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A Cross-Sectional Analysis of Household Rental Housing Demand in Kumasi City, Ghana.

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Abstract

In Ghana, economic analyses of housing issues have seldom been undertaken. This paper is one of the pioneering attempts to remedy this situation. It presents an analysis on the determinants of housing demand among households in Kumasi city, Ghana. Income and price elasticities for renters have also been estimated. It is hoped that the results emanating from this study would contribute significantly to reshaping Ghana's urban housing policy formulation in the future.

1. Introduction :

The satisfaction of housing needs among families and households has been the cornerstone of Ghana's housing policies over the years. The excerpt below, taken from a United Nations document on Housing in Ghana(17), gives credence to this fact. "In its efforts to deal effectively with the overcrowded conditions in rooms and housing units, or inadequacy of infrastructural service in communities and facilities in units, high proportion of sub-standard housing in some urban communities, ……the Government of Ghana adopted the strategy of new construction to provide and increase standard housing stock in urban areas (and rehabilitation to improve rural housing stock) until there was "one house per family". This characteristic feature as contained in the above document on housing in Ghana, can be found in almost all housing policy documents thereafter.

To be able to achieve the objective of meeting the housing needs of families and households, especially in the urban areas, the government established state-financed housing delivery bodies such as the State housing corporation, Public works department and various National and Regional Low cost housing provision committees and institutions. In addition, allied financial institutions were either created or existing ones re-organised to provide housing finance to individuals and institutions involved in housing delivery within the country. In addition to these public sector initiatives, housing developers in the private sector were encouraged to build more houses through the institution of tax rebates and other attractive forms of financial incentives.

Despite these efforts however, not much have been achieved in this sector and the housing situation seems to be worsening with time. The source of this policy failure is linked strongly to the issue of government policies treating the housing sector as a social welfare institution rather than the usual task of performing efficiently in economic terms.

Thus, in other words, attempts have hardly been made to adopt prudent economic policies that can ensure future replicability and sustenance of adopted policies. This lack of commercial impetus on the part of the publicly funded institutions has deprived the sector of a substantial source of funds which could have been recouped from the initial investments for re-investment in the subsequent years.

Rent determination, which has been subjected to the Central government dictates rather than through the free interplay of market forces, has contributed considerably towards diminishing the economic viability of these state housing delivery institutions.

This latter reason, has also made investment in the housing sector unprofitable for the private sector developers. Coupled with the above reasons have been the inconsistencies and high frequency of change in housing policies over the years. The result of the above -heralded problems is that the housing sector has come to be regarded as one of the most distorted and inefficient sectors in the Ghanaian economy (18).

Other problems facing the housing sector that are worthy of mentioning include the following.

First, the government has devoted too much of its energy and resources trying to deliver housing through specific projects carried out by its inefficient institutions, rather than facilitate private developers to spearhead the housing development efforts.

Second, unlike in most parts of the developing world, the national and individual conception of housing has tended to be grandiose making their financial outlays beyond the means of both the nation and the individual.

In addition, institutional problems like weak planning programmes for land, housing management and infrastructure exist. Finally, the lack of incentive for home-ownership due primarily to the lack of affordable mortgage loans to support home-ownership schemes has also contributed to this present state of housing provision.

In the light of the above problems, however, the rapid rate of urbanization in Ghana in recent years has aggravated considerably the urban housing problems. Using 1970 as a statistical base, approximately 31 percent of the Ghanaian population lived in urban areas, with Accra and Kumasi (the two leading cities) making up about 35 percent of the urban population. By 1984, the urban population had risen to 37 percent of the total population and approximately 39 percent of the urban population lived in these two cities. The 1984 census gave the number of persons per house for Accra as 12.1 while that for Kumasi stood at 32.03. Table 1 gives a vivid account of the situation over the years.

The rapid rate of urbanization due primarily to high birth rates and high levels of rural to urban migration is likely to intensify in the future. This assertion may be due to the fact that as rural economies become less supportive of its population, the only alternative left to the residents is to migrate to the urban areas where the economy as well as incomes are relatively stable.

With this anticipated upsurge in population, coupled with the current levels of deficiencies in housing needs, the ability of the urban areas to provide shelter for the people would depend on the efficacy of adoption and implementation of housing programs. The long-term sustainability of policies and programs would be very crucial to the success of any policy adopted for the future.

