually results in the retargetting of such housing programmes originally meant for the low-income groups, to the middle-income and high-income groups. Where the original groups are the beneficiaries, the subsidies are so high that no more than 5%–6% of the low-income group benefit from such programmes (Megbolugbe, 1983). This in turn has implications for cost recovery and the replicability of such shelter-related projects on a large scale in Nigeria.

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