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Influences of Income Levels on Housing Demand: A Case of Low Income Earners in Eldoret Municipality, Kenya

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Abstract

Evidences in Kenya shows that the provision of housing which are affordable to a majority of the urban population poses a serious challenge to the local authority and central government. This study sought to investigate, demand elasticities for low income housing market of Eldoret Municipality in Kenya. This study was guided by utility theory of housing market theoretical framework, and adopted stratified sampling to 260 heads of households from 100,209 households. Data were analyzed using descriptive statistics, correlation analysis and regression analysis. The study revealed that, 1% increase in the household's income will increase housing demand for the low-income households by 0.960 %. The study therefore concluded that demand for housing is positively responsive to income of the low-income households. The study points to the need for promoting income generation activities to sustain demand, subsidizing of housing services and provision of incentives for income generation activities. Further research should be done, on demand elasticities for owner occupant, and the present study can be replicated using time series data.

Key Words: Income levels, Demand Elasticities, Eldoret

Introduction

Housing is a basic necessity everywhere in the world. As such, housing can be thought of as the most universal property type, demand for which is directly related to population demographics and to micro and macro economic factors like income growth and government policies (Linn, 1979). Accelerating population growth, rapid urbanization and man-made or natural disasters have combined to create an ever-growing demand for houses. Current estimates predict an increase of the world's population to around nine billion people in 2050. All these people will require clean water, sanitation and basic healthcare, but they will be in equal need of houses that can provide and maintain these primary services in environmentally sound ways (Ingram, 1984).

Most developing countries face massive housing problems exacerbated by high population growth rates of urbanization, scarcity of resource and above all, mistaken public policies (Linn, 1979). Some of these policies result from political forces, but others are due to ignorance of the operation of housing markets. This is especially true in urban Africa where the local council housing markets are over regulated (Ibid).

In coping with these high rates of growth, governments of developing countries have tried to adopt a policy instrument to control urban expansion, in order to meet the needs of the population for shelter and services. Such a policy instrument demands a careful understanding of the behavior of the urban market, especially in respect of the housing market. Unfortunately, information and studies on market behaviour are mostly lacking in developing countries (Malpezzi and Mayo, 1985).

Consequently, policy makers have had to depend on parameters derived from studies and applications carried out in developed countries. This has caused some misunderstanding of housing market behaviour, and policy makers in turn have failed to create effective policies capable of meeting the needs of the urban population. Therefore, there is a need to extend the analysis of the housing market to a wide variety of locations in developing countries in order to develop general parameters for the behaviour of the housing market (Quigley, 1979).

Over the years there has been an acute shortage in the number of housing units available for the soaring population, especially in urban areas. The current housing needs are estimated to be 150,000 units per year in Kenyan urban areas, while the current production is estimated at 20,000 to 30,000 units annually (Economic Survey, 2003). This leaves a shortfall of over 120,000 units per annum. This problem can be clearly observed by the crowded city centres and the sprawling slums just within a radius of 8 kilometers from the city centre.

The Kenya government's official policy of financing, constructing and facilitating access to housing continued into the 1980s (Economic Survey, 1984). However, the reality was not matched by the intention. Implementation has often been piecemeal and there are continuing house shortages. The housing policy set out in Sessional Paper No.5 of 1967 set a national production target of 7,600 units per year but this has never been realized. According to the 1976-1982 urban housing survey, average annual housing production was only 6,400 units per year with the public sector supplying 75 per cent and the formal private sector 25 per cent. Republic of Kenya (1994), as the urban population grew; formal housing supplied fewer houses relative to demand. By 1989, demand had risen to 65,800 units, yet housing production in the formal public sector further declined during the second half of the 1980s and the first half of the 1990s. In the nine years from 1986-1994, only 5,568 units were built.

Eldoret municipality, which is the focus of this study, is one of the fastest growing urban centres in Kenya (Republic of Kenya, 1994). The town has experienced very high population growth. The provision of affordable housing to a majority of the urban population in Eldoret poses a serious challenge to the local authority, and the central government. Even the private sector is unable to provide acceptable and affordable housing to low-income group. As a result, unplanned housing is mushrooming on the peri-urban areas of the Municipality of Eldoret, in an effort to bridge the gap between housing service delivery and demand for the urban poor. A survey by the Department of Physical Planning (Republic of Kenya 2002) indicated that 60% of the urban population in Eldoret falls within the low-income group.