Table 1 Population and Housing Statistics of Kumasi city (1960-1984)

1960 Population	218,172
1970 Population	345,177
1984 Population	759,109
% change in 1960-1970 population	58.19
% change in 1970-1984 population	119.92
1960 housing stock	10,109
1970 housing stock	16,107
1984 housing stock	23,700
% change in 1960-1970 housing stock	49.47
% change in 1970-1984 housing stock	47.14
average number of persons per house in 1960	21.4
average number of persons per house in 1970	22.7
average number of persons per house in 1984	32.03
Persons per room in 1960	3.9
Persons per room in 1970	3.8
Persons per room in 1984	3.9

source : compiled from 1960, 1970, 1984 population national population census reports.

One of the most important information requirements needed for the proper planning of future housing supply is that of the parameters for determining housing demand. A knowledge of the determinants of housing demand, can help us predict the levels of housing affordability of the various segments of the population. It can also help us examine issues relating to the efficiency of housing subsidies and rent controls which have become an important explicit and implicit part of housing policies in recent years.

Although these issues are very important for urban housing policy formulation,implementation and monitoring, empirical work is almost non-existant and this study is meant to fill this vacuum by providing empirical estimates of household housing demand parameters for Kumasi city, which is Ghana's second largest city. Results based on this study, it is hoped, could aid considerably in the redesigning and the subsequent implementation of housing programs. In addition, it could provide a better base for extrapolition not only to urban areas in Ghana but also to those in sub-Saharan Africa with similar socio-political and economic characteristics as research of this kind hardly exists in these areas.

The plan for the rest of this paper is as follows. First, section two (2) gives an account of the salient characteristics of the housing market of the city. In section three (3), the emphasis is on the model and the estimation method. Section four(4) is devoted to data sources and the definition of variables. Estimated results with further extensions is given in section five (5) while the final part, section six (6), deals with the conclusion of the study.

2. Characteristics of Kumasi Housing Market

Kumasi is Ghana's second largest city with a population of 759109 (inclusive of all areas constituting the present metropolitan area) in 1984.

Increases in population have not been matched by a corresponding increase in the level

of housing stock over the years. The result is that stress on housing has increased dramatically in recent years (1).

The suspected reason for this state of affairs is not far-fetched. The private sector which provides about 70 percent of the house in the city is dominated by people who are cocoa farmers. With the recent downturn in the cocoa industry worldwide which has affected the earnings of these farmers, money available for housing investment has been very minimal. Government policies in terms of rent control and other macro-level problems in the national economy have made the sector less profitable to invest in as compared to the other sectors of the economy.

In terms of public sector housing development, policies have been mostly ad-hoc and have not been able to yield any appreciable improvements in the level of housing stock in the city. In addition these policies have not been sustainable.

With population increases of about 3.25 percent per year, the occupancy ratio of 3 persons per room, (which is the norm in most parts of the city) represents perhaps the highest figure for urban Ghana (1). The impact of this characteristic feature of housing consumption on households in the city who are predominantly low income earners cannot be over-emphasized. This is especially so when low income households in the city tend to have large families.

The housing market is dominated by renter and sub-renter households who constitute about 57.6 percent of the total number of households in the city. Table 2 gives a breakdown of the nature of tenurial arrangements within the city. Other forms of tenure include home-owners, 24.9 percent and relatives of home-owners, 17.5 percent. The latter group represents households that normally belong to the same extended family as that of the home-owner. In almost all cases, this group of households does not pay rents but makes contributions towards the maintenance and upkeep of services and facilities within the house.

Table 2 Tenurial Arrangements in Kumasi city

Type of tenure	Proportion
1. Home-owners	100 (24.9)
2. Relatives of owners	70 (17.5)
3. Renters	208 (51.9)
4. Sub-Renters	23 (5.7)

Another significant characteristic of the housing market is the existence of large disparity in housing conditions over the cityscape. There is a high cost sector where conditions are superb and top-class. These neighborhoods have modern, single family houses with highly sophisticated designs including all the modern comforts and conveniences, and are landscaped with impressive gardens. The dwellings are usually two -storey concrete structures. In contrast to the high quality areas is the dominant sector, the indigenous sector. This sector has low class neighborhoods generally characterized by slum or sub-standard conditions and forms part of either some of the oldest parts of the city or the previously adjoining villages which have been incorporated into the city's area of jurisdiction from time to time.

