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Is Housing Gap a Consequence of Willingness and/or Eligibility to Mortgage Financing by Respondents in Uasin Gishu, Kenya?

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Abstract
Despite significance of mortgage financing, previous research indicated that at best only 3% of households in urban areas in Kenya were eligible for mortgage financing. The study sought to establish the role of socio-economic factors (income level, rental income and education level) on willingness or/and eligibility to mortgage financing. The study adopted explanatory research design. Target population was obtained in the records of all the 16 financial institutions licensed by Central Bank of Kenya offering mortgages in Uasin Gishu County. Purposive and convenience sampling was used in picking the 16 Financial Institutions and 749 respondents respectively. Structured questionnaires and a Double Hurdle Model were employed. Income level and rental income positively and negatively influenced willingness to participate in mortgage financing respectively. Income level and rental income significantly and positively influenced eligibility. The findings are important to the Uasin Gishu Government, financial institutions and other stakeholders in making appropriate policies.
Keywords: Mortgage financing, willingness, eligibility, double hurdle model, Uasin Gishu, Kenya

1.0 Introduction

The nature of housing in Kenya represents major investment requiring substantial capital outlay (Nabutola, 2004). In the majority of housing projects, the developer whether as a corporate or an individual has to borrow and hence the need for mortgage financing (Nabutola, 2004). According to Jared and David (2014) over 70 % of Kenyans financed construction and acquisition of their homes through personal savings, only 28 % of Kenyans financed homes and acquisition using bank loans, out of which only 6 % prefer mortgage financing. It is virtually every Kenyan's dream to own a home. But the reality is that very few of them were likely to be able to save enough to pay for one in cash.

Yamada (1999) observed that the smaller the income, the higher the proportion apportioned to rent payment and in Edwardian Britain, a third of income of the poor was expended on rent payment (Englander 1983). FinMark (2004) indicated that most existing commercially available mortgage products in Botswana required borrowers to have a minimum salary of US Dollars 650 and in some cases US Dollars 780 and consequently concluded that many of those employed in the formal sector did not qualify for conventional housing finance.

According to Russo *et al.,* 1986 noted that formal education may be important predictor of how loan applicants search for and obtain mortgages. Russo *et al.,* 1986 also found that consumers engaged in three activities when searching for a product or service in collection, computation, and comprehension. The last activity was dependent on the consumer's ability to process information, relative to other information, and used the information to make a decision.

Kenya has a large housing shortfall which is growing every year and is increasingly prevalent in urban areas. The current annual housing deficit is estimated at 156,000 units against current levels of construction of 50,000 per annum based on the population growth and urban migration taking place. The deficit is largely filled by the growth in slum dwellings and continued self-construction of poor quality traditional housing. Mortgages have a big role to play in filling this gap (World Bank, 2011). According to Ministry of Housing in Kenya (2011) 27,000 housing units are required annually in the Uasin Gishu County but only an estimated 4,500 units were being produced annually. Do socio-economic factors, that is, income level, rental income and education level influence willingness and eligibility to mortgage financing in Uasin Gishu County? Is willingness and eligibility decisions to mortgage financing by respondents are joint decisions or not in Uasin Gishu County? It is therefore critical to examine the soc-economic factors in order to establish their influence on willingness and eligibility to mortgage financing. This is with a view of bridging the disparity between the current production of housing units and the demand for the housing units in the County.

2.0 Data and Methodology

The population of the clients in the financial institutions offering mortgage financing were 807,687. Krejcie and Morgan (1970) formulae was used to obtain 749 being the sample size of the walk-in customers.

In this study, Double-Hurdle Model is used to analyze the respondent's mortgage financing. The Double-Hurdle Model, originally formulated by Cragg (1971), assumes that households must make two

decisions with regard to purchasing an item, each of which is determined by the same or different set of explanatory variables. For this study the former holds. The Double Hurdle Model can be specified as follows:

$y_{1i} = ax_{1i} + \mu_i$ ……..……..Participation decision…..….....…….....(2.1)

$y_{2i} = \beta x_{2i} + \nu_i$ ……Eligibility decision....…..….....…(2.2)

$y_i = \beta x_{2i} + \nu_i$ ……. $if \quad y_{1i} > 0 \quad y_{2i} > 0$ ..... (2.3)

$y_i = 0$ ……... $Otherwise$ ……..…..……..…. (2.4)

Where; y_{1i} , y_{2i} is a latent variable describing the respondent's willingness and eligibility to mortgage financing respectively, y_i is the observed dependent variable (mortgage financing), x_{1i} and x_{2i} is a set of respondent characteristics explaining the willingness and eligibility to mortgage financing decisions respectively and; μ_i and ν_i are independent, homoscedastic, normally distributed error terms.