Literature Review

Several studies have been conducted relating to income elasticities and demand for housing globally. Hansen *et al* (1996) in their study on the effects of income elasticity on the demand for housing in Sweden used Lorenz concentration curves, to demonstrate that income elasticity is somewhat less than unity for all income levels. Their study sample included households from all over Sweden. Challenging the results of high-income elasticity, other studies have estimated the income elasticity of housing demand as low as 0.1 (Kain and Quigley 1975). Mayo (1981) in his study of income elasticity of housing demand in 14 developing countries concluded that the demand for housing is rather income-inelastic, with parameter values ranging from 0.25 to 0.70 for renters and from 0.36 to 0.87 for owners. He found that, in nine out of 14 cases where comparison was possible in these developing countries that owner income elasticities were greater than those of renters. He used cross-section data.

Goodman and Kawai's (1984) in their study tested functional form of hedonic regressions on rental housing demand for 19 United States metropolitan areas. In the hedonic rent regressions, both linear and log linear forms were rejected through Box-Cox maximum likelihood procedures. Similar tests for demand regressions using logarithmic equation lead to downward bias in income elasticities, but price elasticities were unchanged. Several other studies extended this research by exploring the correlation between income and the income elasticity of housing demand. Ihlanfeldt (1982) for example, showed that the income elasticity of housing demand in Korea tends to rise with the income level. He found that the income elasticity for low-income households falls between 0.14 and 0.62, whereas in the case

of high-income households it lies between 0.72 and 1.1. He used household-based data. Using time-series data, a study undertaken by Mayo and Sheppard (1996), in the U.S, estimated that the income elasticity ranges from 0.5 to unity across income levels. Most studies found support for the argument that the income elasticity of owners is moderately higher than the one of renters. Only a few empirical investigations have produced evidence that income elasticities exceed unity.

Painter and Redfearn (2002) explored the role of interest rates in explaining house ownership demand. The authors presented evidence that in the short run, changes in interest rates or incomes have no effect on house ownership rates. In addition, even rather large swings in interest rates have insignificant long-run effects on house ownership rates, while changes in incomes and demographic variables cause considerable variations in house ownership rates over time.

Diaz-Serrano (2004) investigated the effect of labor income uncertainty on the probability of owner housing demand in Germany and Spain, two countries with highly different rental housing shares. He observed for both cases, that households facing increasing income uncertainty display preference for renting, while those with less uncertainty show a greater propensity for homeownership. Ndulo (1986) empirically analyzed the low-income housing sector of urban Zambia housing market with respect to the response of housing consumption to income and taste variables of the household. It was revealed that the demand for housing is relatively insensitive to income and size of household. Similar studies on income elasticities of housing demand have not been carried out in Kenya urban centres; hence it is a matter that deserves investigate in Eldoret Municipality.

Estimates of elasticities for housing demand in developed countries have been reviewed by Mayo (1981). Ingram (1984), Malpezzi and Mayo (1985), and Grootaert and Dubis (1986), provide rigorous attempts to conduct housing demand in some developing countries based on elasticity of housing demand with respect to income, price, family size and age of family head. The general conclusion that can be drawn from these studies is that estimates of elasticities of demand vary widely between countries and over time. For the United States, for instance, the estimate of income elasticities ranged from 0.55 to 1.63 (Mayo, 1981), while the corresponding values in developing areas ranged from 0.2 to 0.8 (Malpezzi and Mayo, 1985). This means that the demand for housing varies with level of development.

Accordingly, the determinants of housing demand can be seen in the elasticities of household income, price, travelling cost, family size and age of household head.

Ingram (1984) empirically estimated elasticity for determinants of housing demand in Jordan. He took a sample of six Jordan conurbations and used a 1988 housing survey data to sample households covering the main urban centres. He found that housing price elasticity was generally small in all urban centers, as they ranged from -0.5 to -0.229, while housing income elasticity was in the range of 0.2 to 0.8.