The houses are mostly the traditional compound type, single storeyed that tend to be about 30 square meters in area. The rooms are many ranging from 10 to 15 and arranged around three sides of the courtyard facing inwards. A fourth (4th) side contains a

bathroom and other facilities and services that are used communally by all the households living in the house. Streets in these neighborhoods are frequently unpaved and poorly maintained and access to certain sectors is limited during the rainy season for vehicular traffic. Between these two extremes (high cost and indigenous sectors), there exists the tenement sector which is characterized by multi-storey compound houses and blocks of flats but which also contains some single storey compounds(16).

The literature on urbanization and housing in third world cities appear to present the view that the development of squatter or spontaneous settlements has become an inevitable aspect of the third world development. It is further alleged that these spontaneous or squatter settlements constitute the poor urbanites response to problems of accommodation shortage, high rents and land acquisition. However, it can be argued that this characteristic feature may not be true for Kumasi city because of the following reasons. The first, is the attitude of migrants which, unlike in other third world cities, is towards permanent residency in the city. They therefore do not become squatters as is the feature in other cities in the developing world. The second is the official tolerance of sub-standard housing, often called unauthorized housing. The third is the existence of a land tenure system which makes access to land easy as compared to other third world cities. The final reason may be due to residents' attitudes to traditions, customs and beliefs regarding land ownership and the role of the spirit of the dead ancestors in the affairs of the living that safeguards the city against the development of squatter settlements (12), (8).

The above features of the housing market in Kumasi city will be incorporated into the analysis to the extent that the data allow.

3. The Model and Estimation Method

It is generally assumed that the a household has three decisions to make with respect to housing. These are decisions on tenancy status, amount of housing and the type of housing. In this study, the emphasis is on the amount of housing consumed which is reflected by the demand parameters. Despite the fact that there is a clear difference between housing demanded by home-owners and renters in the third world (9), the study concentrates on renter housing for three main reasons.

In the first place, the city is dominated by renter households who live in both private and public rental housing units. This fact has already been highlighted in the previous section.

The second is that the housing problems of renters are far more acute than those of home-owners in the city. One example to illustrate this point is in terms of room occupancy rates where that of home-owners averages 2.3 as against 3.2 recorded for renters.

The second reason is that the survey that is used for this study did not collect information on the value of housing consumed by house—owner, an essential data component for the estimation of home-owners housing demand parameters.

The demand for housing can be derived within the standard household utility maximization framework. The household utility U depends on the consumption of housing H and

other good Z ;

$$U=u(H\ ;\ Z) \qquad \cdots\cdots\cdots\cdots[1]$$

The household maximizes U subject to a budget constraint

$$Y=PhH+PzZ \qquad \cdots\cdots\cdots\cdots[2]$$

where

Y = income

Ph = unit price of housing

Pz = is a price index for all non-housing goods

with Pz as a numeiraire, the maximization exercise yields a demand function for housing as

$$H=h(Y,\ Ph) \qquad \cdots\cdots\cdots\cdots[3]$$

The basic problem for estimating the above equation is that none of the variables mentioned is directly observable (13).

Housing price and quantity can be observed jointly either as rent or as the value of " home purchased", that is in both cases, as a household expenditure.

Futhermore, housing is not a very divisible good but very heterogeneous in nature, for example, one extra unit cannot be purchased or consumed, thus further complicating the housing modeling procedure. Following (9), we estimate equation [3] above as an expenditure equation but with net household housing expenditure (net rents) as the dependent variable.

In this particular study, greater emphasis is to be placed on the income elasticity of demand as this particular estimate offers various avenues for improved housing decision -making. Inadequate knowledge of the levels of this important policy instrument may have contributed significantly to the existing state whereby previously executed public housing projects cannot be replicated due to problems associated with recouping the invested financial resources. The obvious reason for this state of affairs is that the ability of households to pay for housing was rarely assessed before project execution.