3.0 Results and Discussions

Presentation and interpretation of the findings obtained from the field are discussed here under.

There were a total of 749 respondents during the study whereby the questionnaires were self-administered. The characteristics of the respondents that were income level, rental income and education level in relationship to willingness and eligibility to mortgage financing.

3.1 Normality Test

The results of normality tests using Anderson-Darling and Cramer-von-Mises are shown in Table 1.

Table 1: Results of normality test

Variable	Cramer-von-Mises		Anderson-Darling	
	Statistic	P – Value	Statistic	P – Value
Willingness	28.8432	0.000	149.8943	0.000
Eligibility	5.3371	0.000	34.1112	0.000
Income	2.9388	0.000	17.786	0.000
Rental Income	2.0108	0.000	10.6886	0.000
Education Level	9.7277	0.000	44.3675	0.000

Source: Author, 2015 using S – PLUS Statistical Software

The results showed that the modelled variables were normally distributed; p–values were 0.000 < 0.05 for all the variables under study. Therefore statistical inference was amenable to normal distribution processes.

3.2 Descriptive Statistics

Table 2: Summary Statistics of the Surveyed Respondents

Variable	Mean	Std Error	Minimum	Maximum
Willingness	0.6435	0.4793	0	1
Eligibility	1.3525	1.3188	0	8
Gender	0.5714	0.4956	0	1
Income level	42.5341	8.0568	30	60
Rental Income	23105.99	12202.2	1500	96000
Education level	12.2924	2.2831	5	17

Source: Author, 2015

The results showed that the mean age of the respondents was 42.53 years; while the minimum age was 30 years and maximum was 60 years as depicted in Table 3 below.

Table 3: Descriptive Statistics for Age per Gender of the Respondents

Gender	Mean	Frequency	Variance	SD
Female	43.28	321	71.20	8.44
Male	41.97	428	59.61	7.72
Total	42.53	749	64.91	8.06

Source: Author 2015

57% and 43% were men and women respectively an indication that men dominated willingness and eligibility decisions to mortgage financing in Uasin Gishu County. Male mortgagors were likely to have more access to capital and information through financial networks and contacts with financial sector than female.

3.3 Probit Regression Results for Willingness to Participate in Mortgage Financing

The natural logarithm of the willingness to participate in mortgage financing is modeled as a function of natural logarithm of various independent variables. The results from individual probit regression for willingness to participate in mortgage financing are reported in Table 4. The estimated binary probit regression results on willingness to participate in mortgage financing are discussed here under.

Table 4: Results of Individual Probit for willingness to participate in Mortgage Financing

Willingness to mortgage financing	Coefficient	Std. Error	Z Value	P > |Z|
Income Level (X_1)	0.6092 (*)	0.1125	5.42	0.000
Rental income (X_2)	-0.6632 (*)	0.1918	-3.46	0.001
Education level (X_3)	-0.1361	0.3328	-0.41	0.683
Intercept	-7.1030 (*)	1.9983	-3.55	0.000

Source: Author, 2015

(*) Indicates that the coefficient is statistically significant at 95% confident interval

Source: Author, 2015

Intercept coefficient was negative and significantly determined the willingness to participate in mortgage financing. The intercept coefficient is the parameter in an equation derived from a regression analysis corresponding to the expected value of the response variable when all the explanatory variables are zero (Everitt, 2002). From the above regression equation it was revealed that the intercept coefficient was negative 7.1030 meaning that income level, rental income and education level accounted for most of the determinants of willingness to participate in mortgage financing.