Five Studies have been conducted on housing demand for Japan which differ in the methodologies, geographical coverage, data sources and hence the results (Tiwari and Hasegawa, 1999; Moriizumi, 1993; Horioka, 1988; Moriizumi and Takagi, 1983; Yamada *et al*, 1976). These studies attempted to estimate income and price elasticity of housing demand besides various factors that determine housing demand. However, the results from these studies vary so much that there is a need for another study with latest data and methodology.

The demand elasticity estimates of (Moriizumi *et al*.1993 and Yamada *et al*.1976) indicate inelastic housing demand with income and prices. Horioka's analysis indicated that the income elasticity of demand for housing in Japan is 1.4 (highly elastic) and price elasticity of demand is – 0.8 (inelastic). Elasticity estimates from Moriizumi (1993) analysis indicated an income elasticity of 0.11 for owner households and -0.05 for tenants and price elasticity of -0.13 for owners and -0.67 for tenants. Tiwari *et al*.(1999) indicated that the elasticities of demand for rental housing is inelastic with respect to permanent income and price at 0.26 and – 0.33 and for owner houses are inelastic with income as well as prices at 0.37 and – 0.38 respectively.

These five studies estimated elasticities, which vary over a wide range. The most fundamental difference is in choice of variables and geographical coverage. First, these results are different due to different measures of income variable. Horioka (1988) estimated an equation similar to Moriizumi *et al* (1993) and took weighted average of current income and fitted value of regression as his instrument. To this, he added the tax adjusted imputed value of rent for owner households to arrive at permanent income. Moriizumi (1993) used a similar methodology for her permanent income measure. While they made adjustments for taxes, they did not deal with the subsequent

problem of correlated regressor and error introduced by the procedure. The bias introduced could be considerable. Tiwari *et al* (1999) estimated permanent income similar to (Moriizumi ,1983).Yamada *et al* (1976) used pretax current income. Moriizumi *et al* (1983) estimated an instrument for permanent income by regressing current income on life cycle variables. The fitted regression value is the permanent income used in their model and the residual is transitory income. Their studies estimated tax and social security contribution of each family and subtracted it from the permanent income estimates. The problem here is that they did not take care of the problem of correlated regression and error introduced by this procedure.

Kariuki (2002) studied enhancing housing development and ownership in Kenya. Using primary data from a field survey conducted in Nairobi, this study looked into the issue of individual housing development. A situational analysis showed that land tenure affects access to housing finance while lack of basic and support infrastructure has also acted as a disincentive to potential developers. In a few areas welfare associations have mobilized finances for infrastructure development and service provision. Further empirical research was proposed to focus on the issue of access to housing by the low income groups of people in Nairobi who form a majority of the population. Ochieng (2004) investigated the nature of affordability of low-income housing in Kenya. The focus was on strategies that can be used to improve on affordability of the low-income housing. The study used a qualitative case study design for data collection. The method was used because of its ability to enable the research to evaluate and also to explain housing strategies that have been applied to the settlement. He observed that, the important parameters that should inform housing delivery system included housing needs, affordability, housing policies, social and economic factors and politics. The study is however silent on issues of demand elasticities.

The major outcome of the literature review reveals that only a handful number of studies provide demand elasticities estimates of housing for the low-income at a micro-scale level. Furthermore no study in Kenya has looked at housing demand elasticities for the low-income households. It is therefore important to carry out an investigation in a small region (micro-scale level) in order to reveal demand elasticities estimates, since they differ according to size of geographic coverage (Horioka, 1988). In view of these, this study tried to fill the gaps.

Methodology

The study was carried out in Eldoret municipality, one of the fastest growing urban centers in Kenya, and currently the fifth largest in Kenya. The population involved in this study consisted of 100,209 low-income household heads. A sample of 260 household heads (renters) selected using stratified sampling technique. Primary data was collected using interview schedules. The interviewers were also to press for additional information when the response seemed incomplete or not entirely relevant. This aided in obtaining variables such as, the value of house monthly rents, monthly income of the household, household size, gender, the age of the head of the household and the neighborhood location of the household.