It is possible to estimate directly the income elasticity of housing demand if a multiplicative functional form of the independent variables is assumed (5). An example is

$$Exh=a\ Y^{b1}\ \exp(b2Hz)\ \exp(b3Hz) \qquad \cdots\cdots\cdots\cdots[4]$$

Where Exh = housing expenditure

Y = income

Hz = any of the other independent variable such as size of household

Equation [4] can be transformed into a semi-log functional form in which b1 is the estimated income elasticity of housing demand. This form is as shown in equation [5] below.

$$\text{In } Exh=b0+b1\ \text{In } Y+\text{In } b2X2+b3X3 \qquad \cdots\cdots\cdots\cdots[5]$$

Where Y = income

X2'S=continuous variables
X3's=discrete variables

The form of equation [5] assumes that the elasticity of income b1 is constant and the marginal propensity to consume housing decreases which is a reasonable assumption if we consider housing to be strictly a neccessity good. Beside the convenient nature of the estimation inherent in the semi-log form of equation [5] above, it should be noted that the constant elasticity functional form and the log-normal term reduce the chance of heteroscedasticity.

Since the data at hand do not allow the calculation of relative prices, we could not derive the price elasticity of demand for housing from equation [5] above. However, a linear functional form parameters derived from the Stone-Geary utility function was used to derive the price elasticity in the absence of a price variable by employing the relationship below.

$$ep = -ey\frac{y-Onh}{y} \qquad \cdots\cdots\cdots\cdots [6]$$

Where ep=price elasticity
ey=income elasticity
Onh='subsistence minimum' expenditure on non-housing goods
y=income

4. Data Sources and Variable Definitions

The data employed in this study was obtained from a household housing survey conducted in Kumasi city, Ghana in September and October, 1989. The sample totaled 401 households that were selected using a multi-stage random sampling technique. The sampling technique employed was such that it was to be representative of the city's housing market characteristics expounded in the previous section.

The questions asked covered that of the characteristics of the household head, tenancy status, previous residence, facilities and amenities available in the living quarters, duration of stay in the house, rent paid and recent history of rent increases. Others included accessibility indicators to important facilities and services within the city as well as satisfaction with neighborhood amenities.

Since the study focusses on the rental housing market, the variables and data presented and used below are based on the characteristics of the 231 households that were sampled as belonging to the renter housing market in the city.

i. The Dependent variable

The dependent variable for this analysis is the households net monthly rent in Ghanaian cedis.

ii. The Independent variables

The independent variables employed in this study were as follows:

i. Household income-Studies on housing consumption among households have usually used expenditure levels as a means of overcoming the transitional nature of most house-

holds sources of income. The need for some permanent form of income as a basis for making housing decisions becomes more articulate in the case of the study area, where as explained in section 2, incomes are not only low but unsteady.

To circumvent this problem therefore, the study uses household expenditures as a proxy for permanent income (9), (6).

ii. The age of household head was included on the assumption that the stage in ones life -cycle influences ones level of housing consumption.

iii. It is highly debatable if the usual assumption that the size of a household is a strong factor in determining the housing demand levels would be tenable in Kumasi city. This is because it is households on low incomes and probably with low housing consumption levels that tend to have bigger sizes. The inclusion of this variable is therefore to check the plausibility of this assumption in the light of the conditions prevailing in Kumasi city.

iv. Strassman (15) has stressed that in cities of developing countries, from a tenth to a quarter of dwellings have an enterprise on the premises. Such home-based industries he further contended, are likely to proliferate in the future. It is assumed that in premises with home-based industries, the households would demand greater quantity of housing as these industries tend to limit household access to housing space (2)

v. It was also postulated that married household heads, households with high academic attainments (post-secondary or Junior high school) and male-headed households were expected to be strong determinants of household housing demand levels in the city.

vi. In addition, two variables, length of stay in the city and length of stay in the present premises were also used in the analysis. For the first variable, length of stay in the city, it is postulated that long-term residents of the city (over ten years) would demand more housing than recent migrants who because of low affordability levels tend to enjoy less housing. The tight nature of the city's housing market is another reason that may help explain why the assumption that recent migrants are more likely to enjoy less housing than long-term residents was made. This is because, all things being equal, long-term residents may have had enough time to improve their housing conditions through long 'search process'.

Familiarity can also help to increase housing access for long-term residents in a particular house and this is the basis for the assumption for the second variable above.

A summary statistics of the mean values for these variables have been provided in Table 3 below.