The results depicted that income level and rental income coefficients had significant effect on willingness to participate in mortgage financing. Income level coefficient had positive responsiveness, p - value 0.005 < 0.05) indicating that one unit increase in income level coefficient would lead to an increase in willingness to participate in mortgage financing by 0.6092. Rental income coefficient had a negative responsiveness meaning that an increase in one unit of rental income would lead to a decrease by 0.6632 in the willingness to participate in mortgage financing.

Table 5: Results of joint significance test for willingness to participate in Mortgage Financing

Joint Hypothesis	χ^2	Prob > χ^2	Remarks
$X_1 = X_2 = X_3$	35.99	0.0000	Reject Null

Source: Author, 2015

Income level, rental income and education level jointly had a significant effect on willingness to mortgage financing.

Therefore based on these results the first hypothesis stating that there is no significant relationship between any of the socio-economic factors that is, income, rental income and education level on willingness to mortgage financing by respondents in Uasin Gishu County was rejected. Yamada (1999) observed that the smaller the income, the higher the proportion apportioned to rent payment and in Edwardian Britain, a third of income of the poor was expended on rent payment (Englander 1983).

3.4 Probit Regression Results on Eligibility to Mortgage Financing

The natural logarithm of the eligibility to mortgage financing is modeled as a function of natural logarithm of various independent variables. The regression results for individual Probit for eligibility to mortgage financing are reported in Table 6.

Table 6: The results from individual probit regression for eligibility to Mortgage Financing

Willingness to mortgage financing	Coefficient	Std. Error	Z Value	P > |Z|
Income Level (X_1)	0.3607 (*)	0.1159	3.11	0.002
Rental Income (X_2)	0.3676 (*)	0.1826	2.01	0.044
Education level (X_3)	-0.3771	0.3353	-1.12	0.261
Intercept	7.7288 (*)	1.9410	3.98	0.000

Source: Author, 2015

(*) Indicates that the coefficient is statistically significant at 95% confident interval.

Intercept coefficient had a positive responsiveness and significantly determined the eligibility to mortgage financing. Holding income level, rental income and education level to a constant zero; the intercept coefficient was positive 7.7288 meaning there are other determinants not included in the study that could account for eligibility to mortgage financing. The results showed that income level and rental income coefficients positively significantly determined the eligibility to mortgage financing, p – value 0.000 < 0.05. One unit increase in the coefficient of income level and rental income would lead to an increase in eligibility to mortgage financing by 0.3607 and 0.3676 respectively. The results of joint significant test for eligibility are shown in Table 7.

Table 7: Results of joint significance test for eligibility to mortgage financing

Joint Hypothesis	χ^2	Prob > χ^2	Remarks
$X_1 = X_2 = X_3$	16.01	0.0011	Reject Null

Source: Author, 2015

The joint significance test $X_1 = X_2 = X_3$ showed that income level, rental income and education level coefficients jointly determined eligibility to mortgage financing, p – value 0.0011 < 0.05. Therefore based on these findings the second hypothesis was rejected. Alder and Mutero (2007) observed that only a small proportion of urban households estimated to be less than 10 percent have traditionally qualified for mortgage loans from housing finance institutions, with the majority ruled out by their low incomes. Kiyotaki et al., 2008 noted that amount of rent paid determined the homeownership status of the household whether tenant or homeowner.

4.0 Bi-probit Regression Results

The results of bi-probit regression for willingness and eligibility to participate in mortgage financing are reported in Table 8.

Table 8: Regression Results for Bi-Probit Willingness and Eligibility to Mortgage Financing

First Hurdle Willingness	Coefficient	Std. Error	Z Value	P > |Z|
Income of the respondent	0.6085 (*)	0.1125	5.41	0.000
Rental income of the respondent	-0.6623 (*)	0.1918	-3.45	0.001
Education level of the respondent	-0.1363	0.3328	-0.41	0.682
Intercept	-7.0998 (*)	1.9974	-3.55	0.000
Second Hurdle Eligibility				
Income of the respondent	0.3604 (*)	0.1158	3.11	0.002
Rental income of the respondent	0.3668 (*)	0.1825	2.01	0.044
Education level of the respondent	-0.3769	0.3351	-1.12	0.261
Intercept	7.7325 (*)	1.9405	3.98*	0.000
/athrho	0.0227	0.0686	0.33	0.741
Rho	0.0227	0.0686		