To examine the determinants of demand for housing, the expenditure demand (equation 6) is estimated using the logarithmic linear functional form. This functional form has been found convenient because it permits elasticities of housing expenditures to be estimated using ordinary least squares estimation (Boyes and Gerking 1980). The value of the house was regressed on economic and demographic variables: housing size and age of the household. The explicit monthly rent on the house is used as a proxy for the total housing expenditure of the household. The empirical formulation of the model to be estimated takes the form:

$$LnR = a + b1LnY + e \qquad (1)$$

where:

Ln = *Natural logarithm.*

b1 = *regression coefficients.*

a = *intercept coefficient.*

E = *random error term.*

R = *Imputed or explicit monthly expenditure value on house used as proxy for demand*

Y = Current disposal monthly income

Results and Discussions

Results of the study indicate that only 31.15 % of all respondents were single household heads, while 68.85 % of the low-income households were married household heads. This implies that most houses were inhabited with married

people. This can probably be explained by the fact that single households in the low-income groups tend to earn less income compared to their married counter parts that can combine their earnings. The educational background of the respondents indicated that 4.23 % of all respondents were primary school leavers, 43.46 % of the respondents were secondary school leavers, 45 % had tertiary level of training while 7.31 % had university education. This implies that majority of the respondents had acquired some formal education, where the variations could be attributed to differences in the costs of education at different levels and in income levels of the household heads. A survey of length of time households stayed in the same house showed that 53.85 % of all respondents had stayed in the same house for less than a year, while 46.15 % of the respondents had lived in the same house for more than a year. This implies that most of the housing inhabitants were highly mobile as they kept on shifting from one house to the other within a given year. This can be attributed to the kind of jobs done by the low-income households i.e they tend to do causal jobs, hence they shift quite often in search of new job contracts when the earlier ones end.

A survey of the nature of houses inhabited by the respondents indicated that the majority (86.54 percent) of the respondents were living in semi-permanent housing structures, while 13.46 percent of the low-income households were living in permanent housing structures. This could imply that most households were living in semi-permanent housing structures due to their cheapness relative to the other structures.

The study also probed on the size of the households. It was revealed that 43.8 % of all respondents had between 1 and 2 members, 43.5 % had 3 to 4 members, 11.5 % had 5 to 6 members and only 1.2 % had more than 6 members. This implies that households with between 1 and 2 members were the main housing consumers and this can partly be attributed to the fact that their purchasing power for housing space given their low-disposable income was not eroded much by having few household members. Since most of the households had only 1 to 2 members, this can suggest that most of the houses were inhabited with households who were beginning to work, hence did not have stable and reliable source of income to start families and stay with other members like relatives and friends in their houses in addition to this the houses could also be small in terms of rooms to accommodate many household members. On average, household size of respondents in the area of the study were 3 members, with the lowest household size being 1member and the highest being 7 members.

Figure 1, below shows that, 11.2 % of all respondents earned between Ksh 4,000-4,999 per month as household income, 31.9 % earned Ksh 5,000-5,999, 12.7 % earned ksh 6,000-6,999, 25.4 % earned Ksh 7,000-7,999, 6.1 % earned Kshs. 8,000-8,999, 2.3 % earned Ksh 9,000-9,999, while 10.4 % of the respondents earned more than Ksh 10,000 household income per month. This implies that most low cost housing are preferred by those who earn between Ksh 5,000-5,999 income per month since they can not afford to shift to houses meant for either the middle or high income groups. This concurs with the findings in (GOK, 2000) that low-income group of the urban population in Eldoret earned an average of between Ksh 3,000-16,000 per month. The figure also reveals that the income distribution of households is negatively skewed. On average, the income level among the heads of households in the study area was Ksh. 6295.06 per month, with the lowest income being Ksh 3981.07 and the highest being Ksh 10,000.