5. Estimation Results and Further Extensions

i) Model Results

Two functional forms of equation [5], linear and semi-log, were estimated. The linear form was included because it could be used to derive a price elasticity of demand without the need to calculate a price variable.

Table 4 below shows the estimated results obtained for the linear and and semi-log specifications. The semi-log model fits the equation better than the linear model and the rest of the section will be devoted principally to explain this semi-log model results.

Table 3 Mean values of Household Housing Characteristics

1. Housing expenditure (RENT) *(in Ghanaian cedis)	1,235 (1,453)
2. Household Income (EXP)	66,990 (23,160)
3. Age of Head of household (year) (AGE)	43.4 (11.4)
4. Size of Household (SIZE)	5.3 (2.7)
5. % Married (MARITAL)	84 (14)
6. % with Secondary (Junior high) sch. education and beyond (EDUC)	23 (42)
7. % of long-time residents (over 10 years) (MIGRATION)	79 (41)
8. % of Male-headed households (SEX)	75 (43)
9. % of long-time residents in House (STAY)	74 (44)
10. % with home-based industry (INDUSTRY)	46 (50)

/ shown in brackets below the mean values are the standard deviations
* All monetary values are given in Ghanaian cedis (US$1.0)
/ (¥135) approx. 290 Ghanaian cedis in 1989.

Of all the variables under examination, 5 were significant at the 95 percent level while for 3 others at the 90 percent level. The income elasticity figure was 0.36 and 0.58 for the semi-log and linear models respectively. These results imply that the demand for rental housing in Kumasi city is very inelastic and it corroborates the previous researches on housing demand in developing countries Malpezzi, et al (9) in their studies on housing demand in seven cities in the developing countries found that the estimated elasticities range from 0.31 to 0.88. They also found out that about two-thirds of developing countries' estimates fall within the 0.4 and 0.8 range. Thus, Kumasi's estimate for the semi-log model falls a little below this estimated range. It perhaps shows how poor the households in the city are.

The factor that exerted the strongest positive influence on household housing demand in the city was the educational level of household heads (EDUC). It was followed by household permanent income which was represented here by household expenditures (EXP). Other positive determinants of household housing demand in order of importance are length of stay in the city (MIGRATION), age of head of household head (AGE), household size (SIZE), sex of head of household(SEX), and the presence of home-based industry (INDUSTRY).

Factors that exerted negative influences on housing demand in the city were the marital status of household head (MARITAL) and the length of stay in a house (STAY). The former, however, was not significant statistically.

Table 4 Results of analysis for all households

	Linear	Semi-log
1. In (EXP)	9.60 *	0.53 *
	(11.30)	(6.86)
2. In (AGE)	4.82 *	0.24 **
	(3.26)	(1.37)
3. In (Size)	0.06 **	0.18 *
	(1.49)	(1.95)
4. MARITAL	3.35 *	−0.15
	(1.94)	(−0.96)
5. EDUC	2.08	0.97 *
	(1.17)	(8.7)
6. MIGRATION	6.68 **	0.32 *
	(1.46)	(1.70)
7. SEX	1.74	0.15 **
	(0.91)	(1.32)
8. STAY	3.79 *	−0.26 *
	(1.87)	(−2.14)
9. INDUSTRY	3.33 *	0.15 **
	(2.18)	(1.63)
Intercept	−23.26 *	−1.39 *
	(−10.45)	(−1.68)
Income elasticity	0.58	0.36
Price elasticity***	−1.56	
R-square	0.56	0.62
Adjusted R-square	0.55	0.60
F-value	31.7	26.13
DF	230	230

/ shown in the parentheses are the corresponding t-values

* significant at the conventional 95% level
** significant at the 90% level
*** Price elasticity was estimated for only the linear model for reasons already given in the text.

b) Further Extensions

A unique feature of the present study is the stratification of the sampled households into income classes and residential area type. Differentiation along these lines may be able to provide important insights about the peculiar characteristics of the various classes and how they are related to households housing demand in the city.

Tables 5 and 6 below present some of the characteristics of the sampled households by income classes and residential area type. The definitions used here are the same as used previously in the preceding section. With respect to income, three classes were delineated. Households with incomes of 50,000 cedis and below were classified as low income earners. Those with incomes ranging from 50,000 cedis to 100,000 cedis were labeled as middle or medium income earners while those above this range became high income earners.