Source: Author, 2015

(*) Indicates that the coefficient is statistically significant at 95% confident interval

Fitting of comparison equation one reached convergence after 0 – 4 iterations with log likelihood of -418.0972. Fitting of comparison equation two reached convergence after 0 – 3 iterations with log likelihood of -409.3013. Fitting of full model reached convergence after 0 – 2 iterations with log likelihood of -827.34398. These results were consistent with survey studies according to Cameron and Trivedi (2005) and Cameron and Trivedi (2009). The Wald statistics was 246.05 with prob > 0.0000. Therefore the modelled variables fitted the model very well. The overall log likelihood was -827.3985 which large and negative as it was expected as per Park (2009).

The study sought to determine if willingness to participate in mortgage financing and eligibility to mortgage financing were independent decisions. The results from bi-probit regression showed that arthro and rho had p – value 0.741 > 0.05. This showed that willingness to participate in mortgage financing and eligibility to mortgage financing were independent decisions. The third hypothesis was accepted. This result could guide the policy makers in relation to mortgage financing.

5.0 Conclusion

From the data collected and analysed, it can be concluded that in Uasin Gishu County, income level significantly

and positively influenced willingness and eligibility to mortgage financing. Rental income coefficient influenced negatively willingness to participate in mortgage financing but positively influenced eligibility to mortgage financing. The results showed that willingness to participate in mortgage financing and eligibility to mortgage financing were independent decisions.

The Government, financial institutions and other stakeholders should develop programs and products which can encourage respondents to participate in mortgage financing upon having rental income and consequently become eligible to mortgage financing in order to reduce the housing disparity in Uasin Gishu County.

References

Alder, G. and Mutero, J. (2007). Housing Micro-finance in Kenya, background paper for meeting of the Rockefeller Foundation Global Urban Summit.

Cameron, A., Colin, and Pravin K. Trivedi. (2005). *Microeconometrics: Methods and Applications*. New York: Cambridge University Press.

Cameron, A., Colin, and Pravin K. Trivedi, (2009). *Microeconometrics Using Stata*. TX: Stata Press.

Cragg J., (1971): Some statistical models for limited dependent variables: The Double Hurdle Model. *Econometrica*39, 829-844.

Englander, D. (1983) - *Landlord and Tenant in Urban Britain 1838-1918,* Oxford University: Claredon Press.

Everitt B. S. (2002). The Cambridge Dictionary of Statistics Second Edition Cambridge University Press

FinMark Trust (2004) www.finmark.org.za,, FinScope™ Botswana 2004 www.finscope.co.za

Jared O. and David M., (2014), Housing Price Index, Conceptual Framework

Kiyotaki, N., Michaelides, A., and Nikolov, K., (2008). Winners and Losers in Housing Markets. Unpublished manuscript. London School of Economics.

Krejcie, R.V., and Morgan, D.W., 1970. Determining sample size for research activities. Educational and psychological measurement. 30. p. 607-610.

Ministry of Housing in Kenya (2011). Ministry of Housing,Strategic Plan: 2008-2013, Nairobi, Government of Kenya.

Nabutola, Wafula (2004). *Affordable Housing –Some experiences from Kenya.* FIG Working Week 2004, Athens Greece

Park, Hun Myoung, (2009). *Regression Models for Binary Dependent Variables Using Stata, SAS, R, LIMDEP, and SPSS*. Working Paper. The University Information Technology

Services (UITS) Center for Statistical and Mathematical Computing, Indiana University."

http://www.indiana.edu/~statmath/stat/all/cdvm/index.html

Russo, J. E., Staelin, R., Nolan, C. A., Russell, G. J., and Metcalf, B. L. (1986). Nutrition information in the supermarket. *The Journal of Consumer Research*,13(1),48–70

World Bank, (2011). *Developing Kenya's Mortgage Market. Report No. 63391-KE*.

Yamada, Y., (1999) – Affordability Crisis in Housing in Britain and Japan, *Housing Studies January 1999 Vol. 14 Issue 1 pp 99-110.*