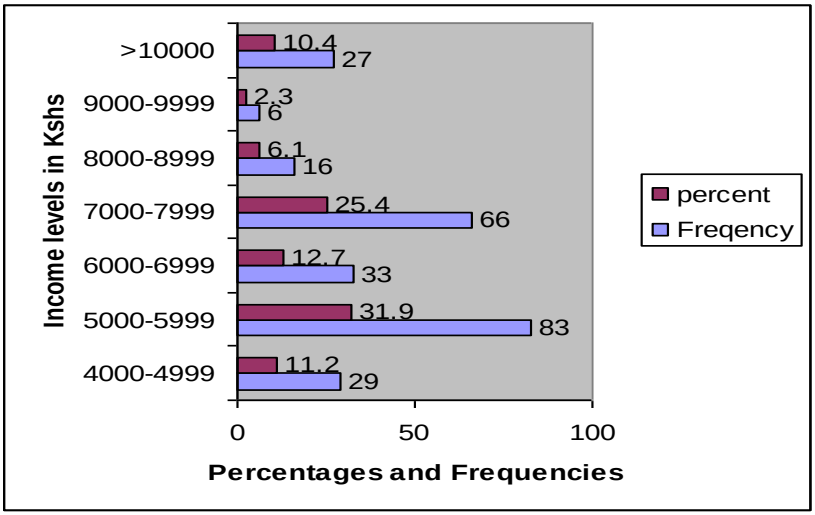

Figure 1: Percentage Distribution of Households Income

Source: Field Survey

Furthermore, the study revealed that 0.4 % of all the respondents spent between Ksh 100-199 on price per unit of housing services per month, 4.6 % spent Ksh 200-299, 64.6 % spent ksh 300-399, 28.5 % spent Ksh 400-499 and only 1.9 % spent over Kshs. 499. This implies that most households

spent between Ksh 300-399 per month on price per unit of housing services. Such low figures for monthly price per unit of housing services can be attributed to lack of social amenities like electricity and piped water in most houses and also on the lack of capability to pay for these services by the low-income households. The average price per unit of housing services of all the respondents at the time of interview was Ksh 181.97 with the lowest price being at Ksh 162.18 and highest being Ksh 530.

Figure 2, shows that 14.2 % of all respondents spent between Ksh, 500-1,000 per month on housing expenditure, 73.9 % spent between Ksh, 1500-2,000, while 10.7 % spent Ksh, 2,500-3,000 and only 1.2 % of the low-income households spent between Kshs. 3,500-4,000 per month on house rent.

The figure further shows that the distribution of housing expenditure according to their rent levels is skewed to the lower rents. Such low figures for housing expenditure are most likely reflective of the low disposable incomes earned by the households who mostly work in the informal sector, hence their preference for cheaper rental houses.

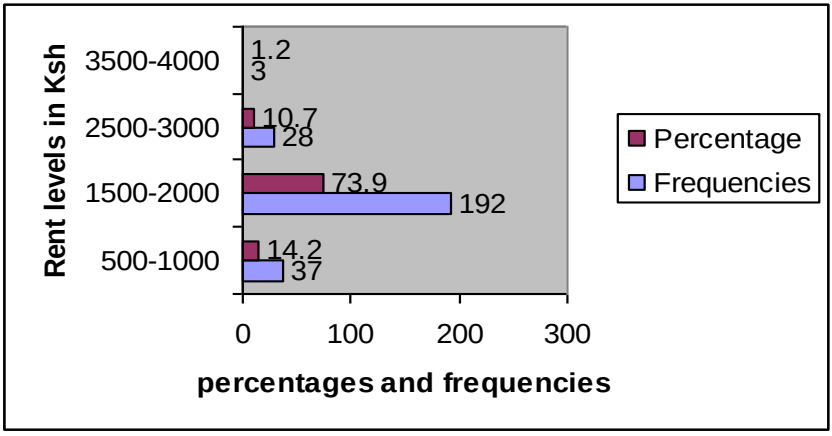

Figure 2: Frequency Distribution of Housing Expenditure

Source: Field Survey

The statistical results are presented in Table 1, which shows that Households income has relatively low but significant correlation coefficient with Rent with a correlation coefficients 0.522 ($p<0.001$).

Table 1: Correlation results of variables in the study (N=260)

		R	Y	P
Pearson Correlation	R	1.000	.522**	.042
	Y		1.000	.410**
	P			1.000
Sig. (1-tailed)	R	.	.000	.225
	Y	.000	.	.000
	P	.248	.000	.