Table 5 Distribution and Characteristics of households by income classes

	High income	Middle income	Low income
1. Household housing expenditures (RENT)	1,825 (12,570)	1021 (1,873)	514 (181)
2. Household Income (INCOME)	108,364 (44,803)	58,294 (29,346)	27,439 (40,060)
3. Age of household head (years) (AGE)	43.6 (4.6)	43.6 (7.7)	42.9 (8.9)
4. Household size (SIZE)	4.8 (1.8)	5.0 (2.4)	5.4 (2.6)
5. % Married (MARITAL)	89	90	74
6. % with Secondary Sch. education and beyond (EDUC)	67	37	27
7. % of long-time residents (over 10 years) (MIGRATION)	87	84	80
8. % Male-headed (SEX)	80	78	69
9. % with over 5 years stay in house (STAY)	92	87	83
10. % with home-based industry (INDUSTRY)	41	55	64
Number of households	44(19.1%)	72(31.2%)	115(49.8%)

* figures are the mean values for the respective characteristics
** In parentheses are the standard deviations
*** all monetary values are in Ghanaian cedis (US$ 1.0 (approx. ¥135)=290 Ghanaian cedis in September/October 1989

These 3 groups represented 49.8 percent, 26.8 percent and 23.4 percent respectively of all the sampled households within the city.

With respect to residential area types, three (3) sectors were identified. These were the high cost, tenement and the indigenous sectors. Description of these sectors have already been provided in section 2 of this study while the salient characteristics are as provided in Table 6 below. Households of the high cost sector accounted for 29.4 percent of the total number of respondents while the equivalent figures for the tenement and indigenous sectors were 25.5 percent and 45 percent respectively.

The results obtained from the analyses of the above data are as shown in Tables 7 and 8.

On the analysis on the residential area type (Table 7), income elasticities of 0.36, 0.44 and 0.33 were obtained for the high cost, tenement and indigenous sectors respectively. The respective figures for the price elasticities were −1.33, −1.41 and −1.31 respectively for these three areas.

For the high cost sector, INDUSTRY, AGE, EDUC, SIZE and SEX were the important positive parameters determining household housing demand levels. High negative estimate was obtained for MARITAL. All the above-named variables were significant statistically.

In the tenement sector, strong positive factors included EDUC,INDUSTRY, MARITAL and AGE. However, INDUSTRY and MARITAL were not statistically significant.

Table 6 Distribution and Characteristics of households by Residential area types

	High cost	Tenement	Indigenous
1. Household housing expenditures (RENT)	2,634 (1,588)	1,899 (1,768)	938 (1,524)
2. Household Income (INCOME)	85,231 (73,449)	69,745 (15,566)	47,886 (13,308)
3. Age of household head (years) (AGE)	43.6 (9.8)	44.5 (11.6)	43.9 (10.6)
4. Household size (SIZE)	4.9 (2.2)	5.0 (2.3)	5.0 (3.1)
5. % Married (MARITAL)	92	78	86
6. % with Secondary School education and beyond (EDUC)	60	35	4
7. % of long-time residents (over 10 years) (MIGRATION)	78	88	82
8. % Male-headed (SEX)	81	59	72
9. % with over 5 years stay in house (STAY)	75	72	73
10. % with home-based industry (INDUSTRY)	42	58	60
Number of households	68 (29.4%)	59(25.5%)	104(45%)

* figures are the mean values for the respective characteristics
** In parentheses are the standard deviations
*** all monetary values are in Ghanaian cedis (US$ 1.0 (approx. ¥135)=290 Ghanaian cedis in 1989.

In the indigenous sector, factors that were both strong, positive and significant were SIZE, EXP and EDUC. The coefficient for INDUSTRY under this sector was negative but significant implying that these industries do not contribute positively to influence housing demand among households in this residential area.

On the analysis dealing with the three income classes, high, medium and low, the results are as depicted in Table 8 below.

Income elasticities were 0.46 for the high income class, 0.38 for the medium income class and 0.29 for the low income class. The corresponding price elasticities were −1.45, −1.36 and −1.27 for the high, medium and low income classes respectively.

MARITAL and EDUC. were the strongest factors explaining housing demand among the high income earning households. For households on both medium and low incomes, EDUC and MIGRATION were the two most significant factors determining household housing demand.