** Correlation is significant at the 0.01 level (1-tailed)

Key:

R = *Imputed or explicit monthly expenditure value on house*

Y = *Current disposal monthly income*

P = *Price per unit of housing services*

Table 2: Coefficients of variables in the equation

Model	Unstandardized Coefficients		Standardized Coefficients	t	VIF
	B	Std. Error	Beta		
(Constant)	3.192	.330		9.662	
Y	.960	.074	.641	12.915	1.598
P	-.642	.114	-.244	-5.649	1.209

Dependent Variable: Rent

R = *Explicit monthly expenditure value on house1*

Y = *Current disposal monthly income*

T *= Monthly transport cost*

P **=** *Price per unit of housing services*

The B column under the unstandardized coefficients in Table 2 indicates the regression parameter estimates (slope). The B values represent the respective amount of % change in total housing expenditure per % change in household income and price of housing services respectively. The variance inflation factors of all estimates are less than 5 in magnitude indicating lack of multi-collinearity problem.

The unstandardized regression coefficients in table 2 and the equation can now be restated as follows:

$$LnR = 3.192 + 0.960LnY \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$(0.330) \quad (0.074)$$

$$t = \quad 9.662 \quad 12.915$$

The standard error of each estimated parameter is given in parenthesis just below the parameter, and the corresponding t – statistics appear below that.

Beginning by considering the household income, the standard error of 0.074 is small relative to the coefficient 0.960. In fact, we can be 95 percent certain that the true value of the log of income coefficient is 0.960 plus or minus 1.96 standard deviations (0.96 plus or minus (1.96) (0.074) = (0.96 +/- 0.145). This puts the true value the coefficient between 0.81 and 1.11. Because this estimate does not include zero, we can conclude that income is a significant determinant of housing demand.

The elasticity of demand for housing with respect to household income is positive and significant. A 1% rise in the household income will result in 0.96% increase in the demand for housing. This shows that as households' income increases the households look for more space hence demand for more housing. This now calls for more housing facilities by the Eldoret municipal council for the low-income group. This finding concurs with several previous findings notably those reported by, Morrizumi (1993), and Ihlanfeldt (1982) all of whom reported positive and inelastic income elasticity estimates for rental houses in Japan and low-income households in Korea respectively. Similar results were obtained by Mayo, (1981) who focused on demand for housing in developing nations.

The elasticity of demand for housing with respect to price per unit services of housing is negative and significant. A 1% rise in the price per unit services will result in 0.642% decrease in the demand for housing. This may be translated to mean that the low-income households in the study will reduce their spending on the demand for houses with high prices for their housing services. This can be attributed to the fact that the high cost of housing services will reduce their already low disposable incomes and their purchasing power, hence denying them the opportunity of meeting their immediate basic needs which they hardly fulfill in most occasions in addition to this most houses in the low-income areas lack sufficient housing services. The regression analysis results confirms the results of table 4.1 which shows that 69.6 % of the low-income households spend less than Ksh 399 per month on housing services. It is theoretically accepted that the price for a normal good is inversely related to its quantity demanded. Ingram, (1984) Horioka's (1988), and Ihlanfeldt (1982) concurred with this finding. They reported that demand for housing is not highly responsive to the price of housing services.

3) Income of the low-income households is the most significant determinant of housing demand in relation to the other determinants given that it has the highest elasticity of 0.960. This can be attributed to the fact that other housing expenditures such as price of housing services and transport cost including rent payment depend on households income levels.

Based on the research findings, we arrive at a number of conclusions; First, increase in income levels for the low-income groups will result into preference for more housing space hence increasing demand for housing. From the findings it can be concluded that demand for housing is positively responsive to income of the low-income households in Eldoret Municipality. Secondly increase in price for housing services by 1% would decrease housing demand by 0.642%. Higher price for housing services will reduce housing demand by a significantly high proportion because the purchasing power for the low-income households will be lowered by the high prices of services in terms of water and electricity consumption. From the study findings, it can be concluded that demand for housing is negatively responsive to price of housing services of the low-income households in Eldoret Municipality.

The study recommends that since income is the most significant determinant of housing demand for the low-income households in Eldoret Municipality,

there has to be a significant increase in income to bring about a significant change in housing demand through job creation and provision of incentives for income generation activities for the low-income groups by the Eldoret Municipal council.

It is suggested that future studies in this area should replicate the present study using time series data. This is because cross-sectional data provides us with information on the variables at a give point in time; in contrast, time series data will give us information on variables over time. There is also need to conduct a similar study among the middle and high-income households.

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