In general, the models examined above have displayed relatively strong explanatory powers as shown by the respective adjusted R-square values and the significance of the F -values is an indication of the statistical plausibility of the adopted disaggregation procedures.

Table 7 Results of analysis on Residential Areas

	High cost	Tenement	Indigenous
1. In (EXP)	0.15 (5.70)	0.13 (3.72)	0.14 (5.33)
2. In (AGE)	0.88 (3.14)	0.46 (1.78)	0.26 (1.08)
3. In (Size)	0.37 (2.34)	0.09 (0.11)	0.18 (1.45)
4. MARITAL	−0.56 (−1.88)	3.86 (0.31)	−0.02 (−0.08)
5. EDUC	0.40 (3.10)	9.6 (3.56)	0.68 (5.27)
6. MIGRATION	0.15 (1.06)	−10.67 (−1.65)	0.04 (0.24)
7. SEX	0.32 (1.94)	2.40 (0.40)	0.22 (1.61)
8. STAY	0.003 (0.003)	−8.84 (−1.51)	−0.32 (−0.34)
9. INDUSTRY	1.59 (2.29)	6.12 (1.25)	−0.18 (−1.57)
Intercept	−5.48 (−3.89)	−8.81 (−2.14)	2.30 (2.44)
Income elastcity	0.36	0.44	0.33
Price elasticity	−1.33	−1.41	−1.31
R-square	0.62	0.56	0.64
Adjusted R-square	0.61	0.52	0.59
F-value	13.3	5.223	26.34
DF	67	58	103

/ shown in the parentheses are the t-values
/ continuous values are in their natural logarithms

6. Conclusions

The paper represents one of the pioneering attempts to analyse the underlying factors that determine rental housing demand among households in urban Ghana. Estimates of both income and price elasticities of housing demand have also been provided.

From the results obtained, it can be concluded that the educational level of household head has been the single most prominent determinant of housing demand in the city. This was also true for all the disaggregated markets examined under the study. It was also found that while the presence of home-based industries (INDUSTRY) is a strong consideration in housing demand among households that are either rich or live in high cost neighborhoods, it nevertheless has no strong positive influence on housing demand determination among households belonging to the other income classes and those in different residential neighborhoods.

The estimates of income and price elasticities of demand, even though low by international comparisons with other areas in the developing world, is expected to act as a

Table 8 Results of analysis on the Income classes

	High income	Medium income	Low income
1. In (EXP)	0.23 (1.42)	0.17 (9.69)	0.014 (5.48)
2. In (AGE)	0.71 (2.79)	0.14 (2.01)	0.006 (0.19)
3. In (Size)	0.81 (1.93)	0.13 (0.44)	0.27 (1.94)
4. MARITAL	1.95 (1.73)	−0.53 (−0.23)	−0.77 (−0.79)
5. EDUC	1.83 (2.23)	4.90 (2.84)	3.76 (4.67)
6. MIGRATION	−5.09 (−0.96)	1.09 (1.61)	2.06 (2.46)
7. SEX	1.36 (0.22)	1.39 (0.75)	0.77 (0.91)
8. STAY	−1.30 (−0.82)	0.03 (1.72)	0.62 (1.41)
9. INDUSTRY	0.27 (1.57)	−0.12 (−1.51)	−1.03 (−1.38)
Intercept	1.89 (2.29)	−4.43 (−2.41)	−3.95 (−2.89)
Income elastcity	0.46	0.38	0.29
Price elasticity	−1.45	−1.36	−1.27
R-square	0.58	0.49	0.57
Adjusted R-square	0.55	0.48	0.56
F-value	4.16	14.83	30.89
DF	41	71	114

/ shown in the parentheses are the corresponding t-values
/ continuous values are represented by their natural logarithms

guage for determining the housing affordability levels of households. In this way, economic viability of housing projects can be determined and enhanced. This will represent a clear departure from the previously existing situation.

A severe limitation of the study was our inability to estimate the housing demand schedules of home-owners because of inadequate data.

It is our hope to dwell on this issue in our subsequent research undertakings. In addition, we hope to broaden the scope of future model formulation to provide estimates for long-term housing demand levels as a way of enhancing our long-term housing policy initiatives.

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